ORIGINAL ARTICLE

The effect of insight level of adult patients with type 2 diabetes on health behaviors according to the health belief model

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Abstract

Aim The aim of the present research was to investigate the effect of insight level of adult patients with type 2 diabetes on healthcare behaviors according to the Health Belief Model.

Subject and methods This research used a cross-sectional design. Sample size was determined using G-Power. A systematic sampling method was used. The Socio-demographic Characteristics Form, Insight Scale and Health Belief Model Scale in patients with diabetes were used as data collection tools. The data were collected through telephone. The t-test, one-way variance, correlation and regression analyses were carried out.

Results It was detected that patients with a different chronic disease and those who did not exercise created a significant difference on the levels of the Health Belief Model Scale. A positive correlation was detected between the self-acceptance sub-dimension which is one of the sub-dimensions of the Insight Scale, and the health belief model total score, the perceived severity, perceived benefit, and health-related activities sub-dimensions; a negative correlation was detected between the self-acceptance and the perceived obstacles sub-dimension. It was found that the same sub-dimension had a significantly positive effect on the Health Belief Model Scale.

Conclusion The increase in self-acceptance level of the patients is associated with health beliefs and positive health behaviors. The positive effect of the increase in experience was detected on the health belief. It is believed that adequate training provided by nurses to newly diagnosed patients could provide the same effect.

Keywords Diabetes · Type 2 diabetes · Health Belief Model · Insight · Health-related behavior

Introduction

Diabetes with a gradually increasing prevalence all over the world is now an important health problem that threatens public health (Miguel-Yanes et al. 2011). Diabetes occurs as a result of insulin deficiency or defects in the effect of insulin; it may be detected in individuals of all ages and significantly reduces the quality of life of individuals (Karadakovan and Aslan 2022). It has been reported that changes such as environmental factors, nutrition, movement, and lifestyle in diabetes which are known to play an important role in genetic transmission affect the appearance of the disease (Davies et al. 2018). It was determined according to the data of the International Diabetes Federation (IDF) that there are 463 million people with diabetes between 20 and 79 years of age globally (IDF 2019). The TURDEP-I study on the gradually increasing prevalence of diabetes in Turkey detected that 7.7% of the population over 20 years of age have diabetes; and according to the TURDEP-II study, 13.7% of the population has diabetes (Satman et al. 2013). According to the report published by the IDF in 2019, the incidence of diabetes in adults in Turkey is 12% (IDF 2019). It is emphasized that diabetes, from which approximately 3.8 million people die every year, has an increased prevalence especially over the age of 40; many acute/chronic complications occur in cases where control is not provided and necessary precautions are not taken, and this makes it difficult for individuals to comply with treatment (Davies et al. 2018; He et al. 2017).

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The treatment compliance of the patients with diabetes is very important in order to increase the quality of life of the individuals and to reduce possible negativities from the disease (Currie et al. 2012). It is important to increase the insight and motivation of individuals to support their compliance to treatment (Demirtas and Akbayrak 2017). The individual may be aware of their physical, emotional and mental state with insight (self-awareness) which has an important place in the psychology literature. Individuals with higher insight in case of a problem or illness in themselves are likely to participate more effectively in treatment (Akdogan and Turkum 2014). There are many difficulties in the management and adaptation process of diabetes, which has a psychological effect in addition to the physical effect on the individual. Complications caused by the disease and thoughts of individuals losing their sense of control for the future in their own bodies affect the social life of individuals and negatively affect their adaptation to diabetes (Fedrick and Temu 2012). Therefore, increasing the insight for all individuals with any chronic disease such as diabetes would be important to facilitate the adaptation to the disease and to develop healthier attitudes. It was observed in studies that individuals with higher insight about their disease manage the treatment process more effectively, and they are more successful in developing positive health behaviors (Al-Maskari et al. 2013). Studies have shown that individuals with higher awareness and effectiveness toward their disease are better able to cope with diabetes and stay away from disease-related complications (Kayabasi and Korkut 2021). It is important for individuals with diabetes to adopt all kinds of attitudes and behaviors that are beneficial for them to improve their health, to increase their awareness of the disease to minimize the damage caused by diabetes and to improve their health. Therefore, insights (awareness) of patients with diabetes on their disease as well as their health behaviors should be assessed. Nurses who provide care for patients with diabetes and play an important role in the delivery of primary health care services have an important role in cooperating with patients on awareness of the conditions and symptoms that lead to appearance of the disease (Azami et al. 2018). Furthermore, nurses play an important role in increasing the insight of individuals with diabetes about their disease, in effectively overcoming the physical and emotional problems that may arise, and in the ability of patients to self-manage diabetes (Jutterstrom et al. 2016). The aim of the present research was to determine the effect of the insight level of patients with diabetes on compliance to the disease and health behaviors.

Research questions

- How do demographic characteristics and health behaviors of the patients with type 2 diabetes affect the Health Belief Model score?

- What is the association between the age and disease duration of the patients with type 2 diabetes and their health behaviors according to their health beliefs?
- What is the association between the insight levels of the patients with type 2 diabetes and their health behaviors according to their health beliefs?
- Does the level of insight of type 2 diabetes patients affect health behaviors of these patients according to their health beliefs?

Methods and materials

Study design, setting, and period

This research is a cross-sectional study, one of the analytical research types. The current research was conducted with patients present in the community between April 2022 and September 2022. It was completed with patients who could be reached by telephone.

Participants

The population of the study consisted of all patients with type 2 diabetes who have phone numbers registered in a health institution. The sample size was calculated using the G-power analysis method. The sample size of the study was determined as 119 with the assumption of $1–\beta = 0.80$ power and $\alpha = 0.05$ significance level and $f = 0.51$ effect size. The systematic sampling method, one of the probabilistic sampling methods, was used. A total of 119 adult patients diagnosed with type 2 diabetes who accepted to participate in the study constituted the sample group of the study. All adult individuals diagnosed with type 2 diabetes who can speak Turkish, read and write, without any mental illness and mental disability were included in the study. Individuals who had perception problems and answered the questions incorrectly or incompletely (2 patients) were excluded from the study.

Dependent and independent variables of the research

The dependent variables of the study are the health behaviors of the patients according to the health belief model. Independent variables are sociodemographic variables and insight levels.

Data collection tools and techniques

The sociodemographic characteristics form prepared by the researchers, Health Belief Model Scale in Diabetes Patients and Insight Scale were used as data collection tools.

Sociodemographic characteristics form

This form was created by the researchers through literature scan (Kayabasi and Korkut 2021; Davies et al. 2018; Azami et al. 2018) and evaluates the age, gender, education level, and some sociodemographic characteristics of the individuals in the research sample. Twenty questions including one open-ended questions exist in the form.

Health belief model scale in diabetes patients

This scale was developed by Tan in 2004 based on the 5 sub-dimensions of the Health Belief Model developed by Schwab et al. in 1994 (Schwab et al. 1994). The scale was developed to evaluate the health beliefs and attitudes of individuals with diabetes and to examine their health behaviors. The scale consists of 36 items under 5 sub-dimensions including perceived sensitivity (5 items), perceived seriousness (3 items), perceived benefits (7 items), perceived barriers (11 items), recommended health-related activities (10 items). A 5-point Likert form is used to evaluate the scale. The rating is done as strongly disagree (1) and strongly agree (5). Some questions in the scale were reversely coded. Items 3 and 4 in the perceived sensitivity sub-dimension and items 16, 17, 18, 19, 20, 21, 22, and 23 in the perceived barriers sub-dimension were reversely coded. A score of four and above indicates higher health belief, whereas scores below four indicate a lower health belief. Tan applied the Health Belief Model Scale (SIM Scale) on Chinese individuals with type 2 diabetes mellitus and found the scale valid and reliable. The reliability of internal consistency was calculated through the Cronbach alpha coefficient. The Cronbach alpha value is 0.72 for whole scale (Tan 2004). The Cronbach's alpha coefficient was determined as 0.77 in this research.

The insight scale

It is a 20-item Likert-type scale developed by Akdogan and Turkum (2018) to determine the level of insight, with a five-point scale with 1 indicating "never" and 5 indicating "always." Items 4, 9, 13, and 17 of the scale are reversely scored. It is accepted that the higher the score, the higher the level of insight. EFA analyses show that the scale has three sub-dimensions, including the "holistic view," "self-acceptance," and "self-understanding," and the three dimensions together explain 45.24% of the total variance. It is reported that the Cronbach alpha value is 0.84 (Akdogan and Turkum 2018). The Cronbach's alpha coefficient was determined as 0.83 in this research.

Data collection method

A data collection tool including the sociodemographic characteristics form prepared by the researchers, Health Belief Model Scale in Diabetes Patients, and Insight Scale was prepared. The data were collected by telephone interview technique. The forms of the patients who accepted to participate in the study and filled out the data collection tools were evaluated. The completion time of the questions in each form lasted for approximately 10 to 15 minutes.

Data processing and analysis

The data obtained for statistical analyses were analyzed using the IBM SPSS Statistics 24.0 package program. Any p value below 0.05 was accepted as statistically significant. The compliance of demographic characteristics with normal distribution was checked through the Kolmogorov–Smirnov test. Descriptive statistics (mean, standard deviation, median value, minimum, maximum, number, and percentile) were provided for the categorical and continuous variables of the study. The t-test and one-way analysis of variance were performed in independent groups for data comparison. The correlation between two continuous variables was evaluated with the Pearson correlation coefficient and with the Spearman correlation coefficient in cases where parametric test prerequisites were not met. The regression analysis technique was used to assess the effect of independent variables on different parameters.

Results

The results obtained from adult patients with type 2 diabetes are described in this section with the help of tables. The review of demographic characteristics of patients with diabetes who have participated in the study revealed that 65.5% of the participants were female, 83.2% of them were married; 56.3% of them had lower education level, and 67.2% of these participants have moderate income level. It was detected in the assessments according to diabetes or healthy living behaviors that only 12.6% of them did not have a relative with diabetes. It was determined that 84% of them had no problem in compliance with the treatment, only 21.8% of the participants exercise, 47.9% of them had another chronic disease other than diabetes, alcohol and cigarettes were used by a limited number of the participants, and 69.7% considered themselves moderately healthy. When the effect of demographic variables or health behaviors on the total score of the health belief model scale was reviewed, it was detected that those with a different chronic disease had 3.42±0.25, and those who did

not exercise had moderate health beliefs with 3.40±0.30; these results were significant ($p < 0.05$; Table 1).

The assessment of the association between the insight scale and its sub-dimensions revealed a positive significant association between the sub-dimensions and the total insight score ($p < 0.01$). It was observed that this association was lower between self-understanding and self-acceptance sub-dimensions, and higher between insight total score and holistic view and self-understanding sub-dimensions (Table 2).

The association between the Health Belief Model Scale in Diabetes Patients and its sub-dimensions indicated that the lowest negative correlation was between perceived benefits and perceived sensitivity, and the highest correlation was between perceived barriers and health-related activities sub-dimensions. It was detected that the lowest positive correlation was between the perceived obstacles sub-dimension and the scale total score, and the highest correlation was between the health-related activities sub-dimension and the scale total score (Table 3).

Table 2 The relationship between the Insight Scale and its sub-dimensions (n = 119)

	Holistic view	Self acceptance	Self understanding
Self acceptance	0.394**		
	0.000		
Self understanding	0.724**	0.276**	
	0.000	0.002	
Total Score	0.897**	0.684**	0.822**
	0.000	0.000	0.000

*$p < 0.05$; **$p < 0.01$ [1]: Spearman correlation coefficient (r); Summary statistics are given as r (p) values

The association between the mean age and time of diagnosis of the disease, and the scale average of the patients were evaluated. It was detected that the lowest negative correlation was between self-understanding sub-dimension and the Health Belief Model Scale total score, and the highest correlation was between the mean age and the holistic view sub-dimension of

Table 1 Comparison of the demographic variables and health behaviors of the participants and the Health Belief Model Scale total score in diabetes patients

Variables		Frequency		Health Belief Model Scale			
		n	%	Min–Max	Mean±SD	F	p
Gender	Female	78	65.5	1.30–3.82	3.34±0.39	1.022	0.314
	Male	41	34.5	2.76–4.58	3.37±0.31		
Marital status	Married	99	83.2	1.30–4.58	3.36±0.37	0.473	0.493
	Single	20	16.8	2.36–3.82	3.31±0.37		
Educational status	Primary education	67	56.3	2.64–4.58	3.40±0.32	2.156	0.120
	High school	30	25.2	2.36–3.79	3.34±0.32		
	≥ University	22	18.5	1.30–3.79	3.21±0.50		
Income	More	29	24.4	1.30–3.79	3.27±0.51	0.930	0.398
	Middle	80	67.2	2.36–4.58	3.38±0.31		
	Little	10	8.4	2.76–3.73	3.35±0.31		
Family history of DM	1st degree	85	71.4	2.64–4.58	3.38±0.31	2.908	0.059
	2nd degree	19	16.0	2.70–3.79	3.40±0.30		
	None	15	12.6	1.30–3.70	3.14±0.63		
Treatment order	Yes	100	84.0	1.30–4.58	3.35±0.38	0.067	0.796
	No	19	16.0	2.76–3.82	3.34±0.29		
Different chronic disease	Yes	57	47.9	2.67–3.82	3.42±0.25	**5.103**	**0.026***
	No	62	52.1	1.30–4.58	3.29±0.44		
Regular exercise	Yes	26	21.8	1.30–3.82	3.19±0.51	**4.138**	**0.044***
	No	93	78.2	2.64–4.58	3.40±0.30		
Cigaret	Yes	34	28.6	2.67–4.58	3.38±0.38	0.546	0.462
	No	85	71.4	1.30–3.79	3.34±0.36		
Alcohol	Yes	8	6.7	2.76–3.58	3.21±0.27	0.265	0.608
	No	111	93.3	1.30–4.58	3.36±0.37		
Health perception	Good	16	13.4	2.91–3.76	3.33±0.27	0.732	0.483
	Middle	83	69.7	1.30–4.58	3.33±0.39		
	Bad	20	16.9	2.64–3.82	3.44±0.32		

*$p < 0.05$; **$p < 0.01$: Student's t-test. One-way ANOVA test of variance, summary statistics are given as F(p) values, the p values of the variables with significant differences are written in bold

Table 3 The relationship between the Health Belief Model Scale and its sub-dimensions

	Perceived sensitivity	Perceived seriousness	Perceived benefits	Detected obstacles	Health related activity
Perceived seriousness	–0.104				
	0.258				
Perceived benefits	–0.090	0.478**			
	0.332	0.000			
Detected obstacles	0.320**	–0.254**	–0.284**		
	0.000	0.005	0.002		
Health related activity	–0.125	0.385**	0.437**	–0.318**	
	0.177	0.000	0.000	0.000	
Total score	0.173	0.548**	0.686**	0.097	0.771**
	0.059	0.000	0.000	0.296	0.000

*$p < 0.05$; **$p < 0.01$ [1]: Spearman correlation coefficient (r); Summary statistics are given as r (p) values

the Insight Scale. It was detected that the lowest positive correlation was between the mean age and health-related activities, and the highest correlation was between the mean age and the diagnosis duration of the disease. A positive correlation was detected between the self-acceptance sub-dimension, which is one of the sub-dimensions of the Insight Scale, and the health belief model total score, the perceived severity, perceived benefit; a negative correlation was detected between the self-acceptance and the perceived obstacles. A significantly negative correlation was detected between the mean age of the patients and the Insight Scale and sub-dimensions. It was determined that the perceived severity, health-related activities, and health belief significantly increased as the duration of diagnosis increased ($p < 0.05$; Table 4).

When the Health Belief Model Scale was evaluated in patients with diabetes without the effect of the variables in the model, a significant score of 2.68±0.258 was obtained.

It was found that the Self-acceptance, Self-understanding and Insight total scores positively affect the levels of the Health Belief Model Scale in patients with diabetes. This effect was determined significant with 0.02±0.008 in the self-acceptance sub-dimension ($p < 0.01$; Table 5).

Discussion

The progression of type 2 DM is basically under the control of the patients themselves. The insight level of the individuals is very important to control diabetes, comply to the treatment, acquire the necessary positive health behaviors, and maintain it. The effect of insight levels of type 2 DM patients on health behavior was investigated in this study.

Table 4 Investigation of the relationship between patients' age, disease duration and insight levels and health belief levels

	PS	PSR	PB	DO	HRA	HBF	DD	Age
HV	–0.171	0.027	0.090	–0.169	0.120	0.030	–0.144	–0.269**
	0.063	0.773	0.330	0.066	0.192	0.748	0.119	0.003
SA	–0.120	0.191*	0.288**	–0.214*	0.255**	0.227*	–0.160	–0.056
	0.194	0.038	0.001	0.019	0.005	0.013	0.082	0.547
SU	–0.171	0.034	0.057	–0.145	0.035	–0.031	–0.177	–0.266**
	0.063	0.712	0.541	0.116	0.705	0.736	0.055	0.003
IT	–0.192*	0.101	0.178	–0.218*	0.171	0.092	–0.197*	–0.248**
	0.037	0.275	0.053	0.017	0.063	0.318	0.032	0.007
DD	0.105	0.224*	0.115	0.025	0.183*	0.245**		0.402**
	0.254	0.015	0.212	0.791	0.047	0.007		0.000
Age	0.066	0.141	0.182*	0.022	0.105	0.190*	0.402**	
	0.479	0.126	0.048	0.809	0.255	0.039	0.000	

*$p < 0.05$; **$p < 0.01$ [1]: Spearman correlation coefficient (r); Summary statistics are given as r (p) values. HV, holistic view. SA, self-acceptance, SU, self-understanding, IT, insight total, DD, disease duration, PS, perceived sensitivity, PSR, perceived seriousness, PB, perceived benefits, DO, detected obstacles, HRA, health related activity, HBF, health belief total

Table 5 The effect of patients' Insight Scale level and sub-dimensions on the Health Belief Model Scale

		Unstandardized B±SH	Standardized Beta	t	p
Health Belief Model Scale	Constant	2.68±0.258	–	**10.396**	**0.000**
	Holistic view	0.00±0.009	0.020	0.151	0.880
	Self acceptance	0.02±0.008	0.278	**2.901**	**0.004**
	Self understanding	–0.00±0.011	–0.053	–0.419	0.676
	Insight scale total score	0.003±0.003	0.092	1.003	0.318

Durbin–Watson = 1.827
R^2 = 0.144
F = 3.799 p = 0.003 **

$*p < 0.05$; $**p < 0.01$ 1: Regression analysis (F); 2: Coefficient analysis (t); Summary statistics are given as regression coefficient (standard error) value, the p values of the variables with significant differences are written in bold.

It was determined in the present study that individuals with chronic diseases other than type 2 diabetes had a significantly higher health belief. This finding indicates that individuals with multiple chronic diseases affect attitudes, values and beliefs more on health behavior. The individuals with a chronic medical condition should be active in the management of their disease (Pon et al. 2019; Carey et al. 2018). It was detected in a study conducted on individuals with diabetes that individuals with chronic diseases other than diabetes had a significantly higher disease acceptance (Akturk and Aydinalp 2018). A cross-sectional study by Melkamu et al. (2021) reported that the severity of the disease perceived by patients with diabetes had a significant effect on their health belief. However, there are also study results indicating that the health belief which changes depending on the perceived severity of the disease in individuals with diabetes negatively affects health behaviors (self-care) in case of other concomitant diseases (Melkamu et al. 2021; Traina et al. 2015). It is considered that the disease severity perceived by the individuals with multiple chronic diseases on their health increases in parallel with this increase. The results of the research and the literature information are usually similar. However, an opposite result was obtained in the self-care study by Melkume et al. Behaviors such as diet and not smoking are included in general health behaviors, and self-care includes care that requires muscle strength and energy (Melkamu et al. 2021). Since multiple chronic diseases may cause loss of muscle power and energy, results may be affected differently. Therefore, the difference is considered to be originated from the self-care. A limited number of studies was detected in the literature on how the health belief behaviors of patients with diabetes change in the presence of other chronic diseases.

It was determined in the study that individuals who do not exercise have a significantly higher health belief. This indicated the fact that people who do not feel sick do not need to exercise. Individuals start exercise only after they begin to experience health problems. In fact, the literature review reveals that the participants do not start exercising without perceiving that they are sick. A previous study on individuals with type 2 diabetes suggested that physical activity brings permanent lifestyle changes in these patients (Koenigsberg and Corliss 2017). The increase in the problems that occur in the case of prolonged disease leads individuals with diabetes to physical activity in order to control the disease better (Sarbazi et al. 2019). Furthermore, some references indicated that physical activity and exercise required for prevention and control of chronic diseases are not considered as a basic requirement (Sánchez et al. 2019; Lima et al. 2019). It is believed that understanding the importance of physical activity for diabetes control may influence this outcome. This information in the literature and the research results are not consistent.

A positive correlation was detected between the self-acceptance sub-dimension which is one of the sub-dimensions of the Insight Scale, and the health belief model total score, the perceived severity, perceived benefit, and health-related activities. As the level of self-acceptance increased in insight of the patients, their beliefs about the disease severity, the benefits of treatment and practice, and the benefits of activities for health also increased. In a study conducted with diabetes patients, it was emphasized that the acceptance of the disease is important in long-term chronic diseases (Lawson et al. 2013). Lawson et al. (2013) detected that individuals have improvements in health-related activities by increasing the acceptance of the disease after a certain period of time after the diagnosis. Studies concluded that providing adequate information to patients with diabetes and ensuring a self-acceptance process are important in changing the perspective on diabetes (Lawson et al. 2013). It was stated in a previous study conducted by Akturk and Aydınalp (2018) that there is a positive association between acceptance of the disease and overcoming the disease in individuals with diabetes. It is predicted that the development of a sense of "self-acceptance" related to the disease in individuals may also reduce the barriers that individuals perceive in their healthy behavior attempts.

Another outcome of the study was a significantly negative correlation between insight total score and perceived sensitivity, perceived barriers, and age. It was observed that the increase in the level of insight has a positive effect on the orientation toward healthy behaviors by increasing the perceived risks of diabetes in individuals. The insight is accepted as recognition of the individuals about their illness, noticing the symptoms, and observing changes created in their body. A previous study concluded insight reduces perceived disability in chronic diseases (Abraham et al. 2015). Individuals need more information about their diseases along with the increase of insight. It is known that this situation creates positive effects in care practices (Abraham et al. 2015; van Puffelen et al. 2015). It is believed that individuals with type 2 diabetes who have the awareness requirements to cope with the disease such as diet, exercise, and nutrition balance are less worried about the complications that may arise. It is important to develop adequate health beliefs in the absence of symptoms or emerging complaints to increase the necessary insight in patients and transform this into a positive effect on health behavior. The negative correlation between the age and insight obtained as a result of the research is considered to be related to the acceptance process of the disease. The negative association between the age and insight as a result of the research is believed to be associated with the acceptance process of the disease. Changes in lifestyle become a lifestyle in the future. This may cause successful control of the disease. The health belief may also increase. Therefore, it is considered that the perception of health increases with age; however, the insight on the symptoms of the disease decreases. Furthermore, it was observed in the present study that the perceived severity, health-related activities, and health belief also increased significantly along with the increase in the diagnosis duration of the patients and their disease experience. Similarly, it was found in the literature that the level of acceptance of the disease and blood sugar level control increased with age (Rho et al. 2015; Berhe et al. 2020). However, Shamshirgaran et al. (2017) concluded that younger patients with diabetes have better glycemic control and positive health behaviors when compared to older individuals (Shamshirgaran et al. 2017). It was determined in the study conducted by Mellergard et al. in 2020 that the glycemic level of older individuals was lower and within the desired range when compared to younger individuals (Mellergård et al. 2020). It is predicted that the difference between the studies may be associated with cultural differences. It is believed that better glycemic control in elder individuals may actually be due to gaining more experience with diabetes, perception differences exist among the elderly, the perception capacity of young people may be better even though their experience level is lower, and these situations would affect the results.

In this study, a significant result was obtained from the Health Belief Model Scale without the effect of the variables in the model. Furthermore, it was determined that the level of self-acceptance of the patients affected their health belief levels positively and significantly. Melkamu (2021) detected that higher self-efficacy results in good self-care practices (Melkamu et al. 2021). It is seen in the results of the study that the self-acceptance levels of individuals with diabetes are associated with self-efficacy and performing the necessary health behaviors for diabetes is affected by this self-efficacy (Yanik and Erol 2016; Orhan and Karabacak 2016). It is observed that it is important for individuals with diabetes to develop positive health behaviors in the process of accepting themselves and their disease positively. It is believed that individuals with type 2 diabetes should have a higher insight in order to cope with their disease and achieve symptom control.

Conclusion

It was detected at the end of the study that the patients with different chronic diseases who were experienced in chronic diseases had higher health beliefs. It was determined that the patients who exercised were usually patients with lower health belief. It was observed that patients with higher self-acceptance levels also had higher levels of health beliefs, and this reflected on their health behaviors positively. The health belief level of the patients who had a longer diagnosis duration and experience with this disease had a higher acceptance of the disease. As the level of self-acceptance increased, the level of health belief also positively increased. The outcomes revealed the positive effects of insightful illness acceptance on health beliefs and health behaviors. Further studies should thereby be planned to increase the insights of patients with diabetes. The number of studies indicating the effectiveness of applied research such as behavioral therapies should be increased. Communication and education issues that would improve health beliefs and attitudes in health institutions, especially during nurse–patient communication, should be determined. We believe that developing diabetes nursing practices, especially in health centers, and spreading the fields that will help to increase the insight of the patients will allow development of positive behavior in individuals. It is recommended to plan individual or group trainings, to get support for implementation of these plans from superiors, and to provide effective and periodic trainings by nurses instead of waiting for patients to learn by experience to improve health beliefs of the individuals and to increase awareness of their disease. Furthermore, further interventional studies are needed to determine the effectiveness of individual/group training or behavioral therapies on insight.

Limitations of the research

Since the research was conducted with patients with type 2 diabetes who continued to be treated at home rather than a clinic, contacting patients was difficult. Contacting patients by phone was challenging and time consuming. This practice has been challenging and limiting in this respect.

Data availability Not applicable

Declarations

Ethical statement Written approval was obtained from the ethics committee of KTO Karatay University Non-Pharmaceutical Research in order to conduct the study (Decision no: 2022/012; Date of Decision: 14/04/2022). It was explained to each patient interviewed by phone that the purpose of the study, the study was voluntary, and they could withdraw from the study at any time. Verbal consent was obtained from the participants. Then, the written document was sent via e-mail and consent was obtained. Declaration of Helsinki rules were complied with at every stage of the study.

Conflict of ınterest There is no conflict of interest among the researchers involved in this study. Researchers did not receive any financial aid throughout the study.

Ethical statement Consent to participate has been obtained.

Permission to publish has been obtained from KTO Karatay University Non-Pharmaceutical Research (Decision no: 2022/012; Date of Decision: 14/04/2022).

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