

## Analyzing Food Patterns and Preferences of Urban Population of Fasa (Phase I of Studying the Nutritional Healthy City in Fasa)

Gıda Övrüntülerinin Analizi ve Fasa'da Kentsel Nüfusun Tercihleri (Fasa'daki Sağlıklı Beslenme Şehrini İnceleme I. Fazı)

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### ABSTRACT

**Background:** Proper and healthy eating is one of the key steps for developing a healthy population. The risk of disease and mortality decreases with a good nutrition. The access level, quality and choice of food consumed among people are affected by the economic, social, race and cultural status. It means that people with various culture and social system consume various types of food in various amounts.

**Methods:** In a cross-sectional study, 1000 adults living in the Fasa were selected by cluster sampling. Demographic, socioeconomic status, dietary habits, consumption of some important food items such as fruit and vegetables, oils, cereals, dairy, and salt were questioned in a 26 item questionnaire.

**Results:** The results show that there are significant problems in people lifestyle and dietary patterns in Fasa. A significant proportion of population had not regularly consumed breakfast and snack or significant consumption in fruits and vegetables. Hydrogenated vegetable oil and fried oil considerably used, and the most common method to prepare meat products was frying in oil. The refined grains are the major source of energy in people, and whole grains and cereals did not significantly used. Sugar and sweeteners were consumed significantly. Albeit, there were some positive points in the diet of region, including low consumption of carbonated beverages and processed foods, as well as high consumption of

need to be planned to improve them to minimize the risk factors of noncommunicable diseases.

**Key Words:** Diet, dietary pattern, Iran, salt intake

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### ÖZET

**Amaç:** Doğru ve sağlıklı beslenme, sağlıklı bir popülasyon geliştirmek için atılan önemli adımlardan biridir. İyi beslenme ile hastalık ve ölüm riski azalır. İnsanlar arasında tüketilen yemeğin erişim düzeyi, kalitesi ve seçimi ekonomik, sosyal, ırk ve kültürel durumdan etkilenmektedir. Bu, çeşitli kültür ve sosyal sisteme sahip insanların, çeşitli miktarlarda çeşitli yiyecek türleri kullandıkları anlamına gelir.

**Yöntem:** Kesitsel bir çalışmada, Fasa'da yaşayan 1000 yetişkin küme örnekleme ile seçilmiştir. Yirmialtı maddelik bir ankette demografik, sosyoekonomik durum, beslenme alışkanlıkları, meyve ve sebzeler, yağlar, tahıllar, süt ürünleri ve tuz gibi bazı önemli gıda maddelerinin tüketimi sorgulanmıştır.

**Bulgular:** Sonuçlar Fasa'da insanların yaşam tarzında ve diyet modellerinde önemli sorunlar olduğunu göstermektedir. Nüfusun önemli bir kısmı düzenli olarak kahvaltı ve atıştırmalık tüketmemiş veya meyve ve sebzelerde önemli miktarda tüketmemiş. Hidrojenlenmiş bitkisel yağ ve yağda kızartılmış yağ kullanılmış ve et ürünleri için en yaygın yağda kızartarak hazırlanmıştır. Rafine tahıllar, insanlardaki ana enerji kaynağıdır ve tahıllar ve tahıllar, önemli ölçüde kullanılmamıştır. Şeker ve tatlandırıcılar önemli ölçüde tüketilmiştir. Yine de, düşük miktarda gazlı içecek ve işlenmiş yiyecek tüketimi ve ayrıca yüksek süt ürünleri tüketimi gibi bölge diyetinde bazı olumlu noktalar oluşmuştur.

**Sonuç:** Bölgenin diyet düzenindeki önemli dezavantajlar, bulaşıcı olmayan indirmek için geliştirilmeleri için

**Anahtar Sözcükler:** Diyet, diyet şekli, İran, tuz alımı

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## INTRODUCTION

The human need for food is one of the most important factors in the survival of life and longevity. The need for nutrition is inherent and permanent (1). Proper and healthy nutrition is one of the key steps for developing healthy populations, with good nutrition. The risk of disease and mortality decreases with proper nutrition. The access level, quality and choice of food consumed among people are affected by the economic, social, race and cultural status. It means that people with various culture and social system consume various types of food in various amounts (2). It is anticipated that from 1990 to 2020 deaths resulted from non-communicable disease increases by 77%, with the highest incidence in developing countries (3). Unfortunately, available data shows that in our country, a large percentage of the population suffers from obesity which leads to a number of chronic diseases including hyperlipidemia, hypertension, diabetes and cardiovascular disease, whose main cause is the change in the consumption pattern in undesirable behaviors (1, 4). Type of consumed oil, salt, pickles, cooking method, processed foods, and hundreds of other factors are dietary habits whose incorrect use leads to incidence of many other chronic and non-communicable diseases (5). Nutrition goals of healthy people 2010 aimed to emphasize on reduction in dietary fat intake to less than 30% and a reduction in saturated fat intake to less than 10% of daily calories which are recommended as cardiovascular disease prevention programs (6-7).

Iranian households do not have a reasonable nutritional pattern, so that the consumption of milk, dairy, eggs and vegetables is 25%, 20% and 25% lower than the recommended values in the recommended ideal food basket (8). To have a better performance, all the population need to have a good nutritional pattern. Unfortunately, we don't have a detailed information about nutritional status of people in Iran in terms of their healthy diet to use this information to improve programming conditions. So, this article reviews nutritional behaviors of people in Fasa to estimate the amount of salt, sugar and oil consumed as harmful items and receipt rate of items such as breakfast, fruits and vegetables as dietary health items, so that we can plan for them and future interventions.

## METHOD

In this cross-sectional descriptive-analytic study, research community consists of Fasa households, which were selected through cluster-stratified sampling from June to September 2016. In this plan, the exact geographic map of Fasa was created in which residential units are displayed in a specific way. Using the above map, Fasa was divided into approximately 25 to 30 geographic regions that were located between the main streets. Geographical regions were classified into two groups: higher economic status and lower economic status. Then, three geographic regions of the higher economic status group and the three geographic regions of the lower economic status group were chosen at random. The central point of these geographic parcels was selected and the nearest alley was chosen as the focal point of the population. According to the number of households, one, two or three closer alleys were selected and all households in the above areas have been questioned and studied. As much as it was possible, we tried to ask questions from the mother of family.

The study protocol was in accordance with the Declaration of Helsinki guidelines and was approved by the Institutional Review Board (IRB) of Fasa University of Medical Sciences (Code: IR.FUMS.REC.1394.056). Written informed consent was obtained from all the participants.

It was confirmed that all the methods were performed in accordance with the relevant guidelines and regulations. Funding for this project was sponsored by Fasa University of Medical Sciences (Code: 94056).

The method for study was in way that after obtaining a permission from the city centers (governor office, municipality, and police force), firstly information was provided through the installing banners and posters in the geographic areas, then two-member teams of interviewers went to each house and collected the necessary information.

To collect data, a questionnaire was first prepared. The questionnaire was designed based on the British Heart Foundation How healthy is your diet? Questionnaire (9). In this questionnaire, demographic information of each family member about health and chronic diseases was questioned along with information about family income. Then 26 questions were asked from mother about information about diet health, number of households, as well as questions about dietary habits (breakfast, lunch, dinner, snack), fruit and vegetable consumption, the type and amount of oil consumed by household, cooking methods of foods such as meat, poultry, potatoes, the way of using nuts, usage frequency, amount of rice consumed, bread, cereal products, sparkling drinks, milk, yogurt, cheese, doogh, prepared foods, by family members, and using salt during baking and on dining table. The counting unit was household in this sampling. Since 100,000 people reside in Fasa, to have an accuracy estimation by 0.01 and through considering a 5% type 1 error, analyzing 3458 people was needed. If the family dimension is assumed 5, the sample size was determined 800 to compensate for the coverage deficit. In this research, the following questionnaires were used.

### A: General Household Questionnaire

The household's general information such as the number of resident members, age, gender, marriage, education, occupation, household income, chronic diseases such as diabetes, hypertension, cancer, heart disease, kidney problems, liver disease, amputation, etc. was gathered with General Household Questionnaire. Interviewers asked the questions from family's mother and completed this questionnaire.

### B: Diet Health Questionnaire

In this questionnaire, information on the amount of fruits and vegetables consumption per household (consuming more than 4 types of fruits and vegetables and consuming dried fruits), household oil type (hydrogenated vegetable oil, liquid vegetable oil, animal based oil, margarines, olive oil, frying oil, etc.), cooking method of foods such as meat, poultry, potato (frying, grilling, boiling, steaming, etc.), the way of using seeds and nuts (daily, weekly, monthly, rarely and never), frequency and amount of consuming rice, bread, whole grain products, cereal, sugar (jams, compote, juice), cakes and sweets and biscuits, carbonated beverages, milk, yogurt, cheese, doogh, processed foods (hamburgers, sausages, falafel and pizza) by family members, as well as using salt during cooking or on the dining table were asked. Since mother often have more detailed information about the family's diet health status, interviewer tried to complete the questionnaire by targeting the mother and asking her. Descriptive statistics and charts displayed results and the relationship between food items consumption and demographic variables using Chi-square test and t-student were considered. All calculations were done in SPSS<sup>®</sup>-18.

## RESULTS

According to the number of samples intended for this survey, 1000 households were visited, of which 990 households willing to cooperate were included. 62.6% were men and 10.5% were employed women and the rest did not have any jobs. Diagram 1 shows the frequency distribution of parents' education level in the household.

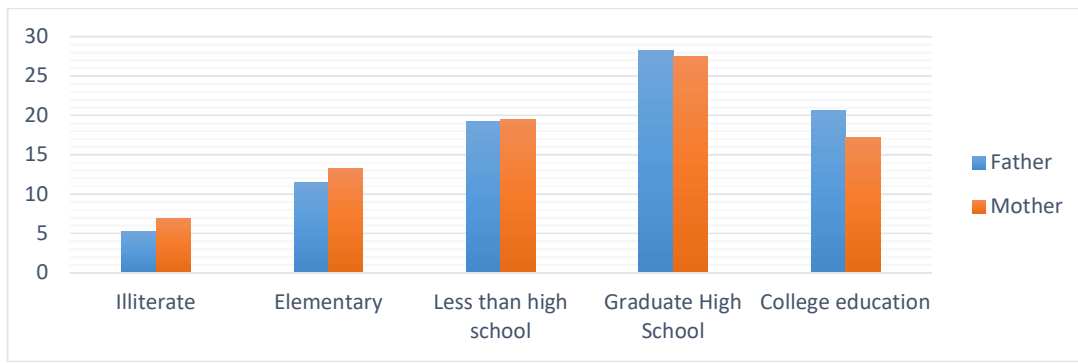


Diagram 1: Percentage Frequency Distribution of Parents' Education Level in the Studied Population.

The findings of this study showed that 29.6% households live on an annual revenue above 10 million Rials per month, 11% households have a revenue between 9500000 and 7500000 Rials, 24.4% households have a revenue between 7300000-5000000 Rials, and 24.5% of households have a revenue of 4500000-450000 Rials.

This study looked at households' dietary habits (breakfast, lunch, dinner, snacks, fruits, vegetables, and eating 4 types of fruits or more and 4 types of vegetable or more). Diagram 2 shows households' dietary habits

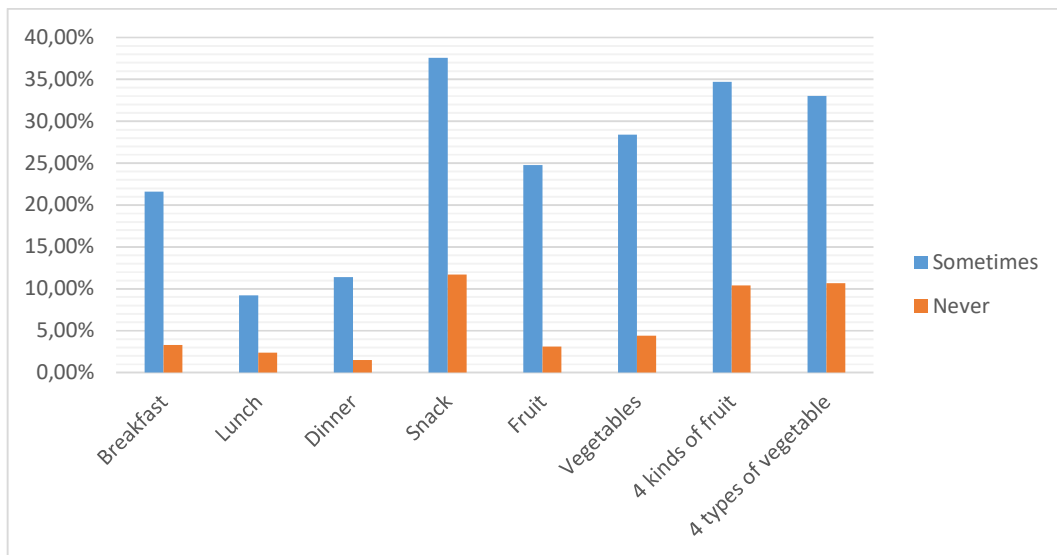


Diagram 2: Households' Dietary Habits

As well, the percentage frequency of oil types consumed to cook and fry is investigated. The results of this study are presented in Table 1.

Table 1: Percentage Frequency of Oil Types Consumed by Households to Cook and Fry.

	Hydrogenated vegetable oil	Liquid vegetable oil	Solid animal oil	Margarine	Olive oil	Butter	Frying oil
Cooking	20.1%	55.4%	0.8%	1.7%	6.9%	1%	19.9%
Frying	11.4%	20.3%	1.3%	5%	4.3%	2%	62.9%

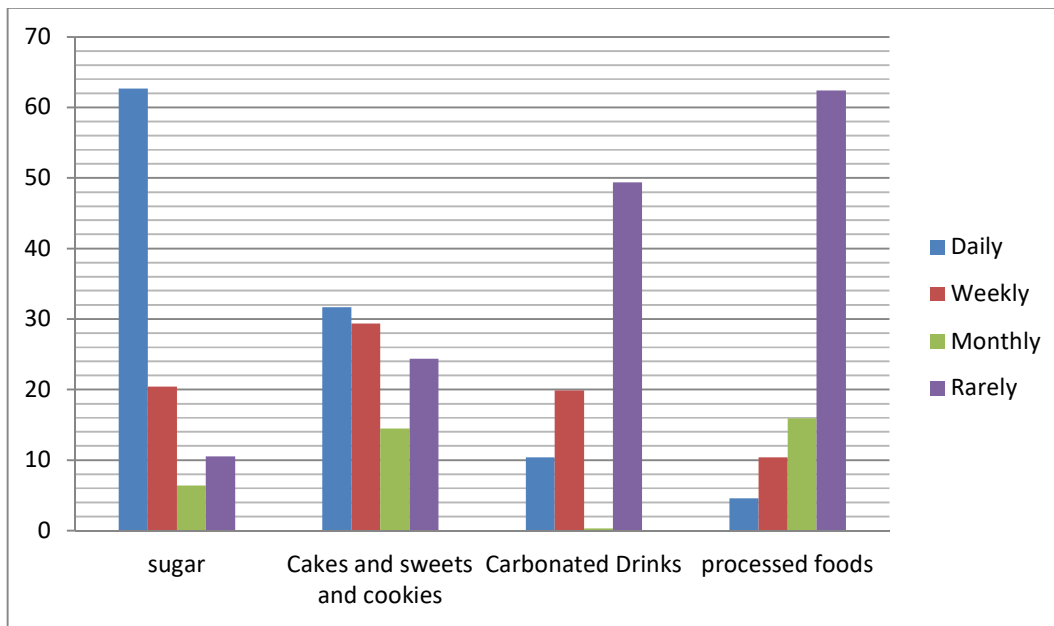
The methods to cook foods such as meat, poultry and potatoes includes frying in oil 63.9%, grilling (oven), 4.80%, boiling 33.50, steaming 4.00%.

In this study, the use of nuts was 11.30% daily, 28.90% weekly, 22.80% monthly, 29.30% rarely, and 7.70% never, were choices selected by household members. The use of rice, bread, whole grain products (whole grain bread or brown rice), and cereals by household members are listed in Table 2.

**Table 2:** Frequency Distribution of Consuming Rice, Bread, Whole Grains Products, Cereals by Household

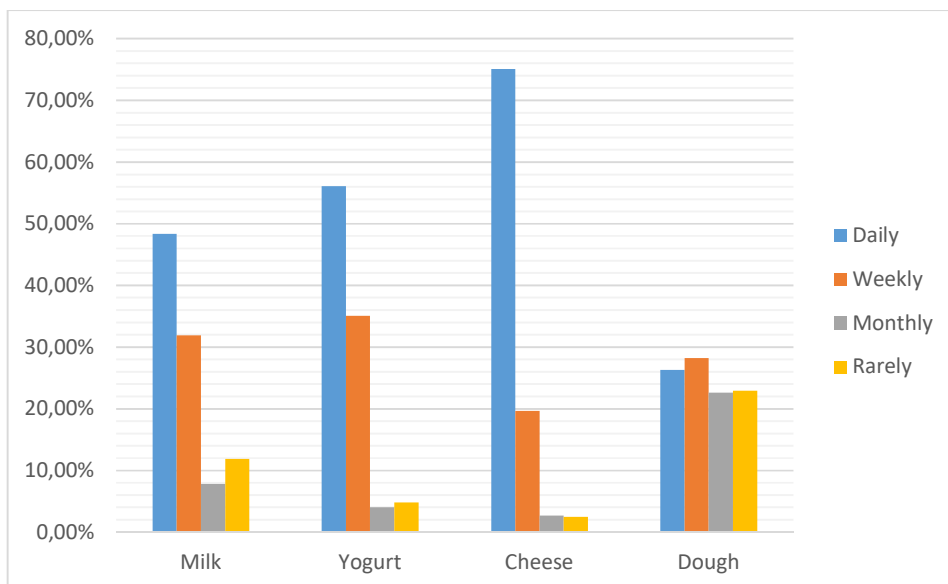
	Daily	Weekly	Monthly	Rarely
Nuts	11.30%	28.90%	22.80%	29.30%
Rice	63.70%	33.3%	1.6%	5%
Bread	95.1%	4%	3%	5%
Whole grain products	26.6%	24.4%	8.8%	50.2%
Beans	21.9%	65.8%	8.2%	4.1%

Consumption frequency of miscellaneous group by family members, including sugar, cakes and sweets and biscuits, carbonated drinks and processed foods are mentioned in Diagram 3.



**Diagram 3:** Consumption Frequency of Sugar, Cakes, Sweets, Biscuits, Carbonated Drinks and Processed Foods by Households' Members

In this study, after reviewing the consumption frequency of dairy foods by households including: milk, yogurt, and cheese, the highest consumption frequency was devoted to cheese with a frequency of 75.1%, following yoghurt 56.1%, milk 48.4%, doogh 26, 3% respectively (Diagram 4).



**Diagram 4:** The Dairy Consumption Habit in the Studied Population

The use of salt at the time of cooking and on the dining table by household members was 92.4%, 35.3%, respectively (Diagram 5).

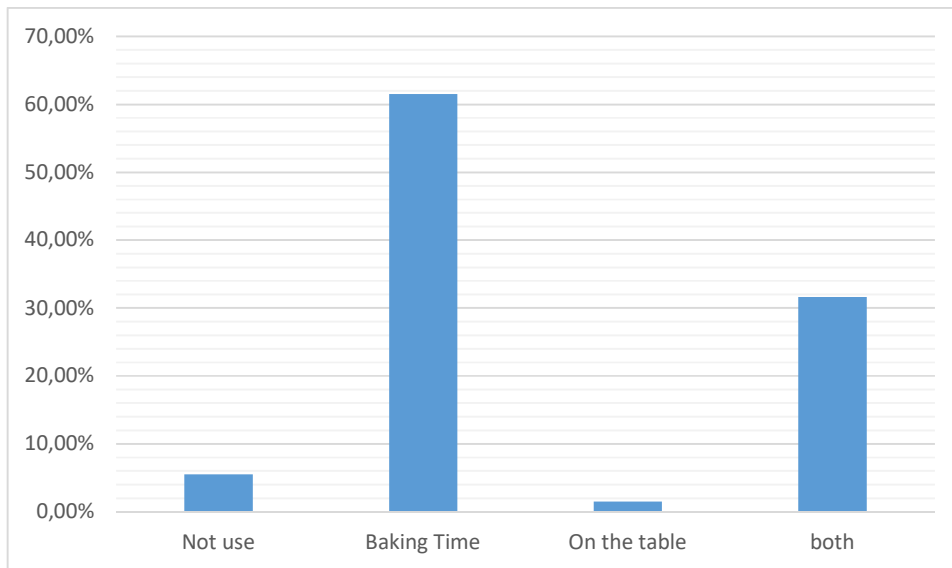


Diagram 5. Details of Salt Consumption by the Studied Household Members

## DISCUSSION

Food intake and dietary patterns of the population play a significant role in their health or disease (10,11), and hence reviewing them and attempting to modify dietary patterns can affect the health of the general population. Our findings indicate that there is a significant variation in the dietary patterns of Iranian urban households, although some of the worrying aspects of this dietary patterns were observed in some cases: breakfast and snacks were inadequate, and approximately 25% did not have regular breakfast and nearly 50% did not have snacks. Unfortunately, there are no comparable statistics in the country to assess the dietary patterns properly, but our results indicate that snacks and breakfast are inappropriate among the population of Fasa. The results of studies especially in the student population suggest that people who do not regularly eat breakfast are at higher risk for heart disease (12) and diabetes (13). It has also been reported that the habit of eating snack indicates better quality diets in people and people eating less snack, had lower quality diets (14).

Regarding fruits and vegetables, about 32% and 28% of studied population had no consistent vegetables and fruits consumption. In the context of consumption variation, the situation was worse, and 43% and 44% of the individuals did not report consuming at least 4 types of vegetables and fruits during the week. Hung et al. reported that people in the highest quintile of fruits and vegetables consumption were 0.95 times less likely to suffer from major chronic diseases than those in the lowest quintile, and that the amount of fruits and vegetables consumed by individuals had reverse relationship with a risk of cardiovascular disease (15).

The most commonly used oil for cooking was liquid vegetable oil, followed by hydrogenated vegetable oil and the most used oil for frying was frying oil and then liquid vegetable oil. Although a significant proportion of our statistical population used liquid and vegetable oil for their daily use, which is a fairly good choice, however, the consumption of hydrogenated vegetable oil is still relatively significant (20%). The best option for using as the usual oil is the olive oil, which has many indications for its usefulness (16-18) which unfortunately did not have a significant share in our studied population (6.9%), while the use of hydrogenated vegetable oils that can be harmful to health (10, 19, 20) is consumed by almost one-fifth of the general population.

The typical method of cooking meat and poultry in the studied households was also significant, since nearly 64% of our statistical population were using frying in preparing meat and poultry and the share of healthier methods such as steaming or boiling was much less. It has been shown that the use of fried foods can play a significant role in increasing the risk of diseases such as diabetes, heart disease and cancer (21-23).

As an appropriate nutritional habit, the amount of consuming seeds and nuts was questioned, since studies have shown that the habit of consuming nuts can prevent many non-communicable diseases (24). The study of this habit in our population suggests that the consistent consuming nuts has also relatively

unsatisfactory status and only approximately 40% of the individuals have a habit of daily or weekly consumption of nuts and nearly 60% of the individuals have little consumption of these useful ingredients.

In the case of cereal consumption, 63% of the individuals used rice and 95% of the individuals used bread daily, indicating that the main source of energy intake for population is the cereals, while only 26% reported that their consumed cereals were being provided from whole grain cereals and 50% of them rarely were consuming whole grains. The results of studies strongly suggest that consuming more whole grains products can play a role in reducing the probability of many non-communicable disease (25, 26) but consuming more refined products leads to more cases of diabetes, heart disease and obesity (27, 28).

Other items that were considered in individuals' diet was amount of sugar consumption. The results of the study showed that nearly 62% of the individuals had a daily sugar consumption, and 31% of the individuals had daily cakes and sweets consumption. We know that such habits can lead to metabolic diseases in the future (29-33). However, in particular processed foods and carbonated beverages consumption was much better. Only 10% of our population consumed carbonated drink daily and less than 5% had daily processed food consumption which was considered as a good nutritional habit (32, 33).

The next studied item was dairy products consumption. 48%, 56%, 75% and 26% of the individuals were consuming milk, yoghurt, cheese, doogh, respectively on a daily basis. Studies have shown that the consistent and regular consumption of dairy products can play a significant role in health (34-37). Perhaps one of the reasons why dairy products consumption is significant is maybe due to lots of livestock industries in the study area.

The last studied item was salt, with many studies about dangers of its high consumption (38-40). 92% of the individuals were adding salt to foods at cooking time and 35% of the individuals were adding salt to foods both at cooking time and on the dining table. More analyzes on salt consumption showed that only 5% of the individuals did not use salt, and 31% used salt both at cooking time and on the table. In Kelishadi's study, most students consumed less or more extra salt while eating, and only 20% of them never added salt to food on the table (41), and in Faghih's study, 52% of adolescents and 50% of adults used salt on the table (42). The unpleasant consuming excessive salt can remain consistent forever and cause diseases such as high blood pressure.

The education level and the higher socioeconomic status lead to a healthier lifestyle and a better diet. In Rezaadeh's study in Tehran, it was found that those who have university education and those with higher revenues use more fruits and vegetables and low-fat dairy products than others (43). Valeria Pala and et.al. in a study in Italy concluded that meat products and animal fats consumption is higher in people with lower education level, while in people with higher education level, vegetables and dairy products consumption is higher (44). Previous studies have shown that people with higher education level usually have healthier dietary habits than those with lower education level (45-48).

In general, our study shows that there are significant problems in the lifestyle and dietary patterns of people in Fasa. Breakfast and snacks were not regularly consumed in a significant proportion of the individuals, and there was also no variation in the fruits and vegetables consumption in about half of the population. The studied individuals were using hydrogenated vegetable oil and frying oil, and the most commonly used method for preparing meat products in the population was frying in oil. The refined grains were accounted for the major share of people's energy, and whole grains products and whole cereals did not have a significant share of consumption. Sugar and sweeteners had significant consumption. Of course, there were some positive points in the region's population's diet, including low consumption of carbonated beverages and processed foods, as well as high consumption of dairy products, but, however, regarding the consuming salt, there was not a good status in the studied population. Therefore, it seems that further training is required to improve the nutritional status of the individuals.

This study was not without limitations. The cross-sectional nature of the study did not allow us to make more accurate judgments, and in the design of the study, we did not look at the reasons for the differences or compare the differences between the groups and mostly sought to describe the status of the dietary habits. However, due to the lack of available studies to identify food preferences and patterns of people in different regions of Iran, this study can provide an overview of the current status of the population and help with further studies or policy makers' decisions.

#### Conflict of interest

No conflict of interest was declared by the authors.

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