Food Advertisements and its Potential Impact on Dental Health

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University of Benghazi **Faculty of Dentistry**

Dental Public Health

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Dedication

This thesis is dedicated to my parents for their endless love, support and encouragement and to my husband Mutaz Faraj, who have been my source of inspiration and gave my strength when I thought of giving up and provided me with continuous support to finish.

I dedicate this success to my children Faraj and Mohammed, the beautiful gift that I receive every day. My life is so magical because of you.

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Abstract

Aims and Objectives:

The study's primary aim is to assess the prevalence of food advertisements that are potentially harmful to dental health in the Arab Region. The secondary objectives are to describe the pattern and prevalence of food\drink advertisements according to sugar and acid content and the proportion of these advertisements in holidays and non-holidays with the investigation of the consumption of cariogenic potential of different foods containing sugar and acids.

Materials and Methods:

Mixed study design was adopted to meet the present study aims. The study included two main parts. The first part includes a content analysis of the records of the most commonly viewed TV channels in the Arab region, in order to describe the pattern and prevalence of food\drink advertisements according to sugar and acid content across the most popular TV channels in the region. The second part is

an exploratory survey of Libyan adults to identify their preference and consumption of food\beverage products.

Results:

A total of 64.51 hours was recorded for the selected television channels, out of 903 adverts for different product types, (n=171, 18.9%) were food adverts, more than half of these food advertisements (53.6%, n=91) were categorized as potentially harmful to dental health, including cariogenic, high in sugar foods and drinks (12.4%, n=21), and both cariogenic and acidogenic (41.2%, n=70). More than half of the recorded adverts (52.3%, 472) were broadcasted on weekend days, and more than one third (56.6%, n=511) were broadcasted on peak time.

Libya and other Arab countries have similar habits and diet desires, as the frequent consumption of foods rich in sugars like white bread and sweet snacks makes up the largest proportion of their diet. Comparison of commonly advertised and commonly consumed foods and drinks, it is clear that carbonated drinks and coffee and tea are quite common dietary items. Overall, the study demonstrated that the Libyan adults frequently consumes coffee and tea as well as carbonated soft drinks and fruit juices which are a primary source for sugars and acids causing caries and erosion. Therefore, the present study has important implications for dietary advice provided both at clinical and community settings. The educational

message should target these habits in order to promote healthy eating and life-style.

Conclusion:

In conclusion, this study focus on the nature of food advertising on the most popular TV channels in the Arab region. The overall proportion of food advertisements is low, but more than half of these food advertisements were for products that potentially harmful to dental health and the great bulk were for foods high in both sugar and acid content, with occasionally a high proportion of advertisements during peak viewing time and holidays.

Accordingly, the most commonly advertised food products, like carbonated soft drinks and coffee and tea are quite common dietary items and are the most frequently consumed food products by Libyan adults. The results show that Libyan adults frequently consumed food with high sugar and acid content which is harmful to dental health.

Chapter 1. Introduction

Introduction:

Oral and general health share common risk factors which can be tackled in a cost-effective intervention (1). Of many common risk factors of oral health and general health, the consumption of high sugary food and drinks has received much attention in recent years as an important player in developing both caries and obesity. The World Health Organization (WHO) has recommended that sugar intake should be limited to less than 10% of daily energy, in order to prevent increased body weight and its associated medical conditions such as diabetes, heart problems as well as dental caries. Therefore, tackling sugar consumption through upstream intervention (such as taxation) and down-stream interventions (such as changing behaviors) are necessary to prevent sugar related diseases (2).

In dentistry, efforts to reduce sugar intake are promoted as a regular activity in both clinical and community settings (3,4). For example, change for life campaign in the UK aimed to raise awareness of sugar adverse effects in community settings (5). In addition, reducing sugar intake has been recognized as one of the key messages in dental health education in clinical and other settings (6,7). Although sugar consumption is a well-known primary cause of dental caries, the association is not that simple. The cariogenic potential of sugary food depends on many interacting factors such as: amount, frequency, consistency as well as influences from other factors such as fluoride availability and quality of saliva (8–

11). For example sticky food take longer time to be cleared from the oral cavity unlike liquids which can be cleared easily, given that the quality and the flow rate of saliva are within the normal range (9,12). In spite of the fact that many factors interplay to influences the role of sugar in caries development, it has been recommended that all dental patients should be advised to reduce sugar amount and frequency and avoid sugar consumption up to one hour before bed time, this generic advice is believed to be more practical in the busy dental care settings (3).

However, the effort to tackle high intake of sugary food and drinks are hindered by overwhelming adverts on TV that promotes the consumption of food and drink regardless their harmful effect on oral and general health (13,14). Therefore, this source of information should be controlled in order to support the effort to promote oral health and reduce the unwanted effect of diet.

In Libya and other Arab countries most of people watch satellite channels and TV programs, suggesting similar cultures and languages in these countries. So far, to authors' best knowledge no previous attempt was made to investigate the content of TV adverts, related to diet and oral health in Middle East and North Africa. In addition, the dietary habits related to oral health among Libyan adult population remain unexplored. Most of previous studies has explored sugar consumption habits of children as part of oral health surveys (15). Therefore,

untapping these areas of research would provide baseline data for future dietary interventions and for policy makers at national and regional levels.

Chapter 2. Literature review

2.1 Overview of the chapter

In this literature review, the definition of dental caries and erosion with clarification of cariogenic and acidogenic foods are presented with explanation of their effect on the dental health. In addition clarification of nutritional behavior as one of the factors that affect the dental health with illustration of the impact of food advertisements on nutritional behavior. Also this chapter will go throw different methods of dietary assessment to evaluate the consumed diet and relate it to dental health. Many studies have been conducted over the past years to show the relationship between food advertisements and dental health. Accordingly, previous studies on the relationship between food advertisements and dental health will be reviewed.

2.2 Dental caries

2.2.1 Definition and causes

Dental caries is defined as a chronic infectious disease, caused by a complex interaction over time between acid producing bacteria, fermentable carbohydrate and other host factors including teeth and saliva (dietary-microbial disease)(16). It can occur in both, crowns and roots of the teeth, and it may occur in early childhood or later in life. Recently, caries is described as a life-time disease rather than a childhood disease. Risk for caries development includes a combination of

factors, physical, biological, environmental, and lifestyle-related factors (16–18). Physical and biological factors include insufficient salivary flow rate, genetic factors, and deficient fluoride exposure. Fluoride encourages remineralization and inhibits the demineralization of the tooth structure and the presence of high numbers of cariogenic bacteria (shifting the balance of the oral biofilm towards health) (19). The lifestyle-related factors can be controlled by the individual, and include oral health related behaviors such as frequent consumption of food contain sugars and poor oral hygiene, which have a direct effect on caries development (20). In fact, eating behaviors that increase the frequency of carbohydrate consumption will consequently increase the exposure time for oral bacteria to ferment the carbohydrate, and thus increase the risk of caries (20). The nutritional behavior can be affected by many factors, one of these factors is the exposure to food advertisements, hence these advertisements leads to more and purchase of the advertised product (21). Other factors that considered as risk for caries development include socioeconomic status, education, poverty and insurance coverage (16–18).

Dental caries is caused by the action of acids which are produced by a group of bacteria that colonies the tooth surfaces when they ferment sugars (primarily sucrose) in foods/beverages (22). The microorganisms (Mutans streptococci and

Lactobacilli) are the most important organisms that cause dental caries in the presence of a cariogenic diet (22–24). Mutans streptococci species, Streptococcus mutans and Streptococcus sobrinus are acidogenic and aciduric bacteria (biochemical properties which include the capability of growing (aciduric) and producing acids (acidogenic) in acidic environments) which mean that they produce acid and they can live in acidic environment, so they play an important role in caries initiation, unlike Lactobacillus which are responsible for caries progression due to their aciduric activity (survive in low pH) (25). These bacteria present in dental biofilm/plaque on the tooth surfaces metabolize dietary carbohydrate and produce acids which lead to decreasing in the pH of the dental plaque to drop between 5.5 and 5.7 which lead to demineralization of the tooth structure (loss of calcium and phosphate ions from the hydroxyapatite crystals of the enamel surface) (23). In contrast, a diet lower in added sugars and fermentable carbohydrates with the buffering effect of saliva (availability of calcium, phosphate and fluoride ions) may favor remineralization, hence dental caries is a continuous disease process, with alternating periods of demineralization and remineralisation of dental hard tissues (26,27).

Any disturbance between these protective factors and the pathological factors will affect the caries process (Figure 2-1), if the pathological factors

predominate, then caries progresses. If the protective factors predominate, then caries is arrested or reversed (28). Initial caries clinically presented as white spot lesion with intact superficial layer and loss of minerals in the subsurface layer, continuous acidic environment result in continuous loss of minerals and continuous tooth destruction (16,23,29).

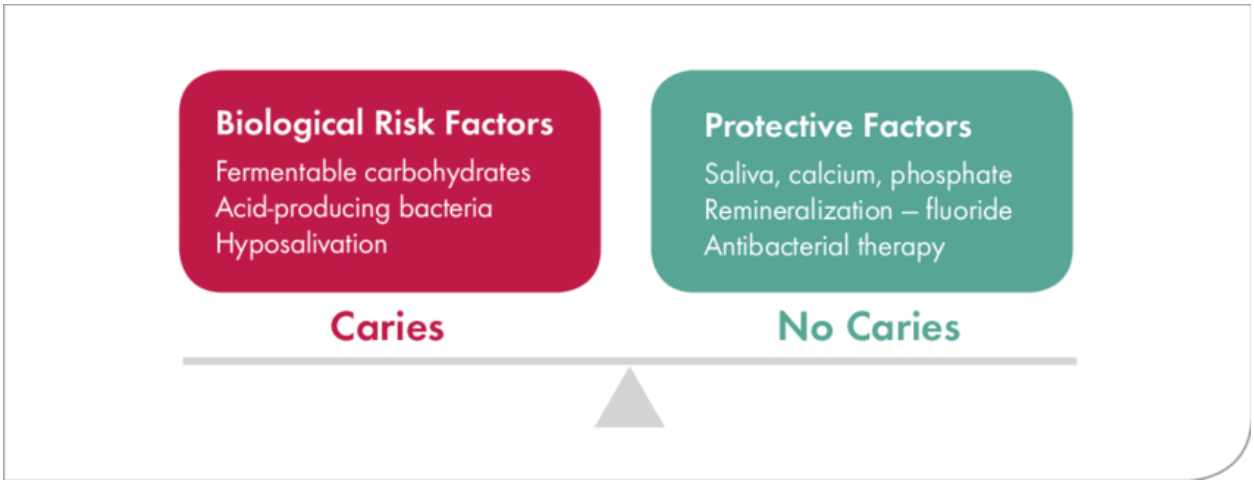

Figure 2-1: The caries balance between pathological factors and protective factors

2.2.2 Cariogenic diet

Dental caries has become a noticeable health risk associated with intake of sugars, particularly sucrose. The low molecular weight and simple structure of these sugars permit for easier diffusion into dental plaque to be metabolized by cariogenic bacteria, leading to quick and abundant acid production. Oral

microorganisms like streptococcus Mutans which is present in dental plaque, metabolize any sugar not only sucrose, but also glucose, lactose, fructose, and prepared starches into acids, including lactic, formic, acetic, and propionic acid (30).

However, sucrose is considered as much more cariogenic than other sugars. Several studies that investigated the differences between sucrose and other monosaccharaides in term of cariogenic potential, have been reported in the dental literature. For example, study involving a small number of participant in Sweden illustrated that replacement of sucrose by invert sugar (a mixture of glucose and fructose) had a lower caries increment in 2 years (31). Another clinical study suggested that sucrose play an important role in the production of extracellular (water-soluble and water-insoluble) glucans by mutans streptococci, enhancing its accumulation in the plaque. Glucans increase the porosity of dental plaque allowing dietary sugars to penetrate and increase acid production adjacent to the tooth surface (31,32).

There are numerous factors prompting the cariogenic potential of sugary foods and drinks. The frequency and amount of sugar intake are important factors in caries development. Frequent intake of high sugary diet results in a prolonged period of acidic environment leading to demineralization of the tooth structure.

Furthermore, the cariogenicity of food also influenced by their consistency. Liquid or non-retentive foods, like ice cream, are less cariogenic than sticky retentive forms, such as caramel, due to the retention time of sugars in the oral cavity (23,30,33).

2.2.3 Different food classification systems

Standard classification of sugars:

Various different terms have been used to name and classify sugars, in 1989, Committee on Medical Aspects of Food Policy (COMA) made a naming system, which has now become the standard classification of sugars in the UK which describe the effect of sugars on dental health (34).

The COMA classification is primarily based on the place of sugar molecules whether they are inside or outside the cellular structure of food and drinks, sugars are categorized for dental health purposes into intrinsic or extrinsic (23,34).

Intrinsic sugars are present inside the cell structure as an integral part of certain natural food, like cereals, fruits and vegetables (containing mainly fructose, glucose, and sucrose), intrinsic sugars are considered as less-cariogenic sugars because of their place within the structure of the food, so they need more

mastication which lead to more salivary flow, saliva act as buffering agent and tend to neutralize plaque acid (33,34).

Extrinsic sugars are establish outside the cell structure of foods and drinks in a free or delivered form and are classified into milk extrinsic sugars which are present in milk and milk containing products and consist mainly of lactose. Non milk extrinsic sugars (NMES) are the extrinsic sugars other than that present in milk and milk containing products like table sugar, fresh fruit juices, sweets, biscuits, cakes and soft drinks, and consist mainly of sucrose, fructose and glucose (34,35). NMES are more cariogenic than MES and intrinsic sugars because they present in free form which is ready to be metabolized by plaque bacteria (23,36).

The Nizel and Papas classification:

Foods with high sugar levels are categorized according to the Nizel and Papas classification into solid and sticky foods e.g. toffee, caramel, banana, cakes, cookies, donuts, raisins, chewing gums, canned fruit in syrup, pastry, etc., slowly dissolving foods e.g. cough drops, breath mints and hard candies and liquid foods e.g. ice cream, soft drinks, sugar and honey in beverages, flavored yogurt, etc. (23,37).

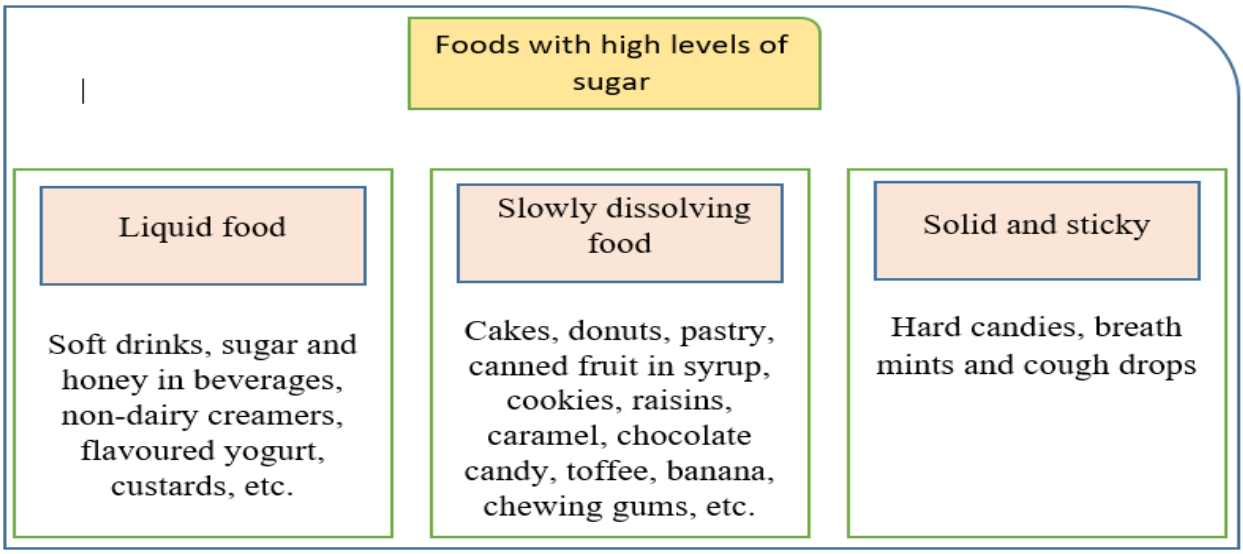

Figure 2-2: The Nizel and Papas classification of foods with high sugar content

Solid and sticky foods and slowly dissolving foods considered as a highly cariogenic foods because of their high retention time in the oral cavity which lead to prolonged acidic environment (Figure 2-2) (23).

2.2.4 Food and caries risk

Fruit and fruit sugars:

Fresh fruits are considered less cariogenic than fresh fruit juices that do not contain added sugar or from dried fruits, and this is due to the pressing and drying process which lead to the transformation of the intrinsic sugars from the cellular structure of these fruits into extrinsic sugars which are more cariogenic, in addition, dried

fruits are more sticky and so they are more cariogenic due to their retention time in the teeth (38).

Starchy staple foods:

Raw starch, such as found in vegetables, is less cariogenic than cooked or refined starch. Some experiments conducted on animals have shown that a mixture of refined starch and sucrose, such as found in biscuits and cakes is considered a highly cariogenic (28).

Milk sugars:

Milk contain lactose, which is considered the least type of sugar among monosaccharaides and disaccharides to cause tooth decay also, because milk and milk products without adding sugar contain calcium phosphate and casein which help in protecting the teeth from the demineralization (29).

2.2.5 Frequency of sugar intake

Frequent intake of sugars lead to prolong decrease in oral pH which is favor for demineralization, due to the use of bacterial plaque to these sugars and the production of acids (shift in microbial ecology to be in advowson of dental caries) (27,39).

The primary indication for the relate between the frequent consumption of sugar and dental caries comes from the Viepholm study which showed that increase the frequency of sugar consumption, the higher the risk of dental caries (27). In another study on Saudi adolescents' daily diet found that the frequency of sugar intake highly associated with caries experience and prevalence than the amount (33). This positive association also confirmed by many other experimental animal and laboratory studies (27).

In the other hand, some epidemiological studies reported a weak or no connection between caries development and frequent sugar consumption, a systemic review was conducted by Anderson et al. in 2009 reported that 19 out of 31 involved studies shows significant association between demineralization and frequent sugar consumption, but the weakness aspect was that, most of these studies were cross-sectional studies (these cross-sectional studies frequently relate current dietary practices to past caries experience), also an accurate retrospective record of sugar exposure in past years would also affect the validity and the reliability in measuring sugars intake (27,40).

Other systematic reviews have shown that there is a clear relationship between the frequency of sugar intake and the occurrence of tooth decay, regardless of the difficulty of linking frequent sugar intake and previous dental caries experience

(26,27), so extrinsic sugar intake should be limited to less than 4 times a day to reduce caries development (39,41).

2.2.6 Amount of sugar

The correlation between the amount of sugar consumed and dental caries has been observed broadly in epidemiological studies and it shows a dose response curve as the consumption of large amount of sugar lead to increase in the dental caries (33,42). The dose-response relationship between caries and sugar consumption proposes that, the level of sugar intake by teenagers and adults should not exceeds 60 g/person/day and about 30 g/person/day for pre-school children, otherwise the rate of caries increase (39).

Consuming sugars in large quantities leads to prolong reduction in the pH, which triggers the shift of the plaque microflora to a more cariogenic one (32). A study conducted on children, who were followed prospectively from infancy up to the age of 10 years, shows that, daily consumption of sugar higher than 10% of daily energy was responsible for caries development (43). A systemic review has been conducted, it found that the evidence on the relationship between dental caries and the amount of sugar intake is of medium strength (27).

2.2.7 Amount –frequency controversy

There is a debate between the amount and frequency of sugar consumption to cause dental caries, both have a major role in dental caries and neither of them has a greater role than the other, as when the amount decrease, this means confidently a decrease in the frequency and any attempts to control one will directly affect the other in any case (27,42).

2.3 Dental erosion

2.3.1 Definition and causes

Dental erosion is defined as a progressive and irreversible dissolution of the dental hard tissues due to acidic attack that does not include bacteria, dental erosion is performed by either intrinsic or extrinsic acid (44). The intrinsic acids are usually the result of the reflux of stomach acids and their presence in the oral cavity as seen in patient with morning sickness, gastro esophageal reflux, etc. which lead to direct contact between the teeth with these acids (23,44,45). The extrinsic acid are the acids that delivered to the mouth from food/beverage such as soft drinks or as a result of medications like chewing vitamin C and aspirin or as a result of occupations that require the exposure or inhalation of high concentration

of acids, also swimming pools containing acidic water (hydrochloric acid) cause erosion to the teeth (44–46).

The pathogenesis of erosion begins as softening and demineralization of the superficial dental hard tissues, after lowering of the pH below the critical level (which is approximately 5.5) by acidic solutions which come into interaction with the teeth. When these acids diffuse inside the teeth they cause loss of calcium and phosphate ions and destruction in the apatite crystals, so erosion is considered as irreversible tooth wear (23,47).

2.3.2 Acidogenic foods

Foods/drinks that contain great amount of acids can lead to erosion and destruction of dentition because of their acidogenic effect (acidogenic effect is defined as erosion and dissolution of tooth enamel that caused by low pH value due to oral acids) (23). Evidence has suggested that the consumption of soft drinks that contain high level of acids is highly associated with dental erosion (48). Another study in 2009 shows that frequent consumption of acidic beverage and fruit juice especially at bedtime have increase the potential for dental erosion (48). The following foods and drinks have a high potential to cause dental erosion (Table 2-1) (3):

1	Soft drinks (carbonated and diluted squashes)
2	Fresh fruit juices, fruit juice drinks and Large quantities of fresh fruit (such as citrus fruit and apples, but not bananas)
3	Wine, alcopops, cider and perry, spirits consumed with mixers
4	Some types of herbal teas
5	Large quantities of vinegar, sauces and pickles
6	Acidic sweets
7	Large quantities of chewable aspirin and vitamin C tablets

Table 2-1: Food and drinks with a high acid content

2.4 Dietary assessment

Dietary assessment is used to evaluate the consumption of food and nutrients for an individual or a population. This information about dietary intake is used for many purposes, for example, in studies on the associations between diet and disease, in the development of nutrition recommendations, and in the observing of dietary intake and the results of dietary interventions. There are several methods used for dietary assessment, they can be divided into two main methods, retrospective

measures of intake such as food frequency questionnaires (FFQ), diet history or 24-houre recalls and current measures of intake, such as weighed or estimated food records. Choosing the appropriate dietary assessment method depends on several aspects, including the aim of the study, the population sample being studied, the availability of resources and the required accuracy of the chosen method (49).

2.4.1 Dietary assessment methods

Food records:

This method is prospective, in which the participants records the food consumed during the day at the time of consumption with the amount of the food usually by using household measures, in addition cooking methods, brands, fat content, and other important details are recorded in preformed sheet, between 1 to 7 days, the more days recorded, the more representative of usual intake of the respondent (49,50). The time and the effort required to record the consumed food increase the participants fatigue and burden, also the accuracy of this method may be decrease when some participants record their data retrospectively. Therefore highly motivated and cooperative participants are required for this method (49).

24-houre recalls:

In this method, dietary information is collected through interviews, which are usually face-to-face or by telephone, where the participant are asked about the

exact food and amount consumed during the past 24 hours (50). The disadvantages of this method are that, the difficulty of the participant to remember what exactly consumed and in what amount in previous 24 hours, the interviewer can use measuring tools such as household cups, spoons and bowls, or photographs of these items to assess the portion sizes. also the risk that the interviewer can influence the participant to give the desirable answers (50).

Accuracy of results is variable among groups with different characteristics, like different ages, genders, mood and intelligence levels. Another limitation in this method is the wide range of intra individual variation in dietary intake over a single day's diet. To solve this, repetition of food recalls three, four or even seven days may be necessary (49). Repeated recalls have been used previously in many studies, for example; a second 24-hour recall used in the National Nutrition Survey for New Zealand within a month of the first 24-hour recall to account for intra-individual variation (51).

Food frequency questionnaires FFQ:

Food frequency questionnaires are considered as the most commonly used tool in nutritional epidemiological studies, because of their low cost, ease of use and they are able to measure long term dietary intake. FFQ consist of a limited list of food items, these items are the main sources of the dietary component under

investigation. The participants are requested to report how frequently each food item in the list is consumed over the previous day, week, month or year. The response to the FFQ by the participants is influenced by many factors like the length and the complexity of the food list and current diet (49). Ideally, FFQs should be designed and tested for reliability and validity in populations in which they are to be used, also to be sure all the items and questions are clear and can be understood by the target population (52).

Design Characteristics of Food Frequency Questionnaires

Types of Questionnaires:

Questionnaires according to the quantification of the consumed diet are classified into; simple or non-quantitative, semi-quantitative or quantitative. Non-quantitative FFQ ask about the frequency of food consumption only, the semi-quantitative FFQ ask about the frequency of consumption of the particular food in addition to the use of close questions asking the frequency of set portion sizes, and the quantitative FFQ queries the amount of food consumption and description of the portion size usually consumed in an open ended format (49,53).

The Food List:

The food list is constructed according to the porpoise of its use , whether it is used to measure specific foods or nutrients or the overall dietary intake, it should include many different food and brands (49). FFQs can ask the respondent either to report a combined frequency for a specific food eaten both alone and in mixtures or to report separate frequencies for each food use, for example the respondent ask about beans whither they eaten alone or in a mixture or ask about eating each type individually, such as refined beans or beans soup and so on, also the FFQ many contain a single question for similar foods like meat (beef or lamb meat) (54).

Study Population:

FFQ must be designed specifically for its target population, because of the food variation between individuals especially those with different age group, different cultural backgrounds and physiological statuses. So recognition of the cultural differences, including cultural awareness is necessary to develop a culturally appropriate FFQ. The respondent's interpretation of questions on the FFQ may differ from the designers due to cultural differences, and miscommunication of interpretation of questions would increase and therefore, this would reduce the overall validity of the FFQ (49).

Administration Method:

FFQ may be interviewer or self-administrated FFQ, interviewer administered FFQ usually with less respondent errors and incomplete answers as found in self-administrated FFQ. An opportunity is given to clarify what is required of the question by the interviewer (49).

Dietary History:

This method is used to estimate the dietary intake of an individual over a specific period of time, usually a month or a year. It consists of three parts; a 24-hour record, 3-day food diary and a FFQ to collect food usually consumed. Firstly, a 24-hour record by well-trained interviewer to obtain general dietary information from the participants with questions on their dietary habit and the portion size of the consumed food, followed by FFQ to confirm and complete the information about the dietary pattern and a 3-day estimated food record to check actual intake. But the dietary history method has large range of limitation since it considered as time consuming method where it requires about 90 minutes to complete and require a highly skilled interviewer and thus, are not regularly used in epidemiological studies (49).

Technology in dietary assessment:

Recently, the dietary intake can be assessed by using devices like computers and mobile phones, thus it will be easy for the researcher to distribute the materials needed for dietary assessment and also more friendly and easier for the participant provided that he or she is familiar with the technology (50).

A study conducted in 2013, Computerized 24-h dietary recalls have been developed and used successfully with adults and children in the US (55). Smart phones and PDAs can be used for digital dietary assessment, and these make it possible to send data of consumed foods to the researchers in real time (56). So technology can be useful in dietary assessment methods to simplify data collection and increase the validation of collected data, but the development of new methods of dietary assessment using technology is still on-going (50).

2.5 Dietary habits of Middle East inhabitant

Most of the Arab countries in the Middle East showed changes in their dietary habits as they adopt a more modernized life-style. For example, in the Arabian Gulf, the traditional diet, characterized as a high-fiber content and low in fat, has changed to a more westernized diet with a high content of fat, free sugars, sodium and cholesterol (57). Also the sugar consumption is already very high and

it continues to rise, which is believed to be due to the shift of the upper and middle social classes to fallow the economic development (57). For example, Bahrain, like other Arab Gulf countries, where Westernized food habits become mainstream. Fast foods, which usually contain a high amount of calories, fat and salt, have become essential items in Bahraini meals, also foods with high sugar content, high fat and salts and low fiber, fruit and vegetables (58).

Another study among Kuwaiti adolescents reported that, the rapid socio-economic growth lead to changing in eating habits, with increase the availability and consumption of fast food, irregular meal pattern, skipping breakfast, decreased intakes of fiber, and increase intakes of sweets and sugars (59).

Libya is considered as an oily country, since 1950s when oil was discovered, the economic development have a collective impact on the health status of the Libyan population, the nutritional transition characterized by increasing in the consumption of sugary drinks, fast-food restaurants, a high intake of red meat, refined sugars, and saturated fat with little fiber (60). Although little is known about the dietary habits of the Libyan culture, the number of fast food restaurants has increased markedly and the reliance of fast food and processed foods is not something we can hide or ignore.

2.6 Food advertisements on television

Television (TV) is a potent medium for marketing and advertising products (61). Previous studies suggest that greater television watching is associated with increased consumption of snacks, sweetened beverages and fast foods (61).

Zimmerman and Bell, in 2010, found evidence to support the theory that, obesity in children who spent more time in watching television was not due to reduction in the physical activity but because of the viewer's responses to the advertisements for foods of low nutritional quality (62).

A study conducted in 2014 to examine the number and quality of foods advertised on television during Ramadan in Arab Gulf countries, showed that food and restaurant adverts were the highest frequency (20.4%) of all advert's categories and most of the food adverts were for less healthy products. The percentage of healthy food products were 4% comparing to the unhealthy food products 11% (61).

Many television advertisements promote the consumption of foods/drinks that affect dental health. Cairns et al, in 2013, in their systematic review, found that TV food advertising can have a direct effect on children's food choices, behaviors and attitudes (63). For example, a content analysis of forty-one hours of children's

television programming in the UK, found that food advertisements containing high sugar and acid were high during children's viewing hours and during school term, with complete absence of advertisements for non-cariogenic/non-erosive substances such as fruit, vegetables, milk or plain water (64). Another study of 166.7 hours recorded , 1330 (26.7%) were food adverts and 595 adverts (44.7%) of them were for food that contain large amounts of sugars and\or acids, which are harmful to dental health and there were no advertisements encouraging the consumption of fresh fruits and vegetables during the children's programs (65).

Mazyad et al. in 2017 conducted a content analysis in UK, for children younger than 12 years old in the relation between oral health and food advertisements, where he found that two thirds of food advert were potentially harm full to dental health (89% were cariogenic, 7.6% both cariogenic and acidogenic, and 3.4% were acidogenic foods) (13). According to Arora et al. in 2018, they studied 297 hours of TV viewing and he found that advertisements of food with high sugar and acid content were high during children's viewing hours and during school term (66).

Many previous studies have shown that there were differences in the pattern of displaying food advertisements throughout the day. Mazyad et al. found that advertisements for foods harmful to dental health were in greater proportion in

entertainment and game programs, which occupies the largest percentage of viewers of children and young people (13). According to Boyland et al. food advertisements had a greater proportion during peak compared to off peak children's viewing hours (67).

To the researcher's best of knowledge, by reviewing the literature, there is no previous attempt was made to explore the content of TV adverts, related to diet and dental health in Middle East and North Africa.

Chapter 3. Amis and objectives

3.1 Amis

The current study aimed to examine the prevalence of food advertisements that are potentially harmful to dental health in the Arab Region.

3.2 Objectives

1. To describe the pattern and prevalence of food\drink advertisements according to sugar and acid content across the most popular television channels in the region.
2. To describe the proportion of food\drink advertisements during holidays and non-holidays, with focus on dental health.
3. To investigate the consumption of cariogenic potential of different foods containing sugar and acids, identified in the content analysis and three days dirt sheet among convenient sample of Libyan adults.

Chapter 4. Materials and methods

4.1 Study designs:

Mixed study design was adopted to meet the present study aims. The study included two main parts. The first part includes a content analysis of the records of the most commonly viewed TV channels in the Arab region, in order to describe the pattern and prevalence of food\drink advertisements according to sugar and acid content across the most popular TV channels in the region. The second part (cross-sectional study design) was an exploratory survey of Libyan adults to identify their preference and consumption of food\beverage products.

4.2 Content analysis of TV advertisements

4.2.1 Television sampling\ viewing periods

A preliminary survey to identify the popular channels in the Libyan culture and to define the peak time of TV viewing (the time of day when most people are watching television and when advertising costs the most). The survey included a convenience sample of 50 individuals with different ages (18-60 years of age). In the survey, the respondents were asked about the most common hours of TV viewing on weekdays and on holidays and the most common channels viewed. After that the data collected and analyzed to determine: 1) the target channels to be recorded. 2) The peak time of TV viewing.

The analysis showed that there were two peak times, peak child-viewing time from 4pm to 8pm for the children channel (MBC3) and peak adult-viewing time from 8pm to 12am for the other three channels (MBC maser1, MBC Iraq, CBC).

The selected channels, MBC3, MBC Maser1, MBC Iraq and CBC, (MBC =Middle East Broadcasting Center, CBC=Capital Broadcasting Center) were then recorded in weekdays (Sunday, Monday, Tuesday, Wednesday and Thursday) and week-end days (Saturday and Friday) in October 2021.

Content analysis is a method for examining the content of a variety of data, such as visual and verbal data. The data then collected and reduced to form defined categories so as to better analyze and interpret them, content analysis is a procedure that may be used with either qualitative or quantitative data (68). The quantitative content analysis (used in the present research) is deductive which means that it is based on pre-existing framework to generate a hypothesis about the relationship between variables, coding scheme of the obtained data usually established before starting testing the hypothesis, it moves from the general to the specific (69,70).

On the other hand, the qualitative content analysis, is inductive where the research question guide data gathering and analysis and it is recommended when

no enough knowledge about the phenomenon is present, so that specific information are observed and then combined into a larger whole or general statement; moves from the specific to the general (69–71).

Data collection and analysis

The four channels were recorded on USB equipment by using StarSat SR-3700HD CA device then transformed to DVD discs, after that the data viewed and analyzed by a single prospector into food and non-food advertisements. But it was taken into account that the advertisements broadcasted between the platforms (at the end of televised programs) were not included in our research, only the adverts shown in the breaks. For food advertisements that contain more than one food product, the most demonstrated product was taken, and in the event that all food products had equal interest, the first shown product was taken.

4.2.2 Data management and calibration

Coding**:** The television recording hours viewed and analyzed to single out the advertisements which then categorized as food\drink advertisements and non-food \drink advertisement. Adverts for food\drink products further tabled into one of the following four subgroups as described in a previous study in the UK (64), according to the sugar\acid content of the product shown in table 4-1:

Table 4-1: Categories of adverts according to the sugar\acid content of the product shown

Group 1	Adverts for food\drinks with high sugar content such as: flavored milk products, breakfast cereals with added sugar, breakfast bar and confectionery (sweets, biscuits, cakes).
Group 2	Adverts for foods\drinks with high acid content, such as sugar-free soft drinks.
Group 3	Adverts for foods\drinks with high sugar and high acid content, including soft drinks (carbonated and non-carbonated).
Group 4	Adverts for foods\drinks with low\no sugar and low\no acid content. This includes dairy products, breakfast cereals with no added sugar, tea/ coffee and meat (64).

The data collected was then inserted in Microsoft Excel 2010 spreadsheet according to the above criteria. After one week the same operator reanalyze 10% of the total number of the recorded adverts to determine the level of intra-examiner reliability, which reached a 99% level of agreement.

The descriptive analysis of the study's data carried out using Statistical Package for Social Science (SPSS version 25.0) to describe the distribution of food\drink advertisements based on their sugar and acid content and also to describe the proportion of these adverts in weekdays and holiday. A chi-squared test was used to evaluate the association between adverts for foods and the other independent variables, which included peak and off-peak viewing hours, advertising pattern across the week day and weekend day, and food advertisements category. All statistical tests were conducted at p-value ≤ 0.05.

4.3 Survey of Libyan adults

4.3.1 Development of food frequency questionnaire

The most common food\drink products that identified from advertisements (Appendix I) and a three-day diet sheet, were used to develop the list of foods and drinks included in the FFQ. A three-day diet sheet was performed with open ended frame and distributed by e-mail to ten participants mainly postgraduate colleagues, only seven participants filled the sheet and send it back. The diet diaries were

analyzed using an inductive content analysis technique to enlist different foods and drinks consumed by the respondents (Appendix II).

The FFQ was performed in Arabic language, and it consists of five pages with nine sections, each section represent different food category and a total of 56 items were included, asking about the habitual food intake during the previous month. All questions were closed-ended questions. The frequency of the consumed food was assessed by the following answers (never or less than once monthly, once monthly, 2 to 3 times monthly, once a week, twice a week, 3 to 4 times weekly, 5 to 6 time weekly, once a day, more than 2 times daily). But to identifying the amount or the portion size three options were used (small, medium and large) with clarification of the medium size with a short description. The questionnaire was pretested by a sample of 15 participants to ensure that all the items and questions are clear and can be understood by the target population.

4.3.2 Sample

A convenience sample of at least 400 Libyan adults of different age group, including parents, workers and university students. This sample is considered appropriate to estimate the proportion of respondents who consume different types of foods and drinks at 95% confidence level and 0.05 margins of error. The

participants were recruited from Benghazi university and Libyan international university and parents of children in private and public schools.

4.3.3 Data collection and analysis

A self-administrated, paper-based questionnaire containing FFQ and socio demographic characteristics was handed to the participants at their work and study places by the researcher in November and December 2021. The questionnaire was collected immediately after they finished (on the same day) but some participants returned it back in the next day.

The analysis of the study's data (the numerical data that obtained from FFQs which were coded and hand-entered by one researcher) was carried out using Statistical Package for Social Science (SPSS version 25.0). A Chi-square test was used to compare responses among different age groups (less than 20 vs above 20) and male and females. All statistical tests were conducted at p-value ≤ 0.05.

Ethical consideration

An ethical approval obtained from the research ethics committee at faculty of Dentistry, University of Benghazi (No.058). The participation in the study was voluntary, and the respondents were informed about the aim of the study before

completing the questionnaire. The data were treated with high degree of confidentiality and no personal identifiers were requested.

Chapter 5. Results

Results:

5.1 Part one; analysis of the advertisements

A total of 64.51 hours was recorded for the selected television channels. Overall, 903 adverts for different product types were identified and analyzed. Figure 1 shows the allocation of adverts in the recorded channels. The majority of adverts recorded from CBC channel (n=423, 47%), followed by MBC Iraq (n=236, 26%), then MBC 3 (n=144, 16%) and finally MBC Egypt (n=100, 11%).

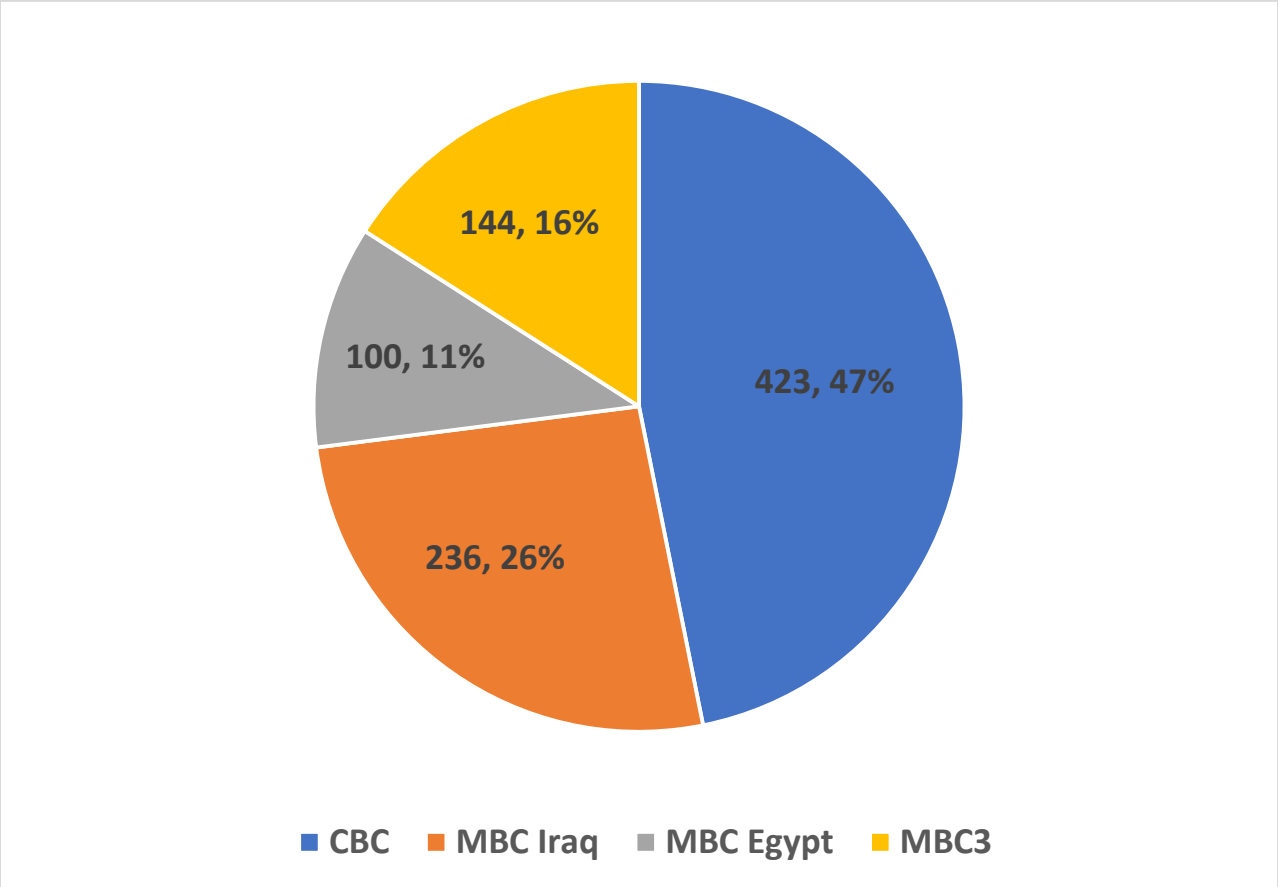

Figure 5-1: Distribution of adverts according to channels sampled

Figure 5-2 illustrates the distribution of adverts by food, week days and peak time. Whereas the majority of adverts shown were nonfood adverts (n=732, 81.1%), the food adverts contributed only (n=171, 18.9%) of all adverts. More than half of the recorded adverts (n=472, 52.3%) were broadcasted on weekend days, and more than one half (n=511, 56.6%) were broadcasted on peak time.

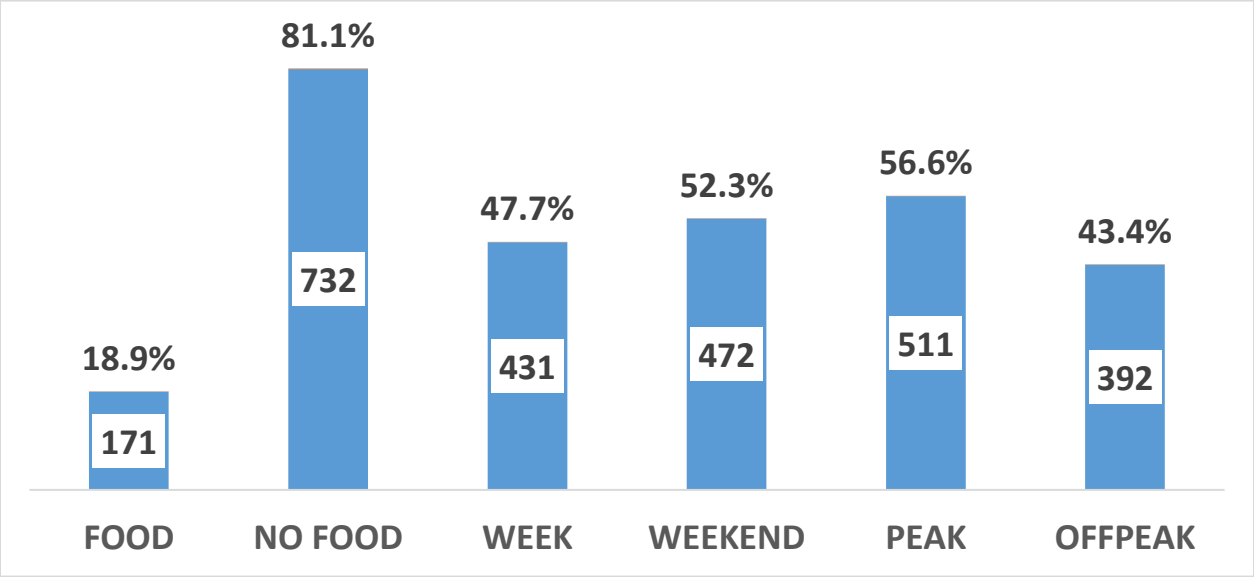

Figure 5-2: Distribution of adverts by food, timing and week days

5.1.1 The extent of advertising of food products

Out of 171 food adverts, more than one half of these food advertisements (n=91, 53.6%) were categorized as potentially harmful to dental health, including

high in sugar foods and drinks (cariogenic) (n=21, 12.4%), and both cariogenic and acidogenic (n=70, 41.2%), figure 5-3.

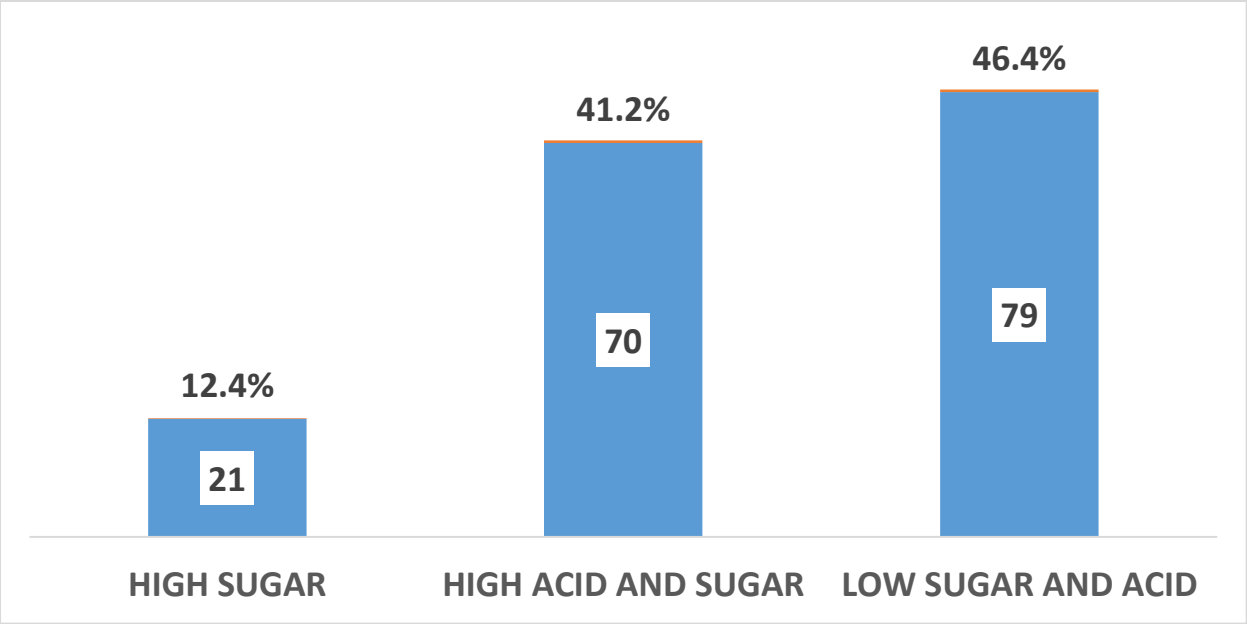

Figure 5-3: Distribution of food adverts according to sugar and acid contents

Figure 5-4 compares the distribution of harmful adverts by timing, channels and week, were the majority of these adverts obtained from CBC channel (n=70, 76.9%) in comparison with the other channels the difference is statistically significant. The broadcasting of harmful advertisements was higher during peak viewing times than that of non-peak viewing time (51.6% and 48.4% respectively), and also higher on weekend days (57.1%) than weekdays (42.9%), but these differences not statistically significant.

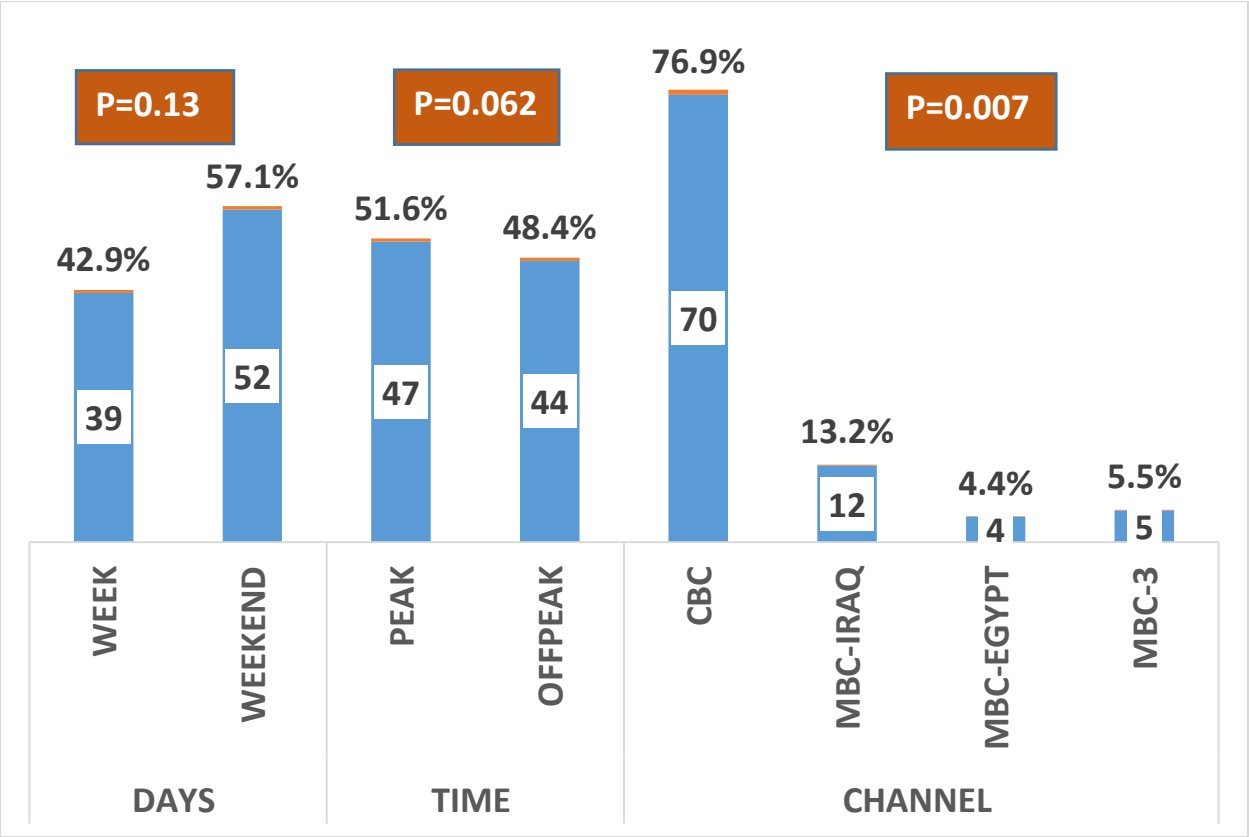

Figure 5-4: Comparison of harmful adverts by timing, channels and week days

Table 5-1: shows a more specific details of the food/drink adverts according to their sugar and/or acid content. It depicts that products with low sugar and acid content were the most frequently broadcast, (n=79, 46.5%) of food/drink adverts. The most common adverts within this subgroup were for Tea/coffee (n=28, 16.47%). The next largest subgroup of adverts was for products high in both acid and sugar (n=70, 41.2%) of food/drink adverts with the advisements for carbonated

soft drink as the only and the most frequent (n= 70, 41.2%) among food/drink adverts.

The third largest subgroup of adverts was for products high in sugar content (n=21, 12.35%) within this subgroup, adverts for Flavoured dairy products were the most common, accounting for (n=13, 7.64%) of all food advertisements. Confectionery (sweets, biscuits, cakes) were also advertised (n=7, 4.11%). No items of fresh fruit or vegetables were advertised during the period under investigation.

Table 5-1: Frequency of food and drink advertisements according to sugar and/or acid content of product

Product	Number of adverts	Percentage of food/drink adverts	Percentage of all advert
High sugar group	21	12.35	2.32
Flavoured diary product	13	7.64	1.43
Confectionery (sweets, biscuits, cakes)	7	4.11	0.77
High acid group	0	0	0
High sugar and high acid group	70	41.2	7.75
Carbonated soft drink	70	41.2	7.75
Low sugar and acid group	79	46.5	8.74
Tea/coffee	28	16.47	3.09
plane water	7	4.09	0.77
Dairy product	7	4.09	0.77

Convenience food	14	8.18	1.55
Junk food	10	5.88	1.1
Rice	11	6.47	1.21
others	2	1.17	0.22

5.2 Part two; analysis of the food frequency questionnaire

5.2.1 Participant's characteristics

Out of Four hundred and fifty questionnaires (450) handed out 431 questionnaires were returned, but only 404 ones were completed and suitable for analysis. This gives a response rate of 80.5%. Figure 5 shows sample distribution, it illustrates that, nearly two thirds of the respondents (n= 256, 63.4%) were females and (n=148, 36.6%) were males. The age of the respondents varies between 17 and 43 years old, around (n=221, 54.7%) of the respondents were 20 years old or less and (n= 183, 45.3%) were more than 20 years old.

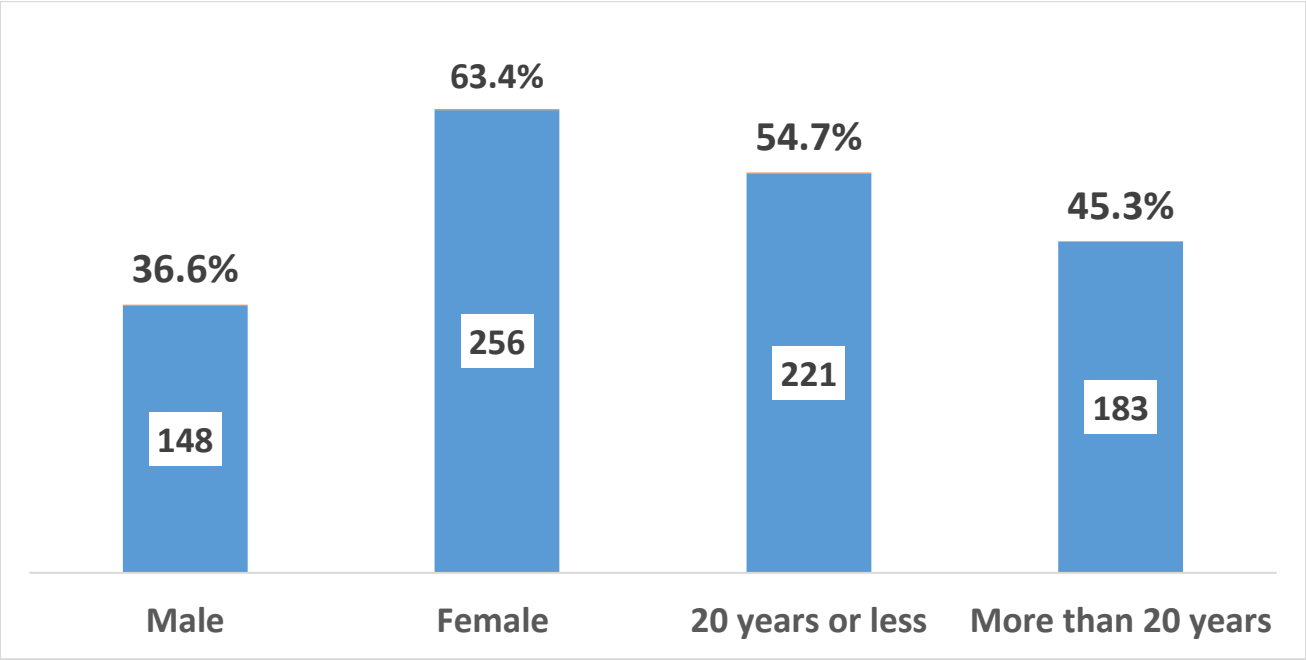

Figure 5-5: Sample distribution of respondents of FFQ

5.2.2 The frequency of consumption of different food/beverage containing sugar and acid:

Figure 5-6: Depicts the frequency of consumption of different cariogenic products high in sugar content. White bread is considered the most frequent item consumed (n= 282, 69.80%), followed by chocolate (n= 171, 40.30%), then biscuits (n= 130, 32.20%), cake (n=95, 23.50%), hermit (n=59, 14.60%), eastern sweets (n=47, 11.60%), honey pie (n=37, 9.20%), date extract (n=17, 4.20%) and finally the least frequently consumed product Cerleac (n=11, 2.70%).

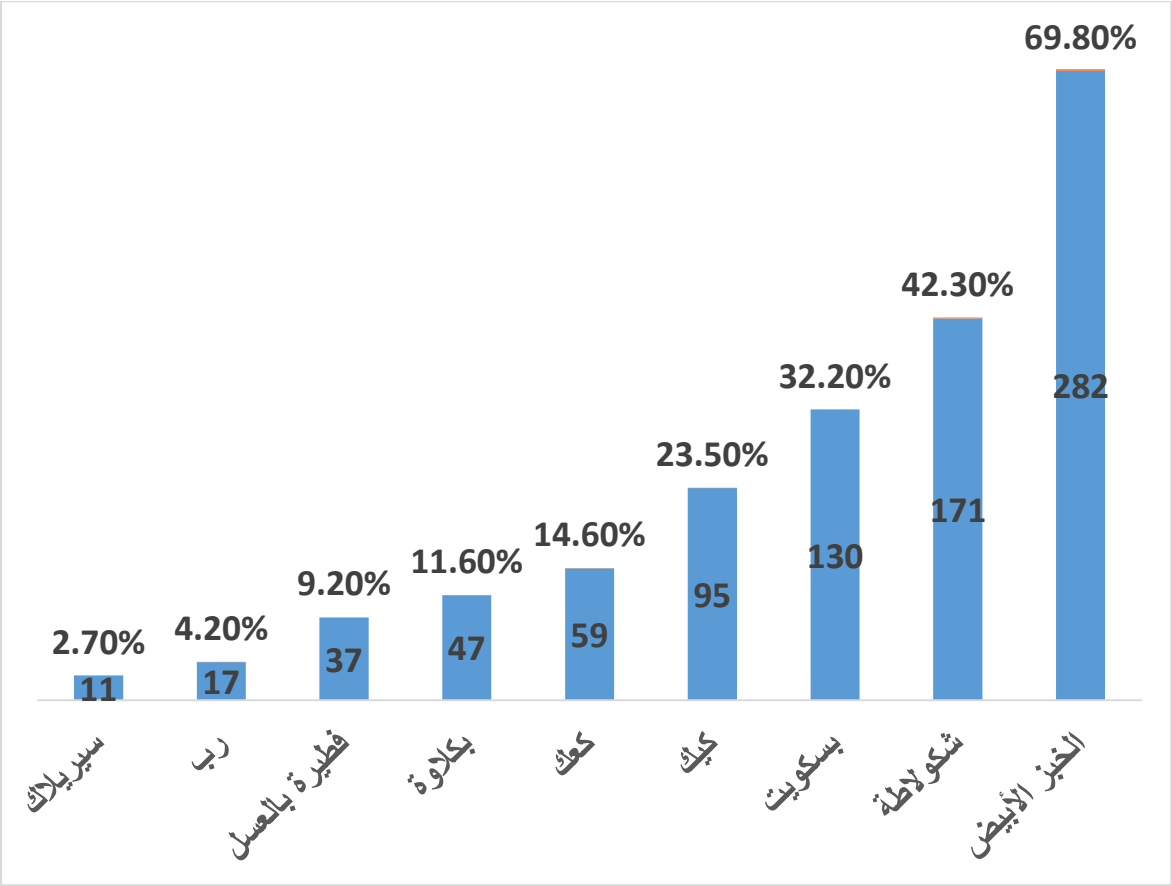

Figure 5-6: frequency of confectionary food high in sugar

Figure 5-7 shows the frequent consumption of different beverage, were orange juice is the most frequent beverage consumed (n=110, 27.2%), Coca cola and Pepsi considered the second most frequently beverage consumed (n=101, 25.0%), then sahlab with nuts (n=87, 21.5%), lemon juice (n=86, 21.3%), seven up (n=62,15.3%), other carbonated soft drinks (n=52, 12.9%) and the last one is red bull (n=40,9.9%).

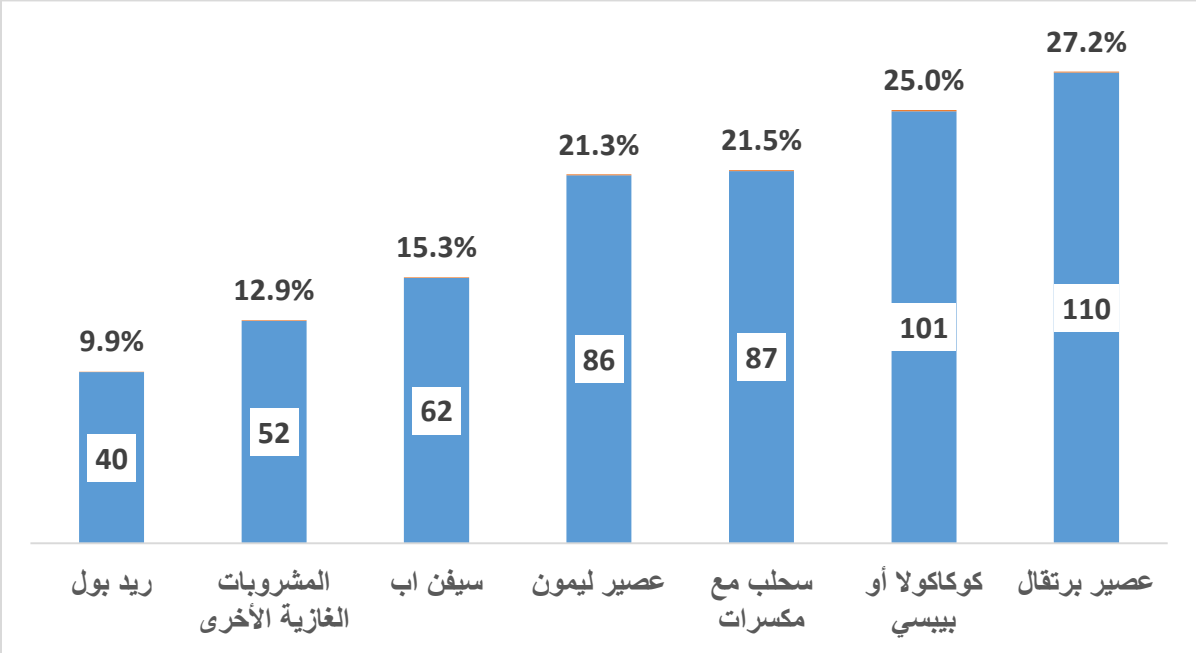

Figure 5-7: frequency of beverage consumption

Figure 5-8: illustrate the frequency of fast food and some selected product, where coffee and cappuccino are the most frequently consumed (n=186, 46.0% and n=180, 44.6%) respectively, followed by chips (n=68, 16.8%) and barley toast (n=67, 16.6%) then pizza (n=58, 14.4%) and finally oatmeal cookies with dates (n=20, 5.0%).

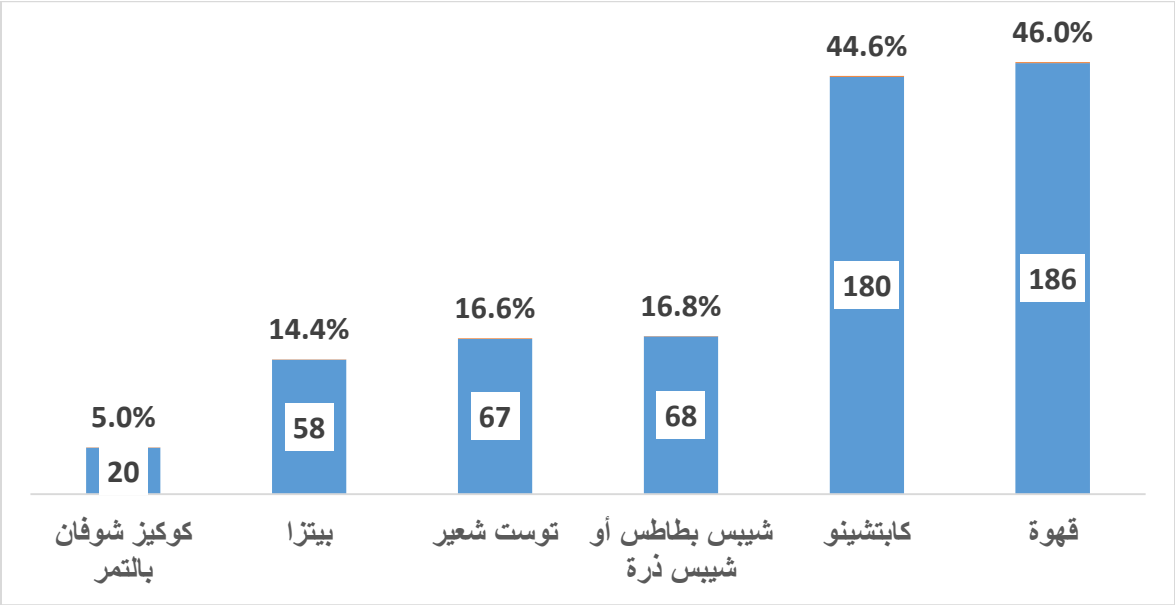

Figure 5-8: frequency of fast food and selected products

Figure 5-9: shows the frequency of dairy products and tea, (n=178, 44.1%) reflect the frequency of tea consumption, while the dairy products like milk (n=156, 38.6%), solid cheese (n=145, 35.9%), cream cheese (n=125, 30.9%) and yogurt (n=70, 17.3%). The frequency of tea with milk is (n=143, 35.4 %).

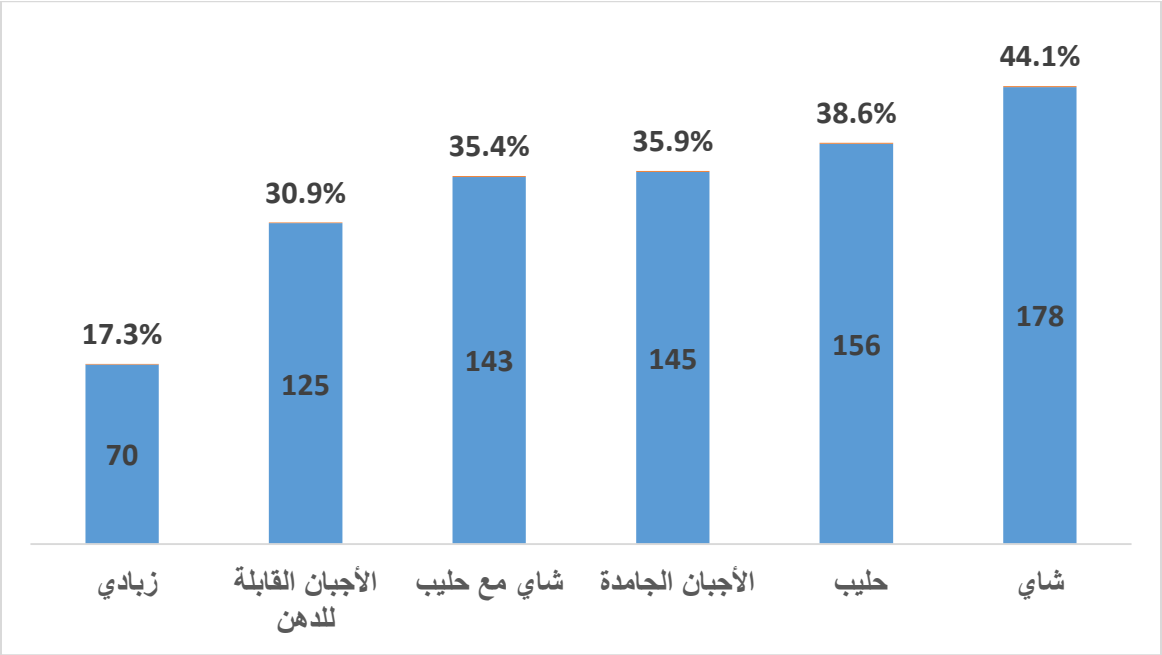

Figure 5-9: frequency of dairy products and tea

Figure 5-10: shows the frequency of fruits and vegetables, salads and fresh vegetables are frequently consumed (n=210, 52.0%), followed by citrus fruits (n=182, 45.0%), then banana and apples (n=117, 29.0% and n=113, 28.0%) respectively, after that dates (n=90, 22.3%), followed by pear (n=49, 12.1%) and finally kiwi (n=41, 10.1%).

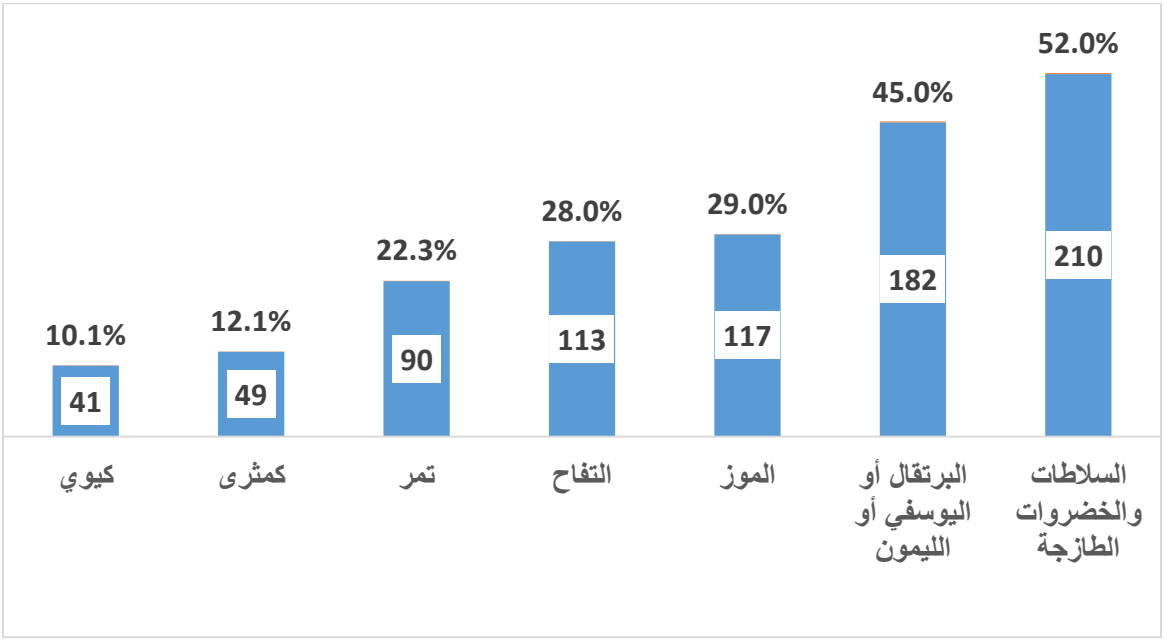

Figure 5-10: frequency of fruits and vegetables

5.2.3 Comparison of dietary intake frequency

Table 5-2 compares the frequent consumption of dietary products by sex (male vs females). Consumption frequency of drinks like coffee and seven up and foods like orange and Limon, vegetables and solid cheese was higher in girls than boys and this difference was statistically significant. But the consumption of red bull and pears was higher in males than females with a statistically significant difference (p=0.028 and p=0.026 respectively).

Table 5-2: Comparison of dietary intake frequency by gender

Food item	Female	Male	P value
Orange and Limon	126 (49.2)	56 (37.8)	0.027*
Red bull	19 (7.4)	21 (14.2)	0.028*
Coffee	105 (41)	81 (54.7)	0.008*
Seven Up	32 (12.5)	30 (20.3)	0.037*
Pears	24 (9.4)	25 (16.9)	0.026*
Vegetables	147 (57.4)	63 (42.6)	0.004*
Solid cheese	104 (40.6)	41 (27.7)	0.009*

*Chi-square test

Table 5-3: compares the frequency of dietary consumption between different age groups, there was a statistically significant difference between young adults and old adults in the frequency of consumption of dietary products, where the consumption of orange and lemon (p=0.006) and drinking of tea (p=0.000), coffee (p=0.004) and cappuccino (p=0.037) was higher in old adults than young adults, while consuming of Cerleac (p=0.014), vegetables (p=0.004) and solid cheese (p=0.009) was higher in young adults.

Table 5-3: Comparison of dietary intake frequency by age groups

Food item	Young adults	Old adults	P value
Orange and Limon	86 (38.9)	96 (52.5)	0.006
Tea	75 (33.9)	103 (56.3)	0.000
Coffee	87(39.4)	99 (54.1)	0.004
Cappuccino	88 (39.8)	92 (50.3)	0.037
Cerleac	10(4.5)	1(0.5)	0.014
Vegetables	147 (57.4)	63 (42.6)	0.004
Solid cheese	104 (40.6)	41 (27.7)	0.009

*Chi-square test

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Chapter 6. Discussion

6.1 Discussion

This study was primarily set out to assess the relationship between food advertisements and dental health in the Arabic region. So far, to authors' best knowledge no previous attempt was made to investigate the content of TV adverts, related to diet and oral health in Middle East and North Africa. A content analysis of the advertisements of the four most viewed television channels as indicated by a sample of Libyan adults was performed in October 2021. The results showed that, during the recorded period of 64.51 hours, 903 advertisements were found and analyzed. The majority of the advertisements were recorded from CBC channel (Egyptian channel), followed by MBC channels (Saudi channels). It is unclear why but it could be a reflection of the strictness of the advertisement policies in these countries. Interestingly, though not statistically significant, the broadcasting of advertisements was higher during peak viewing times than that of non-peak viewing time (51.6% and 48.4% respectively), and also higher on weekend days (57.1%) than weekdays (42.9%). Similarly observations were reported by Al-Mazyad et al. in 2017, who found that the majority of food adverts were broadcasted during peak viewing time and weekend days (13).

In the present study the proportion of nonfood advertisements (81.1%) was higher than the food adverts. This finding is in agreement with previous studies

conducted in the UK, where non-food adverts was found to be broadcasted more than food adverts(13,64,72). However, more than the half of these adverts was for food items that were potentially harmful to dental health with a majority of these being both cariogenic and acidogenic foods (76.9%, n=70) with high sugar and acid content. In comparison, a study in UK in 2005, by Chestnutt and Ashraf found that, the advertisements of food products contributed the largest proportion of all advertisements (62.5%), and that 73.4% of these were potentially harmful to dental health. Another study in UK by Rodd and Patel, in 2005 found that, 34.8% of advertisements were related to food and drink products, and most of them (95.3%) were considered as potentially harmful to dental health. However, a later study in the UK in 2009, the proportion of food averts was reduced to 16.4%, and 38.4% of this was for food and drink high in sugar (72). Unlike the finding of the present study, the cariogenic foods with high sugar content were the most frequently broadcasted (56.4% of food/drink adverts) (64). This change in the pattern of food adverts distribution in UK over the recent years may be due to changes in advertising policies in this country to promote the oral health by reducing the effect of food adverts on the nutritional behaviors of the individuals.

The current study shows that, the most advertised food items were the advisements for carbonated soft drinks (42.94%) which was only and the most

frequent among high sugar and high acid group. Within high sugar group adverts, items for flavoured dairy products were the most common, followed by confectionery (sweets, biscuits, cakes) and no items of fresh fruit or vegetables were advertised during the period under investigation. In line with this, a previous study in 2002, in UK, showed that, confectionery was the greatest commonly advertised item, followed by sugared cereals and sugared dairy products. While in 2005, Rodd and Patel in their study found that, sugared cereals was the most frequently broadcasted item followed by confectionery. Another study in 2014, in Greek found that, the most frequently advertised food category were for high sugar or high sugar and acid foods, with the most advertised food item being confectionery, then yoghurt desserts, followed by fruit flavoured drinks and sugared cereals (65). The variations in these studies may be due to different countries and thus different cultures and different dietary habits of each country or it could be because of the fluctuation in the definition of food items and differences in study design(65).

Another aim of the present study was to investigate the consumption and perception of different foods containing sugar and acids (potentially harmful to dental health) by the use of self-administrated FFQ to collect data about the nutritional behavior of a convenient sample of Libyan adults.

The data demonstrated that white bread is considered the most frequent item consumed (69.80%) among different cariogenic products high in sugar content, followed by sweet snacks; chocolate (40.30%), then biscuits (32.20%), cake (23.50%), hermit (14.60%), eastern sweets (11.60), honey pie (9.20), date extract (4.20) and finally the least frequently consumed product Cerleac (2.70%). Similarly, bread was on the top of the frequently consumed food among Saudi young children in 2018 (73). In comparison, a previous study in 2021, in Benghazi, Libya, found that, the main source of children dietary sugar were sugared drinks with a high frequent consumption of sweet snacks and low frequent consumption of fresh fruits (fruit juices not included) (74). Another study in 2017, in Saudi, found that a high frequent consumption of chicken kabsa and white bread, also there were a high frequency of food items such as chocolate, added sugar, and dates with low frequent consumption of diet soft drinks and low fat dairy products, while the low sugar products are not frequently consumed (75).

As for frequency of fruit and vegetable consumption; the majority of participants in this study consumed salads and fresh vegetables (52.0%), followed by citrus fruits (45.0%) consumption, with difference in the frequency of consumption of fruits, vegetables and solid cheese between male and females, as females higher than males and this difference was statistically significant.

However, the increased consumption of citrus fruits could be attributed to the fact that the study was conducted at winter time and these fruits are seasonal. While another study among Libyan children in 2021, found that, the frequency of sugared drinks and foods consumption was higher in girls than boys (74). Taking together, the above discussion suggest that Libya and other Arab countries have similar habits and diet desires, as the frequent consumption of foods rich in sugars like white bread and sweet snacks makes up the largest proportion of their diet.

Comparison of commonly advertised and commonly consumed foods and drinks, it is clear that carbonated drinks and coffee and tea are quite common dietary items. Overall, the study demonstrated that the Libyan adults frequently consumes coffee and tea as well as carbonated soft drinks and fruit juices which are a primary source for sugars and acids causing caries and erosion. Therefore, the present study has important implications for dietary advice provided both at clinical and community settings. The educational message should target these habits in order to promote healthy eating and life-style.

6.2 Limitation

The present study has some limitations which should be discussed. First, in the recent years, with the increase in the use of the internet, changes in viewing habits for example, the use of subscription channels like Netflix, and delayed

viewing by ‘catch up’ services and YouTube in which advertisement can be skipped. Although this may limit the generalizability of study findings, the data covered important part of the social life of the Libyan and Arabic culture. Second, no Libyan channels were included. Although the aim of the study was to explore the TV ads in wider regional area, we recognize this as a limitation and additional studies focusing on Libyan media are needed. Thirdly, the diet sheets used for developing the FFQ were distributed to postgraduate dental students who are well-educated and therefore, they could have a more conservative diet than general population. However, the findings of FFQ indicated a wide range of food items and habits. Finally, the use of FFQ in a convenience sample has its own limitations such as non-response and social desirability bias. However, this study is exploratory and generalization to the Libyan population was not necessary.

Chapter 7. Conclusion and Recommendations

7.1 Conclusion

In conclusion, this study focus on the nature of food advertising on the most popular TV channels in the Arab region. The overall proportion of food advertisements is low, but the majority of these food advertisements were for products that potentially harmful to dental health and the great bulk were for foods high in both sugar and acid content, with occasionally a high proportion of advertisements during peak viewing time and holidays.

Accordingly, the most commonly advertised food products, like carbonated soft drinks and coffee and tea are quite common dietary items and are the most frequently consumed food products by Libyan adults. The results show that Libyan adults frequently consumed food with high sugar and acid content which is harmful to dental health.

7.2 Recommendations

This study clarify the proportion of food adverts that are potentially harmful to dental health which need to be reduced, at the same time, efforts could be made to encourage more advertising of healthy foods.

Policymakers should be aware of this source of data which should be controlled in order to support the effort to promote oral health and reduce the unwanted effect of diet.

Continuous education and dietary advices should be provided both at clinical and community settings to promote healthy eating and life-style.

References

1. Petersen PE. World Health Organization global policy for improvement of oral health - World Health Assembly 2007. Int Dent J [Internet]. 2008;58(3):115–21. Available from: https://doi.org/10.1111/j.1875-595X.2008.tb00185.x

2. Amoutzopoulos B, Steer T, Roberts C, Collins D, Page P. Free and Added Sugar Consumption and Adherence to Guidelines: The UK National Diet and Nutrition Survey (2014/15-2015/16). [cited 2020 Nov 4]; Available from: www.mdpi.com/journal/nutrients

3. Moynihan PJ. Dietary advice in dental practice. Br Dent J. 2002;193(10):563–8.

4. Moynihan P. Sugars and dental caries: Evidence for setting a recommended threshold for intake [Internet]. Vol. 7, Advances in Nutrition. American Society for Nutrition; 2016 [cited 2021 Jan 11]. p. 149–56. Available from: https://academic.oup.com/advances/article/7/1/149/4524045

5. Croker H, Lucas R, Wardle J. Cluster-randomised trial to evaluate the "Change for Life" mass media/ social marketing campaign in the UK. BMC Public Health [Internet]. 2012;12(1):1. Available from: BMC Public Health

6. Levine R. The scientific basis of oral health education. Vol. 21, Community Dental Health. 2004. 131–133 p.

7. Nakre PD, Harikiran AG. Effectiveness of oral health education programs: A systematic review. J Int Soc Prev Community Dent. 2013;3(2):103–15.

8. Sheiham A, James PT. A reappraisal of the quantitative relationship between sugar intake and dental caries: the need for new criteria for developing goals for sugar intake [Internet].

2014. Available from: http://www.biomedcentral.com/1471-2458/14/863

9. Van Loveren C. Sugar Restriction for Caries Prevention: Amount and Frequency. Which Is More Important? Caries Res [Internet]. 2019 Feb 1 [cited 2020 Nov 7];53(2):168–75. Available from: /pmc/articles/PMC6425816/?report=abstract

10. Chi DL, Scott JM. Added Sugar and Dental Caries in Children A Scientific Update and Future Steps. Available from: https://doi.org/10.1016/j.cden.2018.08.003

11. Anderson CA, Curzon MEJ, Van Loveren C, Tatsi C, Duggal MS. Sucrose and dental caries: A review of the evidence. Obes Rev. 2009;10(SUPPL. 1):41–54.

12. Badrasawi MMH, Hijjeh NH, Amer RS, Allan RM, Altamimi M. Nutrition Awareness and Oral Health among Dental Patients in Palestine: A Cross-Sectional Study. 2020; Available from: https://doi.org/10.1155/2020/3472753

13. Al-Mazyad M, Flannigan N, Burnside G, Higham S, Boyland E. Food advertisements on UK television popular with children: A content analysis in relation to dental health. Br Dent J [Internet]. 2017;222(3):171–6. Available from: http://dx.doi.org/10.1038/sj.bdj.2017.120

14. Li D, Wang T, Cheng Y, Zhang M, Yang X, Zhu Z, et al. The extent and nature of television food advertising to children in Xi'an, China. BMC Public Health [Internet]. 2016;16(1):1–9. Available from: http://dx.doi.org/10.1186/s12889-016-3468-0

15. Arheiam AA, Harris RV, Baker SR. Changes in dental caries and sugar intake before and during the conflict in Libya: A natural experiment. Community Dent Oral Epidemiol. 2020;48(3):201–7.

16. Lamont RJ, Egland PG. Dental Caries. Mol Med Microbiol Second Ed. 2014;2–3(4):945–55.

17. Hurlbutt M, Novy B, Young D. Dental caries: A pH-mediated disease. J Calif Dent Hyg Assoc. 2010;25(1):9–15.

18. Pitts NB, Zero DT, Marsh PD, Ekstrand K, Weintraub JA, Ramos-Gomez F, et al. Dental caries. Nat Rev Dis Prim. 2017;3(May).

19. Pitts NB, Zero DT, Marsh PD, Ekstrand K, Weintraub JA. Dental caries. 2017;(May).

20. Marshall TA. Dietary Implications for Dental Caries: A Practical Approach on Dietary Counseling. Dent Clin North Am [Internet]. 2019;63(4):595–605. Available from: https://doi.org/10.1016/j.cden.2019.06.005

21. Harris JL, Bargh JA, Brownell KD. Priming Effects of Television Food Advertising on Eating Behavior. Heal Psychol. 2009;28(4):404–13.

22. Simón-Soro A, Belda-Ferre P, Cabrera-Rubio R, Alcaraz LD, Mira A. A tissue-dependent hypothesis of dental caries. Caries Res. 2013;47(6):591–600.

23. Al-Mazyad M. Food advertising to children on UK television in 2012: implications for dental health. 2015;(June). Available from: https://core.ac.uk/download/pdf/80774069.pdf

24. RAMOSESPINOSA A. Dental Caries. Vol. 44, Medicina. 1964. SUPPL:89-90.

25. Jakubovics NS, Yassin SA, Rickard AH. Community Interactions of Oral Streptococci [Internet]. 1st ed. Vol. 87, Advances in Applied Microbiology. Elsevier Inc.; 2014. 43–110 p. Available from: http://dx.doi.org/10.1016/B978-0-12-800261-2.00002-5

26. Touger-decker R, Loveren C Van. Sugars and dental caries 1–4. 2003;78.

27. Arheiam A. The use of diet diaries in clinical dentistry. PQDT - UK Irel [Internet]. 2017;(April). Available from: https://search.proquest.com/docview/1985551475?accountid=13042%0Ahttp://oxfordsfx.hosted.exlibrisgroup.com/oxford?url_ver=Z39.88-2004&rft_val_fmt=info:ofi/fmt:kev:mtx:dissertation&genre=dissertations+%26+theses&sid=ProQ:ProQuest+Dissertations+%26+Theses+G

28. Featherstone JDB. The continuum of dental caries - Evidence for a dynamic disease process. J Dent Res. 2004;83(SPEC. ISS. C):2002–5.

29. Tanaka K, Miyake Y, Sasaki S. Intake of dairy products and the prevalence of dental caries in young children. J Dent [Internet]. 2010;38(7):579–83. Available from: http://dx.doi.org/10.1016/j.jdent.2010.04.009

30. Sheiham A, James WPT. Diet and dental caries: The pivotal role of free sugars reemphasized. J Dent Res. 2015;94(10):1341–7.

31. Gupta P, Gupta N, Pawar AP, Birajdar SS, Natt AS, Singh HP. Role of Sugar and Sugar Substitutes in Dental Caries: A Review. ISRN Dent. 2013;2013:1–5.

32. Paes Leme AF, Koo H, Bellato CM, Bedi G, Cury JA. The role of sucrose in cariogenic dental biofilm formation - New insight. J Dent Res. 2006;85(10):878–87.

33. Al-zahrani A, Al-qahtani M, Al-barti M, Bakhurji EA. Dietary Determinants of Dental Caries Prevalence and Experience in Saudi Schoolchildren : Frequency versus Quantity. 2022;2022.

34. Moynihan PJ. Update on the nomenclature of carbohydrates and their dental effects. J Dent. 1998;26(3):209–18.

35. Hartmann G. The Role of Diet. Controv Card Rehabil. 1982;020347(04):1–5.

36. Moynihan P. The interrelationship between diet and oral health. Proc Nutr Soc. 2005;64(4):571–80.

37. Kakodkar P, Chaugule V, Mohinderpal Chadha G, Nimbalkar V. Dental Survey of Institutionalized Children with Autistic Disorder. Int J Clin Pediatr Dent. 2012;5(1):29–32.

38. Lagerweij M, Van Loveren C. Chapter 7: Sugar and Dental Caries. Monogr Oral Sci. 2019;28:68–76.

39. Sheiham A. Dietary effects on dental diseases. Public Health Nutr. 2001;4(2b):569–91.

40. Burt BA, Pai S. Sugar Consumption and Caries Risk: A Systematic Review. J Dent Educ. 2001 Oct;65(10):1017–23.

41. Watt RG. New WHO diet and nutrition review: Implications for dental disease prevention. Nutrition. 2003;19(11–12):1028–9.

42. Moynihan P, Petersen PE. Diet, nutrition and the prevention of dental diseases. Public Health Nutr. 2004;7(1a):201–26.

43. Ruottinen S, Karjalainen S, Pienihäkkinen K, Lagström H, Niinikoski H, Salminen M, et al. Sucrose Intake since Infancy and Dental Health in 10-Year-Old Children. Caries Res. 2004;38(2):142–8.

44. Linnett V, Seow WK. Dental erosion in children: A literature review. Pediatr Dent. 2001;23(1):37–43.

45. Imfeld T. Dental erosion. Definition, classification and links. Eur J Oral Sci. 1996;104(2 (Pt 2)):151–5.

46. Moss SJ. Dental erosion. Int Dent J. 1998;48(6):529–39.

47. Meurman JH, ten Cate JM. Pathogenesis and modifying factors of dental erosion. Eur J Oral Sci. 1996;104(2 (Pt 2)):199–206.

48. Cheng R, Yang H, Shao MY, Hu T, Zhou XD. Dental erosion and severe tooth decay related to soft drinks: A case report and literature review. J Zhejiang Univ Sci B. 2009;10(5):395–9.

49. Drury B. Validation of a food frequency questionnaire to assess nutrient intakes in women participating in the PRedictors linking Obesity and gut MIcrobiomE (PROMIsE) Study.

50. Svensson Å. Assessment of dietary intake in young populations using new approaches and technologies. Vol. 129, Nutrition and Food Security. 2014. 213–222 p.

51. University of Otago and, Ministry of Health. A Focus on Nutrition: Key Findings of the 2008/09 New Zealand Adult Nutrition Survey [Internet]. 2011. 360 p. Available from: http://www.health.govt.nz/system/files/documents/publications/a-focus-on-nutrition-v2.pdf

52. Canella C. A-V dissociation with interference in transient A-V block and left bundle branch block. Am J Cardiol. 1961;7(2):302–4.

53. McNutt S, Zimmerman TP, Hull SG. Development of food composition databases for food frequency questionnaires (FFQ). J Food Compos Anal. 2008;21(SUPPL.):20–6.

54. Thompson FE, Subar AF. Dietary assessment methodology [Internet]. Fourth Edi. Nutrition in the Prevention and Treatment of Disease. Elsevier Inc.; 2017. 5–48 p. Available from: http://dx.doi.org/10.1016/B978-0-12-802928-2.00001-1

55. Foster E, Hawkins A, Delve J, Adamson AJ. Reducing the cost of dietary assessment: Self-Completed Recall and Analysis of Nutrition for use with children (SCRAN24). J Hum Nutr Diet. 2014;27(SUPPL.1):26–35.

56. Kikunaga S, Tomoe TIN, Ishibashi G, Wang DH, Kira S. The application of a handheld personal digital assistant with camera and mobile phone card (Wellnavi) to the general population in a dietary survey. J Nutr Sci Vitaminol (Tokyo). 2007;53(2):109–16.

57. Musaiger AO. Diet and prevention of coronary heart disease in the Arab Middle East countries. Med Princ Pract. 2002;11(SUPPL. 2):9–16.

58. Musaiger AO, Awadhalla MS, Al-Mannai M, Al Sawad M, Asokan G V. Dietary habits and sedentary behaviors among health science university students in Bahrain. Int J Adolesc Med Health. 2015;2015.

59. Al-Haifi AA, AlMajed HT h., Al-Hazzaa HM, Musaiger AO, Arab MA, Hasan RA. Relative Contribution of Obesity, Sedentary Behaviors and Dietary Habits to Sleep Duration Among Kuwaiti Adolescents. Glob J Health Sci. 2016;8(1):107–17.

60. Lemamsha H, Randhawa G, Papadopoulos C. Investigating the Association between Unhealthy Dietary Habits and Obesity among Libyan Adults. Int J Environ Res Public

Health. 2022;19(3):1–18.

61. McHiza ZJ, Temple NJ, Steyn NP, Abrahams Z, Clayford M. Content analysis of television food advertisements aimed at adults and children in South Africa. Public Health Nutr. 2013;16(12):2213–20.

62. Zimmerman FJ, Bell JF. Associations of television content type and obesity in children. Am J Public Health. 2010;100(2):334–40.

63. Cairns G, Angus K, Hastings G, Caraher M. Systematic reviews of the evidence on the nature, extent and effects of food marketing to children. A retrospective summary. Appetite [Internet]. 2013;62:209–15. Available from: http://dx.doi.org/10.1016/j.appet.2012.04.017

64. Rodd HD, Patel V. Content analysis of children's television advertising in relation to dental health. Br Dent J. 2005;199(11):710–2.

65. Gatou T, Mamai-Homata E, Polychronopoulou A, Koletsi-Kounari H. The extent of food advertising to children on Greek television: Focus on foods potentially detrimental to oral health. Community Dent Health. 2014;31(2):68–74.

66. Arora A, Bowman CM, Chow SJP, Thepsourinthone J, Bhole S, Manohar N. A content analysis of Australian television advertising: Focus on child and adolescent oral health 11 Medical and Health Sciences 1117 Public Health and Health Services. BMC Pediatr. 2018;18(1):1–9.

67. Boyland EJ, Harrold JA, Kirkham TC, Halford JCG. The extent of food advertising to children on UK television in 2008. Int J Pediatr Obes. 2011;6(5–6):455–61.

68. Harwood TG, Garry T. Delivered by Publishing Technology to : Chinese University of Hong Kong An Overview of Content Analysis Delivered by Publishing Technology to : Chinese University of Hong Kong. Mark Rev 2003. 2003;479–98.

69. Elo S, Kyngäs H. The qualitative content analysis process. J Adv Nurs. 2008;62(1):107–15.

70. White MD, Marsh EE. Content analysis: A flexible methodology. Libr Trends. 2006;55(1):22–45.

71. Pohontsch NJ. Qualitative Content Analysis. Rehabil. 2019;58(6):413–8.

72. Morgan M, Fairchild R, Phillips A, Stewart K, Hunter L. A content analysis of children's television advertising: Focus on food and oral health. Public Health Nutr. 2009;12(6):748–55.

73. Almajwal A, AL-zahrani S, Abulmeaty M, Alam I, Razzak S, Alqahtani A. Development of Food Frequency Questionnaire (FFQ) for the assessment of dietary intake among overweight and obese Saudi young children. Nutrire. 2018;43(1):1–11.

74. Huew R, Musrati A. Dietary consumption and its association with dental caries in schoolchildren in Benghazi, Libya. Dent Med Res. 2021;9(1):34.

75. Gosadi IM, Alatar AA, Otayf MM, Aljahani DM, Ghabbani HM, Alrajban WA, et al. Development of a saudi food frequency questionnaire and testing its reliability and validity. Saudi Med J. 2017;38(6):636–41.

Appendix I: food\drink products identified from the advertisements

لائحة بالموادالغذائية التي تم استخراجها من الاعلانات	
1	قهوه
2	ريد بول
3	ساندوصات دجاج جاهزه
4	حلويات
5	سبرياك
6	مكبس
7	كوكاكولا
8	زبادي وحليب محلى ومنكه
9	حليب عادي
10	شوكلاطه
11	جبنه
12	سفن اب
13	بيبسي
14	شاي
15	كبده البرنس
16	مشروب شعير عازي
17	مياه
18	أرز
19	بسكويت بالشكولاطه
20	زبادي ولبن اكصفيا

Appendix II: food\drink products identified from the diet diary

قائمة بالأطعمة التي تم استخلاصها من food diary	
الخبز الأبيض	1
كعك	2
فطيرة بالعسل	3
كوكيز شوفان بالتمر	4
توست شعير	5
رب	6
زبدة	7
بيض	8
تونة	9
أسماك	10
معكرونة	11
بيتزا	12
شربة لحم	13
زبادى	14
جبن	15
سلطة	16
صلصة بطاطا	17
برتقال يوسفى وليمون	18
موز	19
كيوى	20
كشرى	21
تفاح	22
تمر	23
بكلاوة	24
كيك	25
شاى مع حليب	26
شاى	27
سحلب مع مكسرات	28
عصير ليمون طبيعى	29
عصير برتقال طبيعى	30
كسكسى بالخضار	31
طبيخة بطاطا	32
رز بالخلطة	33
فلفل محشى	34
طبيخة فاصوليا	35

Appendix III: FFQ

استمارة لتعدد استهلاك الاكل

ا النموذج يسألك عن استهلاكك للأغذية خلال الشهر الماضي
الرجاء تعبئة البيانات المطلوبة
التاريخ: / /
العمر: الجنس:

الحبوب والخبز والوجبات الخفيفة	أبدا أو أقل 1 في الشهر	في 1 الشهر	في 2-3 الشهر	في 1 الأسبوع	في 2 الأسبوع	في 3-4 الأسبوع	في 5-6 الأسبوع	في اليوم1	في 2+ اليوم	حجم الحصة المتوسطة	صغيرة	متوسطة	كبيرة
الخبز الأبيض										متوسطة1			
كعك										متوسطة1			
شيبس بطاطس أو شيبس ذرة										كيس1 صغيراو كف يد 2 مليانه			
فطيرة بالعسل										قطعة متوسطة			
كوكيز شوفان بالتمر										حبة متوسطة			
توست شعير										شريحتين			
سيريلاك										صحن متوسط			
رب										ملعقة2 طعام			
زبيبة										نصف كوب			
اللحوم والأسماك والبيض	أبدا أو أقل 1 في الشهر	في 1 الشهر	في 2-3 الشهر	في 1 الأسبوع	في 2 الأسبوع	في 3-4 الأسبوع	في 5-6 الأسبوع	في اليوم1	في 2+ اليوم	حجم الحصة المتوسطة	صغيرة	متوسطة	كبيرة
بيض										بيضتين			
تونة										نصف علبة			
صدر دجاج										1صدر كبير أو قطع 2 صغيرة			

كم مرة تتناول هذه الأطعمة

الكمية

فخذ دجاج				أفخذ كبير أو قطع 2 صغيرة									
لحم بقري				شريحة متوسطة									
اسماك				سمكة متوسطة									
لحم ضأن				قطعة متوسطة									
كبدة				قطعة متوسطة									
المكرونة والاطباق المشكلة والشربة	أبدا أو أقل 1 في الشهر	في 1 الشهر	في 2-3 الشهر	في 1 الأسبوع	في 2 الأسبوع	في 3-4 الأسبوع	في 5-6 الأسبوع	في اليوم 1	في 2+ اليوم	حجم الحصة المتوسطة	صغيرة	متوسطة	كبيرة
مكرونة				كوب									
بيتزا				شريحتين									
شربة باللحم				كوب									
شربة خضار				كوب									
شربة سمك				كوب									
الحليب	أبدا أو	في 1	في 2-3	في 1	في 2	في 3-4	في 5-6	في اليوم 1	في 2+	حجم	صغيرة	متوسطة	كبيرة
زبادي (كامل الدسم او 2% او 1% او خالي				علبة متوسطة									
حليب (كامل الدسم او 2% او 1% او خالي				كوب									
الأجبان الجامده (كامله الدسم				شريحة أو نصف كوب									

الاجبان قليله للدهن												ملاعق 2 طعام	
الخضار والحبوب	ابدا أو قل 1 في الشهر	في 1 الشهر	في 2-3 الشهر	في 1 الأسبوع	في 2 الأسبوع	في 3-4 الأسبوع	في 5-6 الأسبوع	في اليوم 1	في 2+ اليوم	حجم الحصة المتوسطة	صغيرة	متوسطة	كبيرة
السلطات والخضروات الطازجة										كوب			
أصابع البطاطس المقلية										ربع كوب			
أرز مطبوخ										كوب			
عجة بطاطا										ربع كوب			
الفواكه	ابدا أو قل 1 في الشهر	في 1 الشهر	في 2-3 الشهر	في 1 الأسبوع	في 2 الأسبوع	في 3-4 الأسبوع	في 5-6 الأسبوع	في اليوم 1	في 2+ اليوم	حجم الحصة المتوسطة	صغيرة	متوسطة	كبيرة
البرتقال أو الموسمي أو الليمون										حبة 2 متوسطة			
الموز										حبة متوسطة			
كمثرى										حبة متوسطة			
كيوى										حبة 2			
التفاح										حبة 2 متوسطة			
تمر										حبات 5			
الحلويات	ابدا أو قل 1 في الشهر	في 1 الشهر	في 2-3 الشهر	في 1 الأسبوع	في 2 الأسبوع	في 3-4 الأسبوع	في 5-6 الأسبوع	في اليوم 1	في 2+ اليوم	حجم الحصة المتوسطة	صغيرة	متوسطة	كبيرة
بسكويت										قطعة 2			
شكولاتة										[illegible]			
بكاتوة										قطعة 1			
كيك										قطعة 1			

المشروبات	أقل 1 في الشهر	في 1 الشهر	في 2-3 الشهر	في 1 الأسبوع	في 2 الأسبوع	في 3-4 الأسبوع	في 5-6 الأسبوع	في اليوم 1	في 2+ اليوم	الحصة المتوسطة	صغيرة	متوسطة	كبيرة
شاي أخضر أو احمر او نعناع او شاي										كوب			
شاي مع حليب										كوب			
قهوة										كوب			
كابتشينو										كوب			
كوكاكولا او بيبسي										كوب			
7 up ليمون										كوب			
ريد بول										كوب			
المشروبات الغازية										كوب			
عصير برتقال										كوب			
مع										كوب			
عصير ليمون										كوب			
أكلات أخرى	أبدا أو أقل 1 في الشهر	في 1 الشهر	في 2-3 الشهر	في 1 الأسبوع	في 2 الأسبوع	في 3-4 الأسبوع	في 5-6 الأسبوع	في اليوم 1	في 2+ اليوم	حجم الحصة المتوسطة	صغيرة	متوسطة	كبيرة
كسكسي بالخضرة										صحن متوسط			
طبيخة بطاطا										صحن متوسط			
رز بالخلطة										صحن متوسط			
طفن										ملعقتين			
طبيخة فاصوليا										صحن متوسط			

Appendix IV: Ethics approval

Faculty Of Dentistry
University Of Benghazi

جـــــامعة بنغـــازي
كلية طب وجراحة الفم والأسنان

التاريخ: 2021 / 9 / 27
الرقم الإشاري: ج.ب.ع 21/

لجنة اخلاقيات البحث العلمي
موافقة على اجراء بحث علمي

الى من يهمه الأمر:

نحيطكم علما بان البحث المقدم من:إرم محمد محمد الهشم
بعنوان:" الإعلانات الغذائية وعلاقتها بصحة الأسنان في المنطقة العربية"
قد تحصل على موافقة لجنة اخلاقيات البحث العلمي بكلية طب وجراحة الفم والاسنان\جامعة بنغازي رقم (058)

مع فائق التقدير والاحترام

والسلام عليكم

د. أرحيم أحميدة العوامي
رئيس لجنة اخلاقيات البحث العلمي

صورة الى
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الدعايات الغذائية المتلفزة وعلاقتها بصحة الفم والأسنان والسلوك الغذائي لدى عينة من الليبيين في مدينة بنغازي

قدمت من قبل :

إرم محمد محمد الهشم

تحت إشراف :

د.ارحيم احميدة العوامي

الملخص

أهداف البحث:

تهدف هذه الرسالة لدراسة العلاقة بين الإعلانات الغذائية و مدى تأثيرها على صحة الأسنان.

طرق البحث:

تم تسجيل مجموعة من القنوات العربية الأكثر مشاهدة في الشرق الأوسط وهي (CBC, MBC Maser, MBC Iraq, MBC3) ثم تحليل محتوى الإعلانات الغذائية التي تم تسجيلها وذلك لوضع قائمة بالمواد الغذائية التي تم استعراضها واستخدام هذه القائمة في عمل استبيان ورقي تم توزيعه على عينة من البالغين الليبين لمعرفة مدى استهلاكهم لهذه المواد الغذائية.

النتائج:

الإعلانات الغذائية شكلت نسبة بسيطة من المجموع الكلي للإعلانات (18.9%), وكانت غالبية هذه الإعلانات الغذائية لأطعمة لها تأثير ضار على صحة الأسنان (53.6%), حيث أن أكبر جزء منها كان لأطعمة تحتوي على نسبة عالية من السكريات والأحماض (41.2%) والتي من بينها المشروبات الغازية.

أظهرت الدراسة أن البالغين الليبين يستهلكون بشكل متكرر القهوة والشاي وكذلك المشروبات الغازية وعصائر الفاكهة التي تعتبر مصدرا رئيسيا للسكريات والأحماض المسببة لتسوس وتآكل الأسنان. لذلك فإن الدراسة الحالية لها آثار مهمة على المشورة الغذائية المقدمة على مستوى الأشخاص والمجتمع لتعزيز الأكل الصحي ونمط حياة صحي.

الاستنتاجات:

هذه هي الدراسة الأولى في المنطقة العربية التي تقوم بتحليل محتوى الإعلانات الغذائية ودراسة مدى تأثيرها على السلوك الغذائي للأفراد في الشرق الأوسط. حيث وجد أن المنتجات الغذائية التي تعتبر مضرة بصحة الأسنان تشكل النسبة الأكبر من الاعلانات الغذائية وأن معظم هذه الإعلانات يتم عرضها في أوقات ذروة المشاهدة وفي العطلات وبالتالي تستهدف أكبركمية من المشاهدين, لذلك يجب وضع سياسات للتقليل من هذه الاعلانات وفي الوقت نفسه بذل الجهود لتشجيع المزيد من الأعلان عن الأطعمة الصحية.

الدعايات الغذائية المتلفزة وعلاقتها بصحة الفم والأسنان والسلوك الغذائي لدى عينة من الليبين في مدينة بنغازي

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رسالة قدمت استكمالا لمتطلبات الحصول على درجة الماجستير في صحة الأسنان العامة وطب الأسنان الوقائي

جامعة بنغازي

كلية طب وجراحة الفم والأسنان

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