

Boyras et al, 2017

Volume 3 Issue 3, pp.58-68

Date of Publication: 19th December, 2017

DOI-<https://dx.doi.org/10.20319/lijhls.2017.33.5868>

This paper can be cited as: Boyraz, Y. K., Demir, L. S., Eken, K., Tabara, M. F., Evci, R., Durduran, Y., Uyar, M., & Şahin, T. K. (2017). Preferences of Drinking Water in Meram District. LIFE: International Journal of Health and Life-Sciences, 3(3), 58-68.

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PREFERENCES OF DRINKING WATER IN MERAM DISTRICT

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Abstract

In this study, it was aimed to determine the preferences of drinking water for the people aged 18 years and old in Meram district. This cross-sectional study is conducted in Konya province Meram district between dates April 1-June 1, 2016. Sample size is calculated as 810 people by G-Power 3.1.9.2 sample volume calculation program. A questionnaire prepared by the researcher was given to the participants. Questionnaires were giving to the participants during face-to-face interview. Analyzes of the data were studied in the IBM SPSS 24.0 program on the computer. 514 women (63.5%) and 296 men (36.5%) participated in the study. Daily water consumption average is founded as 1.40 ± 0.81 L. It is found that %9,5 (77) of the participants choose water purifier equipment, %19,4 of the participants (157) choose tap water, %22,0 of participants choose packaged water, %49,1 of participants choose fresh water fountain as drinking water. It is determined that 653 participants (80.6%) who did not prefer tap water didn't prefer it because of these factors: from the taste and odor problem, from limy water, were thought water was dirty, because of the habit, of them was disturbed by chlorinated water.

Keywords

Drinking water, Consumer preference, Daily water consumption, Meram

1. Introduction

Water is the most important resource on Earth, for humans and other living organisms alike. Despite this, nearly half of the world's population does not have access to drinking water of acceptable standard (Kamal, Hashin, & Zin, 2015). First of all, people physiologically need water. It is extremely important to have clean and safe water whether to use or drink. Generally, drinking water in varying amounts according to age, gender, body weight and physical activity conditions, is a necessity for toxic substance removal from the body and to maintain body fluid balance. It is suggested that adult women should drink 2 L of water daily while men should drink 2.5 L. (Turkey Nutrition Guide 2015, Guler 2015, EFSA 2010).

People's water preferences to use or drink started to change due to reasons like city life that has become widespread today, developing industry, reduction of natural resources (Ufacik et al., 2015). People prefer whether packed water, tap water, spring water and refined water for drinking purpose. Factors like population growth, migrations, production and consumption pressure, climate change, environmental pollution cause insufficiency of water resources, which eliminates needs of human being and nature. Because of these reasons, people's demand for reliable water is growing steadily. In this direction, individuals tend to consume packed and refined water (Uzundumlu, Fakıoğlu, Köktürk,&Temel, 2016,Karakuş, Lorcu, &Demiralay2016). Fresh water fountains in Konya streets have a very important role in people's drinkable water preferences. The fountain's water comes from water resources near to the city. As a municipal service, some other fresh water fountains are built in specific neighborhood locations with another network system (Konya Water And Sewage Management, 2016).

Water consciousness in the world and our country, there are researches about changing water consumption preferences and factors affecting them and the aim is to determine community considerations about drinkable water quality problems (Çelik 2005, Yıldırım 2009, Tümer, Birinci,&Yıldırım 2011, Doria 2006, Chen et al., 2012).

1.1 Aim

The subject of this study is to determine the consumption, preference and reasons of drinking water. This study is conducted to determine drinking water consumptions, preferences and the reasons of those preferences of adult individuals in Meram district. Knowing community member's drinking water consumption amounts, preferences and their thoughts about the water they use can be a base for researches to bring their drinking water consumption to an ideal level and provide healthy, reliable and suitable water for their taste.

2. Materials and Methods

This cross-sectional study is conducted in Konya province Meram distinct between dates April 1-June 1, 2016. Konya, which is located in the Central Anatolia Region, is the largest city in terms of Turkey's surface area and also the seventh populous city. 2,131,303 people live in Konya. City is composed of 31 districts. Konya, one of the developed cities of Turkey in terms of economy, is also important with its natural and historical richness. Meram, which is one of the central district of Konya, is located in the South and South West of the city.

The number of neighborhoods' within Meram district borders is 115. By 2016, the district population has been determined to be 346,366. Sample size is calculated as 810 people by G-Power 3.1.9.2 sample volume calculation program and as stated in the Turkish Demographic Health Survey (TDHS) 2013, the prevalence of network water use is taken as 50%, 95% confidence interval ($\alpha = 0.05$), 7% deviation, 80% power and pattern effect 2 (Faul, Erdfelder, Lang,&Buchner 2007). A total of 115 neighborhoods in Meram district were selected and 27 neighborhoods' were selected using a simple random method. A total of 810 individuals were included in each of the selected locations using the Konya Metropolitan Municipality City Information System by choosing 30 people from each neighborhood using random sampling method.

A questionnaire prepared by the researcher was given to the participants. Questionnaires were giving to the participants during face-to-face interview and they were all agreed to participate into study verbally.

Data analysis was done in IBM SPSS 24.0 computer program. Descriptive statistics were given using mean, median (1st quarter - 3rd quarter) and% distribution. The normality analyses of the data were examined by Kolmogorov-Smirnov and Shapiro Wilk tests. Chi-square test was used to compare categorical data. Kruskal Wallis test was used to compare continuous data in multiple groups. For statistical significance, $p < 0.05$ was accepted.

The approval to conduct this research was taken from Necmettin Erbakan University School of Medicine Ethics Committee for Drug and Non-Medical Research (Date: 18/12/2015, Issue 2015/384).The study was funded by Necmettin Erbakan University Scientific Researches Coordination Unit (Project No: 161518004).

3. Results

A total of 810 participants participated in the study and 36.5% (296) of the participants were male and 63.5% (514) were female. The average age of participants was 43.20 ± 15.57 . According to age classification, it was determined that 48,4% (392) of the participants were 39 years and under, 39,8% (322) were in the age range of 40-64, and 11,9% (96) were 65 years and over.It was calculated that $3,84 \pm 1,63$ people were living on average in the residences. 54,6% of the participants had 2000 TL and over income. When daily adequate water consumption rates were compared according to gender, the rate of women(%31.3) was significantly higher than the water consumption rate of men(%12.8) ($p=0,001$, $\chi^2:34,633$ sd:1). Daily water consumption average is founded as 1.40 ± 0.81 L. No significant difference found between men's ($1,45 \pm 0,84$ L)and women's ($1,38 \pm 0,79$ L)daily drinking water

consumption average($p=0,191$). It is found that %9,5 (77) of the participants choose water purifier equipment, %19,4 of the participants (157) choose tap water, %22,0 of participants choose packaged water, %49,1 of participants choose fresh water fountain as drinking water. When preparing food and tea, the water preference used by the participants was 51,5% of the participants (366) tap water, 35,1% (284) fresh water fountains. Significant differences were found between daily consumption of drinking water according to drinking water consumption preferences of participants in the study. It is found that those that preferred packed water has significantly higher daily consumption of drinking water compared to those who preferred tap water and fresh water fountain. (Table 3.1, $p=0,001$).

Table 1: Comparison of Daily Drinking Water Consumption Amounts of Participants according to Drinking Water Consumption Preferences (Meram/Konya 2016)

| | Daily Drinking Water Consumption (L) Median (25-75 per) | p Value |
|-------------------------------------|--|---------|
| Packed water (n=178) | 1,50 (1,00-2,00) | 0,001 |
| Purifier (n=77) | 1,10 (1,00-2,00) | |
| Fresh Water Fountain (n=398) | 1,00 (1,00-2,00) | |
| Tap Water (n=157) | 1,00 (0,60-1,50) | |

The participants' daily drinking water consumption median is compared according to the income groups. 2000 TL and above income group's daily water consumption found significantly higher (1,50 L (1,00-2,00)) than 2000 TL and below income group (1,00 L (1,00-2,00))($p=0,001$). Consumption preferences of drinking water were significantly different according to income groups (Table 3.2, $p = 0.001$). In 2000 TL and above group, house type water purification and packaged water preference ratio were found to be significantly higher ($p = 0.001$).

The drinking water consumption preferences were significantly different according to the number of residents living in the house. In the group where the number of people living in the house was 3 or more, packaged water use rate was significantly lower than the other groups (Table 3.3. $p=0,003$).

It is determined that 653 participants (80.6%) who did not prefer tap water didn't prefer it because of these factors: 45.8% (299) from the taste and odor problem, 30,3% (198) from limy water, 24.8% (162) were thought water was dirty, 11,8% (77) because of the habit, 8.7%(57) of them was disturbed by chlorinated water.

Table 2: Comparison of Drinking Water Consumption Preferences by Income Groups (Meram/Konya 2016)

| Income group (TL) | Tap Water n (%) | Fresh Water Fountain n (%) | Purifier n (%) | Packaged Water n (%) | Total n (%) | p Value |
|-------------------|-----------------|----------------------------|----------------|----------------------|-------------|---------|
| 2000 below | 98 (26,7) | 211 (57,5) | 13 (3,5) | 45 (12,3) | 367 (100,0) | 0,0001 |
| 2000 TL and above | 59 (13,3) | 187 (42,3) | 64 (14,4) | 133 (30,0) | 443 (100,0) | |
| Total | 157 (19,4) | 398 (49,1) | 77 (9,5) | 178 (22,0) | 810 (100,0) | |

χ^2 :82,011 sd:3

Table 3: Comparison of Drinking Water Consumption Preferences by Number of People Living at Home (Meram/Konya 2016)

| Number of People | Tap Water n (%) | Fresh Water Fountain n (%) | Purifier n (%) | Packaged Water n (%) | Total n (%) | p Value |
|------------------|-----------------|----------------------------|----------------|----------------------|-------------|---------|
| 1 | 3 (10,7) | 13 (46,4) | 1 (3,6) | 11 (39,3) | 28 (100,0) | 0,001 |
| 2 | 24 (16,1) | 62 (41,6) | 13 (8,7) | 50 (33,6) | 149 (100,0) | |
| +3 | 130 (20,5) | 323 (51,0) | 63 (10,0) | 117 (18,5) | 633 (100,0) | |
| Total | 157 (19,4) | 398 (49,1) | 77 (9,5) | 178 (100) | 810 (100,0) | |

χ^2 :22,256 sd:6

4. Discussion

In every period of human life, water is the basic substance for the realization of vital activities. In this respect, presence of water in the living environment and the quality of water are extremely important (Bal, 2014). The amount of fluid that needs to be taken daily depends on the level of physical activity. At a moderate level of activity, 2 to 2.5 liters of fluid per day is recommended (Turkey Nutrition Guide, 2015). In a study conducted in Trabzon, it was found that the average daily consumption of drinking water is 1.2 liters and an other study conducted in Istanbul, 86,6% of the participants reported water consumption under 2 liters (Ufacik et al, 2015, Yildirim, 2009). According to Turkey Nutrition and Health Research, daily average liquid consumption in Turkey is 1,8 L for men under 19 years old and 1,4 L for women. Similarly, in this research, daily liquid consumption found as 1,3 L for women, 1,4 L for men. It is determined that 67.7% of the participants drank water below 2 L per day. In this regard, it will be useful for the physicians to inform the persons about the amount of water they need to drink daily and to prepare public spots by the Ministry of Health.

According to TDHS 2013, half of the residences in Turkey use tap water, 36% of bottled water and 8% of sheltered spring water. Drinking water resources vary considerably depending on the settlement. The most common drinking water sources in the city are tap water (51%) and bottled water (44%) (TDHS, 2013). In Turkey, the use of tap water is 31.7% - 44.9%, the use of packaged water 13.0% - 54.0%, the use of purifying equipment 6.3% - 25%, the usage of spring water varies between 2.0% and 27.1% (Çalik et al., 2004, Bal2014, Til et al., 2015, Uzundumlu et al., 2016, Ufacik et al, 2015). In our study, it is determined that fresh water fountains, which are provided by municipality with a separate network system are the most preferred drinking water in Meram distinct followed by packed water and then tap water. It seems that those who prefer water purification equipment are not high in the study. In the light of our data, packaged water, purification equipment and spring water usage rates were found at similar rates to those in the literature. The use of tap water is lower in this study compared to both TDHS 2013 and other studies. This may be due to the municipality's provision of fresh water fountains as an alternative to the tap water supply.

When the literature is examined, many studies have investigated the factors affecting the amount and preferences of drinking water consumption. In these studies, it is determined that individuals' drinking water preferences are affected by factors such as person's health belief, habits, socio-demographic factors like housing status, age, gender, income status, educational status and parameters related to the quality of the tap water, such as taste, smell,

mineral level and pollution, also, access to the source of drinking water, packed water and purification equipment ads (Doria 2006, Ward et al, 2009, Chenoweth et al., 2010, Teillet et al., 2010, Durga 2010, Tümer et al., 2011, Ogbuji et al., 2011, Chen 2012 et al., Quansah et al., 2015). In this study, drinking water preferences were significantly different according to age groups, income status and number of people living at home. The association between usage of purification equipment and income increase have been evaluated as related. In the study, the amount of drinking water consumption was found to be high when our income was high. In addition, purification at home and packed water preference is high in this group. When the number of people living in the house is more than three, the low use of packaged water reminds the financial concern. When we look at the reasons for the preference of the drinking water of the society, in the study conducted by Tumer and his colleagues in Ankara-Kecioren, it is determined that consumers are most concerned about the taste of packaged water (Tumer et al., 2011). In a study conducted in Tokat, the usage reasons of packaged water by consumers are identified as thoughts such as lime of tap water (39,46%), dirty (36.05%), the packaged water is healthy (35,37%), more reliable (17.69%), suitable for children (8.16%), habits (5.44%) and the need for consumption of water outside the home (0.68%). In another study, conducted in Edirne, consumers' first priority in purchasing packaged water was health and hygiene (47.7%), and then price (21.0%) and easy access to the product (14.8%) (Karakus et al., 2016). In a study conducted in Erzurum, the most important criteria for consumers to prefer drinking water are hygiene, taste, mineral content, price and ease of transportation (Uzundumlu et al., 2016). In this study, participants who did not use the tap water as drinking water claimed the reasons as taste and taste problems (45,8%), lime water (30.3%), dirtiness (24,8%), habits (11,8%), being uncomfortable about chlorine in the tap water (8,7%). As it is seen in the studies, the most important reasons in preferring drinking water are that the water is clean, healthy, reliable and suitable for the taste. Ensuring safe, healthy and tasty water by local governments will enhance the choice of tap water.

5. Conclusion

Participants' daily water consumption and the proportion of water drinkers above 2L are low. It has been determined that the usage rate of tap water as drinking water is also low. The purifier and packaged water usage rate is higher in the higher income group. Economic reasons come to the forefront in the preference of drinking water. It is seen that the main reason of not using tap water is due to unpleasant taste and odor problem. It is one of the basic duties of local managers to provide clean, healthy and reliable water to the public. Efforts

should be undertaken to ensure the safety of water resources, to improve the quality of water distribution systems and to remove the negative attitude towards water supply. Health managers and the media should also support local administrators in this regard.

The lack of detailed questioning of the reasons for preferring drinking water is a limitation of research. Only, the reason of why they do not prefer tap water was asked.

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