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Salt, from History to Consumption: An Evaluation of Izmir Katip Celebi University Students' Knowledge, Attitudes and Behaviours About Salt Consumption / Tarihten Tüketime Tuz: İzmir Katip Çelebi Üniversitesi Öğrencilerinin Tuz Tüketimine İlişkin Bilgi, Tutum ve Davranışlarının Değerlendirilmesi

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Abstract

Salt (table salt), one of the few preservation aids in ancient times, is still on our table not only for preservation but also as an indispensable flavor enhancer. From the past to the present, salt has had strategic importance, affecting nations' culinary cultures and their general health conditions. The feeding habits of the people are very much related to their salt consumption habits, and vice versa. In this study, the knowledge, attitudes, and behaviours of Izmir Katip Celebi University students about salt and salt consumption were studied with a survey. 181 students participated in the study. The first 7 questions of the questionnaire included socio-demographic information, while the following 17 questions were about the students' knowledge, attitude, and behaviours related to salt and iodized salt. The participants' current information, attitudes, and salt consumption behaviors were interpreted. It was understood that information need to be provided about the use of iodized salt during food preparation; the iodine deficiency and about how to store, use and consume salt, properly. Also, amount of salt could be written on food packages in a more visible way.

Keywords: Habits, history of salt, preservation, salt, salt consumption.

Özet

Antik çağların ender muhafaza yardımcılarından biri olan tuz (sofra tuzu), sadece muhafaza amacıyla değil, aynı zamanda vazgeçilmez bir lezzet arttırıcı olarak da sofralarımızda yer almaktadır. Tuz, geçmişten günümüze ulusların mutfak kültürlerini ve genel sağlık durumlarını etkileyerek stratejik bir öneme sahip olmuştur. İnsanların beslenme alışkanlıkları, tuz tüketim alışkanlıkları ile çok yakından ilgilidir ve bunun tersi de geçerlidir. Bu çalışmada İzmir Kâtip Çelebi Üniversitesi öğrencilerinin tuz ve tuz tüketimine ilişkin bilgi, tutum ve davranışları anket yöntemiyle incelenmiştir. Çalışmaya 181 öğrenci katılmıştır. Anketin ilk 7 sorusu sosyo-demografik bilgileri içerirken, sonraki 17 soru öğrencilerin tuz ve iyotlu tuz ile ilgili bilgi, tutum ve davranışları ile ilgilidir. Katılımcıların güncel bilgileri, tutumları ve tuz tüketim davranışları yorumlanmıştır. Gıdaların hazırlanması sırasında iyotlu tuz kullanımı; iyot eksikliği ve tuzun nasıl saklanması, kullanılması ve doğru tüketilmesi gerektiği hakkında bilgi verilmesi gerektiği anlaşılmıştır. Ayrıca, gıda paketlerinin üzerine tuz miktarı daha görünür bir şekilde yazılmalıdır.

Anahtar Kelimeler: Alışkanlıklar, koruma, tuz, tuzun tarihçesi tuz tüketimi.

1. Introduction

Salt has been a determinant throughout history. It is an important mineral for all living creatures in the world. It is needed by plants, animals, living organisms, soil, and human beings for basic functions. Salt is not only necessary for body functions, but also a preservative, an agent to flavor foods, and a trade product. Salt has affected subjects like history, linguistics, folks and tales, trades, health, religion, rituals, fertility, cleaning, agriculture, chemistry, and pharmaceuticals.

Salt is defined as a product of chemical reaction of elements sodium and chlorine. Sodium is a flammable metal while chlorine is a toxic gas. This reaction's product is called sodium chloride or table salt. There are various types of other salts both edible and inedible. Edible sodium chloride salts could be listed, namely, as; table salt, kosher salt, Himalayan salt, rock salt, sea salt, Celtic Sea salt (known as grey salt), fleur de sel (in French means flower of salt), kala namak (black salt in Nepalese), smoked salt, flavored salts, black and red Hawaiian salts, and pickling salt (Mattox, 2020).

Salt's relationship with health should never be underestimated. Salt is needed by the body and is an essential mineral. As the human body needs sodium, this need differs from climate to climate. According to WHO (World Health Organizatio), salt consumption is not recommended more than 5 grams a day for human health. All foods contain an amount of salt that could meet the need for daily salt consumption. Excessive salt consumption could lead to diseases such as high blood pressure, obesity, potassium deficiency, water retention and a deficiency could cause brain and muscle dysfunctions. Sodium is needed by the body for nerve system, transferring oxygen, muscular system. Iodine is an element that cannot be produced by the body but is very essential. Iodine is added in salt now and is found in the sea, especially in seaweeds. Iodine is used in the body for hormonal balance, thyroids, fertility, and deficiencies could lead to imbalances and diseases. In warm climates, sodium is needed more than normal because, by sweating, sodium is excreted from the body. As a result of this body craves sodium and magnesium-rich foods. On the technical meeting, it was agreed on the interaction with food manufacturers is fundamental to the salt reduction strategies (WHO, 2006).

Our study was conducted among the students studying in Izmir Katip Celebi University and students' knowledge, attitude and behaviors related to salt and salt consumption were reviewed through evaluation of the conducted questionnaire results.

2. Literature Review

Salt is one of the oldest trade products and preservatives. Salt production is assumed to travel back till 6000 BC and salt was obtained by drying Lake Yuncheng and villagers scraped the salt crystals from the surface. This method is termed "dragging and gathering" by Chinese (Junru, 2018). The oldest record on salt production is recorded during 800 BC., about production and trade a millennium before, the assembly was conducted by boiling off ocean water in pots and crystals were scraped, this can be how

the Romans learned and spread along with southern Europe a millennium after. Except for salt-based sauces, salt was only sprinkled on food because it was highly expensive. Sprinkling salt on food has not been common throughout Chinese history. Salt-containing pastes and sauces were used to give the dishes a taste. This habit is due to the fact that the salt itself was expensive. Salted fish was one of the most widely used salt condiments in Ancient China (Junru, 2018).

Salt was frequently used in naming because of its chemical effect, the nature of the production area, and is a type of mineral. In this, Turkey's rich salt deposits and salt resources in terms of impact has been significant. Salt related place names and places where these names are given are the places where salt and saltwater sources are found in the immediate vicinity, where salt production is made in the past or today (Günay, 2012).

Salt has been used for many centuries for different purposes. Preservation is considered as one of the main objectives of salt consumption. Eating habits of people always led them to preserve their food because of climate, immigration, and so on. Traditionally, many techniques exist for preservation, some techniques require sun, some require ice, and some require salt. In today's world it is much easier to preserve food without any traditional techniques but in the old times people needed to do so and nowadays artisan and home-made products are increasingly popular. Preservation techniques by using salt could be listed and explained as follows:

a.Brining: Moisture is drawn from food cells by salt so that harmful organisms cannot grow. Salt must be penetrated in the food entirely and evenly for the best result. Dry-salting could be used for thin foods, such as pieces of meat, fish for easier preservation. The food is covered with salt which draws out the liquid in the food. This method is not very reliable for fragile products like caviar or big pieces of meat as it takes longer time to salt penetrate into food.

b.Curing: Lewis stated that smoking and salting methods are used for the drying process and add preservative agents that help preservation. Smoke subsides a number of pyrolysis products onto the product, including the phenols syringol, guaiacol, and catechol. Salt speeds up the drying process using osmosis and also prevents bacteria growth. Nowadays nitrites are used to cure meat, giving the food a characteristic pink color (Lewis, 2018).

c.Drying: It is known that various vegetables and meat products have been dried and preserved since ancient times. Vegetables are dried in the sun by washing and weeding appropriately, whole or cut. Other than the meat was consumed fresh for daily necessities, meat meats cut in autumn were kept for winter. One of the methods of staining the meat was drying the meat, the bony portion of the meat was salted, hung on the trees, and dried in the sun. In this way, the need for meat was met in winter days (Koşay ve Ülkücan, 1961).

d.Pickling: Vegetables and fruits such as cucumber, pepper, eggplant, fresh beans, cabbage are left in the prepared brine or vinegar. Chickpea, barley grain, parsley, garlic are added to give aroma and accelerate fermentation. Heavy or clean stones and wood are placed on top, preventing food from getting on the water. It is consumed after fermentation is completed (Koşay ve Ülkücan, 1961).

Beside salt's inevitable usage area, its relationship with health is very important. Salt consumption behaviour in communities and its reduction strategies in diets are very important subjects of study. Salt intakes, knowledge, and behaviour in Samoa was studied by Webster et al. (2016), monitoring salt-consumption patterns through the World Health Organization's surveillance of noncommunicable disease risk factors. Interviewer-administered questionnaires were used to obtain demographic and risk factor information, including history of raised blood pressure and current treatment or advice to reduce salt, and salt knowledge and behaviour (Webster et al., 2016).

Sodium and potassium intake, knowledge attitudes and behaviour towards salt consumption amongst adults in Podgorica, Montenegro was studied. It was concluded that, salt intake was high and potassium was low in Podgorica, Montenegro. Awareness, attitudes and behaviours about salt and its implication for health suggested that there is an urgent need for intensive awareness campaigns and health promotion to improve the take up of preventive strategies aiming at reducing salt consumption (D'Elia, Brajovi´c, Klisic, Breda, Jewell, Cadjenovi´c and Cappuccio, 2019).

The current status of salt reduction in bread and bakery products was reviewed by Silow, Axel, Zannini and Arendt (2016). It was described and assessed the impact of NaCl reduction on a range of bakery products, including dough characteristics, sensory properties and shelf-life.

Akgün, Genç and Arıcı (2018) reviewed the perception and functions of salt and the strategies regarding salt reduction. One important strategy, shown from Israr, Rakha, Sohail, Rashid and Shedzad (2016) was that the salt content reduction could be applied step by step, without noticed by consumer, due to taste adaptation by time, despite some limitations (Akgün et al, 2018). Moreover, to keep in mind the health and nutrition relation and the education given by nutrition specialist was told always to create a voluntary demand by consumers, about salt reduction (Akgün et al., 2018).

3. Method

A quantitative approach was used by using a questionnaire preliminary used by Uzun, Özdemir, Zencir (2016) to determine the habits and behaviours of participants on salt consumption. This cross-sectional study was conducted among volunteer students (181 people) who agreed to participate in the study among Izmir Katip Celebi University students. The data of the study were collected in 15 days (February 2019). Before the study, necessary institutional permits, Izmir Katip Celebi University Ethics Committee permission, and verbal consent of the students participating in the study were obtained. In order to evaluate the knowledge of salt use and salt consumption behaviours of the students participating

in the study, a 24-questions survey form created by the researchers by scanning the literature was applied. 7 questions were asked to the participants questioning socio-demographic data. The 17 questions that show the person's knowledge, attitudes, and behaviours about salt and iodized salt constitute the remaining part of the questionnaire:

The amount of salt consumed daily (5 g, 7 g, 10 g, 13g, I do not know)

Diseases that excessive salt consumption cause (Hypertension, Kidney Diseases, Heart diseases, Diabetes, Stroke, Obesity, Ulcer, Osteoporosis, Other)

Food to get the most salt (Salt added while on the table, Ready to eat foods, Salt naturally found in foods)

Salinity of the consumed food (Without salt, Less salty, Normal, Very Salty)

Diseases causing iodine deficiency (Goiter, Growth retardation, Cancer, Heart disease, I do not know)

Salt type used in the kitchen (Iodized table salt, Table salt, Rock salt, Himalayan salt, Iodine-free salt, Low sodium salt, Coarse brine salt, I don't use, Other)

The container to store salt (In glass bowl, In plastic container, In package, Other)

Salt place in the kitchen (In the sun-proof closet, Next to the stove, Other)

Type of salt shaker used at the table (Pine, Plastic, Porcelain)

Time when salt is added in the dish (While cooking, After cooking, Before cooking)

Yes or No Questions:

Do you add salt without tasting the food?

Do you pay attention to the amount of salt in food intake in cheese, butter, etc.?

Do you find the amount of salt you consume excessive?

Do you make salt intake restrictions?

Do you think that food selection will be affected by having color-based labels showing the amount of salt in foods?

Do you want to restrict salt consumption?

Do you support the introduction of salt restrictions in restaurants?

Statistical analyses were applied to the results, using Excel, MS Office.

4. Results and Discussion

The average age of participants is 21,5±1,8. 71.70% (129) of the students are female students. The average body mass index (BMI) of female students is 20.5 and the average BMI of male students is 22.8, 44.7% (81) of the students study in the social sciences, 38.3% (69) in the health sciences and 16.7%

(30) in the natural and applied sciences. 50% (90) of the students stated that they knew the amount of salt recommended to be consumed daily, while 37.8% (68) stated that they did not know. The 3 most common diseases, expressed by the participants, that are caused by salt are as follows: 89.4% hypertension, 85.6% kidney diseases, 45.6% heart disease. While 81.7% of the students state that they add salt after tasting the food, 60.2% (109) think that they get the most salt from ready-made foods. While 58.3% (105) of students prefer normal amount salt in their meals, 73.3% think that the salt they consume daily is not much.

When students' knowledge and behaviours about iodized salt are evaluated, the most known diseases caused by iodine deficiency are as follows: 70% (126) goiter, 42.2% (76) stated growth retardation, 24.4% (44) of the students stated that they did not know. While the most used salt type in the kitchen is iodized table salt with 75.6%, the least used is the low sodium salt with 1.1% (2) and 2.2% (4) of the students answered other option, 4.4% (8) of the students stated that they used iodine-free salt.

When the answers given by students to the questions about salt restriction were examined; 45.6% (82) of the participants paid attention to the amount of salt in food intake, and 38.3% (69) made salt restrictions, 62.2% (112) wanted to make salt restrictions, 68.9% (124) supported the introduction of salt restrictions in restaurants, 73.3% (132) stated that food selection should be affected by the presence of color-based labels indicating the degree of salt in foods.

According to WHO data, while the main source of salt consumption in many developed countries such as North America and Europe is processed foods, restaurants, and ready-to-eat services, salt is added when preparing food in Asian and African countries (WHO, 2006). In Turkey, more bread, traditional products (pickles, pickled, canned, etc.), cheese and other processed food products for preparing the added salt is thought to create overload, participants think fast food as the main source of salt (Uzun et. al., 2016).

It is thought that the knowledge and attitude of the society on salt affect salt consumption and these are interchangeable factors (Sarmugam et. al., 2013). Considering this point of view, the limited amount of salt (5 g: about 1 teaspoon) recommended to be consumed daily, the main source of salt and the limited level of knowledge about the diseases caused by excessive salt consumption indicates that the students need to be overcome in this regard.

Although most of the students participating in our study use iodized salt, almost half of them stated that they kept their salt under favourable conditions, and most of them stated that they were throwing salt while cooking. In addition, the vast majority of students stated that they knew goiter from diseases caused by iodine deficiency, and two-fifths knew growth retardation. In the study carried out by Uzun et. al., (2016), although most of the students use iodized salt, almost half of them stated that they store their salt under unfavourable conditions and a few of them discard the salt after cooking. In addition, it

was determined that students knew the illnesses other than goiter from diseases caused by iodine deficiency. In Turkey since 1994, "Iodine Deficiency Prevention and Salt Iodizing Program Diseases" being executed and made mandatory iodization of legislation making salt in 1998 (Anonymous, 2015). Moreover, because of the importance of salt reduction for health, a salt reduction program has been applied by Turkish Ministry of Health (Akgün, Genç and Arıcı, 2018; Anonymous, 2016). WHO stated that strategies to reduce salt consumption do not pose a problem for countries that take iodine from salt; It was stated that the amount of salt that is recommended to be consumed by WHO daily can be provided with the amount of iodine needed daily, and it is also stated that measures should be included to protect iodine salt and prevent iodine losses in food preparation (WHO, 2006; Anonymous, 2015). To prevent iodine loss during cooking, salt should be added to dishes after cooking and to prevent iodine loss during storage; iodized salt should be stored in a cool, dry, light-free environment and in dark glass containers (Ayaz, 2013).

One-third of the students stated that they restricted salt consumption and two-thirds stated that they wanted to limit salt consumption. The majority of students stated that they support the restriction of salt in the restaurant, and approximately three-quarters of the participants stated that the choice of food will be affected by the presence of color-based labels indicating the degree of salt in the food. In a similar study conducted by Hacettepe University students, students' attitudes towards salt restriction are similar. Salt intake has been reduced by 40% in Finland since 1970-1980, with the awareness of the public about the effects of sodium reduction on health, and with the legal regulations on salt labelling (Biçer et. al., 2013). The support of society by showing a positive attitude to salt reduction strategies plays an important role in the success of these strategies. In our study, students are not interested in salt intake restriction and labelling and want to demonstrate changes in this direction, which is important in obtaining successful results.

5. Conclusion

It could be concluded that participants of the study lack proper knowledge about salt consumption. It was seen that the iodine taken from the salts sprinkled into the food, with the way students use iodized salt, has lost its effect and the use of iodine is low. Therefore, a wide range of information need to be provided about the use of iodized salt during food preparation and diseases caused by iodine deficiency. This education could be conducted by the ministry of health for all levels of schools and universities, in cooperation with nutrition and diet specialist and culinary professionals. Demonstrations could be made about how to store, use, consume salt properly, and health professionals can talk about impacts on human health during workshops. Also, the amount of salt could be written on food packages in a more visible way. Recently, sugar-free products are very popular and most of the packages are labelled as "sugar-free, low sugar or natural sugar", this marketing strategy creates awareness on sugar consumption and a

similar strategy could be used for salt. Iodine deficiency or diseases caused by salt could be emphasized on packages as well.

6. Notes

Our study was presented as an oral presentation in a symposium (GANUD 2ND INTERNATIONAL CONFERENCE ON GASTRONOMY, NUTRITION AND DIETETICS, 2021, Gaziantep) and was included in the Abstract book. However, it has not been published as full text study.

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