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Effect of NIC Interventions to Older Adult on Behaviour Regarding Drug Use and Drug Response: Quasi-experimental Study

Yaşlı Yetişkinlere Yapılan NIC Müdahalelerinin İlaç Kullanımı ve İlaç Tepkilerine İlişkin Davranışlar Üzerindeki Etkisi: Yarı Deneysel Çalışma

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ABSTRACT

Aim: This study aims to investigate the effect of 'teaching: prescribed medication' NIC on drug use behaviors and 'medication response' NOC outputs of older people.

Material and Method: This study was designed with a quasi-experimental form. The Patient Information Form, Questionnaire of Elderly Drug Use Behaviours, and 'Medication Response' NOC Scale were applied to older adults who were admitted to Internal Medicine Clinic and complied with the research criteria. After applying the forms, 'teaching: prescribed medication' NIC interventions were applied to each of the older adults.

Results: After the 'teaching: prescribed medication' NIC intervention was applied to the older adults, the drug adherence behavior and patient outputs after drug use changed positively ($p<0.05$).

Conclusion: After the 'teaching prescribed medication' NIC nursing interventions, some improvements occurred in the behavior of older adults regarding drug use and the changes expected after drug use. Nurses can make accurate decisions about health care for older adults and provide this health care effectively and objectively by measuring the seriousness of the problem with NOC and applying comprehensive nursing interventions with NIC in organizations providing health services to older adults.

Keywords: NOC terminology, NIC terminology, Older adult, Drug interaction

ÖZET

Amaç: Bu çalışmanın amacı, 'öğretme: reçete edilen ilaç' NIC'inin yaşlı yetkinlerin ilaç kullanımına ilişkin davranışlarına ve 'ilaca tepki' NOC çıktıları üzerindeki etkisini araştırmaktır.

Gereç ve Yöntem: Bu çalışma yarı deneysel tasarımda olup, İç Hastalıkları Kliniği'ne başvuran ve araştırma kriterlerine uyan yaşlı erişkinlere Hasta Bilgi Formu, Yaşlı İlaç Kullanım Davranışları Ölçeği ve "İlaç Yanıt" NOC Ölçeği uygulandı. Formları uyguladıktan sonra, yaşlı yetişkinlerin her birine 'öğretme: reçeteli ilaç' NIC müdahaleleri uygulanmıştır.

Bulgular: Yaşlı yetişkinlere uygulanan 'öğretme: reçete edilen ilaç' NIC girişimi sonrası ilaç uyum davranışları ve ilaç cevabı ile ilgili hasta çıktıları olumlu yönde değişmiştir ($p<0.05$).

Sonuç: "Öğretme: reçete edilen ilaç" NIC hemşirelik hemşirelik girişimleri sonrasında yaşlıların ilaç kullanımına yönelik davranışlarında ve ilaç kullanım sonrası beklenen değişimlerde iyileşmeler gerçekleşmiştir. Hemşireler, yaşlı yetişkinlere sağlık hizmeti sunan kuruluşlarda NOC ile sorunun ciddiyetini ölçerek ve NIC ile kapsamlı hemşirelik girişimleri uygulayarak yaşlı yetkinlere sağlık bakımı sunma konusunda doğru kararlar verebilir ve bu sağlık bakımını etkin ve objektif bir şekilde sağlayabilir.

Anahtar Kelimeler: NOC terminolojisi, NIC terminolojisi, Yaşlı yetişkin, İlaç etkileşimi

INTRODUCTION

With the development of technology and the increase of quality in health services, life expectancy at birth has increased throughout the world. In projections of the World Health Organization (WHO) for the year 2050, one in 5 people will be older than 60 years (WHO, 2015). With the aging process, physiological, psychological, and mental changes occur and many chronic and metabolic diseases emerge. The increase in chronic diseases leads to the use of multiple drugs in older adults (Jankowska-Polańska et al., 2020).

In a systematic compilation of studies about drug use by older adults living in nursing homes, the number of drugs prescribed to one person was determined to average 9.1 (Patterson et al., 2014). Inappropriate and unaware multiple drug use behaviors decrease quality of life and increase drug-related morbidity and mortality risks. At the same time, many drug-drug interactions can be seen as a result of multiple drug use. Moreover, the changes appearing in metabolism and drug excretion with age increase the side-effect risk (Teichert et al. 2013). In this sense, the WHO emphasized the importance of rational use of drugs in multiple drug use. In a report about the improvement of rational drug use published in 2011, the WHO recommended the development of rational drug use education programs for society, the insertion of courses about rational drug use into the high school curriculum to improve relevant information and skills of health care professionals and raising awareness about the subject among people using drugs to prevent drug interactions (WHO, 2011).

Due to chronic diseases, ensuring adherence to treatment in individuals using multiple drugs is the most important component of rational drug use (Morin, Laroche, Texier, & Johnell, 2016). Nurses play a big role in ensuring the adherence of older adults to drug use and treatment (van Loon-van Gaalen, van Winsen, van der Linden, Gussekloo, & van der Mast, 2021). In a study conducted by Griffiths, Johnson, Piper, & Langdon (2004) about multiple drug use in older adults, older adult's knowledge about accurate drug use and drug effects increased after they were trained in multiple drug use management by nurses (Griffiths et al. 2004). In addition to this, Cochrane research revealed that nurses who are trained in primary care health service can provide higher-quality health care, ensure better health

results and achieve higher patient satisfaction levels compared to doctors (Laurant et al., 2018). Nurses are in a good position to promote health, coordinate health care and provide self-management support (Van Camp, Van Rompaey, & Elsevier, 2013). On the other hand, drug management interventions are generally executed by physicians and pharmacists. Nurses represent an avoided and underutilized force in this field at this moment (Van Camp et al., 2013). NIC (Nursing Intervention Classifications) interventions make this invisible force visible that is missed in drug management. Because NIC interventions are a system in which all nursing interventions take place in a comprehensive way after scientific studies and using guides (Bulechek, Butcher, Dochterman, & Wagner, 2017).

Though there are many studies aimed to determine the behaviors of older adults regarding drug use in the literature, studies researching the effectiveness of phone tracking, providing education and consultancy or nursing applications through house visits regarding the adherence to multiple drug use and rational drug management are limited in number (van Loon-van Gaalen et al. 2021; Visco et al., 2018; Arain, Ahmad, Chiu, & Kembel, 2021). Despite affecting medicine management and knowledge in older adults, these nursing interventions, tracking, education, and consultancy through house visits and education and consultancy in hospitals are not standard and comprehensive. The assessment of medicine use according to all of the diseases of older adults, the assessment of all physical, psychological, sociocultural, and economic factors that affect medicine use, and the application of interventions related to these play a big role in managing behavior regarding multiple medicine use (Suhonen, Välimäki, & Leino-Kilpi, 2008). The application of international and standard nursing interventions leads to both a comprehensive assessment and personalized nursing care in older adults who have more than one chronic disease (Bulechek, Butcher, Dochterman, & Wagner, 2017). The NOC (Nursing Outcome Classification), is used in the determination of nursing goals and evaluation of intervention results; NIC, is used in nursing interventions aimed at achieving goals and solving patients' problems. Therefore, the implementation of interventions with the NIC classification system to ensure drug management of the elderly with chronic diseases who use multiple drugs, and

measuring the effectiveness of interventions with the NOC system will make it possible to provide objective and comprehensive care. Because 'Teaching: Prescribed Medication' NIC is prepared within the scope of the literature and used in nursing care internationally. At the same time, 'Medication Response' NOC is used in nursing care at an international level in the evaluation of drug management behaviors. (Bulechek, Butcher, Dochterman, & Wagner, 2017; Moorhead, Swanson, Johnson, & Maas, 2018).

In a study in which Haugsdal & Scherb (2003) retrospectively researched international and standard NIC interventions applied to patients, 120 NIC interventions were also applied along with 'teaching: prescribed medication' NIC interventions. However, no study was found in the literature where the effectiveness of these interventions was assessed with an international and standard scaling instrument (Haugsdal & Scherb, 2003). In this sense, the application of standard nursing interventions to older adults using multiple medicines was assessed with standard assessment tools in this study. In this context, the NIC system, which classifies nursing interventions internationally, and the NOC system, which assessed the effectiveness of these interventions, were used.

Among the 'Teaching: Prescribed Medication' NIC interventions in the NIC system, interventions are included such as determining the name of the patient's medicine, its purpose, usage and dose, effects and side effects, and things to do before using the medicine along with informing the patient about the specific measures they should take before using the drug (Bulechek et al., 2017). With therapeutic effects, changes in blood chemistry and symptoms, behavior, maintenance of expected blood levels, allergic reactions, adverse effects, medication interactions, medication intolerance, and adverse behavioral effect indicators are assessed in the 'Medication Response' NOC scale, ensuring the client's response to the drug, its interactions, and side effects are assessed (Moorhead, Swanson, Johnson, & Maas, 2018).

In this study, the aim was to examine the effect of 'teaching: prescribed medication' NIC interventions on older adults' behavior regarding drug use and 'medication response' NOC outputs.

MATERIAL AND METHOD

Research Type

This quasi-experimental (single group, pre-test post-test) type research was conducted in the Internal Medicine Clinic of a Training and Research Hospital located in Ankara between May and August 2017. Since the effectiveness of NIC interventions has been demonstrated many times in previous studies, a single-group pretest-posttest design was used in this study (Gencbas, Bebis, & Moorhead, 2020). The compliance of the research with the TREND directive was checked (CDC, 2018).

Hypotheses

H1: NIC interventions will create a positive change in older adults' behavior regarding drug use.

H2: NIC interventions will positively change older adults' medication response NOC scale outputs.

H3: There is a relationship between the socio-demographic characteristics and the medication response NOC scale outputs of the elderly.

Variables of Research

Dependent Variables

The dependent variables of the research are older adults' behavior regarding drug use and medication response to NOC scale outputs.

Independent Variables

The dependent variables of the research are NIC interventions which were applied to older adults.

Research Outputs

The main research output is older adults' drug use situations and their behaviors toward drug use. And the other research output is older adults' scores on the Medication Response NOC Scale.

Study Population and Sample

The population of the research comprised people over 60 years old who were staying in the Internal Medicine Clinic of a Training and Research Hospital and complied with the research criteria. For the sample in the research, the G*Power program was used, in light of the literature, at least 45 people should be included after a calculation in which α error was taken as 5% and the power was taken as 95%, and the 0.5 effect size. (Gencbas et al., 2020). To increase the generalizability and

reliability of the study results, 60 people were contacted. All the participants fully completed the questionnaire and NOC Scale. There was no dropout.

People over 65 years old with at least one chronic disease, using a prescribed drug under the control of a doctor, and scoring over 23 points on the Mini-Mental Test were included in the research.

Data Collection Tools

Mini-Mental Test, Information Form, Questionnaire of Elderly Drug Use Behavior, and 'Medication response' NOC Scale were used as data collection instruments. Mini-Mental Test applied by one of the researchers. All the other questionnaires were applied by a nurse working in the ward.

Mini-Mental Test: The original Mini-Mental Test was translated into Turkish by Gungen, Ertan, Eker, Yasar, & Engin in 2002. This is an assessment test that was created to track cognitive changes developing in elderly patients. The test consists of 11 questions and is evaluated on a scale of 30 points. If the points scored are between 24 and 30, it is evaluated as normal. Between 18 and 23 points show light dementia and under 17 points show serious dementia. To make it possible to comply with the applied NIC interventions, to provide cognitive coordination, and to gain accurate data while assessing the effectiveness of the intervention, older adults that scored 23 or more points on the Mini-Mental Test according to education level were included in the research.

Information Form: The original form, created by the researchers after examining the literature, consisted of information about patient sociodemographic features. Moreover, addiction levels, drug use without a physician's prescription which may cause drug interactions, and herbal/traditional method use were also questioned (Irmak, Düzöz, & Bozyer, 2007).

Questionnaire of Elderly Drug Use Behavior: In the 5-point-likert-type Questionnaire of Elderly Drug Use Behaviour, developed by Arpacı, Acikel, & Simsek (2008), there are positive (1, 3-6, 13, 16, 17) and negative (2, 7-12, 14, 15) items, totaling 17. The answer 'never' scores 1 point for negative expressions, as the answer 'always' scores 1 point for positive expressions by reverse coding. Scoring is done based on the self-report of the patient. The questionnaire is not evaluated based on total points and the points scored from every item are calculated separately. A decrease

in the score indicates positive behavior toward drug use. (Arpacı et al., 2008).

'Medication response' NOC Scale: The 'Medication response' NOC Scale was taken from NOC Standard Classified Scales Guide. With this scale, developed by Moorhead et al. (2018), the effect of the drug used by the elderly person can be monitored and improvements in symptoms with properly-used drugs can be assessed. The assessment is made by a nurse with the help of lab results, vital findings, patient attitude and behaviors, nurse observations, and patient output. Some of the indicators in this NOC are expected curative effect, expected changes in symptoms, expected blood levels, expected behavior, side effect, and allergic reaction. This scale, consisting of 8 items, has a 5-point Likert type. The least-desired case is indicated by 1 point, with the most-desired case indicated by 5 (1=Never, 5=Always / 1=Severe, 5=None / 1=serious trouble, 5= no trouble). The content validity of this scale, which is evaluated based on total point averages, was performed by Gençbaş et al. in 2020. After evaluation with expert opinions, the content validity index (CVI) was found to be 0.80 and 0.86. In the current study, Cronbach's alpha value, which is the reliability coefficient of this scale, was obtained as 0.872.

Procedure

After receiving research ethics committee approval and permissions, the Patient Information Form, Scale of Elderly Drug Use Behaviours, and 'Medication Response' NOC Scale were applied to older adults who were admitted to Internal Medicine Clinic and complied with the research criteria. After applying the forms, 'teaching: prescribed medication' NIC interventions were applied to each of the older adults. The NIC interventions were applied to the patients for one week. The interventions were carried out in two stages. The first stage was training, the second stage was counseling and follow-up for one week.

'Teaching: prescribed medication' NIC interventions, developed by Bulechek et al. (2017), were adapted to the Turkish language by Erdemir, Kav, & Yilmaz in 2017. These interventions consist of 35 items and are applied based on the individual's needs, features, and medical history. The number of NIC interventions for each patient varied according to the patient's disease and prognosis, drugs used, age, and other characteristics. A minimum of 20 and a maximum of 35 interventions were applied to patients who

underwent an average of 29.35 interventions. While all 35 NIC interventions were applied for some patients, interventions containing only ‘information’ about the NIC activities needed for

some patients, and only interventions for ‘evaluation of drug effects’ were applied for patients with sufficient knowledge about their drugs.

Table 1. “Teaching: Prescribed Medication” NIC Interventions

1. Instruct the patient to recognize distinctive characteristics of the medication(s), as appropriate
2. Inform the patient of both the generic and brand names of each medication
3. Instruct the patient on the purpose and action of each medication
4. Explain how healthcare providers choose the most appropriate medication
5. Instruct the patient on the dosage, route, and duration of each medication
6. Instruct the patient on the proper administration /application of each medication
7. Review the patient’s knowledge of medications
8. Acknowledge the patient’s knowledge of medications
9. Evaluate the patient’s ability to self-administer medication
10. Instruct the patient to perform needed procedures before taking medication (e.g. check pulse, glucose), as appropriate
11. Inform the patient what to do if a dose of medication missed
12. Instruct the patient on which criteria to use when deciding to alter the medication dosage /Schedule, as appropriate
13. Inform the patient of the consequences of not taking or abruptly discontinuing medication(s), as appropriate
14. Instruct the patient on specific precautions to observe when taking medication(s) (e.g. no driving/using power tools), as appropriate
15. Instruct the patient on possible adverse side effects of each medication
16. Instruct the patient how to relieve and/or prevent certain side effects, as appropriate
17. Instruct the patient on appropriate actions to take if side effects occur
18. Instruct the patient on the signs and symptoms of overdose/under dosage
19. Inform the patient of possible drug/food interactions, as appropriate
20. Instruct the patient on how to properly store the medication(s)
21. Instruct patients on the proper care of devices used for administration
22. Instruct patients on proper disposal of needles and syringes at home, as appropriate, and where to dispose of the sharps container in their community
23. Provide the patient with written information about the action, purpose, side effects, etc. of medications
24. Assist the patient to develop a written medication schedule
25. Instruct the patient to carry documentation of his/her prescribed medication regimen
26. Instruct the patient how to fill his/her prescription(s), as appropriate
27. Inform the patient of possible changes in appearance and/or dosage when filling generic medication prescription(s)
28. Warn the patient of the risks associated with taking expired medication
29. Caution the patient against giving prescribed medication to others
30. Determine the patient’s ability to obtain the required medications
31. Provide information on medication reimbursement, as appropriate
32. Provide information on cost savings programs/organizations to obtain medications and devices, as appropriate
33. Provide information on medication alert devices and how to obtain them
34. Reinforce information provided by other healthcare team members, as appropriate
35. Include the family/significant others, as appropriate

To increase the effectiveness of interventions and ensure behavior change, the items containing information in NIC interventions were created as a visually-supported PowerPoint presentation. The drug schedule created for all patients included in the study was explained on the cards with a table. This was explained to the patients through the cards. After the narration was performed, these cards were given to the patients and they were asked to record their medication

intake times on these cards. Thus, the effects after taking the drug could be observed easily. Other nurses in the clinic were informed about the research and interventions, to make it easier for them to track the patients during medicine times when the researchers were absent. However, to avoid bias, the application of the scales was carried out by only one researcher.

One week after NIC interventions, the Questionnaire Elderly Drug Use Behaviors and the ‘Medication response’ NOC Scale were re-applied.

Ethics Consideration

Before conducting the research, ethical approval was obtained from Keçiören Education and Research Hospital Clinical Research Ethics Committee (Date: 24.05.2017, and No: 2012-KAEK-15/1416), and permission was obtained from the hospital for the implementation. Verbal and written consent was obtained from the patients, to prove their willingness to participate in the study.

Data Analysis

Research data are presented as percentages and numbers. The normal distribution of data was evaluated using the Kolmogorov-Smirnov test, skewness and kurtosis, and QQ normality plots. The change before and after the intervention was assessed with Wilcoxon and dependent samples t-tests according to normality test results via SPSS 23. The relevance between sociodemographic variables and scales was assessed with independent samples t-test, one-way ANOVA, and Mann-Whitney-U. In post hoc analyzes of variables with more than two categories, Tukey's test was used in cases where the variance was homogeneously distributed, and the Dunnett C test was used in cases where it was not.

RESULTS

Most of the participants (85%) were between 65 and 74 years old and 55% were female. Only 7 older adults stated their marital status was single. Of these older adults, 45% were primary school graduates, and only 8% were university graduates. All the participants stated that they don't drink alcohol, and only 13 stated that they are smokers. Of the older adult, 86% stated that they can independently perform their daily activities. At least 1 and at most 7 of the participants stated that they have an average of 2.51 ± 1.28 chronic diseases and 53.3% of them stated that they use 4 or more drugs (Table 2).

After the intervention, improvement was achieved in all items except for only four items ($p < 0.05$). These four items are “I destroy the drugs I do not use or give them where necessary.”, “I often forget to take medication, the time and dose.”, “I carry with me a list of the drugs I use, including the name, dose, and timing of taking them.”, and

“I buy and drink drugs on my own without going to the doctor.”, the scores decreased positively, but no statistically significant result could be obtained ($p > 0.05$) (Table 3).

Table 2. Socio-demographic and Information About The Diseases Data

Characteristics	n	%	
Age	65-74	51	85
	75-84	8	13.3
	85 and over	1	1.7
Sex	Female	33	55
	Male	27	45
Marital status	Married	53	88.3
	Single	7	11.7
Education level	Illiterate	12	20
	Primary school	27	45
	Secondary Education	13	21.7
Job	University	8	13.3
	Housewife	22	36.7
	Farmer	9	15
	Teacher	3	5
	Artisan	2	3.3
Smoking	Other*	24	40
	Yes	13	21.7
Alcohol use	No	47	78.3
	Yes	-	-
Family income perception	No	60	100
	Less than income	8	13.3
	Income is equal to expenses	46	76.7
Living place	More than income	6	10
	Province	42	70
	District	7	11.7
Living alone	Put	11	18.3
	Yes	21	35
Dependence level	No	39	65
	Addicted	3	5
	Semi dependent	5	8.3
Number of drugs	Independent	52	86
	1	7	11.7
	2	14	23.3
	3	7	11.7
Use of medication other than the medicine prescribed by the doctor	4 and over	32	53.3
	Using	15	25
Herbal/traditional method use	Not using	45	75
	Yes	9	85
Number of diseases**	No	51	13.3
	Min.-max.		Mean ± Standard deviation
	1-7		2.51 ± 1.28

* Self-employment

** Diabetes Mellitus, Hypertension, Heart Failure, Kidney Failure, Rheumatic Disease, Cholesterol

Table 3. "Questionnaire of Elderly Drug Use Behaviour" and "Response to Drug" NOC Scores Before and After NIC Interventions

Questionnaire of Elderly Drug Use Behavior Scores Before and After NIC Interventions					
		Mean	Standard Deviation	Z	p
I believe in the benefits and needs of the drugs I use	Pre-test	1.58	0.82	-1.990	0.047
	Post-test	1.45	0.76		
I don't like using drugs.	Pre-test	3.46	1.45	-2.831	0.005
	Post-test	3.10	1.36		
Along with my drug, I pay attention to the foods and drinks I should avoid.	Pre-test	1.93	1.26	-1.968	0.049
	Post-test	1.75	1.00		
I keep my drugs in the medicine cabinet.	Pre-test	2.81	1.71	-2.357	0.018
	Post-test	2.45	1.45		
I destroy the drugs I do not use or give them where necessary.	Pre-test	2.10	1.36	-0.767	0.443
	Post-test	2.01	1.24		
I'm making a backup before my drugs run out.	Pre-test	2.10	1.48	-2.000	0.045
	Post-test	1.71	1.00		
I am looking for a drug that will cure all my problems.	Pre-test	1.93	1.28	-2.027	0.043
	Post-test	1.61	0.99		
I don't know the side effects of my drug.	Pre-test	3.03	1.30	-4.014	0.000
	Post-test	2.48	1.09		
I recommend the drugs that are good for me to my friends.	Pre-test	1.61	1.11	-3.337	0.001
	Post-test	1.25	0.54		
I take a lot of drugs with the belief that they will cure all my physical problems and illnesses.	Pre-test	1.38	0.84	-2.944	0.003
	Post-test	1.10	0.30		
I often forget to take medication, the time, and the dose.	Pre-test	2.23	1.01	-1.895	0.058
	Post-test	2.03	0.901		
I don't take drugs when I feel good	Pre-test	1.76	1.15	-2.423	0.015
	Post-test	1.51	0.85		
I carry with me a list of the drugs I use, including the name, dose, and timing of taking them.	Pre-test	3.33	1.78	-0.597	0.550
	Post-test	3.26	1.80		
I take drugs that are good for my friends.	Pre-test	1.43	1.06	-2.428	0.015
	Post-test	1.16	0.58		
I buy and drink drugs on my own without going to the doctor.	Pre-test	1.46	1.18	-1.739	0.082
	Post-test	1.20	0.63		
I set the clock so I don't forget my medication time.	Pre-test	4.60	0.92	-2.815	0.005
	Post-test	4.08	1.34		
I mark every medication I take on the calendar.	Pre-test	4.81	0.77	1.999	0.046
	Post-test	4.40	1.33		

"Response to Drug" NOC Scale Scores Before and After NIC Interventions				
	Mean	Standard Deviation	t	p
Pre-test	2.95	0.74	-11.65	0.000
Post-test	3.48	0.64		

Before the ‘teaching: prescribed medication’ NIC intervention, ‘2301 Medication Response’ NOC Scale mean scores were 2.95 ± 0.74 , while this value was calculated as 3.48 ± 0.64 afterward. The difference between pre-test and post-test mean scores was statistically significant (Table 3). In this context, positive changes were provided for the drug use process and behaviors of elderly

individuals after the intervention.

When the participants' sociodemographic features are compared with their Scale of Elderly Drug Use Behaviours total points and ‘Medication response’ NOC Scale mean points, the ‘medication response’ NOC scale point averages of older adult living alone was found to be significantly higher than older adult not living

alone ($p < 0.05$). The Scale of Elderly Drug Use Behaviours total mean points of older adults who reported having a disease for 11 to 15 years were found to be significantly higher than older adults who reported having a disease for 0 to 5 years ($p < 0.05$). No statistically significant differences were found between the ‘Medication response’ NOC Scale and Scale of Elderly Drug Use Behaviours Scale points in terms of participant age, gender, marital status, cigarette use, and number of comorbid diseases ($p > 0.05$) (Table 4).

Table 4. Comparison of the Demographic Features of the Participants and "Medication Response NOC Scale" Points

NO			
Characteristics	Mean (sd)	Test	p
Age			
65-74	2.99 (0.76)	1.55 ¹	0.220
75-84	2.85 (0.54)		
85 and over	1.71 (-)		
Number of diseases			
1	2.85 (0.73)	0.204 ¹	0.893
2	3.03 (0.84)		
3	3.00 (0.72)		
4 and over	2.88 (0.73)		
Duration of illness			
0-5 years	2.89 (0.80)	0.995 ¹	0.402
6-10 years	2.87 (0.75)		
11-15 years	3.28 (0.58)		
Over 16 years	2.84 (0.78)		
	Mean rank	Test	p
Sex			
Female	27.50	1.47 ²	.140
Male	34.17		
Marital status			
Married	30.71	-0.254 ²	0.799
Single	28.93		
Smoking			
Yes	28.23	-0.531 ²	0.595
No	31.13		
Living alone			
Yes	44.79	-2.31 ²	0.021
No	28.61		

¹ One Way ANOVA; ² Mann Whitney U Test; ³ Independent student t-test

When the participants' sociodemographic features are compared with their Scale of Elderly Drug Use Behaviours total points and ‘Medication response’ NOC Scale mean points, the

‘medication response’ NOC scale point averages of older adult living alone was found to be significantly higher than older adult not living alone ($p < 0.05$). The Scale of Elderly Drug Use Behaviours total mean points of older adults who reported having a disease for 11 to 15 years were found to be significantly higher than older adults who reported having a disease for 0 to 5 years ($p < 0.05$). No statistically significant differences were found between the ‘Medication response’ NOC Scale and Scale of Elderly Drug Use Behaviours Scale points in terms of participant age, gender, marital status, cigarette use, and number of comorbid diseases ($p > 0.05$) (Table 4).

DISCUSSION

In this study, the aim was to examine the effect of ‘teaching: prescribed medication’ NIC on the behavior of older adults regarding drug use and ‘medication response’ NOC scale outputs. The results of the current research revealed that behavior regarding drug use and patient outputs in older adults expected after drug use, assessed with the ‘Medication response’ NOC Scale, underwent significantly positive changes after NIC interventions. There are no studies that researched the direct effect of NIC interventions applied to older adults on NOC outputs in the literature. Existing studies in the literature have examined the effects of various interventions for drug use in the management of diseases, hospital readmissions, and admissions. The systematic review by van Loon-van Gaalen et al. (2021) revealed that the telephone follow-up application performed by nurses for patients over 65 years old who were discharged from the emergency service and live independently had no effects on revisiting the emergency service, hospitalization, taking prescribed drugs and collaboration with follow-up meetings (van Loon-van Gaalen et al., 2021). Information and communication technology-based integrated care which is applied by nurses was revealed to be effective in controlling hypertension in older adults, which is hard to achieve (Visco et al., 2018). Moreover, in a study conducted by Arain et al. (2021), an in-house electronic medication dispensing system in Canada was effective in drug adherence and increasing health perception in older adults with chronic diseases. So, after all these studies' results, we can say that for nursing interventions and assessing the outputs, we need standardization.

In the literature, one of the important problems in studies that research older adults' drug adherence and drug use behaviors is that the assessment instruments are not standardized (Arain et al., 2021). NIC interventions, which are standardized applications serving as guidelines for nurses within the scope of proof-based applications, and the use of the 'Medication response' NOC Scale in the assessment process for expected patient output after NIC interventions can ensure standardized intervention and assessment of adherence to drug use in the older adults. In addition to this, according to data obtained from two separate scaling instruments, the positive effect of NIC interventions on older adults' drug use process and adherence behaviors confirms the effectiveness of the application in terms of the measured parameters.

Some socio-demographic data on the elderly may affect both drug use behaviors and compliance. Evidence obtained from previous studies shows that the relationships between drug nonadherence and age and gender are contradictory (Rodgers et al., 2018; Mathes, Jaschinski, & Pieper, 2014). In this study, older adults' behavior regarding drug use and expected patient outputs after drug use assessed with the 'Medication response' NOC Scale were not significantly different according to age group and gender. But, in a study conducted by Rodgers et al. (2018) about older adults over 70 years old, even when controlled for other factors, drug adherence increases with age and gender does not have any effect on drug adherence. In addition to this, in a systematic compilation by Mathes et al. (2014), in the studies that address age as a categorical variable, drug adherence in elderly and middle age groups was higher. For studies that address age as a continuous variable, it was revealed that there were no significant correlations between drug adherence and age (Mathes et al., 2014). Contrary to this, it was stated that old age is a negative precursor for general adherence level with treatment (Jankowska-Polańska et al., 2020). The most common reason behind the lower drug adherence among older patients is progressive malfunction occurring in cognitive functions, which is considered to be a big problem for drug adherence (Jankowska-Polańska et al., 2020). In the literature, gender-based differences are explained by women's primary caretaker role which leads to limitations of their time and energy for self-care and eventually to a decrease in their drug adherence. This may also explain the higher

medication adherence of men (Jankowska-Polańska et al., 2020). The reason behind the lack of significant differences according to age groups may be related to the non-homogeneous distribution of these groups.

Living alone is one of the most important factors affecting drug compliance in the elderly. In a study conducted by Jankowska-Polańska et al. (2020) with patients with heart failure, living alone was an independent determinant for tracking appointments, medication, lifestyle changes, and general adherence to treatment. The social support provided by family members and other informal caretakers was stated to be an important factor that affects the medication process. Family members usually support older adults to improve positive drug use behaviors, as they encourage them to go to the required examinations. On the contrary, in this study, expected patient outputs after drug use of older adults living alone, which was assessed with the 'medication response' NOC Scale, were more positive than older adults not living alone, while it was determined that older adult's behaviors regarding drug use do not differ only according to their solitary life. The reason behind the higher NOC Scale points of those living alone may be the assessment of not only patient behavior, which is one of the patient outputs after drug use but also the assessment of lab and vital findings. Therefore, behavior outputs may not have changed after drug use, though lab and vital outputs changed positively.

The effectiveness of the duration of the disease on drug adherence can change according to the type of disease. Some studies stated that the duration of the disease does not affect drug adherence (Mathes et al., 2014), while some studies revealed that the increase in the duration of the disease is a protective factor against drug nonadherence (AbdAllah, Nofal, & Sharafeddin, 2021). The behavior of the older adults who reported not having any disease for 11-15 years regarding drug use are more positive than ones who reported not having any disease for 0-5 years, as the expected patient outputs after drug use assessed with 'Medication response' NOC Scale does not differentiate according to the duration of disease. This can be explained by the development of disease recognition and management skills over time.

CONCLUSION

As a result of ‘teaching: prescribed medication’ NIC nursing interventions, which were applied to the older adult with chronic diseases aiming to improve the individual’s behavior regarding the use of prescribed drugs, some improvements were seen in the behavior of older adults regarding drug use and changes expected after drug use. In this sense, for older adults with more than one chronic disease and using multiple drugs, comprehensive and standard nursing interventions can increase the effectiveness of drugs used and decrease drug-drug interactions during multiple drug use. Therefore, nurses can make accurate decisions about health care for older adults and provide this health care effectively and objectively by measuring the seriousness of the problem with NOC and applying comprehensive nursing interventions with NIC in organizations providing health services to older adults. In addition, it is recommended to conduct studies in which the effectiveness of simpler and more direct interventions and NIC interventions are compared.

The fact that the research is in a single-group pretest-posttest design and the lack of randomization and matching were limitations. It should be taken into account that the blinding technique could not be applied in the evaluation of the results. Individuals participating in the research, those who implemented the initiatives and evaluated/analyzed the result knew that the participants in the research were in the experimental group. In addition, factors such as the knowledge level and experience of the nurse who collected the data may have affected the evaluation process of NOC scales.

Ethics Committee Approval

Ethics committee approval was received for this study from the Keçiören Education and Research Hospital Clinical Research Ethics Committee (Date: 24.05.2017, and No: 2012-KAEK-15/1416).

Author Contributions

Idea/Concept: D.G., H.B., Z.K.D.; Design: D.G., H.B., Z.K.D.; Supervision/Consulting: H.B.; Analysis and/or Interpretation: D.G.; Literature Search: D.G., H.B., Z.K.D.; Writing the Article: D.G.; Critical Review: D.G., H.B., Z.K.D.

Peer-review

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Conflict of Interest

The authors have no conflict of interest to declare.

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