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Effect of health belief model-based education to elder individuals on rational drug use

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Abstract

In this study, it was aimed to determine the effects of education provided according to the health belief model on the rational use of drugs in elder individuals. Pre-test-posttest single group test design was used in this semi-experimental study. The study conducted at Hacı-Rukiye Gazioğlu nursing home, between September 2016 and May 2017. A sociodemographic questionnaire, rational use of drugs questionnaire, and Health Belief Scale on Drug Use were used to collect data regarding sociodemographic characteristics and general health status at baseline and after the provision of education about the rational use of drugs according to health belief model. Overall, data from 103 subjects were analyzed. It was found that 54.4% of the study population was male, while 3.9% were married and 45.6% were literate. The mean age was 77.0±9.8 years. The rate of chronic drug use was 91.3%. Significant changes were found in the attitudes and behaviors regarding the rational use of drugs after education. The mean total score of the Health Belief Scale on Drug Use was 130.4±13.3 before education and 136.8±11.2 after education. It was determined that mean total score and all subdomain scores (perceived susceptibility, perceived severity, health motivation, perceived benefit, perceived barrier, self-efficacy) were significantly increased after education.

Keywords: Health belief model, health education, nursing home, older adult, rational use of drugs

Introduction

In the elder population, the need for medication is increased due to a higher incidence of chronic diseases, resulting ina higher number of drugs used in elder individuals. Thus, adverse drug events and intoxications are more commonly seen in elder individuals because of multi-drug use, drug-drug interactions, alterations in pharmacokinetics and pharmacodynamics of drugs and cognitive problems [1, 2]. In elder individuals, both over-the-counter drugs and under-the-counter drug use are highly more common than other age groups [3-5].

Irrational drug use can increase the incidence of adverse events in all age groups. However, elder individuals are more susceptible as old age is associated withthe onset of several problems including cognitive and physical disabilities [6]. The problems emerging in old age are among major factors that may affect behaviors and attitudes towards drug use.

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Thus, interventions including education at varying levels, counseling, guidance, and coordination have become more important than the treatment itself to prevent unfavorable events related to drug use [7-8].

Desired health behaviors can be developed by health-related interventions directed to describe and change attitudes regarding health behavior. In this context, the Health Belief Model (HBM) is a widely used model to identify health behaviors [9]. The Health Belief Model was first developed by Hochbaum, Kegeles, Levanthal, and Rosenstock in 1950 [10].

This model proposes that an individual's health-related behaviors are affected by certain beliefs and that individuals having such beliefs can be more successful in changing health-related behaviors [11]. Also, the model describes conditions that motivate individuals to do or not to do health-related behaviors [10, 12]. Although the model only aimed to understand programs directing to preventive health behaviors such as screening and vaccination in the first years, it was used in other fields including disease behaviors and general health behaviors in subsequent years [11, 12].

In this interventional study, it was aimed to assess the effects of HBM-based education given to elder individuals on rational drug use.

Materials and Methods

Study design and target population

This is a semi-experimental study using the pretest-posttest model. The study was conducted at Kayseri Metropolitan Municipality Hacı Rukiye Gazioğlu Nursing Home between September 2016 and May 2017. At the time of the study, there were 141 residents aged ≥65 years in Kayseri Metropolitan Municipality Hacı Rukiye Gazioğlu Nursing Home. As we aimed to recruit all elder individuals, no sampling was performed for the study.

Based on a file review, 26 residents with cognitive disorders hampering communication (dementia, Alzheimer's disease, psychosis, etc.) and 12 residents' declining participation were excluded. Thus, the final study population consisted of 103 elder individuals meeting the inclusion criteria.

After a pretest was performed, HBM-based rational drug use education was provided to the participants. Rational Drug Use Questionnaire and Drugs Use Health Belief scale were repeated 3 months after education. In the final analysis, data from 103 participants were assessed.

Data collection methods

Sociodemographic data sheet, Rational Drug Use Questionnaire, and Drugs Use Health Belief Scale was employed for data collection.

Sociodemographic Data Sheet

The Sociodemographic data sheet was developed by researchers based on literature review [5-8] and included 20 items about age, education level, occupation, marital status, number of children, insurance, income, general health status, and medications used. The data regarding diseases, general health perception, and sleep quality relied on self-reported information. Data regarding medications used were extracted from individual files in the nursing home.

Rational Drug Use Questionnaire

The Rational Drug Use Questionnaire was a 20-item questionnaire developed by researchers based on a literature review to describe drug use behaviors of individuals [1, 3-7]. It included questions regarding purpose, type of delivery, dose, duration, type of storage of drugs, and whether they use drugs without medical advice.

Drugs Use Health Belief Scale

The scale was developed by Çiçek et al. via constructing a health belief model [9]. The scale was developed to assess the health belief perception of individuals about drug use. In the study by Çiçek et al., the overall Cronbach alpha value was found as 0.91. The Cronbach value ranged from 0.80 to 0.93 in sub-domains.

The scale has 35 items in 6 sub-domains including perceived susceptibility (6 items), perceived severity (6 items), health motivation (6 items), perceived benefit (4 items), perceived barriers (6 items) and self-efficacy (7 items).

In the scale, each item is rated by 5-points (1 to 5) Likert scale: 1 point, strongly disagree; 2, disagree; 3, uncertain; 4, agree; and 5, strongly agree. The items 23-28 are considered negative; thus, they are scored negatively. The minimum total score is 59 points whereas the maximum total score was 151 points. There is no cut-off point for total score or sub-domain scores. Higher scores indicate greater health belief to rational and under-the-counter drug use [9].

Education program

After pretest data were obtained, HBM-based rational drug use education was performed in December 2016. The duration was 60 minutes including presentation, question-answer, and group discussion. The female participants assigned into 2 groups (n=23 and n=24) whereas the male participants assigned into 3 groups (n=18, n=19, n=19). The female and male participants were separated to ensure privacy and setting where participants can readily ask their questions. The education content included the following topics: harms related to irrational drug use, effects on treatment and disease course, economic burden, andprinciples of accurate drug use. The booklets regarding rational drug use were delivered to participants after completion of the education program.

Statistical analysis

Data were analyzed by SPSS version 15.0. Shapiro Wilk's test was used to assess the normal distribution of quantitative data. To compare behaviors and attitudes regarding rational drug use before and after education, the McNemar test was used for categorical variables while the Wilcoxon signed-rank test was used for quantitative variables. A p-value<0.05 was considered statistically significant.

Results

Table 1 presents the sociodemographic characteristics of the study population. It was found that 54.4% of the study population was male while 3.9% were married and 45.6% were illiterate. The mean age was 77.0±9.8 years. Of participants, 92.2% had social security and 72.8% had his/her income while 48.5% reported that their economic status was poor. Table 2 presents the health-related findings in the study population. Of the participants, 29.1% reported poor general health status whereas 35.0% reported poor sleep quality. Based on answers on Sociodemographic Data Sheet, there was hypertension in 45.6%, diabetes mellitus in 19.4%, cardiac disorder in 35.0%, and chronic obstructive pulmonary disease in 12.6% of the study population. It was found that 91.3% of participants were using drugs continuously. Table 3 presents a comparison of Drugs Use Health Belief Scale scores obtained before and after education. It was found that mean total score and all sub-domain scores (perceived susceptibility, perceived severity, health motivation, perceived benefit, perceived barriers, and self-efficacy) were significantly increased after education (p<0.05).

Table 4 presents comparisons of behaviors related to rational drug use before and after education.

After education, significant increases were found in the proportion of participants reporting that the paid attention to purpose,

Table 1. Sociodemographic characteristics of study population

Characteristics	Groups	n	%
Age (Years)	65-74	41	39.8
	75-84	39	37.9
	≥85	23	22.3
Gender	Male	56	54.4
	Female	47	45.6
Education level	Illiterate	47	45.6
	Literate but no formal education	15	14.6
	Primary school	38	36.9
	College or higher	3	2.9
Marital status	Married	4	3.9
	Single	7	6.8
	Widow	92	89.3
Having Child	Yes	79	76.7
	No	24	23.3
Insurance	Yes	95	92.2
	No	8	7.8
Personal income	Yes	75	72.8
	No	28	27.2
Income level	Good	22	21.4
	Moderate	31	30.1
	Poor	50	48.5
Total		**103**	**100.0**

Table 2. Some characteristics related to health status in the study population

Characteristics	Groups	n	%
Smoking status	Non-smoker	48	46.6
	Ex-smoker	31	30.1
	Active smoker	24	23.3
Perceived general health status	Good	37	35.9
	Moderate	36	35.0
	Poor	30	29.1
Sleep quality	Good	43	41.7
	Moderate	24	23.3
	Poor	36	35.0
Hypertension	Yes	47	45.6
	No	56	54.4
Diabetes Mellitus	Yes	20	19.4
	No	83	80.6
Heart disease	Yes	36	35.0
	No	67	65.0
Chronic obstructive pulmonary disease	Yes	13	12.6
	No	90	87.4
Continuousrational drug use	Yes	94	91.3
	No	9	8.7
Total		**103**	**100.0**

Table 3. Effects of Education on Drugs Use Health Belief Scale total score and sub-scale scores in the study population(n=103)

Subscale domains	Before education		After education		z*	p
	X±SD	Median (Min-Max)	X±SD	Median (Min-Max)		
Perceived susceptibility	24.1±2.4	24.0 (17.0 – 30.0)	25.5±2.0	25.0 (22.0 – 30.0)	6.515	<0.001
Perceived severity	19.8±4.6	19.0 (10.0 – 29.0)	21.2±4.2	22.0 (11.0 – 29.0)	6.988	<0.001
Health motivation	22.3±3.0	22.0 (13.0 – 30.0)	23.1±3.0	23.0 (13.0 – 30.0)	5.441	<0.001
Perceived benefit	16.2±2,2	16.0 (11.0 – 20.0)	16.6±2.1	16.0 (11.0 – 20.0)	4.250	<0.001
Perceived barriers	20.6±2.6	21.0 (12.0 – 26.0)	22.1±3.2	23.0 (10.0 – 29.0)	3.975	<0.001
Self-efficacy	27.1±3.4	28.0 (16.0 – 35.0)	28.0±2.9	28.0 (21.0 – 35.0)	5.031	<0.001
Scale total score	130.4±13.3	130.0 (99.0 – 151.0)	136.8±11.2	139.0 (107.0-151.0)	8.323	<0.001

*: Wilcoxon Signed Ranks Test

Table 4. Comparisons of behaviors related to rational drug use before and after education in the study population(n:103)

Questions	Before education		After education		p*
	Yes		Yes		
	Count	%	Count	%	
Do you use drugs given or recommended by other people?	99	96.1	8	7.8	<0.001
Do you use your prescribed drug in accordance to instructions (chewing, oral, topical etc.)?	98	95.1	101	98.1	0.250
Do you present to a clinician if an adverse event occurs during use of prescribed drug?	97	94.2	101	98.1	0.125
Do you pay attention to postprandial or pre-prandial use of your drugs?	96	93.2	100	97.1	0.125
Do you pay attention to purpose of your drugs?	92	89.3	99	96.1	0,016
Do you pay attention to amount of your drug?	92	89.3	96	93.2	0.125
Do you pay attention to frequency of use of your drugs?	91	88.3	100	97.1	0.004
Do you continue to use your prescribed drug throughout recommended duration?	90	87.4	98	95.1	0.008
Do you buy drugs without prescription?	81	78.6	12	11.7	<0.001
Do you discontinue to use drug before completing recommended duration when you felt good?	77	74.8	20	19.4	<0.001
Do you ask sufficient information about your prescribed drugs?	70	68.0	81	78.6	0.001
Do you pay attention to storage conditions of your drugs?	65	63.1	89	86.4	<0.001
Do you attend to a control visit after completion of drugs?	53	51.5	68	66.0	<0.001
Do you use your prescribed drug with other beverages (tea, milk, fruit juice)?	52	50.5	12	11.7	<0.001
Do you check expiry date of your drugs?	34	33.0	57	55.3	<0.001
Do you use drugs beyond expiry date?	18	17.5	7	6.8	<0.001
Do you read product information of your prescribed drugs?	18	17.5	24	23.3	0.031
Do you learn side effects of your prescribed drugs?	16	15.5	42	40.8	<0.001
Do you continue to use prescribed drug if an adverse event occurs during use?	11	10.7	3	3.9	0.057
Do you offer your prescribed drugs to other people?	5	4.9	2	1.9	0.250

*: McNemar test

frequency, adverse events and type of storage of drugs; that they looked at the expiry date of drug and product information; that they used drugs in parallel to duration noted in prescription; that they received sufficient information and attended to control visit when his/her drug was finished ($p<0.05$). Significant reductions were also found in the proportion of participants reporting that they used drugs beyond expiry date; that they discontinued drug use before the end of recommended duration when he/she felt good; that they used drugs with beverages (tea, milk, juice) other than water; that they used drugs according to the advice of other individuals; and that they purchased drugs by their own will without prescription ($p<0.05$). However, no significant difference was found in the proportion of participants reporting that they paid attention to dose and pre- or postprandial use of drugs; that they used drugs in accordance to instructions; that they gave their drugs to another person; that they continued to use the drug despite side effects; and that they sought medical attention in case of side effects after education ($p>0.05$).

Discussion

Of elder individuals included, 60.2% were 75 years or older. The mean age was 77.0±8.7 years. It was found that there was hypertension in 45.6%, diabetes mellitus in 19.4%, cardiac disorder in 35.0%, and chronic obstructive pulmonary disease in 12.6% of the study population.

In the study population, the rate of chronic drug use was 91.3% while 27.2% were using 1-3 drugs per day and 64.1% were using ≥4 drugs per day.

In a study conducted in nursing homes in 23 provinces of Turkey, it was reported that 11.7% of subjects were using 4 drugs and 17.3% were using ≥5 drugs [13]. In a study by Esengen et al., it was reported that 94.4% of female subjects and 80.4% of female subjects were using at least one drug and that rate of subjects using ≥5 drugs was 42.6% among female subjects and 22.8% among male subjects [6]. In a study by Gökçe-Kutsal et al., it was found that 23.2% of elder individuals were using only one drug while 17.0% were using 2 drugs, 19.2% were using 3 drugs and 38.2% were using ≥4 drugs [14].

In our study, it was found that the mean total score and sub-domain scores in Drugs Use Health Belief Scale were significantly increased after education (Table 3). This can be explained by favorable changes in beliefs regarding rational drug use.

In the study by Çiçek et al., significant differences were found between mean pretest and posttest scores in all sub-domains of the Drugs Use Health Belief Scale except health motivation [9].

In a study on Iranian women, it was found that the practice of breast-self exam and clinical breast exams were positively correlated to perceived benefit, self-efficacy, and health motivation [15]. In another study on women aged>40 years about breast cancer, it was found that there were significant increases in the scores of perceived barriers, self-efficacy, and health motivation after HBM-based counseling [16].

In a study on women presenting to Reproductive Health Centers, it was reported that higher perceived benefit and self-efficacy scores as well as lower perceived barriers score had a positive effect on the practice of self-breast exam [17]. In a study on female university students, it was found that higher perceived benefit and self-efficacy scores were associated withthe practice of self-breast exams [18].

In a study on Saudi women, it was reported that perceived self-efficacy was higher while perceived barriers were lower in women performing self-breast exams[19]. In another study, it was reported that perceived self-efficacy can affect self-breast exam behavior while perceived barriers can affect behaviors regarding both practices of self-breast exam and mammography screening [20].

In an Iranian study about the prevention of osteoporosis on 120 patients, it was found that perceived susceptibility and self-efficacy were important for improved nutrition and walking performance in the control group [21]. In another study on female subjects, it was found that health beliefs were effective on the rate of mammography practiceamong women [22]. In a study on patients with type II diabetes mellitus, it was found that health beliefs towards maintaining the prevention of complications were affected positively by HBM-based educations [23]. In a study by Elik et al., significant differences were found pretest and posttest total scores and sub-domain scores of the Health Belief Scale on the practice of self-breast exam [24]. In a study on screening mammography in female subjects aged≥65 years, Janz et al. found that mammography frequency was increased by an improved level of knowledge [25].

In our study, the proportion of participants reporting that they paid attention to purpose and frequency of drug use was significantly increased after HBM-based education about rational drug use (Table 4).

Also, there was a significant increase inthe proportion of participants reporting that they paid attention to the type of storage of drugs; that they looked at the expiry date of drug and product information; that they learned adverse effects of drugs; that they used drugs in parallel to duration noted in prescription; that they received sufficient information and attended to control visit when his/her drug was finished (Table 4).

It was found that there were significant reductions in the proportion of participants reporting that they used drugs beyond expiry date; that they discontinued drug use before the end of recommended duration when he/she felt good; that they used drugs with beverages) other than water; that they used drugs according to the advice of other individuals; and that they purchased drugs by their own will without prescription (Table 4).

Based on results in our study, the reinforcement of favorable behaviors regarding rational drug use can result from an improvement in perceived susceptibility, self-efficacy, and health motivation whereas changes in unfavorable behaviors may be due to improvements in perceived severity and benefitby HBM-based education.

In a study on elder individuals, Ryan and Bed detected that drug adherence education significantly improved adherence scores [26].

After education, no significant difference was observed in the

proportion of participants reporting that they paid attention to dose and pre- or postprandial use of drugs; that they used drugs in accordance to instructions; that they gave their drugs to another person; that they continued to use the drug despite side effects; and that they sought medical attention in case of side effects. As a proportion of these behaviors were close to desired levels, the effect size of education might be insignificant.

Limitations of the study

The results cannot be generalized to other elder individuals living at home since our study was conducted on elder individuals living in a nursing home. Also, the results cannot be generalized to all elder individuals living in a nursing home as this study was conducted in a single nursing home. As posttest data were collected at the end of month 3, these results do not show long-term effects of education.

Conclusion

In this study, it was found that significant differences occurred in behaviors and attitudes regarding rational drug use after HBM-based education in elder individuals.

It was also found that HBM-based education about rational drug use was effective in elder individuals and that there were significant increases in total score and sub-domain scores of scales after education when compared to baseline.

Our data support those in the literature. It was found that HBM-based education was effective in elder individuals, resulting in improved health beliefs.

HBM is a feasible mode in the education of elder individuals. It is recommended to use HBM in future educations in elder individuals.

Conflict of interests
The authors declare that they have no competing interests.

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Ethical approval
This study was approved by the Clinical Research Ethics Committee of Erciyes UniversityFaculty of Medicine(2016/472).

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