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Factors influencing the water consumption behaviors of the medical students at Inonu University

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Abstract

In this study, the purpose is to determine the water consumption behaviors of Faculty of Medicine students at Inonu University, and to compare these behaviors with some socio-demographical properties. Method: This study was organized in cross-sectional design, and was conducted on 431 students in April 2016 with face-to-face interview method. The questionnaire form consisted of two parts. In the Factor Query part of the questionnaire, there were questions that interrogated the water consumption habits of the students and their socio-demographic properties; and in the Phenomenon Query Part of the study, the Water Consumption Behaviors Scale (WCBS) consisting of 16 items was included. The minimum point that could be received from the scale, which was evaluated in five sub-categories, was 16, and the maximum point was 80. Results: 48,4% of the participants were male; and 51,6% were female. 15,7% consumed water less than one litter a day; 39% consumed between 1-1,5 liter; 24,9% consumed between 1,5-2 liter, 13,8% consumed between 2-2,5 liter; and 6,5% consumed between 2,5-3 liter a day. The average point received from the water consumption scale (47.12±10.13) was as much as 59% of the total points. Conclusions: It was found in the study that the daily water consumption of the students from Faculty of Medicine was inadequate, and the behavior norms of these students that covered the areas like water management, water pollution, and the conscious of taking the personal and social responsibility were at medium level.

Keywords: Water consumption, faculty of medicine student, health

Introduction

Water, as air and food, is among the most important requirements of human life. With the increasing population growth since the 20th century, the problem of global water shortage has arisen because of the pollution of limited water resources by the rising industrialization and the adverse effects of changing climate conditions on fresh water resources. In classical growth theories, water, like other natural resources in our world, was accepted as infinite. However, due to urbanization and industrialization, the ecological threshold values have begun to be exceeded.

The sustainability of water-related policies was brought into question since water resources face a danger of extinction. Today, due to the ever-growing population and increased water use, the size of the crisis is increasing day by day, especially in water-deficient countries. It is predicted that water will be a strategic scarce resource in the future [1]. The demand for water resources, which become more and more scarce across the world, increases rapidly; the amount of water used in agriculture is restricted and the world food safety is in danger. Despite the food needs of a rapidly growing population, the agricultural sector competes with industrial, urban, and environmental uses for a limited resource.

On the other hand, water ecosystems become polluted and poor quality, and the development of new water resources becomes more and more expensive [2]. Today, the world population which is 7.4 billion, uses slightly more than 50% of the renewable surface and groundwater resources. As the human consumption of water increases parallel to the increase of population and changing living conditions, it is estimated that 90% of the renewable freshwater resources will be used by the middle of this century. Only 10% of the available resources will be left for all other living things. Considering the population size and the unconscious use of water resources, it can be said that there will be no water left for ecological and environmental functions [3-5].

While more than one billion people in the world cannot find enough water, 2.4 billion people does not have access to healthy water. In addition to these figures, one billion people will be without water in developing countries in the next 50 years. During the 20th century, world population has tripled while water use has increased 6-fold. As a result of this enormous change, water pollution has reached unprecedented proportions, and more people have become unable to find adequate and quality water [1].

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Given the current water consumption and population data, the water need per capita will increase as the urban population grows. It is also known that the daily water need per capita shows regional differences. The most important reasons for this difference are the abundance of water resources and habits, living conditions, and economic conditions of the communities [6]. According to 2014 data, the share of municipal population served by drinking water network in Turkey is 9%. The proportion of the municipal population served by drinking water treatment facilities is 54%. The amount of drinking water provided by municipalities is 203 liters per person per day [7]. Turkey will be one of the most water-deficient countries in the 2030s if there is no change in population growth and water consumption behavior in the society [8]. The aim of this study is to determine the attitudes of medical school students to water consumption and to determine the factors that influence these behaviors.

Materials and Methods

This is a descriptive cross-sectional study conducted on medical students at Inönü University in April 2016. Administrative permission for the study has been obtained from the Dean of Medical Faculty. The sample of the study was calculated to be 172 based on the data of the pilot study with 80% strength at 95% confidence interval. Simple random and stratified sampling methods were used as a sampling method. Questionnaires were applied to 431 students face-to-face after the written approval of the students.

The questionnaire consists of two parts. In the Factor Query part of the questionnaire, there were questions that probed the students' socio-demographic characteristics and water consumption habits; the Water Consumption Behaviors Scale (WCBS), which was validated in Turkey by Cankaya and Iscen (2014) and consists of 16 items, was included in the Phenomenon Query Part of the study. The scale is a 5-point Likert-type with a minimum of 16 points and a maximum of 80 points that could be received from the scale. A higher score on the scale indicates a more conscious attitude in terms of water consumption behaviors, while a lower score indicates that awareness decreases. WCBS consists of five sub-factors. These are water consumption (Factor 1), water pollution (Factor 2), water conscience (Factor 3), water management at home (Factor 4), and having a personal and social responsibility (Factor 5). "Water consumption" factor involves items 1, 3, 4, and 6; "water pollution" factor involves items 5, 8, and 16; "water conscience" factor involves items 2, 10, and 12; "water management at home" factor involves items 7-11-13; "personal and social responsibility" factor involves items 9, 14, and 15. The Cronbach alpha value of the scale was found to be 0.83. The independent variables of the study are socio-demographic characteristics such as age, sex, place of residence, and graduated high school type, and questions probing the water consumption. The dependent variable is the score obtained from WCBS.

Statistical analysis

The data were statistically evaluated with a software package. In the analysis of the data, Student's t-test, one-way ANOVA, Mann Whitney-U and Kruskal-Wallis and Chi-square tests were used for non-normal distributions. The $p < 0.05$ level was considered significant in all evaluations.

Results

A total of 431 medical students answered the questionnaire. 48.4% of the participants were male and 51.6% were female. The average age was 23.17 for males, 21.84 for females and 22.48 for the whole group. 15.7% of the participants were 1st year students, 16% were 2nd year, 16.7% were 3rd year, 17.2% were 4th year, 16% were 5th year, and 18.4% were 6th year. 14.5% of the working group stays in public dormitory, 11.1% in private dormitory, 44.1% with the family, and 30.3% with their friends. 30.8% of participants were graduated from Science high schools, 56.7% from Anatolian high schools, 11.4% from standard high schools, and 1.2% from Religious high schools (Table 1).

Table 1. Distribution of students by socio-demographic characteristics and water consumption Characteristics

Gender	n	%
Male	200	48.4
Female	213	51.6
Class		
Class 1	65	15.7
Class 2	66	16
Class 3	69	16.7
Class 4	71	17.2
Class 5	66	16
Class 6	76	18.4
Dwelling		
Public dormitory	60	14.5
Private dormitory	46	11.1
Family	182	44.1
Friends	125	30.3
Graduated high schools		
Science high schools	127	30.8
Anatolian high schools	234	56.7
standard high schools	47	11.4
Religious high schools	5	1.2
Social membership		
Yes	116	28.1
No	297	71.9
Water choice for drinking		
Tap water	238	57.6
Bottled water	175	42.4

26.9% of the students stated that they have regular sports activity while 73.1% stated that they do not have regular sports activity. 57.6% consumed tap water for drinking, 42.4% consumed bottled water. 15.7% drink less than 1 liter water per day, 39% between 1-1.5 liters, 24.9%

between 1.5-2 liters, 13.8% between 2-2.5 liters, 6.5% between 2.5 and 3 liters (Table 2).

Table 2. Distribution of daily water consumption amounts of students

Daily water consumption amounts	n	%
Less than 1 liter water	65	15.7
1-1,5 liters	161	39
1,5-2 liters	103	24.9
2-2,5 liters	57	13.8
2,5-3 liters	27	6.5

The minimum score from the scale was 19, the maximum was 80, and the average total score was 47.12 ± 10.13. The participants' total scores on water consumption behaviors were considered in conjunction with various socio-demographic characteristics. The average scale scores of women and men were 47.6 ± 9.6 and 46.5 ± 10.6, respectively (p> 0.05) (Table3).

Table 3. The average total and sub-group scores obtained from WCBS based on gender

Sub-group of the scale	Erkek	Kadın	p değeri
	AO±SS	AO±SS	
Water consumption	12.36±3.29	12.80±3.23	0.198
Water pollution	8.04±2.90	8.73±2.53	<0.001
Water conscience	10.69±2.45	11.03±2.33	0.197
Water management at home	8.98±2.90	8.75±2.75	0.337
Social responsibility	6.48±3.08	6.31±2.52	0.940
Total score	46.56±10.64	47.64±9.63	0.276

The mean scores with respect to the longest living place were 47.03 ± 10.34 for city, 47.89 ± 9.18 for town, and 45.88 ± 10.51 for village (p> 0.05). The average score of those who had any social membership was 49.78 ± 10.54, while those without membership were 46.08 ± 9.79 (p <0.001).

The scores with respect to the completed high school type were 48.25 ± 10.33, 46.63 ± 10, 46.23 ± 10.56, and 49.6 ± 6.1 for Science, Anatolian, standard, and Religious high schools, respectively (p> 0.05). Average scores according to the amount of water consumed per day were 46.32 ± 11.9, 46.42 ± 9.9, 47.1 ± 9.19, 46.28 ± 9.64, 45.81 ± 11.59 for those who consume less than 1 liter, 1-1.5 liters, 1.5-2 liters, 2-2.5 liters, 2.5-3 liters per day, respectively (p> 0.05). According to the monthly average income of the families, the average scores were 49.64 ± 11.07, 46.08 ± 10.31, 47.78 ± 9.29, and 46.33 ± 10.56 for minimum wage or below, 1,301-2,300 TL, 2,301-3,000 TL, and 3,001 TL or above, respectively (p> 0.05). The mean score of those who exercise regularly was 47.55 ± 11.27, and the average of those who did not, was 46.96 ± 9.70 (p> 0.05). The average score of those who consumed tap water for drinking, was 46.75 ± 10.69, and those consuming bottled water were 47.62 ± 9.33 (p> 0.05).

When the mean scores of the subcategories of scale and gender were compared, only a statistically significant difference was found in the scores obtained from the "water pollution" factor, and women had higher score (p <0.001). There was no statistical difference between genders in terms of water consumption, water awareness, home water management, and social responsibility subscales (p = 0.198, p = 0.197, p = 0.337, p = 0.940). A statistically significant difference was found between the average amount of water consumed per day by students who exercise regularly and those who did not (p <0.001); those who exercise consume more water.

There was a statistically significant difference between the social responsibility subscale scores of students who were members of a social group and those who are not (p <0.001). With respect to class levels, statistically significant differences were found between the mean scores for "water conscience" factor (p <0.01), "water pollution" factor (p <0.001), and "social responsibility" factor (p <0.001).

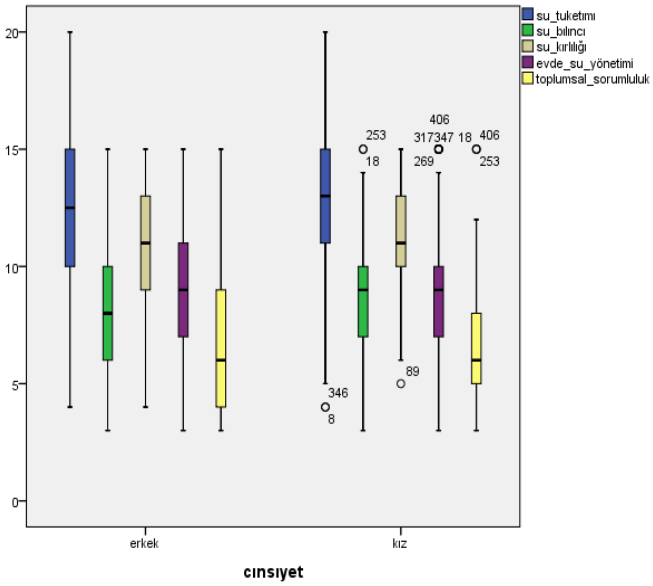
The average scores according to the classes of the students were 50.43 + -9.94 for 1st year students, 47.66 ± 10.19 for 2nd year, 50.88 ± 8.83 for 3rd year, 46.73 ± 10.79 for 4th year, 42.60 ± 10.79 for 5th year, and 44.68 ± 9.13 for 6th year (p <0.001) (Table4).

A statistically significant difference was found between the class levels in terms of average total scores. In the post hoc analyses performed in the subgroups, it was observed that it is due to the 1st year and 3rd year students.

Table 4. The average total and sub-group scores obtained from WCBS based on classes

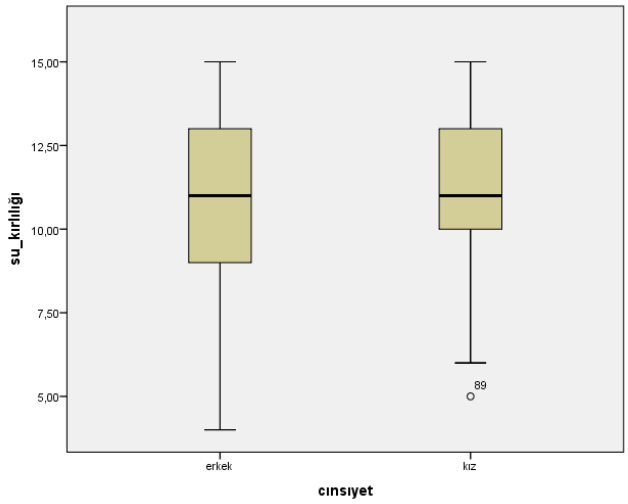
Sınıf	1	2	3	4	5	6	p
Sub-group of the scale	**AO±SS**	**AO±SS**	**AO±SS**	**AO±SS**	**AO±SS**	**AO±SS**	
Water consumption	13.50±3.25	12.66±3.10	13.08±3.23	12.35±3.07	11.83±3.44	12.17±3.30	0.570
Water pollution	9.44±2.53	8.48±2.93	9.84±2.15	8.12±2.41	7.12±2.86	7.48±2.57	<0.001
Water conscience	11.24±2.20	11.15±2.42	11.11±2.27	11.28±2.24	9.84±2.59	10.57±2.29	<0.01
Water management at home	8.66±2.83	9.04±2.65	9.66±2.54	8.70±2.85	8.53±3.16	8.59±2.83	0.125
Social responsibility	7.56±2.80	6.31±2.77	7.17±2.63	6.26±2.73	5.27±2.52	5.85±2.65	<0.001
Total score	50.43±9.94	47.66±10.19	50.88±8.83	46.73±10.79	42.60±10.79	44.68±9.13	<0.001

Graph 1. Distribution and median scores based on gender (*)



*The numbers on the graph show extreme values in the female student group.

Graph 2. Distribution and median scores of "water pollution" factor based on gender



Discussion

Humans are perhaps the most important reason for the environmental problems in the world we live in. The increasing pressure of man over nature and the consequent deterioration of the existing ecological balance have begun to show itself globally and become an important problem [9]. The increase in the world population has led to a higher population density. In addition, the rapidly developing technology has affected the daily life to a great extent and led to an increased consumption [10].

A water shortage problem has appeared in the world due to an increasing industrialization, which pollutes scarce water resources and changing climate conditions, which adversely affect water resources [11]. Water is one of the most important resources for sustainable development. A global cooperation is needed to prevent the world's water resources from being consumed quickly and unconsciously and to prevent the deterioration of water quality [11]. Although 71% of the surface of the earth is covered with water, only 3% of this is usable freshwater. Moreover, 75% of this freshwater is in frozen state in or near the poles. Only 1% of the world's water is within the reach of humans for consumption as freshwater. Taking this into consideration, it will be better understood why freshwater resources must be protected [12].

The highest total score in the Water Consumption Behavior Scale (WCBS) that we use in this study is 80. The average total score of the students in our study is 47.12 ± 10.13. It has been found that the water consumption behaviors of medical students are moderately positive. It is alarming that the water consumption behaviors of students of a profession closely related to health are not at the desired level. In our study, when the participants' total scores on WCBS were evaluated in terms of gender, mean scores were 47.6 ± 9.6 and 46.5 ± 10.6 for women and men, respectively ($p > 0.05$). There was no statistically significant difference, although the water consumption behaviors of women were more positive. In a study conducted by Allac et al. on students of School of Education at Ataturk University (teacher candidates), taking demographic characteristics into consideration, the mean WCBS score of women and men were found 15.75 ± 3.71 and 15.09 ± 4.01, respectively; water consumption scale did not differ based on gender [13]. In another study investigating environmental awareness of senior medical students, Vaizoglu et al. have also concluded that there is no statistical relation between the environmental awareness of students and their gender. Similar results were obtained in our study. It is thought that the reason for this difference is the decrease in the difference of knowledge between genders as the education level increases.

When the averages scores obtained from the subscales were compared, the female students were statistically more positively behaved than the males only in "water pollution" factor ($p<0.05$). In the study conducted on the teacher candidates, it was determined that the average scores of the candidates in the water consumption scale did not differ according to their place of residence [13]. This result shows that environmental problems are global, affect all humanity without distinction between urban and rural areas, and measures should be taken for more positive behavior in society, especially university students. In our study, students who have a social membership are more likely to have positive water consumption behaviors than those who do not have a membership ($p<0.05$). In another study conducted by Ozmen et al., no statistically significant difference was found when the family income status of the students included in the survey were

compared with their environmental attitudes [14]. In this respect, it is a parallel study.

In a study titled "Investigation of Sensitivities of University Students to Environmental Issues", Senyurt et al found that sensitivities of students do not differ significantly based on the level of family income [15]. There is no difference in the total average scores of students based on the amount of water consumed per day ($p> 0.05$). There is no significant difference in water consumption behaviors between those who prefer tap water or bottled water for drinking ($p<0.05$). The average score of those who consume only bottled water is higher although not significant. This may be due to the tendency of those who pay attention to the quality of the water they drink to consume the water more carefully. In our study, it was found that there was no difference between water consumption behaviors and the type of high school graduated from ($p<0.05$). Studies that found similar results are present in the literature. In a study of university students by Kahyaoglu et al., it was concluded that there was no significant difference between the environmental attitudes of teacher candidates based on the high school type that they graduated [15]. This may be due to the fact that the environmental health courses given at the high school level are of the same quality. A statistically significant difference was found between the average amount of water consumed per day by students who exercise regularly and those who do not ($p<0.001$). It was understood that the medical students who take care of their health consume more water. There was a statistically significant difference between the social responsibility subscale scores of students who hold a membership to a social group and those who do not ($p<0.001$). Membership in a social group shows that social awareness is greater [16]. With our work, this fact has been exposed again. There is a significant difference between the total scores of the students in terms of the classes they are in ($p<0.001$). This difference stems from first and third-year students. This situation has been evaluated as a result obtained by chance. According to a study by Okur et al. on senior medical students at Adnan Menderes University, when the average total scores obtained from the five sub-factors were considered, participants have the highest score (12.74 ± 3.17) from "water consumption" factor. This result is in parallel with our study. In our study, when the senior students and students from other classes were considered, it was found that they received the highest score from the water consumption factor subscale [17].

Daily intake of drinking water was insufficient for the students who were included in the survey and the average score of the water consumption scale was 59% of the total score. Between genders, there was no difference in behavioral norms, including water awareness, water management, personal and social responsibility, except for factor water pollution. It can be said that the students who are residents of dormitories and the students who are members of a social group are more sensitive about water consumption behaviors. As a result, it can be suggested that the students' level of awareness on this subject be increased by giving more room to courses related to environmental health and water consumption in medical education.

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