

Research Article

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Understanding the role of media and food labels to disseminate food related information in Lebanon

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Abstract: Today's consumers are becoming more aware of what they consume and the implications that a proper diet can have for their health. This work aimed to understand how Lebanese people get information about foods, and which communication media they consider the most appropriate. Also, the attitudes toward food labelling were assessed. This was a cross-sectional study undertaken by means of a questionnaire survey on a sample of 258 Lebanese participants. Data analysis used statistical tools such as *T*-test and ANOVA with *post hoc* to test possible group differences or Cronbach's alpha to assess internal scale reliability. The results showed that radio was the first choice as a media tool used by Lebanese people for gathering food information (29.1%), followed by hospitals (23.3%), and the participants also considered that these are the most appropriate means to communicate information (28.3 and 22.5%, respectively). Regarding the Lebanese behaviour on nutrition labelling, nearly half of the participants (44.6%) very frequently or always check the food labels but some showed no interest in the components and the fibres they contain. Reliability analysis showed that the items used to assess the food labelling scale have a very high internal consistency ($\alpha = 0.847$). So, the Lebanese people tend to rely on radio for information about food and the labels are considered as important source of information as well. Nevertheless, Lebanese don't consult the nutritional composition as often as desirable in order to adjust their purchases or compare to different items, aimed at healthier food choices. So in order to

inform Lebanese people about related food rich in fibres and to instigate their purchasing intentions, the producing companies must rely on marketing campaigns through radio and on labels not just the information in nutritional composition.

Keywords: food label, mass media, nutritional information, attitudes, questionnaire survey

1 Introduction

The customers of the 21st century are becoming more educated, which allow them to analyse and discern information, thus becoming better aware of making the right decisions, also throughout the use and assistance of modern media. As a matter of fact, and based on food communication research outcomes, consumers expose themselves more and more to information related to food, affecting their buying and eating habits [1]. Hence, more studies have found that people are more engaged and active in digging and diving for quality information about food that are mostly referred to on the internet [2,3].

As per Scheufele and Tewksbury [4], many communication studies revealed the fact that influence on citizens' perceptions is a result of different forms of media and the effect they exert. News and content circulating in the media and the online information sources can therefore influence readers' knowledge, attitudes, and behaviour toward food [5,6]. The problem with online information is that sometimes people are exposed to fake news [7,8], consequently affecting and distorting their perception of risks and inappropriate awareness of things [9–11].

Consumers' food choices are often shaken by the quality of nutritional information in relation to food that can help leading to reducing uncertainty of the food health attribute. Food economic models of consumer's demand and implementation of effective communication approaches for changing dietary behaviours

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could be developed through a better understanding of the nutritional health information and its impact on consumer's food choices [12]. Furthermore, food labelling, consumer awareness, and comprehension of label information are crucial for determining, maintaining, and communicating their food value [13]. These labels are important for the consumer's analysis and judgmental system. They can assist the individuals in the appraisal of a product and also contribute in aiding the producer in enhancing and adapting its manufacturing system to meet consumers' expectations and needs, and also leaning to satisfying and promoting socioeconomic objectives [14]. Despite this fact, in part of the environment, awareness of food labels is yet debatable along with their impact of influence on consumers' attitudes, preferences, and quality perceptions [14]. Some researchers like Grunert and Aachmann [15] suggested the strengthening of the research base systems on labels and their influence on consumer behaviour for a more valid and compliant evidence-based policy in this area. Findings from prior research on the role of labels, indeed, are particularly controversial, with some authors considering it as a critical antecedent of consumers' behaviour [13,16,17] and others finding it as a factor of minor influence [18,19].

A number of studies have demonstrated that dietary fibre is part of a diet rich in fruits, vegetables, and cereals, which contributes to the prevention of several chronic diseases, including non-communicable diseases [20–23]. As a result, a general rule advises to consume a standard amount of dietary fibre, which varies according to sex as follows: 25 to 32 g/1000 kcal for women and 30 to 35 g/1000 kcal for men [24]. Still, the fibre consumption tends to be lower than recommended, due to poor diets and westernisation of food habits [25]. Therefore, it is advisable to understand how the consumers can increase the consumption of fibre-rich foods, and in what way they can be better informed about its benefits for human health. Studies have focused on the sources of information about dietary fibre in some countries, like Romania [26], Latvia [27], Croatia [28], Portugal [29], and Turkey [30]. However, in the scientific literature, there are no such studies for the Lebanon population.

2 Research motivation and questions

The Food and Agriculture Organization (FAO) in coordination with different ministries in Lebanon (Ministry of Public health and Ministry of Agriculture) have developed lately different policies and manuals to raise awareness and

spread information about food safety, components, and ingredients, but there is a lack of studies related to Lebanese attitude towards food information and means of dissemination. The Lebanese Country Programming Framework (CPF) 2016–2019 focuses on the objectives listed in the Ministry of Agriculture's (MoA) Strategy 2015–2019 and the LCRP/Food Security Strategic Response Plan 2016 established with FAO, and one of the primary government priorities was to "improve agricultural sector performance that contributes to economic, social, environmental, and sustainable rural development." In this, several cross-cutting concerns, including gender as well as information and knowledge exchange, were mainstreamed [31].

Moreover, in the absence of accurate food security and nutrition information in Lebanon, the Food-Based Dietary Guideline Manual for Promoting Healthy Eating in the Lebanese Adult Population was launched in 2013 and adopted by the Lebanese Ministry of Public Health for distribution to policymakers, health-care providers, nutritionists, and dietitians in Lebanon. The guidelines seek to improve overall health, eating habits, and reduce the risk of chronic non-communicable illnesses among Lebanese people. They are intended for usage and disseminated in a variety of contexts, hospitals, private clinics, households, institutions, and health-related enterprises [32].

The purpose of the present study is to cover the above research gaps, by assessing first the role of media used to disseminate information related to food in Lebanon and second to see how the food labels can influence consumers' acceptance and purchase intention. Specifically, the aims are to investigate the level of information communicated to the Lebanese population about dietary fibre as part of food labels and which means are used for the dissemination of the information related to dietary fibre. Our ultimate goal relates to purchasing intention of fibre-rich foods as driven by the information provided in the labels. Finally it was important for the authors to test if there were any sociodemographic differences (living environment, gender, education level, and age groups) in terms of information and food labelling awareness among Lebanese citizens especially considering that a previous study covered Lebanese food motivation and the authors found a gender difference in their perception about a healthy diet [33]. Hence, this research aims to elaborate and describe the possibilities of using new media as an opportunity to raise awareness on food fibres in a developing country and also evaluate consumer's attitude towards food labelling.

In this study, the authors tried to answer two major research questions related to the importance of information

related with food, namely about where to find this information and the level of awareness the customers have while purchasing their items. Additionally, it seemed interesting for the researchers to study the variables of food information dissemination and food label awareness of the Lebanese population in relation to the variable age and also check if there are any distinct and interesting differences based on the region environment (rural or urban).

RQ1: Where do Lebanese people find information and are these means of communication the most appropriate? Are there any sociodemographic differences such as gender, age, living environment, and education level?

RQ2: What is the level of awareness of Lebanese people about food labelling? Are there any sociodemographic differences such as gender, age, living environment, and education level?

3 Research methodology and data analysis

A cross-sectional study survey was undertaken on a sample of 273 participants from which 258 responses were considered valid. The questionnaire was distributed and administered randomly through social media from January 2021 till end of March 2021. The sample was a convenience sample of only adult participants, and therefore, people under the age of 18 were excluded. Inclusion criteria were being adult citizen, residing in Lebanon, contactable through social media, and with means to answer the online questionnaire. The research is integrated with an international project lead by CI&DETS research Centre of the Polytechnic Institute of Viseu in Portugal. The questionnaire was a result of the international project “Food Fibres” and related to previous publications [34,35], being then extended to Lebanon. The data collecting instrument included some groups of questions which were used in this particular study as follows:

- Demographics (4 items) (age; education; gender; and living environment)
- Means of dissemination of information (2 items), where the answers for each item were ordered from most important (score 1) to the least important (score 6) enabling respondents to choose which answer fits the most (radio, television, school, magazines, internet, and hospitals)
- Food labelling (5 items), testing consumer’s attitude towards food labelling (a 5-point Likert scale from 1 Never to 5 Always)

The questionnaire was the same as already applied in other countries (Argentina, Croatia, Egypt, Hungary, Italy, Latvia, Macedonia, Portugal, Romania, and Turkey), and therefore no modifications were made for its application to the Lebanese population [36]. The sources of information listed in the questionnaire were: Health centres/hospitals, radio, television, school, magazines/books or the internet, and these were kept as in the original survey. Regarding each of the alternative answers, people would choose the option based on their own judgment, i.e. there were no explanations in the questionnaire as to what each of the media meant. In this way, by choosing, for example, the option hospitals/health centres, the participants could choose this option if they got the information from the personnel, like doctors or nurses, or even from pamphlets or notice boards.

Data processing was carried out using IBM Statistics (Statistical Package for the Social Sciences SPSS v24). For the data analysis, basic descriptive statistics were used, complemented with statistical tests (*T*-test, ANOVA) [37]. The *T*-test was applied to test possible mean differences between two groups in variables with only two groups (sex, education, and living environment), while ANOVA was used to test possible differences in the mean values for variable age, which has more than two groups (eight groups, to be more precise). Statistical tests were undertaken: first to determine the normality of the distribution, the authors measured Skewness (SK) and Kurtosis (K) [37]; as for the central tendency, the researchers focused on mean, standard deviation, and coefficient of variation [37]. In addition to that, a quantitative descriptive and analytical study was undertaken, with a non-probabilistic sample of respondents mostly women and living in an urban environment [38]. The reliability of the scale constituted with the questions about food labelling was evaluated through the computation of the Cronbach’s alpha (α), which measures the internal consistency of the scale for the different questions [39,40]. The values of Cronbach α vary from 0 to 1. Higher scores correspond to a more reliable and homogenous scale, in which the individual questions (items) reliably measure the domain core concept (variable) [41]. Values of α below 0.6 are considered indicators of unacceptable internal reliability, from 0.6 to 0.7 are considered as weak internal reliability, values within the range of 0.7 to 0.8 correspond to a reasonable internal reliability, from 0.8 to 0.9 to a good internal reliability, and values above 0.9 are considered indicators of an excellent internal reliability [42].

The level of significance considered was 5% ($\alpha = 0.05$) in all statistical analyses.

In the tests performed, the following research hypotheses were considered:

- a) For research question 1 mentioned above:
 - a.1) For the variable, availability of information:
 - One hypothesis related to gender differences is:
 - HO: There are No differences in terms of gender related to availability of information*
 - And the corresponding alternative hypothesis:
 - H1: There are gender differences...*
 - Another hypothesis related to environmental differences (similar to *HO* and *H1* above but replacing gender by living environment);
 - The third related to education level (similar to *HO* and *H1* above but replacing gender by education level);
 - The last related to age differences (similar to *HO* and *H1* above but replacing gender by age group);
 - a.2) For the variable, most adequate means of dissemination of information:
 - One hypothesis related to gender differences is:
 - HO: There are No differences in terms of gender related to the most adequate means of dissemination*
 - H1: There are gender differences*
 - Another hypothesis related to environmental differences (similar to *HO* and *H1* above but replacing gender by living environment);
 - The third related to education level (similar to *HO* and *H1* above but replacing gender by education level);
 - The last related to age differences (similar to *HO* and *H1* above but replacing gender by age group);
- b) For research question 2 mentioned above:
 - For gender differences:
 - HO: There are No differences in terms of gender for variable food labelling*
 - H1: There are gender differences*
 - For environmental differences (similar to *HO* and *H1* above but replacing gender by living environment);
 - For educational level (similar to *HO* and *H1* above but replacing gender by education level);
 - For age differences (similar to *HO* and *H1* above but replacing gender by age group).

For each set of hypotheses, the null hypothesis *HO* and its corresponding alternative hypothesis *H1* is linked to one specific test, and if the significance of the test (*p*-value) is lower than the established significance of 0.05, then there are statistical differences, which means that *HO* is rejected and *H1* is accepted. On the other hand, if

the *p*-value is higher than 0.05, *HO* is accepted and there are no significant differences between groups.

4 Results

4.1 Sociodemographic characterization

The demographical data for the sample studied is summarised in Table 1. The variable age was divided into 8 categories (18–23 years; 24–29 years; 30–35 years; 36–40 years; 41–45 years; 46–50 years; 51–55 years; and more than 55). In total, 258 people participated in this study, from which 59.7% were female and 40.3% were male. The population under study has a high level of education since a vast part of the participants, 93%, had a university degree, while 7% held a secondary degree and none of them had just a primary school degree. As for the living environment, the largest majority of the sample individuals live in the city, since 78.3% of the participants who responded lived in urban areas, while 21.7% lived in rural areas. The participants – as mentioned above – were classified into small age groups, the researchers noted that the highest respondents' percentage, 31.8%, were from the age category between 18 and 23 years, followed by the second age category (17.1%) which is from 41 to 45 years old. The sample of population taken into consideration in the study is therefore well distributed in terms of age, trying to represent the Lebanese population in terms of age. In this way, the participants aged from 18 to 35 years encompass

Table 1: Sociodemographic characterisation of the study sample

| Variable | Group | Frequency | Percent |
|--------------------|--------------------|-----------|---------|
| Age | 18–23 years | 82 | 31.8 |
| | 24–9 years | 26 | 10.1 |
| | 30–35 years | 26 | 10.1 |
| | 36–40 years | 19 | 7.4 |
| | 41–45 years | 44 | 17.0 |
| | 46–50 years | 36 | 13.9 |
| | 51–55 years | 13 | 5.0 |
| | More than 55 years | 12 | 4.7 |
| Education | Secondary school | 18 | 7.0 |
| | University degree | 240 | 93.0 |
| Sex | Female | 154 | 59.7 |
| | Male | 104 | 40.3 |
| Living environment | Rural | 56 | 21.7 |
| | Urban | 202 | 78.3 |
| Total | | 258 | 100 |

Table 2: Sources of information used by Lebanese participants to find information about food and dietary fibre

| Ranks ⁽¹⁾ | Hospitals | | Radio | | Television | | School | | Magazines | | Internet | |
|----------------------|-----------|----------|---------|----------|------------|----------|---------|----------|-----------|----------|----------|----------|
| | % total | <i>N</i> | % total | <i>N</i> | % total | <i>N</i> | % total | <i>N</i> | % total | <i>N</i> | % total | <i>N</i> |
| 1 | 23.3 | 60 | 29.1 | 75 | 7.0 | 18 | 13.2 | 34 | 12.4 | 32 | 15.1 | 39 |
| 2 | 16.7 | 43 | 21.7 | 56 | 24.0 | 62 | 14.3 | 37 | 15.5 | 40 | 7.8 | 20 |
| 3 | 8.9 | 23 | 18.2 | 47 | 29.1 | 75 | 19.0 | 49 | 20.2 | 52 | 4.7 | 12 |
| 4 | 11.2 | 29 | 12.0 | 31 | 24.0 | 62 | 28.7 | 74 | 15.9 | 41 | 8.1 | 21 |
| 5 | 17.8 | 46 | 13.6 | 35 | 12.4 | 32 | 13.6 | 35 | 26.0 | 67 | 16.7 | 43 |
| 6 | 22.1 | 57 | 5.4 | 14 | 3.5 | 9 | 11.2 | 29 | 10.1 | 26 | 47.7 | 123 |
| Total | 100 | 258 | 100 | 258 | 100 | 258 | 100 | 258 | 100 | 258 | 100 | 258 |

⁽¹⁾Ranking from 1 (most important) to 6 (least important).

almost half of the targeted adult Lebanese population, 52%, while the remaining 48% are aged from 36 and above.

4.2 Results for RQ1: food information communication and means of dissemination

Table 2 shows the results obtained when the participants under study were asked where they found information about food and dietary fibre. The results showed that the highest percentage of respondents, 29.1%, state that they find information about dietary fibre on radio rating it as first, which is a normal result for mass media in a developing country, followed by hospitals, 23.3% rating these as their first source. Hence, considering the sum of participants who ranked the first two sources (ranks 1st and 2nd), radio has 50.8% of total responses (29.1% + 21.7%) being the most important means of finding information in Lebanon, followed by hospitals 40.0% (23.3% + 16.7%).

When asked what is the most appropriate means of communication to encourage the consumption of healthy food, the results are shown in Table 3 and the findings are as follows: most of the respondents, 28.3%, consider that Radio is ranked first followed by hospitals, 22.5%, and magazines, 17.8%. Moreover, if we considered the values for the first two ranks (positions 1st and 2nd), radio has 50.4% of total responses for the most appropriate means of finding information about healthy food in Lebanon, followed by hospitals, 35.7%.

When analysing the impact of the sociodemographic variables: living environment, age, gender, and education level on the availability of information related to food and on the most adequate means of dissemination for each of the options provided, several hypotheses are put forward, as described previously. The results that allow to evaluate the abovementioned hypotheses are presented in Tables 4 and 5. These results were obtained by calculating a mean rank for each of the media considered, weighted based on the percentages of each score. With regards to the living environment, there are no significant differences for the means of information available to Lebanese people (p -value $\geq 5\%$), therefore it was

Table 3: Most appropriate means of communication to encourage the consumption of healthy food

| Ranks ⁽¹⁾ | Hospitals | | Radio | | Television | | School | | Magazines | | Internet | |
|----------------------|-----------|----------|---------|----------|------------|----------|---------|----------|-----------|----------|----------|----------|
| | % total | <i>N</i> | % total | <i>N</i> | % total | <i>N</i> | % total | <i>N</i> | % total | <i>N</i> | % total | <i>N</i> |
| 1 | 22.5 | 58 | 28.3 | 73 | 3.9 | 10 | 10.1 | 26 | 17.8 | 46 | 17.4 | 45 |
| 2 | 13.2 | 34 | 22.1 | 57 | 20.2 | 52 | 17.4 | 45 | 17.8 | 46 | 9.3 | 24 |
| 3 | 14.0 | 36 | 16.3 | 42 | 29.8 | 77 | 14.0 | 36 | 16.7 | 43 | 9.3 | 24 |
| 4 | 12.0 | 31 | 15.1 | 39 | 22.1 | 57 | 26.0 | 67 | 16.7 | 43 | 8.1 | 21 |
| 5 | 12.0 | 31 | 12.4 | 32 | 16.3 | 42 | 20.2 | 52 | 22.5 | 58 | 16.7 | 43 |
| 6 | 26.4 | 68 | 5.8 | 15 | 7.8 | 20 | 12.4 | 32 | 8.5 | 22 | 39.1 | 101 |
| Total | 100 | 258 | 100 | 258 | 100 | 258 | 100 | 258 | 100 | 258 | 100 | 258 |

⁽¹⁾Ranking from 1 (most important) to 6 (least important).

Table 4: Statistical results of T-test made to the influence of gender, living environment, or education level on the availability of information related to food and on the most adequate means of dissemination of information

| Media | Living environ. | Mean | Std. dev. | F | Sig. | Sex | Mean | Std. dev. | F | Sig. | Education level | Mean | Std. dev. | F | Sig. |
|---|-----------------|------|-----------|-------|-------|--------|------|-----------|-------|-------|-----------------|------|-----------|-------|-------|
| Availability of information related to food | | | | | | | | | | | | | | | |
| Hospitals | Rural | 3.73 | 1.94 | 0.011 | 0.917 | Female | 3.62 | 1.95 | 0.461 | 0.498 | Univ. degree | 3.40 | 1.90 | 3.926 | 0.049 |
| | Urban | 3.44 | 1.91 | | | Male | 3.33 | 1.87 | | | Secondary sc. | 4.83 | 1.69 | | |
| Radio | Rural | 3.16 | 1.65 | 1.020 | 0.313 | Female | 2.79 | 1.60 | 0.474 | 0.492 | Univ. degree | 2.75 | 1.59 | 1.341 | 0.248 |
| | Urban | 2.64 | 1.54 | | | Male | 2.70 | 1.54 | | | Secondary sc. | 2.78 | 1.35 | | |
| Television | Rural | 2.91 | 1.28 | 0.062 | 0.804 | Female | 3.11 | 1.23 | 0.041 | 0.839 | Univ. degree | 3.24 | 1.24 | 0.426 | 0.515 |
| | Urban | 3.30 | 1.214 | | | Male | 3.37 | 1.23 | | | Secondary sc. | 2.89 | 1.13 | | |
| School | Rural | 3.63 | 1.64 | 1.365 | 0.244 | Female | 3.43 | 1.47 | 0.694 | 0.406 | Univ. degree | 3.53 | 1.52 | 0.983 | 0.322 |
| | Urban | 3.45 | 1.48 | | | Male | 3.58 | 1.58 | | | Secondary sc. | 2.94 | 1.35 | | |
| Magazines | Rural | 3.66 | 1.55 | 0.225 | 0.636 | Female | 3.55 | 1.61 | 1.618 | 0.204 | Univ. degree | 3.61 | 1.56 | 0.004 | 0.952 |
| | Urban | 3.55 | 1.56 | | | Male | 3.63 | 1.48 | | | Secondary sc. | 3.11 | 1.53 | | |
| Internet | Rural | 3.91 | 1.97 | 1.114 | 0.292 | Female | 4.51 | 1.81 | 3.766 | 0.043 | Univ. degree | 4.47 | 1.89 | 0.053 | 0.818 |
| | Urban | 4.62 | 1.85 | | | Male | 4.40 | 2.02 | | | Secondary sc. | 4.44 | 2.04 | | |
| Most adequate means of dissemination of information | | | | | | | | | | | | | | | |
| Hospitals | Rural | 3.41 | 1.87 | 0.770 | 0.381 | Female | 3.64 | 1.93 | 0.005 | 0.945 | Univ. degree | 3.57 | 1.89 | 5.444 | 0.020 |
| | Urban | 3.61 | 1.94 | | | Male | 3.46 | 1.92 | | | Secondary sc. | 3.61 | 2.33 | | |
| Radio | Rural | 3.04 | 1.84 | 7.771 | 0.005 | Female | 2.74 | 1.53 | 1.189 | 0.277 | Univ. degree | 2.78 | 1.57 | 1.034 | 0.310 |
| | Urban | 2.72 | 1.49 | | | Male | 2.86 | 1.65 | | | Secondary sc. | 2.89 | 1.78 | | |
| Television | Rural | 3.63 | 1.46 | 2.046 | 0.154 | Female | 3.38 | 1.34 | 0.676 | 0.412 | Univ. degree | 3.50 | 1.30 | 0.051 | 0.822 |
| | Urban | 3.47 | 1.25 | | | Male | 3.68 | 1.22 | | | Secondary sc. | 3.56 | 1.34 | | |
| School | Rural | 3.61 | 1.64 | 2.374 | 0.125 | Female | 3.66 | 1.51 | 0.659 | 0.418 | Univ. degree | 3.70 | 1.55 | 3.387 | 0.067 |
| | Urban | 3.67 | 1.50 | | | Male | 3.65 | 1.56 | | | Secondary sc. | 3.06 | 1.11 | | |
| Magazines | Rural | 3.45 | 1.62 | 0.000 | 0.988 | Female | 3.29 | 1.64 | 0.055 | 0.814 | Univ. degree | 3.34 | 1.63 | 1.662 | 0.198 |
| | Urban | 3.31 | 1.62 | | | Male | 3.41 | 1.60 | | | Secondary sc. | 3.28 | 1.45 | | |
| Internet | Rural | 3.88 | 1.77 | 2.384 | 0.124 | Female | 4.29 | 1.86 | 3.685 | 0.046 | Univ. degree | 4.11 | 1.96 | 3.78 | 0.053 |
| | Urban | 4.22 | 1.98 | | | Male | 3.93 | 2.04 | | | Secondary sc. | 4.61 | 1.69 | | |

Table 5: Statistical results of ANOVA made to the influence of age on the availability of information related to food and on the most adequate means of dissemination of information

| | Age class | Availability of information related to food | | | | Most adequate means of dissemination of information | | | |
|------------|-----------|---|-----------|-------|-------|---|-----------|-------|-------|
| | | Mean | Std. dev. | F | Sig. | Mean | Std. dev. | F | Sig. |
| Hospitals | 18–23 | 3.57 | 1.96 | 1.489 | 0.171 | 3.50 | 2.03 | 1.382 | 0.213 |
| | 24–29 | 3.31 | 1.72 | | | | | | |
| | 30–35 | 3.35 | 1.79 | | | | | | |
| | 36–40 | 3.37 | 1.80 | | | | | | |
| | 41–45 | 4.09 | 2.03 | | | | | | |
| | 46–50 | 3.17 | 1.88 | | | | | | |
| | 51–55 | 2.46 | 1.61 | | | | | | |
| | 55+ | 3.92 | 2.19 | | | | | | |
| | Total | 3.5 | 1.92 | | | 3.57 | 1.92 | | |
| Radio | 18–23 | 3.02 | 1.58 | 1.377 | 0.215 | 2.73 | 1.55 | 1.624 | 0.129 |
| | 24–29 | 2.42 | 1.47 | | | | | | |
| | 30–35 | 3.12 | 1.97 | | | | | | |
| | 36–40 | 2.74 | 1.52 | | | | | | |
| | 41–45 | 2.3 | 1.46 | | | | | | |
| | 46–50 | 2.64 | 1.42 | | | | | | |
| | 51–55 | 3.08 | 1.61 | | | | | | |
| | 55+ | 2.58 | 1.56 | | | | | | |
| | Total | 2.76 | 1.58 | | | 2.79 | 1.58 | | |
| Television | 18–23 | 3.09 | 1.26 | 0.990 | 0.439 | 3.48 | 1.40 | 0.470 | 0.856 |
| | 24–29 | 3.38 | 1.13 | | | | | | |
| | 30–35 | 3.15 | 1.12 | | | | | | |
| | 36–40 | 3.32 | 1.11 | | | | | | |
| | 41–45 | 2.98 | 1.30 | | | | | | |
| | 46–50 | 3.58 | 1.20 | | | | | | |
| | 51–55 | 3.46 | 1.61 | | | | | | |
| | 55+ | 3.17 | 1.12 | | | | | | |
| | Total | 3.21 | 1.24 | | | 3.50 | 1.30 | | |
| School | 18–23 | 3.24 | 1.42 | 0.700 | 0.672 | 3.59 | 1.42 | 0.177 | 0.990 |
| | 24–29 | 3.69 | 1.35 | | | | | | |
| | 30–35 | 3.69 | 1.54 | | | | | | |
| | 36–40 | 3.58 | 1.90 | | | | | | |
| | 41–45 | 3.41 | 1.37 | | | | | | |
| | 46–50 | 3.75 | 1.63 | | | | | | |
| | 51–55 | 3.77 | 1.69 | | | | | | |
| | 55+ | 3.33 | 1.78 | | | | | | |
| | Total | 3.49 | 1.51 | | | 3.66 | 1.53 | | |
| Magazines | 18–23 | 3.76 | 1.58 | 0.331 | 0.939 | 3.44 | 1.55 | 0.660 | 0.706 |
| | 24–29 | 3.38 | 1.92 | | | | | | |
| | 30–35 | 3.38 | 1.47 | | | | | | |
| | 36–40 | 3.58 | 1.54 | | | | | | |
| | 41–45 | 3.61 | 1.47 | | | | | | |
| | 46–50 | 3.47 | 1.54 | | | | | | |
| | 51–55 | 3.62 | 1.56 | | | | | | |
| | 55+ | 3.33 | 1.44 | | | | | | |
| | Total | 3.58 | 1.56 | | | 3.34 | 1.62 | | |
| Internet | 18–23 | 4.32 | 2.02 | 0.292 | 0.956 | 4.27 | 1.90 | 0.880 | 0.523 |
| | 24–29 | 4.81 | 1.79 | | | | | | |
| | 30–35 | 4.31 | 2.07 | | | | | | |
| | 36–40 | 4.42 | 2.04 | | | | | | |
| | 41–45 | 4.61 | 1.59 | | | | | | |
| | 46–50 | 4.39 | 2.06 | | | | | | |
| | 51–55 | 4.62 | 1.76 | | | | | | |
| | 55+ | 4.67 | 1.61 | | | | | | |
| | Total | 4.47 | 1.89 | | | 4.15 | 1.94 | | |

statically evident to accept the null hypothesis. In fact, since p is higher than our chosen significance level $\alpha = 0.05$, we can accept the null hypothesis and conclude that for all the means considered as providing information, there are no statistically significant differences according to the living environment (rural or urban).

Nevertheless, related to the variable living environment, the researchers also noted a significant difference when the respondents were asked about the most appropriate means of dissemination, in this case for radio. This means that participants living in rural or urban areas differ significantly in their assessment of the importance of radio to disseminate information ($F = 7.771$, $p = 0.00457$). Hence, for this case, the null hypothesis, H_0 , must be rejected and alternative hypothesis H_1 shall be accepted. The results indicate that participants from urban areas consider radio as more appropriate means to disseminate information (mean score 2.72) when compared with those from rural areas (mean score 3.04). Nevertheless, this is still the most commonly cited source and ranked first in terms of accuracy and trustworthy information related to food.

In regards to gender (Table 4), there are no statistically significant differences between men and women in relation to the availability of information or the most adequate means of dissemination, in practically all cases, with just the exception of internet. For the internet, the authors found significant differences between men and women related to availability of information ($F = 3.766$, $p = 0.043$) and to most accurate means of dissemination ($F = 3.685$, $p = 0.046$). Hence, in these cases also the null hypothesis H_0 must be rejected and the alternative hypothesis H_1 must be accepted. The results showed that regarding availability of information women consider internet more relevant when compared to men (mean scores of 4.51 and 4.40, respectively). When it comes to considering internet as the most appropriate means of dissemination of information, again women have a higher mean score (4.29) than

men (3.93), indicating that women consider internet as more appropriate than men.

In regards to level of education (Table 4), there are no statistically significant differences between university degree holders and secondary school respondents in relation to the availability of information or the most adequate means of dissemination, in practically all cases, with just exception of the hospitals. For the hospitals, the tests revealed significant differences between the respondents with different education levels related to availability of information ($F = 3.926$, $p = 0.049$) and to most adequate means of dissemination ($F = 5.444$, $p = 0.020$). Hence, in these cases also the null hypothesis H_0 must be rejected and the alternative hypothesis H_1 is accepted, i.e. there are significant differences for these tested variables.

Finally, in what concerns the age groups, the results from Table 5 reveal that no significant differences were found either for the availability of information related to food or for the most adequate means of dissemination of information. This was observed for all sources/media considered. Therefore, in all cases, the null hypothesis H_0 was accepted, i.e. there are no significant differences across age groups.

4.3 Results for RQ2: Lebanese customers' attitudes and awareness towards food labelling

To answer this question, we investigated what are Lebanese people's attitudes towards food labelling. The questionnaire had a set of five items assessed on a scale from never to always, being the results presented in Table 6. First the variable reliability was tested considering all items through

Table 6: Attitudes of Lebanese participants towards food labelling and dietary fibre ($N = 258$)

| Questions | Always <i>N</i> (% total) | Many times <i>N</i> (% total) | Sometimes <i>N</i> (% total) | Rarely <i>N</i> (% total) | Never <i>N</i> (% total) |
|---|------------------------------|----------------------------------|---------------------------------|------------------------------|-----------------------------|
| Q1. When buying a food product, I usually consult the label information | 49 (19.0) | 66 (25.6) | 74 (28.7) | 49 (19.0) | 20 (7.8) |
| Q2. On the label, I usually consult the nutritional information | 37 (14.3) | 66 (25.6) | 73 (28.3) | 53 (20.5) | 29 (11.2) |
| Q3. In the nutritional label of any food, I usually check how much fibre it possesses | 5 (1.9) | 31 (12.0) | 76 (29.5) | 79 (30.6) | 67 (26.0) |
| Q4. The amount of fibres is a factor to be taken into account in the choice of similar foods | 17 (6.6) | 36 (14.0) | 86 (33.3) | 74 (28.7) | 45 (17.4) |
| Q5. If I buy a food product where the packaging refers to "high fibre" or "high in fibre", I check the label for the amount of fibre it has | 14 (5.4) | 46 (17.8) | 71 (27.5) | 76 (29.5) | 51 (19.8) |

Cronbach's alpha ($\alpha = 0.847$), and internal reliability was confirmed as very good, with a value higher than 0.8. Lebanese attitudes towards reading food labels (Q1) show that they give high importance to consulting the food label as noted in Table 6, with nearly half of the participants (44.6%) doing it always or many times. This confirms that a high number of participants look at food labels as a way to get general information about the food products that they consume.

However, the percentages and the attitudes started to decrease while the researchers focused more and more onto the components of the labels and nutritional information provided; this fact shows that Lebanese people do look into labels but they don't take into account all the percentages, and particularly details related to the purchased item while choosing it. If we look at Table 6, we see that 19.0% declare to always look at the labels, but only 14.3% always look at the nutritional information. When asked specifically about dietary fibre, only 1.9% always check its content in the food they purchase, although 6.6% admit that they consider the fibre content as factor of choice between similar foods. In relation to the attitudes towards the allegations provided by the food suppliers in the label about high fibre content, it was observed that only 5.4% of the participants always confirm if that information is true, based on the value presented on the nutritional composition.

The items in questions Q1–Q5 were used to compute a new variable named “food labelling” that accounts for the attitudes of the participants as a whole. The items in the scale were coded from 1 to 5 corresponding to Always, Many times, Sometimes, Rarely, and Never. The variable food labelling was calculated as a mean value of all items' scores for each participant. Moreover, parametric *T*-tests were conducted in order to confirm the possible presence of any sociodemographic differences according to sex or living environment for the computed variable “food labelling,” testing the hypotheses previously presented. The results showed that there were no significant differences for sex ($F = 0.207$, $p = 0.649$), for living environment ($F = 0.215$, $p = 0.643$), or for education level ($F = 0.164$, $p = 0.686$) in what concerns the food labelling variable. Hence, the authors accepted the null hypothesis in the three cases, stating that no sociodemographic statistically significant differences were found since p -value $\geq 5\%$. But concerning age differences, there was a statistically significant difference between groups as demonstrated by one-way ANOVA ($F = 2.057$, $p = 0.04873$). A Tukey *post hoc* test showed that persons aged more than 55 years were significantly more aware of food labelling than the group aged between 36 and 40 years ($p = 0.023$).

There was no statistically significant difference between the other age groups.

5 Discussion

Our research question RQ1 involved the following aspects: Where do Lebanese people find information and are these means of communication the most appropriate? Are there any sociodemographic differences such as gender, age, living environment, and education level? To this we investigated how the participants rated a number of media as their sources of information related with dietary fibre, and then evaluated possible sociodemographic variability regarding the availability of the information on each of the media considered. Also, we have investigated which media the participants considered as most adequate to disseminate the information about healthy eating. These aspects, although related might be different, i.e. one participant can get information mostly from the radio but could consider school as the most appropriate media to do it. The results should enlighten as to how better to disseminate the information to obtain better adherence to this type of food with health benefits. Uduakah [43] addressed the issue of development communication that could be used to induce change by influencing the public and take them to a full mind set transformation. For him, development communication can help citizens accepting new ideas that shall be opted on doing and trying new things out. Therefore, this kind of communication is sometimes considered corrective, integrative, and revolutionary in nature and it is result oriented whereas the assistance of media is a core for the implementation of this development communication system. Without media none of this could happen because it is the major link and intermediary means between users, customers, service providers, etc. Information that are disseminated through media is a necessary condition for improvement of all areas. In certain cases, extension agents or even friends, neighbours, and relatives might be the primary source of knowledge in agricultural sectors. Extension Agents, according to Nsoanya and Nenna [44], are the primary providers of information for farmers. Friends and family were important sources of information for farmers in Rivers State, Nigeria, according to Nlerum et al. [45], whereas the source of information from the mainstream media (i.e. television, newspapers, radio, etc.) might occasionally account for only a tiny fraction of the total [46].

One of those major media tools and channels that is pointed as the most mandatory in rural population of

developing countries is television, as it has the potential to diffuse development information and supplement the extension effort [47]. Also, researchers like Musa [48] confirmed the fact that in developing countries, people tend to use the television and radio more than the internet, as they are considered as a traditional mass media. Yakubu and Usman [49] also found that television is the major source of information in rural populated areas and is regarded as a major communication tool for information dissemination. So, what is the major tool for Lebanese people? And are there any demographic differences? The obtained results indicated that the most important means of finding information in Lebanon were radio followed by hospitals. Television, magazines, school, or internet were classified as being less important for the Lebanese to get information on healthy food topics. The media are a principal source of information about food and nutrition for many people [50] and they are capable of persuading and having a powerful influence in our society [51]. Even though new information initially becomes available in scientific journals, they are unlikely to be a direct information source for most consumers and the general public. Moreover, consumers tend to get food information through mass media rather than from doctors or dietitians [52] and Lebanese people are no exception, even after considering the average income of households.

The results further showed that radio and hospitals were again considered as the most appropriate media to disseminate information about healthy eating. This confirms that the Lebanese get the information through radio and hospitals and consider them as the most appropriate to do it. Having this high rank for radio could be due to the fact that Lebanese people spend most of their times heading to work in their private cars while the only available medium is their car radio. Additionally, all health programs are most frequently broadcasted early in the day, during morning shows, whether it is on TV or on Radio. These results confirm the theories that in a developing country the mass media is where people usually find information about food. The link between TV viewing and eating behaviour is of particular interest, which has been demonstrated in several studies. However, these can be of different nature, on the one hand, for example through cooking shows or advertisements TV can increase cues and lead to unhealthy food choices [53,54], but on the other hand, it may also incentivise the consumption of healthier foods, through proper information dissemination or leisure shows [55,56].

One related work by Georgescu *et al.* [34] on the means of information about dietary fibre and healthy foods found that in Romania internet was the main

source of getting information (for 54.9% of participants), while the lowest was hospitals (18.2%). These results are contrary to our results where internet was the last and hospitals came in second. These differences highlight the role of the socio-political environments on the people's perceptions, behaviour, and level of knowledge.

Regarding the first part of RQ1, the results allowed establishing the primary sources through which an effective dissemination of information is reaching the Lebanese, which are radio and hospitals/health centres, and eventually adapt strategies for its adaptation to achieve even higher level of literacy and incentivised adoption of healthier diets.

In what concerns the investigation of the possible variations according to the different sociodemographic variables considered on the most adequate means of dissemination of information, results showed that sex or living environment influenced the results for internet, while level of education influenced the results for hospitals. This means that people from rural or urban areas get information differently through the internet, and also women from men. Also, participants with a university degree get information from hospitals differently from those with a lower school level. In what concerns the opinions about the suitability of the media, living environment influences the opinions when it comes to magazines, sex influences the opinions for internet, and school level influences the opinions for hospitals. In this way people from rural areas consider radio as more appropriate than those from the cities, people with secondary school education rate hospitals higher than those with a university degree, and women consider internet a better source to disseminate information than men. This could be studied more deeply in terms of net behaviour and gender differences in future studies. It could depend on the level of trust, or on the accessibility to information while at work, among others. The work by Guiné *et al.* [12] presented a study on the factors related with information about food fibres in different countries and found two major factors, one related to the sources of dietary fibre and other to the health effects. Also, they found three clusters of people according to higher or lower knowledge on the above mentioned factors and the cluster membership characterisation revealed that differentiating sociodemographic variables were country, living environment, and the level of education but not age or sex.

The second research question, RQ2 was: What is the level of awareness of Lebanese people about food labelling? Are there any sociodemographic differences such as gender, age, living environment, and education level? For this matter, the attitudes of the participants toward

food labelling were evaluated. The results confirmed that a high number of participants look at food labels as a way to get general information about the food products that they consume. Nowadays, consumers tend to purchase food items only if they bear available nutrition information, as a result of their continuous education and health awareness [52]. Many chronic diseases can be treated and avoided through healthy nutrition and appropriate diet [53]; a balanced life style equates the link between nutrition and health [54]. Labels are mandatory and become a source of information as they can easily educate consumers on making nutritionally appropriate choices [55], and promoting healthy dietary behaviour. Hence, consumers' discerning skills have to be elevated constantly through additional knowledge on label information for making the appropriate choice towards a healthy diet and nutritionally balanced products [56]. On the other hand, it is also important to pay attention to consumers with more limited literacy that might lead to problems in reading and interpreting the labels [57], thus preventing them to take advantage of all the benefits that could result afterwards.

Nutritional information on food labels can guide people in making decisions about healthy food choices. Thinking critically about how food choices can have an impact on whether the choices are as healthy as possible, Lebanese dietitian and nutritionist should raise more awareness for Lebanese consumers to get the proper habits of consulting the nutritional composition of foods, and not just to trust blindly on a marketing brand that can lead to improper decision making. In several studies, there has been reported the role of mass media in the promotion of consumption of unhealthy nutrient dense foods [57], some focusing on certain groups like for example college students [58], adolescents [59], or children [60]. However, there has been a shift in the recent years towards using marketing campaigns to promote healthy eating habits rather than unhealthy. Among these works is highlighted the study by Englund et al. [61] about the effect of branded marketing and media campaigns as allies and tools to incentivise healthy eating and promote food well-being among Americans. Their results confirmed that industry, government, and nongovernmental organisations can rely on health-branding strategies as a means to adequately and efficiently increase knowledge and empower consumers to adopt healthier diets on a view to improve health and well-being. Another study by Tobey et al. [62] focused on the effect of marketing campaigns on the consumption of fruits and vegetables.

The information provided on food labelling is pivotal for consumer's choices. It has been shown that for some

consumers, healthy food labels do, to some extent, cue them when making food choices [63]. It is important to notice that consumers often find comparing healthiness of products tedious and rely on marketing strategies, such as for example highlighting the nutrition information, health claims, or the eco-friendly or fair trade tags [64–67].

Regarding the research question RQ2, the results showed that the Lebanese tend to consult the label many times when purchasing food, and when they do it, they see the nutritional information. However, aspects such as the fibre content are not checked so much and also the fibre content is not a factor that influences their food choice. In this way, it is understood that increasing the intake of fibre-rich foods has to be done through other ways than just the information on the label. Additionally, no meaningful sociodemographic variability was found, which indicated that campaigns aimed at incentivising the consumption of fibre-rich foods as a way to improve health can be targeted to the general public in Lebanon.

6 Conclusion

The results obtained from this work showed that for Lebanese participants, radio is the most recognised means for communicating information about healthy eating, followed by hospitals. Additionally, these two means were also considered as the most adequate to disseminate this type of information for Lebanese people. Significant differences were found between rural or urban living environments for radio as most appropriate means of dissemination of information and also among sexes for internet regarding either the availability of information or the appropriateness for dissemination of information.

The other subject investigated was regarding the participant's behaviour towards nutrition labelling. A great number of people usually check the labels although some showed no interest in the food components and particularly the fibre content. The labels are considered as important sources of information for Lebanese people, but they don't consult the nutritional composition so much as desirable in order to adjust their purchases or compare between different options available on the market.

Therefore, researchers succeeded in identifying and defining the best adequate means for Lebanese people education on the importance of food fibres on one hand (mass media: radio, hospitals, and television), and on the other, they observed the little importance that the

Lebanese consumers' still attribute to food labelling when purchasing their products. In our research findings a limitation was identified, since the authors didn't take into consideration the level of income of the population specifically in the sample studied since Lebanon is facing a financial crisis since October 2019 and the highest level of inflation, the salaries, and income are not adjusted to the Lebanese purchasing power. Furthermore, these findings enable Lebanese people to concentrate on the most essential drivers for fibre-rich foods in order to develop a market strategy or policies and to spur more study. These findings also assist small businesses in establishing and creating consumer- and producer-focused origin-based labelling awareness and education initiatives. Advertisements or short videos can be used to educate consumers on the necessity of buying and consuming fibre-rich food for their health that is well-produced, certified, and monitored, as well as coming from a reputable source and being of high quality. It will be easy to improve the marketing of such a product. Arrangements might be made to target producers.

As for future studies, it would be interesting to explore bloggers, influencers, and WhatsApp as powerful tools for communication and dissemination of information related to food components and fibres. These tools allow diverse frames to communicate information on platform, and boosting joint action for multisectoral products. This research showed a small percentage of Lebanese people who are interested in the composition of food while checking the labels and get their information through radio but some have already begun to utilise internet media as a source of information. The media, which provide unique opportunities for information dissemination, may play an essential role in enlightening individuals about a variety of topics, health related issues, food security, and components. So, what could be the quality of information Lebanese would search for in the internet while considering food products and will they try to purchase food on social commercial platforms? These questions could be considered for future studies in our Lebanese context.

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References

- [1] Hoefkens C, Valli V, Mazzocchi M, Traill WB, Verbeke W. European consumers' perceived seriousness of their eating habits relative to other personal health risks. *Prev Med.* 2013;57:618–22. doi: 10.1016/j.ypmed.2013.08.011.
- [2] Kutttschreuter M, Rutsaert P, Hilverda F, Regan Á, Barnett J, Verbeke W. Seeking information about food-related risks: The contribution of social media. *Food Qual Preference.* 2014;37:10–8. doi: 10.1016/j.foodqual.2014.04.006.
- [3] Tiozzo B, Ruzza M, Rizzoli V, D'Este L, Giaretta M, Ravarotto L. Biological, chemical, and nutritional food risks and food safety issues from italian online information sources: web monitoring, content analysis, and data visualization. *J Med Internet Res.* 2020;22:e23438. doi: 10.2196/23438.
- [4] Scheufele DA, Tewksbury D. Framing, agenda setting, and priming: the evolution of three media effects models. *J Commun.* 2007;57:9–20. doi: 10.1111/j.0021-9916.2007.00326.x.
- [5] Gray NJ, Klein JD, Noyce PR, Sesselberg TS, Cantrill JA. Health information-seeking behaviour in adolescence: the place of the internet. *Soc Sci Med.* 2005;60:1467–78. doi: 10.1016/j.socscimed.2004.08.010.
- [6] Mello S. Media coverage of toxic risks: a content analysis of pediatric environmental health information available to new and expecting mothers. *Health Commun.* 2015;30:1245–55. doi: 10.1080/10410236.2014.930398.
- [7] Scheufele DA, Krause NM. Science audiences, misinformation, and fake news. *PNAS.* 2019;116:7662–9. doi: 10.1073/pnas.1805871115.
- [8] Vargo CJ, Guo L, Amazeen MA. The agenda-setting power of fake news: a big data analysis of the online media landscape from 2014 to 2016. *N Media Soc.* 2018;20:2028–49. doi: 10.1177/1461444817712086.
- [9] Bomlitz LJ, Brezis M. Misrepresentation of health risks by mass media. *J Public Health.* 2008;30:202–4. doi: 10.1093/pubmed/fdn009.
- [10] Ropeik D. The risk of poor coverage of risk – why does a healthier-than-ever world feel so scary? *Columbia J Rev.*

- 2010;30-1-2. https://www.cjr.org/the_observatory/the_risk_of_poor_coverage_of_r.php.
- [11] Rosselli R, Martini M, Bragazzi NL. The old and the new: vaccine hesitancy in the era of the Web 2.0. Challenges and opportunities. *J Prev Med Hyg.* 2016;57:E47-50.
- [12] Guiné RPF, Correia P, Leal M, Rumbak I, Barić IC, Komes D, et al. Cluster analysis to the factors related to information about food fibers: a multinational study. *Open Agriculture.* 2020;5:593-606. doi: 10.1515/opag-2020-0060.
- [13] Skubic MK, Erjavec K, Klopčič M. Consumer awareness of PDO-labelled food in Slovenia. *Italian J Anim Sci.* 2019;18:366-71. doi: 10.1080/1828051X.2018.1530959.
- [14] Erraach Y, Sayadi S, Gomez AC, Parra-López C. Consumer-stated preferences towards Protected Designation of Origin (PDO) labels in a traditional olive-oil-producing country: the case of Spain. *N Medit.* 2014;13:11-9.
- [15] Grunert KG, Aachmann K. Consumer reactions to the use of EU quality labels on food products: a review of the literature. *Food Control.* 2016;59:178-87. doi: 10.1016/j.foodcont.2015.05.021.
- [16] Bryta P. Regional ethnocentrism on the food market as a pattern of sustainable consumption. *Sustainability.* 2019;11:6408. doi: 10.3390/su11226408.
- [17] Menapace L, Colson G, Grebitus C, Facendola M. Consumers' preferences for geographical origin labels: evidence from the Canadian olive oil market. *Eur Rev Agric Econ.* 2011;38:193-212. doi: 10.1093/erae/jbq051.
- [18] Fotopoulos C, Krystallis A. Are quality labels a real marketing advantage? *J Int Food Agribus Mark.* 2001;12:1-22. doi: 10.1300/J047v12n01_01.
- [19] Marcoz EM, Melewar TC, Dennis C. The value of region of origin, producer and protected designation of origin label for visitors and locals: the case of fontina cheese in Italy. *Int J Tour Res.* 2016;18:236-50. doi: 10.1002/jtr.2000.
- [20] Day AS, Davis R, Costello SP, Yao CK, Andrews JM, Bryant RV. The adequacy of habitual dietary fiber intake in individuals with inflammatory bowel disease: a systematic review. *J Acad Nutr Dietetics.* 2021;121:688-708.e3. doi: 10.1016/j.jand.2020.12.001.
- [21] Yang H-L, Feng P, Xu Y, Hou Y-Y, Ojo O, Wang X-H. The role of dietary fiber supplementation in regulating uremic toxins in patients with chronic kidney disease: a meta-analysis of randomized controlled trials. *J Ren Nutr.* 2021;31:438-47. doi: 10.1053/j.jrn.2020.11.008.
- [22] Yang H, Sun Y, Cai R, Chen Y, Gu B. The impact of dietary fiber and probiotics in infectious diseases. *Microb Pathogenesis.* 2020;140:103931. doi: 10.1016/j.micpath.2019.103931.
- [23] Eberhardt F, Crichton M, Dahl C, Nucera R, Jenkins J, Marx W, et al. Role of dietary fibre in older adults with asymptomatic (AS) or symptomatic uncomplicated diverticular disease (SUDD): Systematic review and meta-analysis. *Maturitas.* 2019;130:57-67. doi: 10.1016/j.maturitas.2019.10.006.
- [24] Sarić MM, Ljubičić M, Lapčić I, Guiné RPF. Contribution of fruit, vegetables, whole cereals, and legumes to total fibre intake in adult Croatian Dalmatian population. *Arh Hig Rada Toksikol.* 2020;71:138-45. doi: 10.2478/aiht-2020-71-3305.
- [25] Guiné RPF, Florença SG, Leal M, Rumbak I, Barić I, Komes D, et al. Consumption of fibre rich foods: comparative study in different countries. *Croatian J Food Sci Technol.* 2020;12:67-76. doi: 10.17508/CJFST.2020.12.1.09.
- [26] Georgescu IM, Rus VA, Tarcea M, Ruta F, Fazakas Z, Guine R, et al. Population preferences for sources that offers information about dietary fibres health effects – an international cross-sectional survey. *J Pak Med Assoc.* 2019;69:985-90.
- [27] Kļava D, Straumīte E, Krūma Z, Guiné R. Latvian citizens' knowledge about dietary fibre. *Proc Latvian Acad Sci Sect B.* 2017;71:428-33. doi: 10.1515/prolas-2017-0076.
- [28] Ljubicic M, Saric MM, Rumbak I, Baric IC, Komes D, Satalic Z, et al. Knowledge about dietary fibre and its health benefits: A cross-sectional survey of 2536 residents from across Croatia. *Med Hypotheses.* 2017;105:25-31. doi: 10.1016/j.mehy.2017.06.019.
- [29] Guiné RPF, Ferreira M, Correia P, Duarte J. Study about how a sample of portuguese people perceive the health benefits of dietary fibre. *Curr Nutr Food Sci.* 2017;13:137-46.
- [30] Yalçın E, Kösemeci C, Correia P, Karademir E, Ferreira M, Florença SG, et al. Evaluation of consumer habits and knowledge about dietary fibre and fibre-rich products in Turkish population. *Open Agriculture.* 2020;5:375-85. doi: 10.1515/opag-2020-0042.
- [31] FAO. Programmes and projects | FAO in Lebanon | Food and Agriculture Organization of the United Nations n.d. <https://www.fao.org/lebanon/programmes-and-projects/en/> (accessed January 19, 2022).
- [32] FAO. Food-based dietary guidelines – Lebanon. Food and Agriculture Organization of the United Nations n.d. <http://www.fao.org/nutrition/education/food-dietary-guidelines/regions/lebanon/en/> (accessed January 19, 2022).
- [33] Boustani NM, Guiné RPF. Food choice motivations and perception of a healthy diet in a developing Mediterranean country. *Open Agriculture.* 2020;5:485-95. doi: 10.1515/opag-2020-0048.
- [34] Georgescu M, Tarcea M, Hardmas R, Seni G, Teodorescu C, Szasz S, et al. Romanian population perception about food risk behavior starting from their social and cultural profile. *Bull Univ Agric Sci Veterinary Med Cluj-Napoca Food Sci Technol.* 2020;77:10-6. doi: 10.15835/buasvmcn-fst:2019.0039.
- [35] Tarcea M, Fazakas Z, Ruta F, Rus V, Zugravu C, Guine R. Romanian knowledge and attitudes regarding dietary fibers. *Bull Univ Agric Sci Veterinary Med Cluj-Napoca Food Sci Technol.* 2016;73:123-8. doi: 10.15835/buasvmcn-fst:12329.
- [36] Ferreira M, Guiné RPF, Duarte J, Correia P, Leal M, Baric IC, et al. Sources of information about dietary fibre: a cross-country survey. *Eur Proc Soc Behavioural Sci EpSBS.* 2016;XVI:7-17. doi: 10.15405/epsbs.2016.11.2.
- [37] Pestana MH, Gageiro JN. *Análise de dados para ciências sociais – a complementaridade do SPSS.* 6th edn. Brasil: Edições Sílabo; 2014.
- [38] Maroco J. *Análise Estatística com o SPSS Statistics.* 5th edn. Brazil: Report number; 2012.
- [39] Broen MPG, Moonen AJH, Kuijff ML, Dujardin K, Marsh L, Richard IH, et al. Factor analysis of the Hamilton depression rating scale in Parkinson's disease. *Parkinsonism Relat Disord.* 2015;21:142-6. doi: 10.1016/j.parkreldis.2014.11.016.
- [40] Ferrão AC, Guine RPF, Correia PMR, Ferreira M, Lima JDJ. Development of a questionnaire to assess people's food choices determinants. *Curr Nutr Food Sci.* 2019;15:281-95.
- [41] Hellstrom WJG, Feldman R, Rosen RC, Smith T, Kaufman G, Tursi J. Bother and distress associated with peyronie's

- disease: validation of the peyronie's disease questionnaire. *J Urol.* 2013;190:627–34. doi: 10.1016/j.juro.2013.01.090.
- [42] Hill MM, Hill A. *Investigação por questionário*. 2nd edn. Lisboa: Edições Sílabo; 2009.
- [43] Uduakah N. *Development Communication*. Oyo, Nigeria: Stirling-Horden Publishers Nig Ltd; 1998.
- [44] Nsoanya LN, Nenna MG. Adoption of improved cassava production technologies in anambra-east local government area of Anambra state, Nigeria. *J Res Natl Dev.* 2011;9:36–43. doi: 10.4314/jorind.v9i2.
- [45] Nlerum FE, Albert CO, Prince-Kaye ES. Access of rural women to agricultural information in the Eleme Area of Rivers state, Nigeria. *J Agric Food Inf.* 2012;13:192–7. doi: 10.1080/10496505.2012.667711.
- [46] Ebewore SO, Isiorhovoja RA. Knowledge status and disease control practices of cassava farmers in delta state, Nigeria: implications for extension delivery. *Open Agriculture.* 2019;4:173–86. doi: 10.1515/opag-2019-0017.
- [47] Rao BSS. *Television for rural development*. New Delhi, India: Concept Publishing Company; 1992.
- [48] Musa AH. *Benefiting information and communication technology for all*. Inaugural Lecture Series. Selangor, Malaysia: Universiti Putra Malaysia Publisher; 2008.
- [49] Yakubu DH, Usman A. Farmers' perceptions on the role of mass media in sustainable agricultural development: a case study of the northern zone of sokoto agricultural development project (S.A.D.P.), Nigeria. *J Agriculture Biol Sci.* 2012;3:305–12.
- [50] ADA. *Nutrition trends survey*. Chicago IL, USA: American Dietetic Association; 1997.
- [51] Levy AS, Schucker RE. Patterns of nutrient intake among dietary supplement users: attitudinal and behavioral correlates. *J Am Diet Assoc.* 1987;87:754–60.
- [52] FMI-FIA US. *Grocery Shopper Trends*. Arlington, Virginia, USA: FMI – The Food Industry Association; 2008.
- [53] Bourn R, Prichard I, Hutchinson AD, Wilson C. Watching reality weight loss TV. The effects on body satisfaction, mood, and snack food consumption. *Appetite.* 2015;91:351–6. doi: 10.1016/j.appet.2015.04.070.
- [54] Alblas MC, Mollen S, Franssen ML, van den Putte B. See the cake and have it too? Investigating the effect of watching a TV cooking show on unhealthy food choices. *Physiol Behav.* 2021;236:113409. doi: 10.1016/j.physbeh.2021.113409.
- [55] Manohar S, Rehman V, Sivakumaran B. Role of unfamiliarity and information on consumers' willingness to try new healthy foods. *Food Qual Preference.* 2021;87:104037. doi: 10.1016/j.foodqual.2020.104037.
- [56] Folkvord F, Anshütz D, Geurts M. Watching TV cooking programs: effects on actual food intake among children. *J Nutr Educ Behav.* 2020;52:3–9. doi: 10.1016/j.jneb.2019.09.016.
- [57] Emond JA, Fleming-Milici F, McCarthy J, Ribakove S, Chester J, Golin J, et al. Unhealthy food marketing on commercial educational websites: remote learning and gaps in regulation. *Am J Preventive Med.* 2021;60:587–91. doi: 10.1016/j.amepre.2020.10.008.
- [58] Engel M, Rella N, Furman J, Burde D, Webb M, Mathews A. The development of find your happy plate: a social marketing campaign to encourage intake of nutrient dense foods by college students. *J Acad Nutr Dietetics.* 2020;120:A131. doi: 10.1016/j.jand.2020.08.058.
- [59] Gascoyne C, Scully M, Wakefield M, Morley B. Food and drink marketing on social media and dietary intake in Australian adolescents: findings from a cross-sectional survey. *Appetite.* 2021;166:105431. doi: 10.1016/j.appet.2021.105431.
- [60] Tatlow-Golden M, Garde A. Digital food marketing to children: exploitation, surveillance and rights violations. *Glob Food Security.* 2020;27:100423. doi: 10.1016/j.gfs.2020.100423.
- [61] Englund TR, Zhou M, Hedrick VE, Kraak VI. How branded marketing and media campaigns can support a healthy diet and food well-being for Americans: evidence for 13 campaigns in the United States. *J Nutr Educ Behav.* 2020;52:87–95. doi: 10.1016/j.jneb.2019.09.018.
- [62] Tobey L, Anne H, Raab C, Manore MM. Focus on fruits and vegetables for low-income families: framework for the food hero social marketing campaign in Oregon. *J Am Dietetic Assoc.* 2011;111:A12. doi: 10.1016/j.jada.2011.06.037.
- [63] Fagerstrøm A, Richartz P, Arntzen E, Sigurdsson V. An explorative study on heuristic effects of healthy food labels in an online shopping situation. *Procedia Computer Sci.* 2021;181:709–15. doi: 10.1016/j.procs.2021.01.222.
- [64] Berry C, Romero M. The fair trade food labeling health halo: effects of fair trade labeling on consumption and perceived healthfulness. *Food Qual Preference.* 2021;94:104321. doi: 10.1016/j.foodqual.2021.104321.
- [65] Truong VA, Lang B, Conroy DM. Are trust and consumption values important for buyers of organic food? A comparison of regular buyers, occasional buyers, and non-buyers. *Appetite.* 2021;161:105123. doi: 10.1016/j.appet.2021.105123.
- [66] Rondoni A, Grasso S. Consumers behaviour towards carbon footprint labels on food: a review of the literature and discussion of industry implications. *J Clean Prod.* 2021;301:127031. doi: 10.1016/j.jclepro.2021.127031.
- [67] An R, Shi Y, Shen J, Bullard T, Liu G, Yang Q, et al. Effect of front-of-package nutrition labeling on food purchases: a systematic review. *Public Health.* 2021;191:59–67. doi: 10.1016/j.puhe.2020.06.035.