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Elderly diabetes patients' health beliefs about care and treatment for diabetes[1]

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Abstract

Purpose: This descriptive study aimed to assess elderly diabetes patients' health beliefs about care and treatment for diabetes.

Methods: The universe of the study consists of 1176 diabetic patients aged 65 years and over who are registered to eight family health centers affiliated to Mezitli district of Mersin province. In the sample, it was planned to reach the elderly between 165-330. As a result, 280 elders were reached. After obtaining the necessary permissions from the related institutions, data were collected with Descriptive Characteristics Form and HBMS for Diabetes Patients in 2012 and analyzed with nonparametric tests.

Results: Of 280 patients, 55.7% were male and 60% were aged 65-69. The median value for HBMS showed that the patients had a negative health belief. The patients with higher education levels and those receiving information about diabetes had higher median of values for both the scale and its subscales, those checking their blood glucose had high median of values for the scale and the subscale perceived benefits and barriers, those complying with nutrition therapy had higher median of values for perceived barriers and recommended health behaviours, those having regular check-ups had higher median of values for perceived barriers and those doing exercise regularly had higher median of values for perceived benefits ($p<0.05$).

Conclusion: Elderly diabetes patients should be offered education about self management and HBMS for Diabetes Patients should be used to determine educational needs and to evaluate effectiveness of education offered to help diabetes patients to develop positive health beliefs.

Keywords: Health beliefs; Health Belief Model; Elderly; Diabetes Mellitus, Diabetes care.

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1. Introduction

Causing to complications such as heart disease, renal failure, amputation, and blindness diabetes is an important disease. Its chronic complications presents socioeconomic and quality of life burden (Shah et al. 2015)The prevalence of diabetes for all age-groups worldwide was estimated to be

increase (Wild et al., 2004). Diabetes prevalence in Turkey is 13.7% in the adult population and 30% in the population aged 60 years or older (TURDEP-II, 2010).

Diabetes can be controlled by education on awareness of diabetes risk factor and symptoms, and also counselling to patients on diabetes self-management (healthy nutrition, physical activity, self-monitoring of blood glucose and medication adherence)(Avery et al., 2012). People who have diabetes should to carry out daily self-management activities to avoid or delay diabetes-related morbidity. Diabetes self-management education has an important contribution to self-awareness and competencies of people with diabetes on diabetes care (Powers et al., 2015). Individuals' self-efficacy is a crucial to improved self-management. Patients' beliefs are very important for lifestyle modification and self-management in diabetic patient in agreement with health care professionals. So there is a need to know what are patient's beliefs, attitudes and self-efficacy for planning effective diabetes education. By reason of been estimated, the complications and the costs of diabetes can be reduced importantly thanks to increase of knowledge and awareness (Cochran and Conn, 2008). Health Belief Model HBM serves to understand and predict the patients' attitude toward health issues and preventive measures (Rosenstock et al., 1988, Champion and Skinner, 2008) At the beginning HBM was designed to understand why people did not contribute in some early disease diagnosis programs although they are at risk to diseases. According to the HBM, a person more likely can take a health action if he/she perceives the disease is severe; he/she is at risk; health action(s) is beneficial and he/she can apply it; understands limited barriers to the health action and there are some cues about the health action would be beneficial for her/his health; and receives a cue to get the health (Rosenstock et al., 1988). For a long time diabetes has been studied by means of the Health Belief Model (Kartal and Özsoy, 2007, Dimatteo et al., 2007, Mann et al., 2009, Ayele et al., 2012, Fisher et al., 2002, Jin et al., 2008). It has been shown that adaptation of healthy action required for successful diabetes management was significantly correlated with patients' beliefs and attitudes (Cochran and Conn, 2008, Dimatteo et al., 2007, Mann et al., 2009, Ayele et al., 2012, Fisher et al., 2002, Jin et al., 2008).

Diabetes is one of the most important diseases affecting the quality of life in old age (Beğer et al., 2009). Decreased awareness of health problems, denial of symptoms, difficulty in expressing complaints and accessing health services, considering complaints as normal, low education levels and health staff' insufficient interest have been reported to make diabetes control difficult. Life style and medication management for glycaemia and lipid control, hypertension, is important for reducing morbidity and improving long-term quality of life for patients diagnosed by diabetes. Elderly diabetes patients should be evaluated by a diabetes team at certain intervals, barriers to care should be identified and individual monitoring should be performed carefully. So that individualized diabetes care can be planned, beliefs predictive of health behaviour should be evaluated. Considering that changing elderly individuals' life styles and health behaviour can be more difficult due to old age related restrictions, it is of great importance to evaluate health beliefs and the literature seems to be limited in this regard. Therefore, the aim of this study was to evaluate elderly diabetes patients' health beliefs about care and treatment of diabetes.

2. Method and Material

This is a descriptive study and was performed between January and June 2012. The study population included 1176 diabetes patients aged 65 years or older followed by eight family health care centres in a small town of Mezitli province in Mersin. The study sample was five-ten times the number of the items in Health Belief Model Scale for diabetes patients (HBMS) (33 items) and was planned to include number of 165-330 elderly diabetes patients. Stratified sampling was used to determine the number of patients to be enrolled from each family health centre. Due to difficulties in contacting the patients at their homes (not having a phone or not opening the door for safety reasons), elderly diabetes patients presenting to family health centres with any conditions were enrolled in the study until the planned size of the sample was achieved. As a result of the hot weather people migrated to highlands we access the sample size to 280.

62 Inclusion criteria were lack of emergency health problems, willingness to participate and ability to
63 communicate. In addition, the number of correct answers to the questions in Standardized Mini
64 Mental Test about orientation, attention and calculation (e.g. questions what the year, month and
65 day it is, whether it is morning or noon, where one lives, listing five days of the week in the reverse
66 order) were taken into account (Küçükdeveci, et al., 2005). Data were collected with a descriptive
67 characteristics form and HBMS at face to face interviews.
68 The descriptive characteristics form was composed of 22 questions about socio-demographic
69 features, disease and treatment. HBMS for Diabetes Patients was developed by Schwab et al. by
70 taking account of five subscales of Health Belief Model (HBM) to evaluate beliefs about and
71 attitudes towards diabetes and its treatment The validity and reliability of the scale for the in Turkish
72 language was tested by Kartal and Özsoy in 2005 in type II diabetes patients (Kartal and Özsoy,
73 2007, Schwab et al., 1994, Tan, 2004). The test-re-test reliability of the scale was 0.90 and
74 Cronbach's alpha ranged from 0.73 to 0.86 for the subscales and was 0.89 for the scale in general.
75 The scale included a total of 36 items and five subscales; i.e. perceived susceptibility (5 items),
76 perceived seriousness (3 items), perceived benefits (7 items), perceived barriers (11 items) and
77 recommended health behaviour (10 items). In the present study, Cronbach's alpha was 0.71 for
78 the scale in general, 0.55 for perceived susceptibility, 0.55 for perceived seriousness, 0.86 for
79 perceived benefits, 0.82 for perceived barriers and 0.88 for recommended health behaviour. The
80 scale is a Likert scale and the items are scored on a five-point scale (1 corresponding to completely
81 agree and 5 corresponding to totally disagree). The highest score to be obtained is 5. Scores of 4
82 and higher indicate positive health beliefs and scores lower than 4 indicate negative health beliefs.[9,18]
83 Data were analyzed with Statistical Package for the Social Sciences (SPSS 11.5). Shapiro-Wilk test
84 was used to determine whether scores for the scale in general and scores for the subscales were
85 normally distributed. Mann Withney U was used to compare median of values for categorical
86 variables of two groups depending on the distribution characteristics of the data. Kruskal-Wallis
87 test was used to compare median of values between the groups for categorical variables with more
88 than two subgroups depending on the distribution feature. Type 1 error level was considered as
89 .05.
90 Ethical approval was obtained from the Mersin University Ethics Committe (No.112,
91 22/12/2011). The participants were informed about the aim of the study and their written consent
92 was taken.
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94 ## 3. Results
95 Out of 280 elderly diabetic patients included in the study, 55.7% were male, 60% were aged 65-69
96 years, 46.4% were primary school graduates, 1.6% was illiterate and 90.7% were unemployed. In
97 addition, 38.9% had diabetes for more than 10 years, 77.9% were taking oral anti-diabetic
98 medications, 51.8% had a family member with diabetes and 77.9% had a disease accompanying
99 diabetes. Of all the patients included, 96.4% had access to a health centre when they needed, 61.1%
100 complied with their diet, 85% had their regular check-ups, 90.4% measured their blood glucose
101 (most of them did it when they needed it), 94.6% took their medications regularly and 47.6% did
102 exercise. Ten percent of the patients were smokers.
103 Table 1 presents the patients' median of values for HBMS and its Subscales. The scores for the
104 subscales recommended health behaviour and perceived benefits were higher (Table 1).
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Table 1. The Patients' Median of Values For HBMS And Its Subscales — 106

Subscales	Median (% 25-75)
Perceived susceptibility	2.50 (2.50/3.25)
Perceived seriousness	4.00 (3.66/4.33)
Perceived benefits	4.00 (4.00/4.28)
Perceived bariers	3.77 (3.55-3.77)
Recommended health behavior	4.00 4.00/4.60)
Total	3.81 (3.69/4.06)

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116 In the present study, the elderly with higher education levels had higher scores for HBMS and its
117 subscales (p=0.003). The elderly diabetes patients with a regular income had higher median of
118 values for perceived seriousness and the patients offered information about diabetes had higher
119 scores for HBMS and its subscales (p=0.015). However, this study did not show a significant
120 relation between health beliefs about treatment of diabetes and age, gender, marital status and
121 employment status (p>0.05) (Table 2). And did not find a significant relation between duration of
122 diabetes and types of treatment offered and scores for HBMS and its subscales (p>0.05) (Table 3).
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Table 2. The distribution of the patients' median of values for HBMS and its subscales by their socio-demographic features (n=280)

Socio-demographic Features		n (%)	Perceived susceptibility Median (%25-75)	Perceived seriousness Median (%25-75)	Perceived benefits Median (% 25-75)	Perceived barriers Median(%25-75)	Recommended health behaviour Median (%25-75)	Total Median(%2575)
Education	***Literate / Illiterate	52(18.6)	2.87(2.50/3.50)	4.00(3.33/4.00)	4.00(4.00/4.25)	3.77(3.36/3.77)	4.00(4.00/4.47)	3.75(3.64/3.99)
	Primary school	130(46.4)	2.75(2.50/3.25)	4.00(3.66/4.33)	4.00(4.00/4.46)	3.77(3.44/3.77)	4.00(4.00/4.60)	3.81(3.69/4.03)
	High school or higher education	98(35.0)	2.50(2.25/3.00)	4.00(3.66/4.33)	4.00(4.00/4.42)	3.77(3.66/3.88)	4.05(4.00/4.70)	3.84(3.69/4.06)
*p			p = 0.008	p = 0.321	p = 0.037	p = 0.007	p = 0.035	p = 0.003
Income	Having a regular income	220 (78.6)	2.50(2.50/3.25)	4.00(3.66/4.33)	4.00(4.00/4.42)	3.77(3.55/3.77)	4.00(4.00/4.60)	3.81(3.69/4.06)
	Not having a regular income	60 (21.4)	2.87(2.50/3.43)	3.66(3.33/4.00)	4.00(4.00/4.39)	3.77(3.44/3.77)	(4.00(4.00/4.60)	3.80(3.70/3.99)
**p			p = 0.069	p = 0.015	p = 0.626	p = 0.370	p = 0.712	p = 0.720
Receiving education on	Yes	177 (63.2)	2.50(2.50/3.25)	4.00(3.66/4.33)	4.00(4.00/4.57)	3.77(3.55/3.88)	4.10(4.00/4.70)	3.84(3.72/4.12)
	No	103 (36.8)	2.75(2.50/3.25)	3.66(3.33/4.00)	4.00(4.00/4.28)	3.77(3.33/3.77)	4.00(4.00/4.50)	3.75(3.66/3.93)
			p = 0.260	p< 0.001	p=0.048	p=0.007	p=0.019	p=0.001

* Kruskall Wallis ** Man-Whitney U ***Seven patients were just literate and did not have any formal education.

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Table 3. The distribution of the patients' median values for HBMS and its subscales by their features about management of diabetes (n=280)

Features of Diabetes Management		n (%)	Perceived Susceptibility Median (25-75)	Perceived Seriousness Median (25-75)	Perceived Benefits Median (25-75)	Perceived Barriers Median (25-75)	Recommended health behaviour Median (25-75)	Total Median (25-75)
Taking medicates regularly	Yes	265 (94.6)	2.50(2.50/3.25)	4.00(4.66/4.33)	4.00(4.00/4.28)	3.77(3.55/3.77)	4.00(4.00/4.60)	3.81(3.69/4.06)
	No	15 (5.4)	2.50(2.25/3.00)	4.00(4.66/4.33)	4.14(4.00/4.57)	3.66(3.22/4.77)	4.10(4.00/4.60)	3.72(3.63/4.09)
**p			p = 0.148	p = 0.721	p = 0.725	P = 0.274	p = 0.898	p =0.363
Complience with the diet	Yes	171 (61.1)	2,50(2.50/3.25)	4,00(3.33/4.33)	4.00(4.00/4.42)	3.77(3.55/3.88)	4.00(4.00/4.70)	3.81(3.72/4.09)
	No	109 (38.9)	2.75(2.50/3.25)	4,00(3.66/4.33)	4,00(4.00/4.42)	3.77(3.33/3.77)	4.00(4.00/4.50)	3.78(3.66/4.00)
*p			p = 0.578	p = 0.892	p = 0.860	p = 0.012	p = 0.021	p=0.076
Having check-ups	Yes	239 (85.4)	2,50(2.50/3.25)	4,00(3.33/4.33	4.00(4.00/4.42)	3.77(3.55/3.77)	4,00(4.00/4.60)	3.81(3.69/4.06)
	No	41 (14.6)	2,50(2.50/3.25)	4,00(3.66/4.33)	4.00(4.00/4.28)	3.66(3.38/3.77)	4,10(4.00/4.60)	3.78(3.69/4.00)
**p			p =0.737	p =0.292	p = 0.154	p = 0.010	P = 0.462	p =0.550
Doing exercise **	Yes	134 (47.9)	2.75(2.50/3.25)	4.00(4.33/3.33)	4.00(4.00/4.57)	3.77(3.33/3.77)	4.00(4.00/4.70)	3.84(3.69/4.09)
	No	146 (52.1)	2.50(2.25/3.25)	4.00(3.66/4.33)	4.00(4.00/4.28)	3.77(3.55/3.77)	4.00(4.00/4.50)	3.78(3.69/4.00)
**p			p = 0.443	p = 0.523	p = 0.031	p = 0.563	p = 0.095	p =0.372
Monitoring blood glucose ***	Yes	253 (90.4)	2,50(2.50/3.25)	4.00(3.66/4.33)	4.00(4.00/4.42)	3.77(3.55/3.77)	4.00(4.00/4.60)	3.81(3.69/4.06)
	No	27 (9.6)	3,00(2.50/3.50)	4.00(3.33/4.00)	4.00(4.00/4.14)	3.55(2.88/3.77)	4,00(3.80/4.50)	3.75(3.57/3.90)
**p			p = 0.102	p = 0.127	p = 0.047	P = 0.006	P = 0.185	p =0.020
Smoking	Yes	28 (10.0)	2,62(2.50/3.25)	4.00(3.66/4.66)	4.00(4.00/4.39)	3.77(3.58/3.77)	4,10(4.00/4.67)	3.75(3.70/4.13)
	No	252 (90.0)	2,50(2.50/3.25)	4.00(3.41/4.33)	4.00(4.00/4.42)	3.77(3.55/3.77)	4,00(4.00/4.60)	3.81(3.69/4.06)
**p			p = 0.598	p = 0.282	p = 0.720	p = 0.734	p = 0.628	p = 0.896

* Man Whitney U test **Exercise was evaluated by the question whether the patients did exercise or not. They were not asked the questions how long and how often they did exercise. *** If only reveals that the patients measured their blood glucose at home. Since the frequency of glucose measurement varied widely. It was not categorized.

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138 Ninety-one point seven percent or higher percentages of the patients agreed with the items
139 expressing positive health beliefs under the heading of recommended health behaviour and 88.2%
140 and higher percentages of the patients agreed with the items expressing positive health beliefs under
141 the heading of perceived benefits. A low percentage of the patients agreed with two items
142 expressing positive health beliefs under the heading of perceived seriousness. Seventy-one percent
143 and higher percentages of the patients did not agree with the items expressing negative health
144 beliefs under the heading of perceived barriers. Fifty-nine percent or higher percentages of the
145 patients agreed with two items expressing negative health beliefs under the subscale of perceived
146 susceptibility (Table 4).
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Table 4. The distribution of the percentages of the responses to HBMS (n=280)

Items of Health Beliefs Model Scale	Do not agree (%)	Neutral (%)	Agree (%)
Perceived Susceptibility			
1. People with Type 1 diabetes (young type) have higher chance to get diabetes complications	2.86	35.36	61.79
2. People with Type 2 diabetes (adult type) do not usually get diabetes complication	71.43	18.21	10.36
3. As long as I feel well. I am unlikely to develop diabetes complications	63.21	8.57	28.21
4. I will not get diabetes complications because my wound heals fast	59.64	17.14	23.21
Perceived Seriousness			
5. I think that diabetes is a serious disease	4.29	1.43	94.29
6. Type 1 diabetes (young type) is a serious disease	0.71	35.36	63.93
7. Type 2 diabetes (adult type) is as serious as Type 1 diabetes	16.79	32.14	51.07

Perceived Benefits

8. Keeping blood sugar close to normal can help to prevent diabetes complications	1.79	1.07	97.14
9. Regular exercise helps to improve diabetes control	2.14	2.14	95.71
10.Reduce weight helps overweight people with diabetes to delay or prevent complications	1.43	2.14	96.43
11. Stop smoking helps to delay or prevent diabetes complication	1.07	4.29	94.64
12. Avoiding regular sweet intake helps in diabetes control	1.43	0.00	98.57
13. Low fat diet helps to delay or prevent diabetes complication	2.86	2.50	94.64
14. Control blood pressure helps to delay or prevent diabetes complication	4.64	7.14	88.21

Perceived Barriers

15. There is not much use in trying to have good blood sugar control because the complications of diabetes will happen anyway	92.86	1.43	5.71
16. People with Type 2 diabetes (adult type) do not need to do regular blood sugar tests	88.57	3.57	7.86
17. It is not necessary to do blood sugar testing at home because I go to see doctor regularly	83.93	1.79	14.29
18. Deep fried and fatty food is not a problem for people with diabetes	93.21	0.71	6.07
19. As long as I take my medication daily. I do not have to control my diet Intake	87.86	0.71	11.43
20. There is no relationship between smoking and diabetes complications	85.36	7.50	7.14
21. Looking slightly rounded in body size is a sign of good health	88.93	3.21	7.86
22. I do not have to check my feet daily because they look healthy	75.00	3.21	21.79
23. Diabetes is curable so it is not a serious disease	71.79	3.21	25.00

Recommended Health Behaviour

24. It is important to keep my blood sugar in good control	1.07	0.71	98.21
25. It is important to check my blood sugar several times a week at home	3.93	0.00	96.07
26. It is important to keep my weight under good control	0.36	0.36	99.29
27. It is important to stop smoking	0.36	1.07	98.57
28 It is important to take a low fat diet	1.07	1.79	97.14
29. It is important to avoid regular sweet intake	1.43	1.07	97.50

30. It is important to take medication as prescribed	0.71	1.07	98.21
31. It is important to check my feet daily	3.57	4.64	91.79
32. It is important to check my blood pressure regularly	2.86	4.64	92.50
33. It is important to make exercise regularly	1.79	2.50	95.71

* The responses " do not agree" and " totally disagree" were categorized under the heading of "do not agree" and the responses " agree" and " completely agree" were categorized under the heading of "agree".

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149 ## 4. Discussion

150 The median of value for HBMS was 3.81, which suggested that the patients had negative health
151 beliefs. Kartal, in an interventional study on diabetes patients, most of whom were aged 50 years
152 or older; found that the patients had negative health beliefs about their disease (3.58±0.47) before
153 they were offered education (Kartal, 2014). Yandım in a comparative study on diabetes patients,
154 most of who were aged 40 years or older (94%), showed that both patients with diabetic foot
155 (3.47±0.30) and those without diabetic foot (3.57±0.27) had negative health beliefs (Yandım,
156 2011). Consistent with the literature, the present study also revealed that the median of va[20] for
157 HBMS (3.81) indicated negative health beliefs among the elderly diabetes patients and the scores
158 were even higher than those reported in the literature.
159 Socio-demographic features like age, gender, marital status, education and income in HBM are
160 considered as factors which modify health beliefs (perceived susceptibility, seriousness, benefits
161 and barriers) which play a role in fulfilling health behaviour (Champion and Skinner, 2008). In the
162 present study, the elderly with higher education levels had higher scores for HBMS and its subscales
163 (p<0.05). This finding shows that higher education levels have positive effects on health beliefs,
164 which is consistent with the literature (Dimatteo et al., 2007, Tan, 2004, Kartal, 2014). The elderly
165 diabetes patients with a regular income had higher median of values for perceived seriousness and
166 the patients offered information about diabetes had median of values for HBMS and its subscales
167 (p<0.05). These findings show that elderly diabetes patients' health beliefs are affected by their
168 incomes and receiving in[16]mation about the disease, which is consistent with the literature
169 (Yandım, 2011, Mollaoğlu et al., 2009, Sharifirad et al., 2009, Kartal et al., 2008, Kitiş and Emiroğlu,
170 2006). However, this study did not show a significant relation between health beliefs about
171 treatment of diabetes and age, gender, marital status and employment status (p>0.05), which is
172 congruent with the literature (Tan, 2004, Sharifirad et al., 2009, Kartal et al., 2008, Akça and Çınar,
173 2008).
174 According to HBM, perceived seriousness associated with a disease is a factor which triggers health
175 behaviour (Rosenstock et al., 1988, Champion and Skinner, 2008). We investigated whether
176 duration of diabetes, types of treatment, presence of complicatio[7] and having a family member
177 with diabetes affected perceived seriousness about the disease, but did not find a significant relation
178 between duration of diabetes and types of treatment offered and scores for HBMS and its subscales
179 (p>0.05). Several other studies in the literature sho[19] that there was not a significant relation
180 between these variables and health beliefs (Dimatteo et al., 2007, Ayele et al., 2012, Jin et al., 2008,
181 Kartal, 2014, Yandım, 2011, Akça and Çınar, 2008). Tan and Yandım revealed that the relation
182 between presence of complications due to diabetes and health beliefs was not significant (Tan,
183 2004, Yandım, 2011). Lack of a significant relation between health beliefs and variables related to
184 the disease can be attributed to the fact that the sample was not heterogeneous in terms of these
185 variables.
186 Positive health beliefs about diabetes are expected to improve patients' compliance with their
187 treatment. Regular administration of medications and insulin, formation and maintenance of a diet,
188 having regular check-ups, doing exercise regularly and measuring one's own blood glucose level

189 are important indicators of compliance with diabetes. It has been shown in the literature that there
190 is a relation between compliance with diabetes and health beliefs about care and treatment for the
191 disease. A meta-analysis revealed that there is a positive relation between perceived seriousness
192 about the disease and compliance with its treatment, but that compliance is affected when patients'
193 health is impaired (Avery et al., 2012, Man et al., 2009, Fisher et al., 2002, Jin et al., 2008, Mollaoğlu
194 et al., 2009, Kitiş and Emiroğlu, 2006, Akça and Çınar, 2008).
195 In a study by Farmer et al., 61.7% of the patients were reported to take their medications regularly
196 and they believed that this behaviour would be beneficial for treatment of their disease. The
197 patients not taking their medications regularly were reported to act so due to their beliefs that the
198 medications may have side-effects and cause weight gain (Jin et al., 2008). Several other studies
199 showed that believing in treatment given and its effectiveness had a positive effect on patients'
200 compliance with their treatment (Ayele et al., 2012, Akça and Çınar, 2008). Consistent with the
201 literature, the current study also revealed that the patients receiving their medications regularly had
202 higher median of values for HBMS, but did not have a significant relation (p>0.05).
203 Diabetes patients' compliance with their diet and treatment plays an important part in maintenance
204 of metabolic control of this disease (Fisher et al., 2002, Tekin et al., 2007). Studies on diabetes
205 patients' compliance have revealed that the patients have insufficient compliance with their diet
206 and that elderly patients have more difficulty in compliance than adults (Mollaoğlu et al., 2009,
207 Badur, 2009). Kartal reported that the patients with sufficient compliance had higher scores for
208 health beliefs (p<0.05) and Ayele et al. showed that the patients believed in seriousness of their
209 disease had better compliance with their diet (Kartal and Özsoy, 2007, Ayele et al., 2012, Kartal,
210 2014). Self-management education about diabetes based on the whole person approach can
211 improve positive health beliefs. Shafirad et al showed that education about nutrition offered in
212 accordance with HBM had a positive influence on patients' health beliefs and enhanced compliance
213 with their diet (Sharifirad et al., 2009). Patients doing exercise feel fresher and keep their weight
214 under control in combination with a diet. Doing exercise also helps elderly diabetes patients to
215 achieve normal blood glucose levels without any pharmacological treatments. In studies by Kartal
216 et al, Yandım and Javanshir, the patients doing exercise had more positive health beliefs (Kartal,
217 2014, Yandım, 2011, Javanshir, 2006). Measuring one's own blood glucose levels and complying
218 with recommended check-ups are also linked with positive health beliefs (Tan, 2004, Kartal, 2014).
219 Relevant research suggested that the patients measuring their own blood glucose levels had more
220 positive diabetes related health beliefs (Jin et al., 2008, Tan, 2004, Kartal, 2014). In studies by Akça
221 and Çınar, Skovlund and Peyrot diabetes patients were shown to have a very low compliance with
222 having regular check-ups (Akça and Çınar, 2008, Skovlund and Peyrot, 2005) . Compatible with the
223 results of abovementioned studies, this study revealed that the patients having check-ups at regular
224 intervals had higher scores for perceived barriers, the patients doing exercise had higher scores for
225 perceived benefits and that the patients measuring their own blood glucose levels had higher scores
226 for perceived barriers, perceived benefits and health behaviour in general . Based on the evidence
227 from the literature and these findings, it is clear that there is a positive relation between health
228 beliefs about care and treatment for diabetes and compliance with treatment.
229 In the present study, the patients got lower scores for two items of the subscale perceived
230 susceptibility: item 3 "I do not develop diabetes complications as long as I feel well" and item 4 "I
231 do not develop diabetes complications since my wounds heal quickly". It was also striking that the
232 patients got lower scores for perceived susceptibility in the item "Type 2 diabetes is as serious as
233 Type 1 diabetes." This is a widespread belief and can be attributed to the fact that patients with
234 Type 1 diabetes have to take insulin and frequently have acute complications. A considerable
235 proportion of the patients agreed with the following two items expressing negative health beliefs:
236 "I do not have to check my feet as long as they look healthy" (item 22) and "Diabetes can be cure
237 and therefore, it is not a serious illness (item 23). This agreement shows that the patients had weak
238 health beliefs about checking their feet and seriousness of the disease. When perceived
239 susceptibility and perceived seriousness are dealt with together, they are called perceived threat

(Champion and Skinner, 2008). As a result, although the patients included in this study had low scores for health beliefs, some proportion of the patients had lower scores for diabetes related perceived threat.

In the HBM for diabetes and its treatment, responses scored four or above indicate a positive health belief. In the present study, the health belief score obtained by the elderly diabetes patients was about 4 and it was higher than those obtained in other studies using the same scale (Mann et al., 2009, Kartal, 2014, Yandım, 2011). However, the patients got lower scores for perceived susceptibility to diabetes and its treatment than for other subscales. It may be that the patients did not have sufficient education about diabetes. As presented in Table 2, the patients' scores for health beliefs about diabetes were affected by their education levels and receiving education about diabetes.

This study has two limitations. The first limitation of this study is that it was performed on elderly diabetes patients living in a small town. Therefore, the results of the study are restricted with this population. The second limitation of the study is that self-efficacy was not evaluated. In fact, the subscale self-efficacy was not included in the validity and reliability analyses.

5. Conclusions

In conclusion, in our study, diabetes is one of the most frequent health problems in the Turkish population. An effective management of this disease requires making changes in patients' life styles. Diabetes patients' compliance with their treatment and new life styles is associated with their beliefs about diabetes and its treatment. The elderly diabetes patients included in this study had a median of value of 3.81 for HBMS for Diabetes, indicative of a negative health belief, and lower scores for the subscales perceived susceptibility and perceived seriousness. The study revealed that there was a relation between income and perceived seriousness and the patients with higher education levels got higher scores for all the subscales out of perceived seriousness and that the patients offered education about diabetes had higher scores for the scale and its subscales. Diabetes self-management education is an important tool to develop a positive health belief about diabetes. Aging related losses of abilities and education levels should be taken into account in preparation and implementation of education programs about diabetes. In addition, self-efficacy is an important cognitive variable incorporated into HBM. Further studies on health beliefs about diabetes and its treatment should also include this variable and should be performed on elderly diabetes patients from all regions so that they represent the conventional population.

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PRIMARY SOURCES

1. Ming Yeong Tan. "The relationship of health beliefs and complication prevention behaviors of Chinese individuals with Type 2 Diabetes Mellitus", Diabetes Research and Clinical Practice, 2004
   Crossref
   82 words — 1%

2. Tavassoli, Elahe; Reisi, Mahnoush; Javadzad, Seyed Homamodin; pour, Zabiholah Gharli; Gilasi, Hamid Reza; Ghasemi, Sima and Hafez, Asghar Ashrafi. "The effect of education on the improvement of fruits and vegetables consumption aiming to preventing colorectal cancer", Gastroenterology & Hepatology from Bed to Bench, 2014.
   Publications
   49 words — 1%

3. seaoc.org
   Internet
   34 words — 1%

4. www.sstbdergisi.com
   Internet
   25 words — < 1%

5. Shuan-Hong Zhang, Yue Zhao. "Cogenetic origin of mafic microgranular enclaves in calc-alkaline granitoids: The Permian plutons in the northern North China Block", Geosphere, 2017
   Crossref
   22 words — < 1%

6. www.biogeosciences-discuss.net
   Internet
   18 words — < 1%

7. Nalini M Selveindran, Syed Zulkifli Syed Zakaria, Muhammad Yazid Jalaludin, Rahmah Rasat. "Quality of Life in Children with Disorders of Sex Development", Hormone Research in Paediatrics, 2017
   18 words — < 1%

Crossref

8 www.inspq.qc.ca
Internet

16 words — < 1%

9 Hognestad, A.. "Plasma C-reactive protein as a marker of cardiac allograft vasculopathy in heart transplant recipients", Journal of the American College of Cardiology, 20030806
Crossref

14 words — < 1%

10 Vahid Garousi, Matt M. Eskandar, Kadir Herkiloğlu. "Industry–academia collaborations in software testing: experience and success stories from Canada and Turkey", Software Quality Journal, 2016
Crossref

13 words — < 1%

11 blog.scottnolan.org
Internet

12 words — < 1%

12 Nöthling, Jani, and Ashraf Kagee. "Acceptability of routine HIV counselling and testing among a sample of South African students: Testing the Health Belief Model", African Journal of AIDS Research, 2013.
Crossref

11 words — < 1%

13 "Workplace Reform in the Healthcare Industry", Springer Nature, 2005
Crossref

10 words — < 1%

14 Bartolucci, Enrico G.. "A Clinical Evaluation of Freeze-Dried Homologous Dura Mater as a Periodontal Free Graft Material: Study in Humans*", Journal of Periodontology, 1981.
Crossref

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15 www.clinicaltrials.gov
Internet

10 words — < 1%

16 repositorium.sdum.uminho.pt
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9 words — < 1%

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