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Health Locus of Control, Health Related Behaviors and Demographic Factors: A Study in a Turkish Population

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Authors' contributions

This work was carried out in collaboration between all authors. Author AO designed the study, and wrote the protocol. Author FOD managed data collection and literature searches. Authors NB and NB performed the statistical analyses. Author NB wrote the first draft of the manuscript. All authors read and approved the final manuscript.

Original Research Article

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ABSTRACT

Aims: The purpose of this study was to examine the association between socio-demographic variables and the health locus of control (HLC) as well as health locus of control and health-related behaviors.
Study Design: Cross-sectional, descriptive.
Place and Duration of Study: This study was conducted in 2012 in the fourth largest city of Turkey. Data collection lasted about six months.
Methodology: Participation in this study was voluntary and data collection was conducted anonymously. Convenience sampling was used. People on the streets, in parks, in shopping centers, metro stations, and students at the university campus were informed about the study and asked to participate. A total of 1125 people were asked and 885 gave their verbal consent. The participation ratio was 78.7%. The study participants (437 women and 448 men aged 18-84 years) filled out the Multidimensional Health Locus of Control (MHLC) scale, together with a questionnaire about their social, demographic and economic characteristics and a questionnaire regarding their health-

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related behaviors which was consisted of 10 items.
Results: The Cronbach α of the MHLC scale was within the range 0.74-0.78. Internal health locus of control was determined in 71.4% of the participants; chance in 10.3% and powerful others in 18.3%. The rate of powerful others health locus of control (HLC) increased with age. There were no HLC differences between males and females. No significant relationship was found between socio-economic characteristics and HLC. Of the evaluated 10 health related behaviors, physical exercise; reading health related printed material; checking food expiry dates, and reading food content labels were found to be significantly related to HLC.
Conclusion: Except for age, no significant associations were found between socio-demographics and health locus of control. The impact of HLC on health related behaviors was small.

Keywords: MHLC scales; health locus of control; health related behaviors; Turkey.

1. INTRODUCTION

The results of The Global Burden of Disease Study 2010 [1] showed that infectious diseases, diseases related to maternity and childhood, and malnutrition now cause fewer deaths and less illness than they did twenty years ago. However, non-communicable diseases, such as cancers, cardiovascular diseases, diabetes, and chronic respiratory diseases have become the dominant causes of death and disability worldwide [2]. Studies have shown that all these non-communicable diseases share common risk factors which are closely related to lifestyle and behaviors. Alcohol and tobacco consumption, unhealthy diet, and physical inactivity are examples of common unhealthy behaviors. A significant proportion of this burden could be prevented with adequate and sustainable changes in lifestyle. Lifestyle changes are largely determined by social or psychological factors, including the health belief of the individual. Thus understanding the health belief of an individual is a prerequisite for changing unhealthy behaviors. Researchers have long been interested in the determinants of health related behavior, paying particular attention to the beliefs people hold about their health. One construct which has attracted a lot of interest in this area is the Health Locus of Control (HLC) and it is defined as the perception of what controls one's own health [3-5]. HLC has its origins in Rotter's (1954) theory, which hypothesized that individuals may have an internal or external locus of control[6]. In Rotter's theory, the likelihood of a desired reinforcement occurring as the result of a particular behavior and the value of that reinforcement to the individual are the main determinants of behavior potential [7]. Wallston, Wallston & DeVellis applied Rotter's idea to the health domain and developed the Multidimensional Health Locus of Control (MHLC) scales [8]. The MHLC scales have been used in numerous studies for over 30 years and have helped researchers to understand the role of beliefs in the context of health behaviors, health outcomes and healthcare [8,9]. There are 3 types of MHLC scales; MHLC- A and B scales tap beliefs about control of one's health status while MHCL-C scale taps beliefs about control of one's illness. Each of these scales contains three subscales:

1. Internal HLC (IHLC), measures an individual's tendency to believe that health outcomes are due mainly to one's own behavior.
2. Powerful others HLC (PHLC), measures an individual's tendency to believe that health outcomes are due mainly to health professionals,

3. Chance HLC (CHLC), measures an individual's tendency to believe that health outcomes are due mainly to chance or fate.

PHLC and CHLC are classified as external belief and IHLC as internal belief [8,9]. The hypothesis for people who score highly on the IHLC dimension and believe that their own health behaviors determine their own health status is that they should be more likely to carry out healthy behaviors than those with low scores on the IHLC [3,4,7]. Similarly the hypothesis for people who score highly on the CHLC dimension and believe that their health status is determined by chance, fate or luck is that they should be less likely to carry out recommended health behaviors. The hypothesis for people who score highly on the PHLC dimension and believe that their health status is determined by powerful others (health professionals) is less straightforward and more complex because these kind of people could be both more or less likely to carry out healthy behaviors. Powerful others beliefs might be associated with less healthy behavior if individuals believe that health problems can be managed by health professionals [7,10].

In Western countries the relationships between MHLC scores and various types of health-related behaviors such as smoking, alcohol drinking, healthy eating etc. have been assessed [10-19]. In most of the studies where MHLC scales were used as a determinant of health-related behaviors, researchers found inconsistent and small associations between MHLC scores and health behavior and they argued that this may be due to small sample sizes and over reliance on the statistical methods used [7]. In a study of 7000 university students from different European countries, researchers used Form B of the MHLC scale along with a measure of 10 health behaviors [10]. IHLC scores were found to be positively associated with four of the behaviors (physical exercise, fibre intake, avoidance of fat, limiting salt intake). CHLC scores were negatively associated with six of the behaviors (smoking, alcohol consumption, regular breakfast, daily fruit, fibre intake, avoidance of fat) and PHLC scores were positively associated with two (avoidance of alcohol consumption, daily fruit intake) and negatively associated with four of the health behaviors (physical exercise, tooth brushing, seat belt use and avoiding salt intake). A recent survey on the basis of a nationally representative adult population from Germany revealed that the risk of unhealthy behavior is generally similar in persons with a high health locus of control compared to those with a low health locus of control [13]. The same study found that the chance dimension showed the most significant associations with all unhealthy behaviors such as less physical exercise, fewer dental check-ups, less participation in health courses and less systemic information seeking. Another recent survey of a large sample of university students showed that individuals with CHLC engaged more strongly in unhealthy behaviors whereas those with IHLC related to healthy behaviors [20].

Some studies have assessed the relationship between socio-demographic characteristics and health locus of control [13,18,20,21]. The results showed inconsistencies. Some showed higher PHLC and CHLC scores for women [21], some obtained higher PHLC and IHLC scores for men [13] whereas another one determined higher scores for men in all of the three dimensions of health locus of control [20]. A higher age was accompanied by higher scores of PHLC and CHLC [13,21]. The IHLC score increased with a higher level of education whereas the CHLC score decreased [21]. A study found a negative correlation with duration of education and external health locus of control [22]. Some researchers found that a lower socio-economic status was associated with stronger beliefs in the influence of chance on health [18] whereas others showed that a lower socio-economic status was

associated with higher health locus of control values in all three dimensions [13] and some found no relationship between socio-economic status and health locus of control [22].

In Eastern countries the relationships between MHLC scores and various types of health-related behaviors have not been well studied. There are few studies in literature, most of which have dealt with the psychometric characteristics of the translated versions of the MHLC scales [21, 23-26]. We assumed that a study from an Eastern country with a different cultural and ethnic background would be interesting. As an Eastern country Turkey has roots in a more collectivist culture, and we expected that most of the participants will have a health locus of control which depends on chance.

In Turkey four studies were performed by using the MHLC scales [27-30]. Three of them used MHLC scale B form and one MHLC scale a form. Three of these studies were conducted among students [27-29] and one among patients [30]. One of the studies among students showed that females seemed to perceive their health problems as occurring by chance and internal health locus of control appeared to be a predicting factor for the physical symptom reporting [27]. Another study among students compared two groups of students in terms of health locus of control. One group of students received lectures on health locus of control whereas the other group did not. The lectures on health locus of control were found to increase the perception of internal health locus of control of adolescents while decreasing the chance health locus of control [28]. The last study among students assessed the relationship between adolescents' locus of control and healthy dietary behaviors [29]. The study among patients investigated the relationship between health locus of conrol and quality of life in patients with chronic low back pain [30]. The present study was different from the previous studies because it was performed in a general population and aimed to examine both socio-demographic correlates of health locus of control and the association between health locus of control and health related behaviors. The following questions were addressed:

(1) Is there any relation between socio-demographic characteristics and health locus of control?
(2) Are health behaviors related to health locus of control?

2. MATERIALS AND METHODS

This cross-sectional, descriptive study was conducted in 2012 in Bursa which is the fourth largest city of Turkey. Participation in the study was based on anonymity and volunteering. Questionnaires were distributed by trained university students, filled out by the participants, then collected and checked for missing data by the distributors. Any missing data was completed by the participants. This process took on average about 10 minutes per participant. Approval for this study was given by the institutional review board.

2.1 Participants

The participants of this study were adult residents (≥18 years) of the corresponding city. Convenience sampling was used for the selection of the study participants. People on the streets, in parks, in shopping centers, metro stations, and students at the university campus were informed about the study and asked to participate. During this 6-month process 1125 people were asked to participate and 885 gave their verbal consent.

2.2 Measures

The Turkish version of form A of the MHLC scales was used. The forward-backward procedure was applied to translate Form A of the MHLC scale from English to Turkish. The original scale was translated into Turkish by the authors, and was then translated back into English by two bilinguals who were blind to the original version. The expert panel, which comprised a psychologist, a Turkish language specialist and a public health scientist, reviewed the back translation and made some corrections. The edited version of the MHLC scale in Turkish was submitted to a group of 50 medical students in order to ascertain whether or not the understanding of the questionnaire items was the same as that of the researcher. This pilot study showed no discrepancies so it was decided to use it in its existing form.

The Turkish version of form A of the MHLC scale is the same as the original scale, including 18 items and consisting of three subscales, namely PHLC, CHLC and IHLC. Each of these subscales contains six items with a six-point Likert response scale ranging from 'strongly disagree =1' to 'strongly agree=6'. The total of the scores for items 1, 6, 8, 12, 13, and 17 gives the score for IHLC, the total of items 2, 4, 9, 11, 15, 16 gives the score for CHLC and the total of items 3, 5, 7, 10, 14, 18 gives the score for PHLC. All the subscales are independent of one another. The highest score among the three subscales shows the individual's health locus of control.

Participants completed a second questionnaire about their social, demographic and economic characteristics, which had been prepared by the authors.

The third questionnaire used in the study was about health-related behaviors and consisted of 10 items, which were: Smoking, alcohol consumption, physical exercise, fast food consumption, fruit and vegetables consumption, having breakfast, reading books, booklets etc. about health protection and promotion, watching programs about health issues on TV, looking at food expiry dates, and reading food content labels. For each of these behaviors we gave scores on a 5-points Likert scale ranging from 0 (worst score) to 4 (best score). Scoring was as follows:

Smoking: Current regular smoker=0, Once or twice a week= 1, Not regularly, sometimes=2, Ex smoker=3, Never smoked=4
Alcohol consumption: Current regular consumer=0, Once or twice a week= 1, Not regularly, sometimes=2, Ex consumer=3, Never consumed=4
Physical exercise: Never=0, Used to= 1, Not regularly, sometimes=2 Once or twice a week=3, Regularly every day=4
Fast food consumption: Current regular consumer=0, Once or twice a week=1, Once or twice a month=2, Not regularly sometimes=3, Never consumed=4
Fruit and vegetable consumption: Never=0, Not regularly, sometimes=1, Once or twice a month=2, Once or twice a week=3, Every day=4
Having breakfast: Never=0, Once or twice a month=1, Only on holidays=2, Three days a week=3, Every day=4
Reading books, booklets etc. about health protection and promotion: Never=0, If needed=1, If the subject is interesting=2, Often =3, Always=4
Watching programs about health issues on TV: Never=0, If needed=1, If the subject is interesting=2, Often=3, Always=4
Looking at the expiry date of foods: Never=0, Rarely=1, Sometimes=2, Often=3, Always=4
Reading food content labels: Never=0, Rarely=1, Sometimes=2, Often=3, Always=4

The scores of the health-related ten behaviors were totaled to obtain the total health-related behavior score. The range of the total score was 0-40. Higher scores indicate healthier behaviors. Then the total score was multiplied by 2.5 to give a percentage for better comprehension.

2.3 Analyses

Statistical analyses were made using SPSS V.17.0 package program. Reliability analysis, descriptive statistics, Chi Square, Mann Whitney U and Kruskall Wallis tests were used. We used non-parametric tests because one sample Kolmogorov-Smirnov test showed that the data was not distributed normally.

3. RESULTS

3.1 Description of the Participants

The study group consisted of 885 participants (49.4% female; 50.6% male). Most of the participants (59.4%) were aged between 18-24 years, 65.3% were single and 34.7% were married. Educational level according to the most recently graduated school was as follows: 22.6% primary school, 69.6% secondary or high school and 7.8% university. Economic status in terms of their own perception was reported as 34.0% good, 55.5% moderate and 10.5% poor.

The Cronbach α values of the MHLC scales, which show the internal consistency, were within the range 0.74-0.78 (for IHLC and PHLC 0.78; for CHLC 0.74). Participant distribution according to HLC was determined as 71.4% IHLC, 18.3% PHLC and 10.3% CHLC.

3.2 HLC in Relation to Socio-demographic Characteristics

The mean HLC scores (Mean±SD) were as follows: IHLC:27.40±5.35; CHLC:18.78±6.13 and PHLC:21.38±6.65. Table 1 shows the distribution of the study group according to socio-demographic characteristics and type of HLC.

No statistical difference was found between male and female participants according to HLC. There were more participants aged between 18-34 ages determined with IHLC than those of an older age. Higher rates of CHLC and PHLC were determined in participants aged ≥55 years compared to younger participants. In order to avoid the confounding effect of age we analyzed the statistical difference between other socio-demographic characteristics and HLC separated for every age group and found no significant statistical difference.

3.3 HLC in Relation to Health Behaviors

The total health behavior score of the study group was 63.3±0.52 (mean±SE). Female participants had higher scores. Participants who were 35 years of age and older, who were married and who had graduated from university had higher total behavior scores. The relationship with economic status and health behavior was not found to be statistically significant. Table 2 shows descriptive statistics together with statistical analyses in relation to socio-demographic characteristics and the total health behavior score.

Table 1. Socio-demographic characteristics and HLC of the participants

		HLC			Total	χ^2	P value
		Internal	Chance	Powerful Others			
		N (%)	N (%)	N (%)	N		
Gender							
Male		315(72.1)	49(11.2)	73 (16.7)	437	1.989	0.370
Female		317(70.8)	42(9.4)	89 (19.9)	448		
Age (years)							
18-34		474(75.0)	59(9.3)	99 (15.7)	632		
35-54		108(67.9)	17(10.7)	34 (21.4)	159	20.615	0.001
55 +		50 (53.2)	15(16.0)	29 (30.8)	94		
Age / Education							
	Primary	30(75.0)	3(7.5)	7 (17.5)	40		
18-34	Secondary	417(76.0)	50(9.1)	82 (14.9)	549	3.933	0.415
	University	27(62.8)	6(14.0)	10(23.3)	43		
	Primary	57(64.8)	11(12.5)	20(22.7)	88		
35-54	Secondary	41(77.4)	5(9.4)	7(13.2)	53	6.331	0.176
	University	10(55.6)	1(5.6)	7(38.9)	18		
	Primary	34(47.2)	13(18.1)	25(34.7)	72	4.400	0.110
55+	Secondary and more	16(72.7)	2(14.3)	4(18.2)	22		
Age / Marital status							
≤34	Single	432(76.2)	53(9.3)	82(14.5)	567	6.131	0.05
	Married	42(64.6)	6(9.2)	17(26.2)	65		
≥35	Single	5(45.4)	2(18.2)	4(36.4)	11	Fisher-exact	0.34
	Married	153(63.2)	30(12.4)	59(24.4)	242		
Age / Economic status							
	Good	184(76.7)	17(7.1)	39(16.3)	240		
18-34	Moderate	263(74.1)	40(11.3)	52(14.6)	355	4.610	0.330
	Poor	27(73.0)	2(5.4)	8(21.6)	37		
	Good	31(75.6)	1(2.4)	9(22.0)	41		
35-54	Moderate	61(65.6)	13(14.0)	19(20.4)	93	4.205	0.379
	Poor	16(64.0)	3(12.0)	6(24.0)	25		
	Good	13(65.0)	5(25.0)	2(10.0)	20		
55+	Moderate	23(53.5)	6(14.0)	14(32.6)	43	6.309	0.177
	Poor	14(45.2)	4(12.9)	13(41.9)	31		

p values in bold are significant

Statistically significant difference among different age groups was due to the 18-34 age group. The difference between 35-54 and 55+ age groups was not statistically significant [*U(Mann Whitney U test)*=6806.0, *z*=-1.19, *n.s.*, *r*=-0.07]. Whereas differences between 18-34 and 35-54 age groups (*U*= 38136.50, *z*=-4.708, *p*<0.0001, *r*=-0.16) and as well as between 18-34 and 55+ age groups (*U*= 25107.00, *z*=-2.427, *p*<0.0001, *r*=-0.09) were significant.

Statistically significant difference among different educational levels was due to the secondary level group. The difference between primary and university educated participants was not statistically significant (*U*=6571.50, *z*=-0.59, *n.s.*, *r*=-0.04). Whereas differences between primary and secondary educated participants (*U*=50803.00, *z*=-3.73, *p<0.0001*,

r=-0.13) and as well as between secondary and university educated participants (*U*=15969.50, *z*=-3.39, *p<0.0001*, *r*=-0.12) were significant.

The total health behavior scores according to HLC are shown in Table 3.

Table 2. Descriptive statistics, statistical analyses in relation to socio-demographic characteristics and total health behavior score

Socio demographic characteristics	Total health behavior score				Test statistics	P value	r
	Mean	SD	SE	Median			
Gender							
Male	59.3	15.71	0.74	60.0	Mann-Whitney	0.001	-0.27
Female	67.5	14.27	0.68	67.5	66850.000		
Age (years)							
18-34	61.8	14.95	0.59	62.5	Kruskall Wallis	0.001	
35-54	67.7	17.02	1.35	70.0	25.050		
55 +	66.1	15.25	1.47	66.2			
Education							
Primary	66.4	17.03	1.20	67.5	Kruskall Wallis	0.001	
Secondary	61.8	14.81	0.59	62.5	21.855		
University	67.7	15.59	1.87	70.0			
Marital status							
Single	61.2	14.39	0.59	62.5	Mann-Whitney	0.001	-0.19
Married	67.3	16.85	0.96	70.0	68062.500		
Economic status							
Good	64.8	14.59	0.84	65	Kruskall Wallis	0.105	
Moderate	62.3	15.85	0.72	62.5	4.517		
Poor	63.9	16.75	1.74	62.5			

p values in bold are significant

Table 3. Descriptive statistics and statistical analysis in relation to HLC and total health behavior scores

HLC	Total Health Behavior Score					Test Statistics	P value
	N	Mean	SD	SE	Median		
Internal	632	63.8	14.69	0.58	65.0	Kruskall Wallis	
Chance	91	58.2	17.11	1.79	60.0	10.106	0.006
Powerful Others	162	64.4	17.35	1.36	65.0		
Total	885	63.3	15.55	0.52	65.0		

Participants with CHLC had the lowest and those with PHLC, the highest total health behavior scores and the difference was found to be statistically significant. This significant difference was due to CHLC group. The difference between IHLC and PHLC groups was not significant (*U*=48958.00, *z*=-0.86, *n.s.*, *r*=-0.03) whereas differences between IHLC and CHLC groups (*U*= 23285.00, *z*=-2.942, *p*=0,003 *r*=-0.11) and as well as between PHLC and CHLC groups (*U*= 5762.50, *z*=-2.883, *p*=0.004, *r*=-0.18) were significant.

Health-related behaviors according to HLC are shown in Table 4.

Table 4. Health-related behaviors according to Health Locus of Control

Behavior	Internal N=632	Chance N=91	Powerful Others N=162	χ^2	P value contingency coefficient
Smoking					
Smoker	208 (32.9)	34(37.4)	49 (30.2)		
Quitted	56 (8.9)	12(13.2)	23 (14.2)	6.44	0.16
Never	368 (58.2)	45(49.4)	90 (55.6)		
Alcohol					
Every day	36 (5.7)	6 (6.6)	18 (11.1)		
1-2 times weekly	17 (2.7)	3 (3.3)	4 (2.5)		
Sometimes	137 (21.7)	17(18.7)	27 (16.7)	8.72	0.36
Quitted	38 (6.0)	7 (7.7)	9 (5.6)		
Never	404 (71.4)	58 63.7)	104 (64.2)		
Physical Exercise					
Never	89 (14.1)	23 (25.3)	21 (13.0)		
Used to	75 (11.9)	17 (18.7)	27 (16.7)		
Sometimes	278 (44.0)	26 (28.6)	67 (41.3)	20.72	0.008
1-2 times /week	125 (19.8)	16 (17.6)	23 (14.2)		0.151
Every day	65 (10.2)	9 (9.8)	24 (14.8)		
Fast food					
Every day	32 (5.1)	9 (9.8)	10 (6.2)		
1-2 times /week	152 (24.1)	15 (16.5)	32 (19.7)		
1-2 times /month	95 (15.0)	17 (18.7)	23 (14.2)	7.08	0.53
Rarely	188 (29.7)	24 (26.4)	42 (25.9)		
Never	165 (26.1)	26 (28.6)	55 (34.0)		
Fruit & vegetables					
Never	13 (2.1)	7 (7.6)	9 (5.5)		
Rarely	56 (8.9)	9 (9.9)	11 (6.9)		
1-2 times /month	37 (5.9)	8 (8.8)	8 (4.9)	13.47	0.09
1-2 times /week	214 (33.8)	28 (30.8)	39 (24.1)		
Every day	312 (49.3)	39 (42.9)	95 (58.6)		
Breakfast					
Never	25 (4.0)	9 (9.9)	8 (4.9)		
1-2 times /month	34 (5.3)	8 (8.8)	9 (5.6)		
Only at weekends	87 (13.8)	10 (10.9)	20 (12.3)	10.13	0.26
3 days/ week	137 (21.7)	18 (19.9)	33 (20.4)		
Every day	349 (55.2)	46 (50.5)	92 (56.8)		
Health-related reading					
Never	142 (22.5)	31(34.1)	45 (27.8)		
If needed	126 (19.9)	25 (27.5)	30 (18.5)		
If interested	240 (38.0)	25 (27.5)	47 (29.0)	20.54	0.008
Often	84 (13.3)	6 (6.6)	22 (13.6)		0.151
Always	40 (6.3)	4 (4.4)	18 (11.1)		
Watching health programs					
Never	124 (19.6)	23 (25.3)	36 (22.2)		
If needed	87 (13.8)	13 (14.3)	22 (13.6)		
If interested	258 (40.8)	33 (36.3)	55 (34.0)	8.85	0.35
Often	108 (17.1)	15 (16.5)	25 (15.4)		
Always	55 (8.7)	7 (7.7)	24 (14.8)		

Table 4 Continued……..

Checking food expiry date					
Never	29 (4.6)	14 (15.4)	16 (9.9)		
Rarely	51 (8.1)	8 (8.8)	12 (7.4)		
Sometimes	76 (12.0)	13 (14.3)	20 (12.3)	27.52	0.0006
Often	175 (27.7)	25 (27.5)	28 (17.3)		0.174
Always	301 (47.6)	31 (34.1)	86 (53.1)		
Reading food labels					
Never	85 (13.4)	20 (22.0)	27 (16.7)		
Rarely	116 (18.4)	17 (18.7)	27 (16.7)		
Sometimes	139 (22.0)	14 (15.4)	22 (13.6)	25.27	0.0014
Often	151 (23.9)	17 (18.7)	26 (16.0)		0.167
Always	141 (22.3)	23 (25.3)	60 (37.0)		

Numbers in parentheses are percentages; p values in bold are significant

The most performed health behaviors for the total study group were as follows: Never intake alcohol (64.0%), never smoke (56.8%), having daily breakfast (55.0%); daily consumption of fruit and vegetables (50.4%); always checking food expiry dates (47.2%).

The least performed health behaviors for the total study group were as follows: Always reading health related material (7.0%); always watching health related programs (9.7%); daily physical exercising (11.1%); always reading food labels (25.3%), and never consuming fast food (27.8%).

Among the assessed ten health-related behaviors, four behaviors (physical exercise; reading health related books, booklets etc.; checking food expiry dates, and reading food content labels) were found to be associated with HLC. Of the participants who reported that they never do physical exercise, a higher rate was determined in the CHLC group, whereas of those who reported performing daily physical exercise, a higher rate was determined in the PHLC group. Of the participants who reported that they never do health related reading, a higher rate was determined in the CHLC group, whereas of those who reported reading health related materials as often and always, a higher rate was determined in the PHLC group. Of the participants who reported that they never checked food expiry dates or read food labels were higher among the CHLC group.

4. DISCUSSION

The current study was one of the first to examine the association between HLC and health related behaviors in a Turkish general population using the MHLC scales. Previous Turkish studies, evaluated HLC by using the same scale among students [27-29] or patients [30] and aims of the previous studies were different from ours therefore we had not much opportunity to compare the results of the current study with other studies from Turkey. Previous studies found the mean IHLC and CHLC scores lower than ours whereas the PHLC scores were similar [27-30]. As an Eastern country Turkey has roots in a more collectivist culture, and we expected that most of the participants will have a health locus of control which depends on chance. This study showed that this was not true. Opposite to our expectations most of the participants had an Internal Health Locus of Control and those with PHLC was higher than with CHLC. This finding could be a sign of socio-cultural change more toward individualist cultural norms.

4.1 HLC and Socio-demographic Characteristics

Some previous studies have shown gender differences in terms of HLC although no significant difference was determined in the current study. A study from Japan showed higher PHLC and CHLC scores for women [21] and another study among adult German population revealed higher PHLC and IHLC scores for men [13].

In this study higher age (≥55 years) was particularly associated with higher powerful others and chance HLC values. Some previous studies found similar associations between age and HLC [13,21]. The study among German adult population found that higher age (>45 years) was accompanied by higher values on all three HLC dimensions, with more pronounced differences on the CHLC and PHLC scales, than on the internal scale [13]. Why people in older ages have more powerful others and chance control might be explained in several ways. Older people might have a stronger belief in health professionals. Older people might have to face the burden of chronic diseases and they become dependent on medical care which takes away the perception of self control of their body. We found no significant associations between educational, marital and economic status and HLC. In the Western literature the associations between educational, marital and economic status showed inconsistencies as it is mentioned in the introduction section of this paper and previous Turkish studies did not assessed these relationships.

4.2 HLC and Health Behaviors

According to the Reasoned Action Theory which was developed by Ajzen & Fishbein [31] behavior is determined by the intention; moderated by actual control. Intention is determined by attitude, perceived norm, and perceived behavioral control. Perceived behavioral control influences behavior directly and indirectly through intention. Actual control feeds back to perceived control. Performing the behavior feeds back to the beliefs underlying the three determinants of intention. All possible influences on behavior that are not in the model are treated as background variables and are supposed to be mediated by the determinants in the model.In this model socio-demographics are distal factors for health behaviour, while HLC (perceived behavioral control) is a proximal factor. Therefore, HLC should be closer associated with health behaviours, than socio-demographics. Overall the health behavior score of the total study group was at a moderate level. Older participants, those with university education, or who were married had higher behavior scores. The difference between male and female participants was significant and females had higher scores than males. A statistically significant but small association was found between HLC and the total health behavior score. Among the ten assessed health related behaviors we found no significant relationships in terms of HLC and smoking, drinking, consuming of fast food and fruit and vegetables, having breakfast and watching health programs. On the other hand, four behaviors: physical exercise, health related reading, checking food expiry dates and reading food labels were found to be significantly associated to HLC but these associations were small. The powerful others dimension showed the highest percentages of participants with all healthy behaviors: Everyday physical exercise, always reading health-related materials, always checking food expiry dates and always reading food labels. However, the chance dimension showed the highest percentages of participants with all rather unhealthy behaviors. In literature, a study by Steptoe & Wardle found statistically significant but small correlations between HLC and health behaviors [10]. Other studies found that MHLC scores only accounted for a small fraction of variation in health behavior and the overall predictive value of HLC to be rather small [13,20]. The findings of the current study were in line with

these studies. The small impact of HLC on health behaviors may also be related to the fact that control beliefs are only one aspect relevant to health behavior and are better predictors when they are taken as moderators for the concept of perceived behavioral control [32,33].

Among the previous Turkish studies only one assessed the relationship between HLC and healthy dietary behaviors and found that students with IHLC were more effective than students with CHLC in maintaining healthy dietary behaviors [29].

5. CONCLUSION

At the end of this study, the questions asked in the introduction section of this paper were answered as follows:

(1) Is there any relation between socio-demographic characteristics and health locus of control? Among the assessed socio-demographic characteristics only age was found to be related to health locus of control.
(2) Are health behaviors related to health locus of control? Among the assessed ten health behaviors six were not related to health locus of control whereas four were related.

6. LIMITATIONS

This study evaluated associations between HLC and health behavior in a cross-sectional design. Causal inferences cannot be drawn from such data. Since the data were collected by self completed questionnaires, biases in the reporting of health behaviors cannot be ruled out. Another limitation of this study is the use of convenience sampling which may have resulted in biases and not be a representative sample. Although it has limitations, this is the first study using the MHLC A scale on a relatively large sample in a Turkish population as an example of a study in an Eastern culture and it can therefore be considered to be of value.

CONSENT

All authors hereby declare that all participants of this study gave their verbal consent for participation. Those who did not want to participate were excluded. All questionnaires were filled anonymously.

ETHICAL APPROVAL

Approval for this study was given by the institutional review board.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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