ORIGINAL RESEARCH

Medication adherence of patients with chronic diseases: a study in the Black Sea region of Turkey

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Abstract
Chronic diseases are among the most common causes of morbidity and mortality in the world. Chronic diseases can be controlled and their frequencies can be reduced through fight against risk factors such as obesity, smoking, and insufficient physical exercise; early diagnosis, and appropriate treatment. In this study, we aim to assess the medication adherence of individuals with chronic diseases. In this descriptive study, the sample includes individuals who have been diagnosed with chronic diseases and who have applied to a public hospital. The data collection is performed with a questionnaire form with questions on socio-demographic features and on the chronic illness, and with the Morisky Medication Adherence Scale-8. 68% of the patients who participated in the study were female and 32% of them were male. It has been found that 51.4% of the patients (5.35±2.5) had low medication adherence. For those patients who have stated that they got information regarding the treatment and who had high levels of belief that the treatment could help them control the disease, the medication adherence score was significantly higher (p<0.05). Informing the patients about the characteristics of the treatment, the medications, and the effects of the treatment on the disease increases the medication adherence of the individuals with chronic diseases.

Keywords: Chronic disease, medication treatment, medication adherence

Introduction

Chronic diseases are prevalent in all societies and they are ranked as the first among the causes of morbidity and mortality [1]. Cardio-vascular diseases, cancers, chronic-obstructive pulmonary disease (COPD), and diabetes mellitus are the most common non-communicable diseases [2].

According to the disease burden study dated 2013 in Turkey, the disease burdens of non-communicable diseases such as ischemic heart disease, back and neck pain, diabetes, and mental problems are increasing [3]. It is stated that the most important factors leading to non-communicable diseases include obesity, physical inactivity, and (active and passive) smoking [3,4]. Obesity is one of the increasingly common health problems and is the most important risk factor causing non-communicable diseases. The obesity prevalence has been doubled between the years of 1980 and 2008. In the Europe region of World Health Organization (WHO), more than 50% of men and women are overweight, and 23% of the women and 20% of the men are obese [4]. In a study conducted on female factory workers, it is found that 35.6% of the workers are overweight or obese [5]. The increase in the risk factors increases the prevalence of the chronic diseases and makes it difficult to control these diseases.

During the fight against the risk factors of non-communicable disease, prevention and control of the diseases can be achieved through early diagnosis and medication treatment [2]. The increase in the non-adherence to medications and the related negative outcomes such as increased costs of patient case have increased the research attention on medication adherence [6]. Medication adherence is commonly defined as the degree of patients' acting in accordance with the dose and interval of the medications as prescribed [7-9].

According to WHO's related data of 2003, the long-term medication adherence in chronic diseases is about 50% in developed countries and it is lower in developing countries [10]. During disease treatment; taking medications regularly and compliance with the medical recommendations are crucial for the success of the treatment and are also of great importance for the patients [11,12]. Non-adherence to medication comes in many forms including not using the prescribed medications or using them irregularly, using non-prescribed medications, missing appointments, not participating the control sessions and similar acts [13].

It is pointed in the literature that insufficient adherence to therapies lead to negative health outcomes and increases in patient care costs [9].

There are many factors affecting the medication adherence of individuals. Age, gender, personality traits, socio-economical level, mental capacity, the characteristics of the disease, and health care system are some of these factors. Previous non-adherence

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to medications is one of the important indicators of later non-adherence. In order to improve the medication adherence of the patients, there factors should be examined and related problems should be solved [9,14].

In this study, we aim to assess the medication adherence of individuals with chronic diseases and related factors.

Material and Methods

This descriptive study has been conducted at a governmental hospital in Giresun (Turkey). The sample of the study comprises 350 patients who have at least one chronic disease and who have applied to the hospital between 1 June 2015 and 1 July 2015. In order to conduct the study, necessary permissions have been obtained from the General Secretariat of Public Hospitals. Informed consents have been obtained from the participating patients and the study conforms to the universal ethical principles. The patients, who are diagnosed with chronic diseases and who need to constantly take medications, are included in the scope of the study. The data has been collected from the patients using a questionnaire form with questions on socio-demographic characteristics, chronic diseases and medication use, in addition to the Morisky Medication Adherence Scale-8 (MMAS-8) [15]. The reliability and validation study for the Turkish version of MMAS-8 has been carried out for asthma and COPD [16]. MMAS-8 contains

a total of 8 items which aim to reveal the medication-related acts of the patients based on their self-statements [15]. MMAS-8's first 7 items are yes/no questions and the 8th item is a Likert-type 5-point response scale. For this scale, a total of 8 points denote full medication adherence, a score between 8 and 6 (inclusive) denotes average adherence, and finally a total score less than 6 denotes low medication adherence [15]. We have tested the fitness of the data to normal distribution using the Kolmogorov-Smirnov test. During the analysis of the data; frequency, percentage, Chi-square test, independent samples t-test have been used. Chi-square test has been used for the comparison of qualitative data and independent samples t-test has been used for the comparison of the means of two independent groups. Statistical significance level is taken as 0.05 in this study.

Results

The socio-economical characteristics of the participating patients are presented in Table 1. The mean age of the patients is 60.06±16.0. About 58.4% of the patients have ages from the interval of 25-64. The education levels of 83.6% of the women and 61.6% of the men are primary school or lower. 82.6% of the participating patients are married and 89.4% of the patients are living with their families. 22.9% of the women and 30.4% of the men are smokers. 89.7% of the patients have indicated they do not do regular physical exercise.

Table 1. The Socio-Demographic Characteristics of the Patients

Characteristics	Female		Male		Total	
	N 238	% 68.0	N 112	% 32.0	N 350	% 100.0
Age						
15-24	11	4.6	4	3.6	15	4.3
25-64	139	58.4	57	51.4	196	56.2
65 and ↑	88	37.0	50	45.0	138	39.5
Education						
Primary School or lower	199	83.6	69	61.6	268	76.6
Secondary School	14	5.9	11	9.8	25	7.1
High School	14	5.9	20	17.9	34	9.7
University	11	4.6	12	10.7	23	6.6
Marital Status						
Married	192	80.7	97	86.6	289	82.6
Single	46	19.3	15	13.4	61	17.4
Place of Residence						
City	57	24.1	33	29.5	90	25.8
Town	102	43.0	51	45.5	153	43.8
Village	78	32.9	28	25.0	106	30.4
Smoking						
Yes	28	11.9	34	30.4	62	17.8
No	208	88.1	78	69.6	286	82.2
Regular Physical Exercise						
Yes	18	7.6	18	16.1	36	10.3
No	218	92.4	94	83.9	312	89.7

Some participants did not respond to some questions, therefore, the total counts may not be the same for all questions

Table 2 presents information about the chronic diseases and medication use characteristics of the patients. 52% of the patients participating in the study have hypertension, 32.6% of them have type II diabetes mellitus, 19.5% of them have heart disease, 8.6% of the patients have kidney disease, and 7.1% of them have respiratory system disease. 40.1% of the patients have indicated that they have the chronic diseases for 5 years or less while 9.4% of them have disease durations of 21 years or more. 19.9% of the patients have stated that they do not take their medications regularly and 33.7% of the patients have indicated that they have problems during the medication use. 35.9% of the patients have stated that they did not receive information regarding the medications and 41.6% of them have stated that they had been hospitalized due to their diseases. No significant difference in medication use has been observed between genders (p>0.05). It has been found that female patients have more problems during medication use compared to the male patients and the difference in between is statistically significant (p<0.05). It has been also observed that the patients who do not smoke take their medications more regularly compared to the patients who smoke and the difference is statistically significant (p<0.01). It has been determined that the patients who have taken information regarding the medications take their medications regularly when compared to the ones who have not taken medication information and the corresponding difference is statistically significant (p<0.01).

Table 2. Chronic Illnesses and Medication Use Characteristics of the Patients

Characteristics	Female		Male		Total	
	N 238	% 68.0	N 112	% 32.0	N 350	% 100.0
Chronic diseases						
Hypertension	126	52.9	56	50.0	182	52.0
Diabetes mellitus	77	32.4	37	33.0	114	32.6
Heart disease	44	18.6	24	21.4	68	19.5
Neural disease	18	7.8	3	2.7	21	6.1
Cancer	17	7.3	5	4.6	22	6.5
Respiratory system disease	15	6.3	10	8.9	25	7.1
Kidney disease	14	5.9	16	14.3	30	8.6
Duration						
0-5 years	100	42.9	37	33.9	137	40.1
6-10 years	58	24.9	33	30.3	91	26.6
11-15 years	31	13.3	15	13.8	46	13.5
16-20 years	31	9.0	15	13.8	36	10.5
21 years or ↑	23	9.9	9	8.3	32	9.4
Are you taking your medications regularly?						
Yes	188	80.0	90	80.4	278	80.1
No	47	20.0	22	19.6	69	19.9
Do you have problems when taking medications?						
Yes	88	37.4	29	25.9	117	33.7
No	147	62.6	83	74.1	230	66.3
Did you get information regarding the medications?						
Yes	151	65.1	69	62.2	220	64.1
No	81	34.9	42	37.8	123	35.9
Have you been hospitalized due to this disease?						
Yes	79	34.2	63	57.3	142	41.6
No	152	65.8	47	42.7	199	58.4

Some participants did not respond to some questions, therefore, the total counts may not be the same for all questions.

Table 3 summarizes the medication adherence of the patients and related factors. The medication adherence score of the participating patients is 5.35±2.5. No significant relationship has been observed between age and medication adherence (p>0.05). The adherence scores of the patients who have indicated that they take the medications regularly, who do not have problems when taking medications and who have stated that they got information about the medications have significantly higher scores (p<0.05). The medication adherence scores of the patients who believe that the medications will help control the diseases have also been significantly higher (p<0.05).

Table 3. Medication Adherence of the Patients

Characteristics	Low adherence		Average adherence		Full adherence		
	N	%	N	%	N	%	p
Age							
<65	81	59.1	14	50.0	96	65.3	0.250
>65	56	40.1	14	50.0	51	34.7	
Gender							
Female	127	70.6	26	65.0	72	66.7	0.068
Male	53	29.4	14	35.0	36	33.3	
Got information about the medications							
Yes	97	54.5	30	78.9	81	75.7	
No	81	845.5	8	21.1	26	24.3	0.001
The belief that the treatment can control the disease							
I do not think so	51	29.1	7	17.9	11	10.6	
I think so	124	70.9	32	82.9	93	89.4	0.001

Discussion

Together with the increase in the expected lifespan of people, the frequency of chronic diseases and the number of individuals having long-term medication treatment increase too. The factors affecting the medication adherence of old patients include race, medication type and dosage, number of medications, cost of medication, scope of the insurance, and physician-patient interrelationships [17].

52% of the patients participating in our study have hypertension, 32.6% of them have type II diabetes mellitus, and 19.5% of them have heart diseases. Insufficient treatment of chronic diseases has serious adverse effects and other related complications on the patient health. For instance; insufficient treatment of diabetes leads to micro and macro complications, not controlling hypertension leads to cardiovascular diseases and decreases in the life quality [18].

19.9% of the patients participating in the study have indicated that they do not take their medications regularly, 33.7% of them have indicated they experience problems during medication use. Accordingly, almost one fifth of the patients do not use their medications regularly and almost one third of the patients have problems during medication use. According to a study by Gatti et al., the reasons for low medication adherence include being young and negative beliefs regarding medications [19].

The medication adherence score of the participating patients has been determined to be 5.35±2.5 (51.4%) which corresponds to low adherence level. In the study by Gatti et al., the medication adherence levels of almost half of the participants (52.7%) were found to be low [19]. In a study by Gün et al. on the medication adherence and quality of life of the patients with hypertension, the percentage of full medication adherence was found to be 15.8% [20]. In a study by Küçük et al. on patients with type II diabetes, it was determined that the medication adherence score of the patients is 5.4± 2.2 and hence the medication adherence was low [21]. The findings of this latter study are similar to our findings. In the study by Reynolds et al. on the medication adherence of

osteoporosis patients at the postmenopausal period, it was found that the medication adherence of 30.7% of the patients is low [22]. Medication adherence problems increases the cases of hospitalization, morbidity, and mortality. Hospitalization cases lead to familial and workplace-related problems in addition to further decreasing the patient's quality of life [23,24].

The medication adherence scores are significantly higher for those patients who have stated that they take their medications regularly and that they do not have problems when using the medications. The adherence scores are also found to be significantly higher for the patients who have stated that they were given information about the medications and who think that the medications can control the diseases. It is pointed out in the related literature that the patients' beliefs about the physician-patient relationship is one of the key factors affecting the medication adherence and the physicians should accordingly treat the patients as equals and try to get the ideas of the patients during the decision-making process [25].

In a study conducted by Virgolesi et al. on psychiatry patients, the adherence of the patients to the treatment plan was achieved through trainings given by nurses which had increased the disease management capabilities of the patients [26].

According to the related 2012 data, about 7.4 million deaths were due to heart attacks, 6.7 million of them were due to strokes, and a total of 17.5 million deaths (including the previous two rates) were due to cardiovascular diseases [27-29]. It is stated in the literature that such cases could be reduced by improving the coverage of medication treatment and counselling [27-29]. In another related study, it was pointed out that high medication adherence was interrelated with low medical costs, for diabetes and hypercholesterolemia [30].

As medications are important technological products for the prevention of and fight against diseases on the individual and social scales, they should be used in intelligent ways also considering the concerns of public health and health economics [31].

Conclusion

In this study, it is determined that the medication adherence scores of the patients with chronic diseases are low. While no significant difference in medication adherence is observed with respect to age and gender, the corresponding scores are significantly higher for those patients who got information about the medications, who take their medications regularly, and who believe that they will be recovered with the treatment.

Acknowledgements

References

1. World Health Organization, "Global Status Report on Non-communicable Diseases", 2014, http://apps.who.int/iris/ bitstream/10665/148114/1/9789241564854_eng.pdf, accessed date: 15.03.2017

2. Türkiye Kalp ve Damar Hastalıkları Önleme ve Kontrol Programı ("Turkish Cardiovascular Disease Prevention and Control Program") 2015-2020, T.C. Sağlık Bakanlığı ('Republic of Turkey Ministry of Health'), Ankara, Turkey, 2015.

3. Ulusal Hastalık Yükü Çalışması ("National Disease Burden Study"), 2013, http://www.hips.hacettepe.edu.tr/UHYCSunumu_06122016.pdf

4. World Health Organization, "Overweight and obesity", http://www.who. int/gho/ncd/risk_factors/ overweight/en/, accessed date: 15.03.2017

5. Küçük E. Health perception and healthy lifestyle behaviors of female factory workers. Arch Environ Occup Health. 2016;71(4):216-21.

6. Osterberg L, Blaschke T. Adherence to medication. New England Journal of Medicine. 2005;353(5):487-97.

7. Cramer JA, Roy A, Burrell A, Fairchild CJ, Fuldeore MJ, Ollendorf DA, Wong PK. Medication compliance and persistence: terminology and definitions. Value in Health. 2008;11(1):44-7.

8. Meichenbaum D, Turk DC. Facilitating Treatment Adherence: A Practitioner's Guidebook. New York, NY: Plenum Press; 1987.

9. Cramer JA, Roy A, Burrell A, Fairchild CJ, Fuldeore MJ, Ollendorf DA, Wong PK. Medication compliance and persistence: terminology and definitions. Value Health. 2008;11(1):44-47.

10. World Health Organization, "Adherence to Long-Term Therapies", http:// apps.who.int/ medicinedocs/en/d/Js4883e/, accessed date: 15.03.2017

11. Çakır F, İlnem C, Yener F. Kronik psikotik hastalarda taburculuk sonrası takip ve tedaviye uyum. Düşünen Adam Psikiyatri ve Nörolojik Bilimler Dergisi. 2010;23:50-9.

12. Aker T, Üstünsoy S, Kuğu, N, Yazıcı A. Psikotik bozukluğu olan hastalarda tedaviye uyum ve ilaç tedavisine uyumsuzluğu değerlendirme. Düşünen Adam. 2003;16:211-8.

13. Docherty JP, Fiester SJ. The therapeutic alliance and compliance with psychopharmacology. Review of Psychiatry. In: American Psychiatric Association (editor). Psychiatry update. Washington DC: American Psychiatric Press. 1985;607-632.

14. Kelly M, McCarthy S, Sahm LJ. Knowledge, attitudes and beliefs of patients and carers regarding medication adherence: a review of qualitative literature. Eur J Clin Pharmacol. 2014;70(12):1423-31.

15. Morisky DE, Ang A, Krousel-Wood M, Ward HJ. Predictive validity of a medication adherence measure in an outpatient setting. J Clin Hypertens. 2008;10(5):348-54

16. Oğuzülgen İK, Köktürk N, Işıkdoğan Z. Astım ve kronik obstrüktif akciğer hastalarında Morisky 8-maddeli ilaca uyum anketinin (MMAS-8) Türkçe geçerliliğinin kanıtlanması çalışması. Tuberk Toraks. 2014;62(2):101-7.

17. Balkrishnan R. Predictors of medication adherence in the elderly. Clin Ther. 1998;20(4):764-71.

18. Yeaw J, Benner J, Walt S, Smith D. Comparing adherence and persistence across 6 chronic medication classes. J Manag Care Pharm. 2009;15(9):728-40.

19. Gatti ME, Jacobson KL, Gazmararian JA, Schmotzer B, Kripalani S., Relationships between beliefs about medications and adherence, Am J Health Syst Pharm. 2009;66(7):657-64.

20. Gün Y, Korkmaz M, Hipertansif hastaların tedavi uyumu ve yaşam kalitesi, DEUHYO ED. 2014;7(2):98-108.

21. Küçük E, Yapar K. Tip II diyabetli hastalarda sağlık algısı, sağlıkla ilgili davranışlar ve ilaç tedavisine uyum: Türkiye'nin Karadeniz Bölgesi'nde bir çalışma. TAF Preventive Medicine Bulletin. 2016;15(4):285-92.

22. Reynolds K, Viswanathan HN, O'Malley CD, Muntner P, Harrison TN, Cheetham TC, Hsu JW, Gold DT, Silverman S, Grauer A, Morisky DE. Psychometric properties of the Osteoporosis-specific Morisky Medication Adherence Scale in postmenopausal women with osteoporosis newly treated with bisphosphonates. Ann Pharmacother. 2012;46(5):659-70.

23. Misdrahi D, Llorca PM, Lancon C, Bayle FJ., Compliance in schizophrenia: predictive factors, therapeutic considerations and research implications. L'Encephale. 2002;28:266-72.

24. Demirkol ME, Tamam L. Psikiyatrik bozukluklarda tedavi uyumu. Psikiyatride Güncel Yaklaşımlar. 2016;8(1):85-93.

25. Stavropoulou C. Non-adherence to medication and doctor-patient relationship: Evidence from a European survey. Patient Educ Couns. 2011;83(1):7-13.

26. Virgolesi M, Pucciarelli G, Colantoni AM, D'Andrea F, Di Donato B, Giorgi F, Landi L, Salustri E, Turci C, Proietti MG. The effectiveness of a nursing discharge program to improve adherence's medication and the satisfaction of patients in the PICU. J Clin Nurs. Published Online: 23 February 2017.

27. World Health Organization. "Global Health Estimates: Deaths by Cause, Age, Sex and Country, 2000-2012", Geneva, WHO, 2014.

28. World Health Organization, "Package of essential noncommunicable (PEN) disease interventions for primary health care in low-resource settings", http://whqlibdoc.who.int/publications/ 2010/9789241598996_ eng.pdf, accessed date: 15.03.2017

29. World Health Organization, "Scaling up action against noncommunicable diseases: how much will it cost?" http://whqlibdoc.who.int/ publications/2011/9789241502313_eng.pdf, accessed date: 15.03.2017

30. Sokol MC, McGuigan KA, Verbrugge RR, Ebstein RS. Impact of medication adherence on hospitalization risk and healthcare cost. Med Care. 2005;43:521-30.

31. Passmore PR, Kailis SG. In pursuit of rational drug use and effective drug management: clinical and public health pharmacy viewpoint. Asia Pac J Public Health. 1994;7(4):236-41.