

# Factors affecting tea consumption pattern in an urban society in Isfahan, Iran

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## ABSTRACT

**Objective:** To determine the tea consumption pattern in an urban society in Isfahan. **Methods:** A descriptive, cross-sectional survey was carried out using questionnaire among 664 households who were selected by two steps cluster sampling. A questionnaire was developed including demographic questions, information on the quantity of tea intake by every member of the family, tea type, and tea brand preference. **Results:** The individuals who prioritized black tea as their 1<sup>st</sup> choice were 90.1% of the total surveyed community. The average amount of tea consumed was calculated as 1243 ± 530 ml/day. The individuals who were between 36 and 45 and <15 years old were shown as the highest and the lowest tea consumers, respectively. Men significantly consumed more amount of tea than women did and married participants significantly used more amount of tea than singles ( $P < 0.05$ ). The number of the family members, though, had no impact on tea consumption ( $P > 0.05$ ). Brand preference of tea showed that the individuals who prioritized Ahmed brand as their 1<sup>st</sup> choice constituted 44% of the total participants. **Conclusion:** Tea consumption pattern in an Iranian sample is specific. Despite of the huge evidence on the green tea benefits, this type of tea has very low popularity and among the available black tea brands, the imported ones are the most preferred.

**Key words:** Daily intake, Iran, pattern, tea

## INTRODUCTION

Prepared by brewing the camellia leaves and shrubs, tea is known as the most popular beverage worldwide.<sup>[1-4]</sup> Recent *in vitro* studies as well as several human and animal studies have confirmed the health beneficials of different types of tea.<sup>[5]</sup> However, being investigated by many clinical trials, green tea has mainly attracted the researchers' attentions regarding its positive and protective effects. In an epidemiological study, carried out in Japan, cholesterol-lowering effect of green tea was affirmed; subjects drinking nine or more cups of green

tea a day showed less serum cholesterol; about 8 mg/dl than those having two cups a day.<sup>[6]</sup> In addition, different studies showed that black tea consumption can reduce total cholesterol and low-density lipoprotein in adults suffering from hypercholesterolemia.<sup>[7]</sup> In a case-control study, in the USA, heart protection properties of tea were observed; men and women who had drunk 237 ml or more of brewed tea compared to the individuals who did not use to drink tea revealed a lower risk of myocardial infarction during the study period.<sup>[8]</sup> Adversely, the health benefits of tea consumption were rejected by a few research works, e.g., antioxidant status of the blood serum was not improved in a human study carried out by Davies *et al.*<sup>[7]</sup> In addition, in a completely different point of view, tea consumption has been associated with risks of

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some complications. A positive correlation between drinking tea and increasing risk of rectal cancer was ascertained in a study, which was accomplished in Japan.<sup>[9]</sup> Regarding the concept of food safety, some recent studies have presented a warning message about the role of tea as a route for transition of toxic chemicals and heavy metals in the human's diet in the societies, with the tradition of drinking a plenty of tea in their diet.<sup>[10-12]</sup> Accordingly, the relation between tea consumption and human health has been remained an arguable concept.<sup>[13]</sup> Since any harmful or healthful effect of tea consumption is depend on the extent of tea intake and the consumers physiological status,<sup>[10,14-18]</sup> identifying the real amount of tea intake and its consumption pattern among different groups of the society by descriptive studies can be helpful to generalize the results of the research studies that investigated the relation between tea intake and the human health to real life. In Iran, per capita consumption of dried tea was previously estimated as 1.6 kg.<sup>[19]</sup> However, little information is available on the pattern of tea consumption among different groups of the society. This study intends to provide the factors affecting tea consumption pattern of urbanized Isfahan people as an Iranian sample.

## METHODS

This study was a descriptive, cross-sectional survey, carried out in an urban society in Isfahan, Iran, from December 1 to February 28, 2012. Subjects ( $n = 600$ ) were selected through two-stage cluster random sampling method. Of the total six regional educations area in Isfahan, three were randomly selected. Three schools within each area were randomly chosen and were characterized as the second cluster. A two parts questionnaire was developed including demographic questions ( $n = 6$ ), information on the quantity of tea intake by every member of the family ( $n = 2$ , including the volume of the tea consumption unit and the duration of daily tea drinking intervals) as the first part. In the second part, tea preparation pattern including type, brands, and preparation method was asked through inquiries which were filled out by the households in each family ( $n = 171$ ). Descriptive statistic used to express the distribution frequencies and mean comparison analysis was performed using one-way ANOVA followed by post-HOC Tukey test at  $\alpha < 5\%$  by SPSS 16 software [SPSS Inc.: Chicago].

## RESULTS

### Demographic characteristics

Of the 664 participants, 42.6% were males and 56% were females. The mean body weights of the respective groups were  $67.57 \pm 15.05$  and  $60.1 \pm 14.70$  kg. Regarding the marital status, 41.2% of the total respondents were single and 52.8% were married. Families with 1–4 and 5–8 members constituted 53.8% and 43.4% of the total participated families, respectively. All the participants were assigned into different distinct groups according to their age, weight, occupation, and education levels. Table 1 shows the frequency distribution of the subjects among the characterized groups.

### Tea types preference

In Table 2, the results of the frequency distribution of the participants by their tea type preference are depicted. The individuals who prioritized black tea as their 1<sup>st</sup> choice formed 90.1% of the total surveyed community, on the other hand, <3% preferred green tea as their 1<sup>st</sup> priority and high tea bag consumers covered just 6% of the participants. According to the presented data in Table 2, as the second choice of tea, green tea was rated after tea bag. Hence, lack of interest in green tea was quiet visible among the surveyed population.

### Daily tea intake

Frequency distribution of daily tea intake of participants by age, weight, gender, occupational level, marriage status, number of family members is presented in Table 3. Based on the results of mean comparison analysis, using one-way ANOVA and post-Tukey test, there was a significant difference in the mean tea consumption among the classified age groups ( $P < 0.05$ ); with the average consumption of  $1447 \pm 499.9$  and  $287 \pm 135.6$  ml/day, respectively, the individuals aged from

**Table 1: Frequency distribution of participants by age, weight, occupation, and educational level**

Categories	Frequency (%)
Age	
≤7	1.60
8-15	13.20
16-25	26
26-35	9.70
36-45	33.10
46-55	13.20
>55	3.10
Occupation	
Employee	11.20
Labor	17.60
Householder	30
Student	33.30
Other	6.30
Educational level	
Below diploma	59.00
Diploma	26.20
Collegiate	14
Weight (kg)	
≤30	3.70
31-50	13.80
51-70	44
71-80	19.90
>80	7.90

**Table 2: Frequency distribution of the participants by tea type preference**

Type of tea	Frequency (%)			
	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	No point
Black	90.1	2.9	2.9	4.1
Green	2.9	18.7	26.9	51.5
Tea bag	5.8	27.5	14	52.6

1<sup>st</sup>=First priority, 2<sup>nd</sup>=Second priority, 3<sup>rd</sup>=Third priority

36 to 45 and <7 years old were shown to be the highest and the lowest tea consumers, respectively. Subjects with maximum tea consumption (3125 ml/day) formed 1.9% and 0.6% of the participants in the 45–26 age group and the total community, respectively, while <1% of the total surveyed subjects had the minimum amount of consumption. In the lowest age group, the majority of subjects used to drink 300 ml tea a day. While, most of the participants in the age groups of 26–35 and 36–45 years drank 500 ml tea in a day. Based on the information depicted in Table 3, participants weighted more than 50 kg significantly have more average tea intake than those weighed <50 kg. Accordingly, a considerable proportion of the participants in the former group drank 1500 ml tea in a day.

Considering different genders, although the maximum and the minimum of tea consumption in this study were found among both genders, the numbers of high consumers in the female group were less than that of males (0.4% vs. 1%). Moreover, comparison of the mean consumption data showed

that men are significantly higher tea consumers than women ( $P < 0.05$ ).

In terms of different occupation levels, it was revealed that the maximum amount of tea is consumed among the labors and households; because 2% and 0.7% of the respective groups had such a volume of daily tea intake. Consumption quartiles showed that the 2<sup>nd</sup> and the 3<sup>rd</sup> quartile values of the employees and the labors were equal. In addition, both mentioned occupation levels were demonstrated to have the significant higher mean tea intake than others ( $P < 0.05$ ). On the other hand, students showed the lowest consumption data in all characterized quartiles and the lowest average tea intake ( $P < 0.05$ ). Regarding to different education levels, with no significant difference in the mean consumption of academically trained subjects and nonacademically trained ones, high school graduated parties were revealed to drink much tea than nonhigh school graduates ( $P < 0.05$ ). However, the majority of subjects with the highest level

**Table 3: Quartiles of daily tea intake (ml) among different categorized groups**

Category	Q1	Q2	Q3	Q4	Mean	SD
Age (year)						
≤7	0-300	300-300	300-300	300-500	287 <sup>a</sup>	135.62
8-15	0-500	500-600	600-900	900-1000	637 <sup>a</sup>	245.27
16-25	0-900	900-1275	1275-1500	1500-2125	1209 <sup>b</sup>	436.35
26-35	600-900	900-1500	1500-1500	1500-2125	1345 <sup>b</sup>	419.57
36-45	600-1000	1000-1500	1500-1500	1500-3125	1447 <sup>cb</sup>	499.97
46-55	0-925	925-1387	1387-1781	1781-2625	1409 <sup>b</sup>	511.81
>55	900-900	900-1275	1275-2125	2125-2125	1428 <sup>b</sup>	487.51
Total	0-900	900-1275	1275-1500	1500-3125	1243 <sup>b</sup>	530.23
Gender						
Men	0-900	900-1275	1275-1500	1500-3125	1367 <sup>a</sup>	559.56
Female	0-900	900-1000	1000-1500	1500-3125	1148 <sup>b</sup>	487.93
Occupation						
Employees	0-1275	1275-1500	1500-2150	2150-2625	1518 <sup>a</sup>	524.65
Labors	300-1275	1275-1500	1500-2125	2125-3125	1603 <sup>a</sup>	499.70
Householders	600-900	900-1275	1275-1500	1500-3125	1265 <sup>b</sup>	405.41
Students	0-600	600-900	900-1000	1000-2125	934 <sup>c</sup>	437.60
Other	0-900	900-1275	1275-1500	1500-2125	1342 <sup>b</sup>	530.57
Educational level						
Below diploma	0-900	900-1000	1000-1500	1500-3125	1160 <sup>a</sup>	532.28
Diploma	0-900	900-1500	1500-1500	1500-3125	1324 <sup>b</sup>	496.71
Collegiate	600-1000	1000-1500	1500-1500	1500-3125	1426 <sup>b</sup>	499.68
Marital status						
Single	0-600	600-900	900-1500	1500-2125	1008 <sup>a</sup>	493.555
Married	0-1000	1000-1500	1500-1500	1500-3125	1409 <sup>b</sup>	487.661
Family member						
1-4	0-900	900-1275	1275-1500	1500-3125	1238 <sup>a</sup>	529.13
5-8	0-900	900-1275	1275-1500	1500-2625	1250 <sup>a</sup>	539.03
Weight (kg)						
≤30	0-300	300-550	550-900	900-1000	544 <sup>a</sup>	307.21
31-50	0-600	600-900	900-1275	1275-1275	943 <sup>b</sup>	474.86
51-70	0-900	900-1500	1500-1500	1500-3125	1326 <sup>c</sup>	515.42
71-80	0-1000	1000-1250	1250-1500	1500-2125	1398 <sup>c</sup>	490.65
>80	0-600	600-1500	1500-1500	1500-2125	1362 <sup>c</sup>	463.782

Means with lowercase letters in the same column for each category are significantly (Tukey test at  $P < 0.05$ ) different. SD=Standard deviation

of education showed to have 1500 ml tea per day. As it was shown in Table 3, marriage has a significant effect on tea consumption. Averagely, married participants drank much tea than singles ( $P < 0.05$ ). Furthermore, comparing tea consumption quartiles indicated more amount of tea intake in all quartiles for married participants than that of singles. Adversely, average tea consumption or either of the consumption quartiles was not affected by the number of the family members.

### Tea brands preference

Table 4 displays the frequency distribution of the participants by their tea brands preference. The individuals who prioritized Ahmed and Golestan brands as their 1<sup>st</sup> choice made 44% of the total participants. Although it was not the 1<sup>st</sup> choice, “shahrzad tea” was rated as the 2<sup>nd</sup> and 3<sup>rd</sup> option for the 7% and 13.5% of surveyed community, respectively. However, only <2% of the subjects preferred Langar Shomal and Bahare Lahigan as their 1<sup>st</sup> priority.

## DISCUSSION

Tea consumption patterns among different societies have been usually studied by the epidemiological research studies in relation to the incidence of some complications or in association with functional benefits.<sup>[20-25]</sup> Despite the particular state of tea consumption in an Iranian culture and tradition, there is little information in the scientific literature on the factors affecting tea consumption in Iran. By interviewing a considerable number of subjects, this study was carried out in order to achieve the quantitative pattern of tea intake in an urban society in Isfahan, Iran. Although green tea has been stated as the most popular tea in Asia, in this survey, a minor group of the community has been identified as the green tea advocates. This is in accordance with the results of other works in Northern Iran that assessed the relation between tea consumption habits and incidence of esophageal cancer.<sup>[26,27]</sup> Fazeltabar Malekshah *et al.* reported that the average amount of black tea and green tea daily intake in Northern Iran is about  $1184 \pm 765$  ml and  $36 \pm 184$  ml, respectively,<sup>[27]</sup> and Islami *et al.* confirmed that black tea is more popular than green tea among the Northern residence of Iran.<sup>[20]</sup> From the nutritional point of view, high tea consumption has been associated with an increased risk of heavy metal intake as well as rectal cancer.<sup>[9-11,15]</sup> However, green tea has more advantages and less harmful potentials than the black tea.<sup>[10,26,28-30]</sup>

**Table 4: Frequency distribution of participants by tea brand preference**

Type of brands	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>
Ahmed	43.9	12.3	6.4	1.2
Golestan	14.6	9.9	5.8	5.8
Shahrzad	2.3	13.5	7.0	1.8
Jahan	5.8	7.6	4.7	1.8
Bahare Lahigan	1.8	0	0	0.6
Langare Shomal	1.2	0.6	0	0

1<sup>st</sup>=First priority, 2<sup>nd</sup>=Second priority, 3<sup>rd</sup>=Third priority, 4<sup>th</sup>=Forth priority

In this study, the effects of age, weight, and education on tea consumption demonstrated that children and teenagers have the least amount of tea usage among the surveyed society. The same result has been observed in different populations.<sup>[11,15,21]</sup> In addition, individuals aged from 36 to 45 are the heavy tea consumers; a little older than the Turkish high tea consumers (30–39 age), which were previously investigated by Cao *et al.*<sup>[15]</sup> However, another study in Turkey represented the age of 35 and more for the highest tea consumption.<sup>[11]</sup> The average black tea consumption among the Chinese children and adult was estimated as 800 ml/day and 1500 ml/day, respectively.<sup>[16]</sup> Comparing the information obtained in this study, Chinese children drink more tea, about 4 times, than that of Iranian children but the amount of tea consumption by Chinese adults is close to what has been found for the Iranian adults. Considering the global data, the average amount of daily tea consumption in this study ( $1243 \pm 530.23$  ml), could be regarded as 10 times more than the world’s average (120 ml/day).<sup>[13]</sup> For Taiwanese, the average of daily tea intake was reported as 1250 ml/day,<sup>[10]</sup> which is nearly equal to the corresponding data in this survey. The impact of gender on tea consumption was found significant in a study carried out in Turkey; men were recognized to drink much tea per day than woman.<sup>[15]</sup> However, in another study in Turkey, suffered from a small sample size, the amount of tea consumed by men and women did not make a significant difference.<sup>[11]</sup> In this study, men drank much more tea than woman and the difference was statistically significant. Same result was reported by Fazeltabar Malekshah *et al.* from Northern Iran on black tea; however, their study showed that women consumed more green tea than men.<sup>[27]</sup> Out of Eastern countries, American men revealed to drink much tea than that of women.<sup>[31]</sup>

According to the information which was depicted in Table 3, although labors had the highest amount of daily tea intake in the first and forth consumption quartiles, the average amount of tea consumed in this group was not significantly different with the employee group, and both are identified as the occupations with the highest daily tea intake. House holders are rated as the second most tea consumers; though, heavy tea drinkers are found among them. In addition, based on the data presented in the Table 3, tea has been more consumed among the educated participants. This might be due to the reason that the majority of the employees and labors were educated.

In consistent with the above results, positive relation between tea intake and educational level<sup>[22]</sup> was reported in a study, which investigated the relationship between tea consumption and cancer incidence. Similar results were also presented elsewhere.<sup>[11,21]</sup> As one of the results of the present survey, the number of the family members does not have any significant effect on the daily tea consumption. It might be due to that the tradition of drinking tea is quiet prevail in families. From the economical point of view, the quantity of daily tea consumption may not be impressed by the families’ budget.

The popularity for imported tea brands including “Ahmed,” “Golestan,” and “Shahrzad” among the subjects should be informative for the authorities who involved in the production

and tradition of Iranian tea. Note that, a recent survey in Turkey revealed that imported tea brands are not as popular as their homemade counterparts.

## CONCLUSION

Despite the huge evidence on the green tea benefits, this type of tea has very low popularity in Iran. Tea consumption pattern in an Iranian sample is specific. Average daily consumption of tea among the urban society in Isfahan as an Iranian sample is 9–10 times more than the world average. Age, gender, weight, occupation, education level, and marriage have an influential impact on the tea consumption. Among the available black tea brands, the imported ones are more popular than the homemade products.

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## Conflicts of interest

There are no conflicts of interest.

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