Article

Food and Nutrition Myths among Future Secondary School Teachers: A Problem of Trust in Inadequate Sources of Information

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Abstract: The Internet and social networks are full of nutrition information, offering people guidance to make healthy eating choices. These sources always present themselves as a gateway to reliable information on healthy eating; however, too often this is not the case. Far from being trustworthy, there are usually plenty of food myths. A food myth is a widespread false belief about food, nutrition, and eating facts that gives rise to certain behaviors, from fashionable trends to diets. Academic training is a valuable tool to combat food myths and the pseudoscience linked to them, but educators must participate in this battle. To test this idea, we analyzed the prevalence of nine highly popular food myths held by 201 secondary school Spanish teachers. The aim was to assess whether expertise in science areas prevents teachers from falling into these food misconceptions. Our study results showed that food myths are held regardless of specialty area. The power of the media in popularizing and spreading nutrition myths among educators may be the cause, even more potent than academic training. We conclude that since scientific knowledge is not enough to erase food myths, we need further actions if we aim to prevent the problems that food myths may cause.

Keywords: food; nutrition; nutrition myths; healthy habits; secondary teachers

1. Introduction

According to current academic researchers, the factor most linked to a person’s health is their dietary habits (Mello et al. 2020; Pot 2018; Mochizuki et al. 2017). Dietary habits can be defined as the food choices of people that reflect what food they prefer or what they can get according to their economic level and, consequently, consume (Bello 2005).

According to the IIIrd Study on Health and Lifestyle (AEGON Insurance Group 2020), eight out of ten Spaniards claim to have a varied diet, and seven out of ten keep a close eye on their food intake for health reasons. It seems that Spanish society takes care of its eating habits. It is a fact that eating habits in Western societies are closely affected by beauty standards (Mckay et al. 2018; Sánchez-Cabrero et al. 2020). In Spain, the interest in eating habits has grown faster, either by the influence of beauty standards or by the obsession with being young and healthy (De Los Santos-Mantero 2018; Sánchez-Cabrero et al. 2019; Sánchez-Cabrero 2020; Díaz-Méndez 2006).

Eating habits in secondary school students play an important role in the perception that adolescents have about their lifestyle (Bazán-Riverón et al. 2019; Das et al. 2017). However, while most school children have favorable attitudes toward healthy behaviors, many of them hold beliefs that are contrary to these attitudes and wishes, and these are due to socio-environmental factors (Veléz et al. 2014). To put it differently, knowledge...
about healthy eating comes from what is learned within one’s own family, from nutritional discourses that introduce a certain ‘cacophony’ (Dixon and Banwell 2004; Fischler 2011) and, what is more concerning, from the Internet and the media, but not from formal education (Blázquez Barba et al. 2018).

A food myth is a widespread false belief about food and nutrition that ends up in a trend and that ultimately becomes a commonly followed food habit (Feldman and Marks 2005; Lesser et al. 2015; Pomerleau et al. 2001). The World Health Organization (WHO) (World Health Organization Team 2004) establishes that our eating habits are among the highest risk factors leading to chronic disease (Poulain 2020).

For that reason, it is clear that it is necessary to debunk eating myths coming from popular culture because they can lead to unhealthy and dangerous habits, especially during adolescence and youth (Bruckner and Handl 2020; De Los Santos-Mantero 2018), and continue later in life during adulthood before being passed on to the next generations.

From a sociological point of view, it is appropriate to analyze the relationship between the emergence and maintenance of false myths about food, and its relationship with cultural, social and family aspects in a critical way (Jänhonen et al. 2016; Poulain 2017; Beardsworth and Keil 1996). It may be relevant to know how nutritional family discourses perpetuate themselves from generation to generation, introducing a ‘cacophony’ of incorrect eating myths (Fischler 2011). The fact that this knowledge comes from a trusted circle could prevent the appropriate and objective evaluation and testing of the belief from a scientific standpoint if it does not seem credible (Dixon and Banwell 2004).

It is necessary to food literacy, as the intersection between community and the research, that the food skills that are acquired are not separated from the environmental and social context (Jänhonen et al. 2016; Cullen et al. 2015; Truman et al. 2017; Velardo 2015; Zandstra et al. 2001).

Sociologists, biologists, and nutritionists study how food and diet influence health and nutrition. They establish benefits and drawbacks of the consumption and abuse of certain foods, but only a small part of this research and discovery reaches society, despite having been accepted in the academic sphere (Chiles 2017). It is very difficult to distinguish whether a person has real scientific knowledge about a food habit, as the most usual situation is that a person does not know the origin of their knowledge, which they consider to be true. One of the main problems in the differentiation of the scientific knowledge about food myths is that, usually, formal teaching does not deal directly with human nutrition and food habits, although food is essential for human health (De la Cruz Sánchez 2021).

The most widespread food myths are those related to well-accepted alcoholic drinks such as wine and beer (Antoñanzas Villar et al. 2008; Demoisier 2010; Samoggia 2016), possibly due to the commercial interests of industrial lobbies. Additionally, it is possible to find many misconceptions regarding the nutrients of legumes (Timsina 2018), the benefits of whole-grain bread (Behall et al. 1999), eggs and their influence on cholesterol (Gray and Griffin 2009), dairy products (Lordan and Zabetakis 2017; Astrup et al. 2019), and heme and non-heme iron (Agencia Española de Seguridad Alimentaria y Nutrición, AESAN 2014), among others. In addition, the National Dietary Intake Survey in Spain (Agencia Española de Seguridad Alimentaria y Nutrición, AESAN 2014) revealed sex differences in consumption patterns of essential minerals such as iron.

Truthful scientific information must find a way to influence people to counter food myths, and this is a task for both academics and teachers (Bruckner and Handl 2020). Let us not forget that, apart from the media and internet, some of these myths are also fed by nutrition handbooks, magazines, and even by some health professionals (Edwards et al. 2019; Juzwiak and Ancona-Lopez 2004).

One way to examine whether some of the most common and harmful food myths arise in our societies and how prevalent they may be is to ask young people trained in scientific matters. If this population shares these myths, it probably means that we may be facing a severe problem that demands our attention.
In this study, we questioned 201 future secondary school teachers from different academic areas. This study was performed during their initial training while they were studying for the Master’s Degree in Secondary School Teacher Training, Vocational Training, Baccalaureate, and Languages. The reason why we analyzed this group of secondary school teachers was that they will be the main academic reference for the next generation. As said above, if they hold some of the food myths, the problem, far from being solved, will likely be perpetuated, as these myths will spread among students.

The main hypothesis in the work was that food myths are very widespread among secondary school teachers and that those teachers in the sample (with specializations in biology, physics, and chemistry) would have a greater understanding of nutritional issues with respect to the rest of the sample.

To investigate this hypothesis (1), we assessed whether the area of expertise of education postgraduates who are studying the official Spanish master’s degree that allows them to work as teachers is positively related to their knowledge of nutrition and prevents them from believing in food myths. More specifically, we investigated if those with specialization in biology, physics, and chemistry have greater mastery over nutritional issues. Secondly, (2) we aimed to identify which nutrition myths are more prevalent among future teachers.

2. Materials and Methods

2.1. Study Design and Data Analysis

We carried out a descriptive and ex post facto cross-sectional study of food and nutrition myths among university postgraduates in education that enrolled in a master’s degree in the academic year 2019–2020 that entitles them to work as high school teachers. As descriptive statistics, we used the arithmetic mean and standard deviation for the nutrition myth and the distribution of frequencies for the rest of the variables. For inferential analyses, we used a Student t-test for independent samples. Finally, percentages describe the degree of knowledge about food and nutrition.

2.2. Recruitment and Data Collection

The sampling was carried out by cluster sampling among the students on the Master’s Degree in Secondary School Teacher Training, Vocational Training, Baccalaureate, and Languages at a Private Spanish University. All students in the 2019–2020 academic year from the seven selected areas who voluntarily agreed to participate and who correctly completed the evaluation instrument designed ad hoc for the study were included in the study; 84% of the total population took part in the study. No filter was applied to select participants based on ethnic or social origin. The distribution of profiles and academic areas obtained represents the sampling process followed.

The study sample consisted of 201 participants (110 females and 91 males), who previously graduated with an official university degree with no direct relation to education and are pursuing an official master’s degree in secondary education that entitles them to work as teachers. They have an average age of 34.47 years (33.94 for women and 35.12 for men) and a standard deviation of 6.67 (6.82 for women and 6.49 for men). See in Figure 1 the distribution of the sample according to sex and age.

Participants are representatives of the seven different areas of expertise included in the official university master’s degree in High School Teacher Training (language and literature; mathematics and economics; biology and geology; physics and chemistry; technology; geography and history; and educational orientation), with the biology and geology modality being the most frequent (n = 55) and the educational orientation modality the least frequent (n = 10), as can be seen in Figure 2.
Figure 1. Sample distribution according to age and sex of the participants.

Figure 2. Sample distribution according to academic area.
It should be noted at this point that the academic areas in the *master’s degree* do not reflect a single degree, but rather sets of similar studies; for example, the technology area is made up of computer and telecommunications degrees and educational orientation (understood as educational guidance) is made up of degrees close to education and psychology.

We used a cluster sampling survey of students pursuing a university master’s degree in *Secondary School Teacher Training* at a Private Spanish University. No extra selection was applied, and participants have different professional profiles and backgrounds. They come from all Spanish regions because the master’s degree is taught online.

2.3. Instrument for Obtaining Evaluated Data and Variables

An ad hoc 2-page/12-item online questionnaire was designed and hosted on the private server encuestafacil.com so that all participants could access it anywhere and with any type of electronic device connected to the internet. The questionnaire was validated by the Scientific and Ethical Committee of the UAX (Meeting Acta 1) and underwent a strict validation process by external experts. Acceptance of the informed consent was addressed on the first page and accepting was a requirement to participate in the survey.

The variables evaluated are described below:

- **Sex**, as a dichotomous variable (female or male).
- **Age**, as a discrete quantitative variable.
- **Academic area of expertise**, area of training in one of the seven specialties offered in the master’s degree. It is treated as a nominal categorical variable with seven categories: language and literature; mathematics and economics; biology and geology; physics and chemistry; technology; geography and history; and educational orientation.
- **Nutrition myths**. Continuous quantitative variable. It consists of the sum resulting from the participant’s response to nine myths of food and nutrition. Each myth poses a statement that can be positive. False is evaluated on an ordinal scale of two conditions (0 = TRUE, wrong; 1 = FALSE, right). The myths are based on:
  - Nutrition Myths
  - Vegetables do not contain significant amounts of iron
  - One glass of wine a day is good for health
  - It is not possible to follow a 100% vegan diet and be healthy
  - Whole-grain bread is less fattening than white bread
  - If one suffers from high cholesterol, it is better not to consume eggs or eat just one per week
  - Legumes are rich in carbohydrates and poor in protein intake
  - Dairy products intake is essential to keep calcium to an optimal level
  - When there is no time to eat some fruit, having a natural fruit juice is an equally valid option
  - Light and skim products help us lose weight

We chose nine prevalent food myths through consultation and final validation with nutrition experts. Each of the selected myths was the most widespread in each of the main areas considered. As a result, we chose myths regarding intake of essential minerals, intake of alcoholic beverages, vegan diets, cereals, cholesterol, legumes, dairy, fruits, and light products.

The evaluated myths were:

2.3.1. MYTH 1: ‘Vegetables Do Not Contain Significant Amounts of Iron’. FALSE

The National Institute of Health (NIH) advises an iron Recommended Dietary Allowance (RDA) of 9 mg (men) and 18 mg (women) between the ages of 20 and 49 (Institute of Medicine (US) Panel on Micronutrients 2001).

The iron amounts were consulted on the Agricultural Research Service website of the United States Department of Agriculture (USDA) (U. S. Department of Agriculture 2021). According to this source, the amount of iron found in vegetables is as follows: spinach,
There are two iron types: heme-iron (present in fish and meat) and non-heme iron (in vegetables). Besides the iron amounts, one noteworthy parameter is the bioavailability (BA), expression of the available fraction of a compound total mass, which depends on the iron-type and the combination of the foods. Non-heme-iron has a 5–12% absorption rate whereas heme-iron has 14–20% absorption rate (Cámara-Martos 2004; Hurrell and Egli 2010). Nevertheless, according to NIH, it is necessary to indicate that some vegetables have significant amounts of non-heme iron (black and white beans, whole cereals, nuts, raisins, etc.) but their ingestion must be linked to acids, e.g., a vitamin C intake (citruses, strawberries, red pepper, tomatoes, broccoli, etc.) (Hurrell and Egli 2010). Thus, the myth is false because of these data.

2.3.2. MYTH 2: ‘One Glass of Wine a Day Is Good for Health’. FALSE

The polyphenols discovered in wine are the origin of this myth. Fresh grapes contain up to 300 mg of polyphenols/per 100 g, and some of them are polyphenolic antioxidants (PA), as resveratrol. On average between red and white grapes, resveratrol is up to 15–100 µg/g in fresh grapes, so 15 g of fresh grapes has 0.75–1.5 mg of resveratrol (Murtaza et al. 2013).

However, the resveratrol amount depends on the type of wine. The average total resveratrol content in red, rosé, white, and cava Spanish wines is: 7.55 mg/L, 2.15 mg/L, 0.48 mg/L and 0.67 mg/L, respectively (Gonzalo et al. 1995). Some studies have found a link between wine consumption as a protector in heart disease and stroke (Sacco et al. 1999), but in general, resveratrol studies have found that it is a potent antioxidant and can afford health promotion in several chronic conditions, but it has been using supplements of grapes concentrates, not always using wine (Downer et al. 2019; Singh et al. 2015).

Besides, in this breakdown of effects, we cannot leave out the potent neurotoxic effect of wine (Erdozain et al. 2014), and the effects of its continuous consumption on general health (Samoggia 2016; Downer et al. 2019), as well as its possible negative social effects (Spear 2018). In general, no level of alcohol consumption improves health (Burton and Sheron 2018).

Hence, the myth is false. Current research suggests, clearly, no level of alcohol consumption improves health (Burton and Sheron 2018).

2.3.3. MYTH 3: ‘It Is Not Possible to Follow a 100% Vegan Diet and Be Healthy. FALSE

A vegan is a person who has decided not to exploit animals in any way and, therefore, to follow a vegan diet means not eating meat, fish, dairy products, honey, and/or eggs. Vegan diets enjoy numerous benefits recognized by the WHO (World Health Organization) and other studies (Trepanowski and Varady 2015; Borude 2019; Rogerson 2017) with only one consideration that must be taken into account. An exclusively vegan diet seems to lack Vitamin B12, which is the only nutrient that needs to be taken as a supplement to balance that nutritional guideline nowadays (Ankar and Kumar 2021). A possible lack of Vitamin B12 is one of the problems a vegan may face, as a low B12 intake can lead to anemia and nervous system impairment (Guney et al. 2016). Vitamin B12 biosynthesis is confined to few bacteria, and as such its production relies on microbial fermentation (Martens et al. 2002). Although vitamin B12 appears to be synthesized by intestinal bacteria in the ileum of the large intestine, its utilization would be minimal due to an uncoupling between synthesis and absorption due to multiple factors. It is true that vitamin B12 is the only supplementary nutrient that needs to be taken to balance that nutritional guide-line in a vegan person, but its deficiency is not only found in vegans but also in people with an omnivorous diet (Ankar and Kumar 2021).
Consequently, the myth is false because it is possible to be on a healthy vegan diet including supplementary B12 intake.

2.3.4. MYTH 4: ‘Whole-Grain Bread Is Less Fattening than White Bread’. FALSE

White bread is made with refined flour, whereas whole bread is made with the complete grain of the cereal. It is true that the Glycemic Index (GI) in white bread is indeed higher than whole bread (Behall et al. 1999). According to the Glycemic Index Foundation, GI is a relative ranking of carbohydrates in foods according to how they affect blood glucose levels. Carbohydrates with a low GI value (55 or less) are more slowly digested, absorbed, and metabolized and cause a slower rise in insulin levels (Gao et al. 2019; Lau et al. 2005; Holscher 2017; Myhrstad et al. 2020).

However, if we review their tendency to fatten, there are no major differences in calories: white bread provides 277 Kcal (1.6 mg iron, 0.6 mg zinc, and 25 mg magnesium) per 100 g and whole bread provides 259 Kcal (2.7 mg iron, 1.8 mg zinc, 76 mg magnesium), in 100 g (Ruiz-Moreno et al. 2019).

Thus, whole bread is not a lower-calorie food, but it might be better for health according to its GI, and the amounts of minerals.

2.3.5. MYTH 5: ‘If One Suffers from High Cholesterol, It Is Better Not to Consume Eggs or Eat Just One per Week’. FALSE

Eggs have a high nutritional value, are rich in essential amino acids, and are an easily digestible protein, while also being high in healthy fatty acids, vitamins (it contains all the vitamins that the human being needs), and minerals. According to the USDA, for each egg, we consume 266 mg of cholesterol, which would represent 89% of the daily recommendations (on a 2000 Kcal diet). An egg also provides 2 g of saturated fats, 2.4 g of monounsaturated fats, and 0.9 g of polyunsaturated fats, as well as 47 mg of Omega-3 fatty acids and 723 mg of Omega-6. The egg white contains water and proteins, whereas the yolk contains fat-soluble vitamins (A, D, E, and K); thiamine; biotin; pantothenic acid; folic acid; and vitamins B12 and B6. Minerals include phosphorus, zinc, iron, iodine, and selenium (Richter et al. 2019).

However, although it contains significant amounts of cholesterol, it does not seem to have a direct link with the elevation of blood cholesterol (Gray and Griffin 2009; Richter et al. 2019; Shin et al. 2013).

The Dietary Guidelines for Americans in 2015 (U.S. Department of Agriculture, USDA 2020) removed the prior recommendation to limit the consumption of dietary cholesterol per day. The same applies to the different Dietary Guidelines for the Spanish population. Consequently, the myth is false.

2.3.6. MYTH 6: ‘Legumes Are Rich in Carbohydrates and Poor in Protein Intake’. FALSE

According to the EFSA (European Food Safety Authority), the protein intake for adults is a minimum of 0.83 g, per kilogram, per day. Adults older than 65 need a bit more (Richter et al. 2019). To give an example, an adult of 60 Kg needs, approximately, 49.8 g/protein/day.

According to data from the USDA (U.S. Department of Agriculture, USDA 2020), lentils, chickpeas, and white beans have a combined average of 9.2 g of protein, 24 g of carbohydrates, and 7.26 g of dietary fiber, per 100 g. To compare these numbers with the data from the most consumed meats, chicken, veal, and pork have a combined average value of 17.2 g of protein, 0 g of carbohydrates, and 0 g of fiber.

The protein digestibility corrected amino acid score (PDCAAS) depends on the foods. Chickpeas and soybeans have 0.78 and 0.91 values respectively, whereas veal has 0.92. Considering the amino acid typology, legumes are rich in arginine and lysine, but poor in methionine and glycine (Ruiz-Moreno et al. 2019; Chen and Eriksson 2019).

Fiber is present in legumes, which is essential for good intestinal health. To obtain a good-quality protein, it is advisable to mix legumes with foods rich in the latter two
2.3.7. MYTH 7: ‘Dairy Products Intake Is Essential to Keep Calcium to an Optimal Level’. FALSE

Calcium is essential for heart functioning as well as for muscles and nerves. In addition, it plays a major role in blood coagulation, although the reason why it is best known is that its insufficiency may cause osteoporosis. However, supplemental calcium has limited efficacy in the prevention of bone fracture (Lesser et al. 2015).

The NIH recommended daily intake is 1000 mg of calcium for adults (1200 mg for pregnant women and people over 70) (van Dronkelaar et al. 2018).

The calcium absorbable fraction (AF) is very different between foods. For example, cow’s milk has 125 mg of calcium/100 g (a small cup), but its AF is only 32% (i.e., 40 mg absorbed calcium/100 g) (Martínez de Victoria 2016). Almonds have 250 mg of calcium per 100 g (approx.), with 21.2% AF, and approx. 50 to 60 mg are absorbed per 100 mg. Broccoli has approx. 40 mg/100 g (AF 25 mg of calcium absorbed) and cauliflower has 70/100 g (AF 35 mg of calcium absorbed) (Rodríguez Huertas et al. 2019).

Although vegetables are indeed a good calcium source, and we can live without dairy products, milk is the best way to get a rapid calcium intake (Rodríguez Huertas et al. 2019).

Finally, a further deepening is needed in relation to calcium absorption. For good calcium absorption, homeostasis, calcium-phosphorus, and correct vitamin D values (among others) must be taken into account. For calcium to be assimilable, the Ca/P ratio must be 2:1 and must have a good concentration of vitamin D (Veldurthy et al. 2016).

According to the NIH, the recommended daily amount of vitamin D is 600 IU (1 microgram vit D = 40 IU); 80–90% of the total body’s vitamin D is vitamin D3, which comes from de novo after exposure to UVB radiation. The rest is achieved through nutrition: salmon (600 IU), sardine (400 IU), tuna (230 IU), egg yolk (25 IU), and mushrooms (100 IU) per 100 g of product (National Institute of Health 2021).

The best things to do to improve calcium intake are eating well, receiving enough sun exposure, and watching your calcium/phosphorus/Vit D ratio (Yao et al. 2019).

2.3.8. MYTH 8: ‘When There Is No Time to Take Some Fruit, Having a Natural Fruit Juice Is an Equally Valid Option’. FALSE

An orange provides approximately 70 Kcal and 3.5 g of fiber, and orange juice approximately 100 Kcal and 0.5 mg of fiber. Juice has less fiber and also free-natural-sugars. Fiber is a non-digestible food constituent that is essential for enteric maintenance (Bustos A and Medina P 2020).

Daily fiber intake must be 25–30 g per day for adults according to Reynolds (Reynolds et al. 2019).

Besides, free sugars must be studied when we talk about juice. The fruit has its own sugars along with its fiber, making them less bioavailable. Free sugars in a juice are very bioavailable to the body. Free sugars are very bioavailable to the body. The fruit has its sugars along with its fiber, making them less bioavailable. According to Bernstein et al. (Bernstein et al. 2016), free sugars are linked to an increased risk of obesity, cardiovascular disease, diabetes, and tooth decay.

2.3.9. MYTH 9: ‘Light and Skim Products Help Us Lose Weight’. FALSE

According to the Spanish Interministerial Commission for Food Regulation, a lite product is one that has reduced (not eliminated) from the original product its content in calories coming from fats and sugars at least by 30%. The WHO recommends not exceeding 25 g of sugar intake per day (World Health Organization (WHO) 2015).

The bottom line is that, although lite products provide fewer calories, some do so by replacing fat with sugars and sweeteners that give them greater palatability. Another important aspect is the tendency to consume more of the product thinking that it can be
abused because it is lite, which leads to the fact that, in many cases, the consumption of these products is directly associated with weight gain, not with the weight reduction they claim (Sánchez-Cabrero et al. 2020; Ruiz-Moreno et al. 2019; Richter et al. 2019).

3. Results

In response to the first research goal, Table 1 shows the mean and standard deviation of total hits in the nine food myths obtained by the participants according to their specialty. Each success yields one point and mistakes do not score, so each participant has a score between 0 and 9.

<table>
<thead>
<tr>
<th>Area of Specialty</th>
<th>N</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physics and Chemistry</td>
<td>27</td>
<td>6.52</td>
<td>1.42</td>
</tr>
<tr>
<td>Mathematics and Economics</td>
<td>30</td>
<td>6.80</td>
<td>1.35</td>
</tr>
<tr>
<td>Geography and History</td>
<td>17</td>
<td>6.29</td>
<td>1.65</td>
</tr>
<tr>
<td>Technology</td>
<td>50</td>
<td>6.88</td>
<td>1.67</td>
</tr>
<tr>
<td>Biology and Geology</td>
<td>55</td>
<td>6.84</td>
<td>1.91</td>
</tr>
<tr>
<td>Language &amp; Literature</td>
<td>12</td>
<td>6.08</td>
<td>2.07</td>
</tr>
<tr>
<td>Educational Orientation</td>
<td>10</td>
<td>6.10</td>
<td>1.45</td>
</tr>
<tr>
<td>TOTAL</td>
<td>201</td>
<td>6.67</td>
<td>1.68</td>
</tr>
</tbody>
</table>

At first glance, we see that neither participants with a biology or geology specializations, nor participants with physics and chemistry specialization are the ones that obtained the best results. However, it is necessary to see Table 2, where we see a comparison between the scores obtained by the participants within the areas of biology and geology and physics and chemistry as opposed to the rest of the areas. t-contrasts were used to determine whether these differences observed in Table 1 were statistically significant and to confirm or reject the initial hypothesis that participants with science majors are better prepared to identify food myths.

<table>
<thead>
<tr>
<th>Area of Specialty</th>
<th>gl</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physics and Chemistry</td>
<td>199</td>
<td>0.508</td>
<td>0.612</td>
</tr>
<tr>
<td>Biology and Geology</td>
<td>199</td>
<td>−0.853</td>
<td>0.395</td>
</tr>
<tr>
<td>Physics and Chemistry + Biology and Geology</td>
<td>199</td>
<td>−0.420</td>
<td>0.675</td>
</tr>
</tbody>
</table>

None of the contrasts carried out showed significant differences when compared to the rest of the participants specialized in the other academic areas related to social sciences and humanities; hence, neither the students of biology and geology, nor those of physics and chemistry, nor those formed by the confluence of both groups, are better prepared to identify food and nutrition myths.

Therefore, we can reject the initial hypothesis of the study, stating that students with a background in biology, physics, and chemistry, who are studying for a master’s degree in teacher training, show a better background of nutritional knowledge concerning food myths.

In response to the second research goal, Table 3 shows the percentages of correct responses for each myth.

It is noteworthy how the myth ‘A glass of wine a day is beneficial for health’ is the myth in which participants failed the most. In contrast, the myth ‘Legumes are rich in carbohydrates and poor in protein intake’ was correctly identified with a rate of correct answers of nearly 90%.
Table 3. Success percentages for each feeding myth.

<table>
<thead>
<tr>
<th>Feeding Myths</th>
<th>Correct Answers Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vegetables do not contain significant amounts of iron</td>
<td>86.1</td>
</tr>
<tr>
<td>One glass of wine a day is good for health</td>
<td>46.8</td>
</tr>
<tr>
<td>It is not possible to follow a 100% vegan diet and be healthy</td>
<td>66.7</td>
</tr>
<tr>
<td>Whole-grain bread is less fattening than white bread</td>
<td>69.7</td>
</tr>
<tr>
<td>If one suffers from high cholesterol, it is better not to consume eggs or eat just one per week</td>
<td>82.1</td>
</tr>
<tr>
<td>Legumes are rich in carbohydrates and poor in protein intake</td>
<td>88.6</td>
</tr>
<tr>
<td>Dairy products intake is essential to keep calcium to an optimal level</td>
<td>69.7</td>
</tr>
<tr>
<td>When there is no time to eat some fruit, having a natural fruit juice is an equally valid option</td>
<td>83.1</td>
</tr>
<tr>
<td>Light and skim products help us lose weight</td>
<td>74.6</td>
</tr>
</tbody>
</table>

4. Discussion

Regarding the first objective of the research, it is noteworthy to see how there were no significant differences between education postgraduates of very different specializations, including degrees such as biology and physics and chemistry, which, in theory, should imply greater nutritional knowledge. This result is particularly remarkable because it shows that university graduates in experimental and natural areas such as biology, physics, or chemistry have erroneous food beliefs that, in some cases, are contrary to their training (Blázquez Barba et al. 2018; Feldman and Marks 2005; Velde et al. 2014). If we discard the academic field as the main source of information on nutrition, we are left with the family-cultural sphere (Dixon and Banwell 2004; Fischler 2011), the internet, and the media (Blázquez Barba et al. 2018) as the main sources of knowledge.

On the one hand, apart from general traditions and their link with food (Poulain 2017; Beadsworth and Keil 1996), nutritional discourses coming from the family sphere that introduce a certain ‘cacophony’ from generation to generation must be regarded as a great influence (Dixon and Banwell 2004; Fischler 2011). Sociologically, we must be critical of Western societies if they are not able to adequately incorporate scientific knowledge as the main knowledge of trust, not only in the nutritional field, since it is possible that the results shown in this study are only a small example of the flow of inadequate social knowledge in societies that define themselves as the ‘Knowledgeable source’, where scientific knowledge is as close to society as it has never been before in history.

On the other hand, the hypothesis that food myths may be more related to mass media and internet information and, therefore, the channels of formal education are not sufficient to fight misrepresentations, is supported by authors such as Blázquez Barba et al. (2018).

According to Truman et al. (2017), it is necessary to achieve a good food literacy level in society. This would range from the acquisition of functional knowledge, concerning skills, abilities, and choices about food, to critical knowledge concerning understanding and possibly questioning read information.

Healthy eating habits are a significant nutrition literacy issue, probably due to information divulged by mass media (Velardo 2015). Existing nutritional literacy measuring tools tend to emphasize literacy and numerical skills and/or nutritional knowledge (Velardo 2015), but very few of them assess future teachers who will have an impact on future students.

In the current study, we performed just this and found an average of 25% of errors in the nine selected myths. This comprises a considerable number of future secondary school teachers who are in a position of spreading the myths analyzed herein. It is far from what would be desirable, i.e., a 100% success rate among secondary school teachers when identifying food myths.

Furthermore, there were no significant differences between education postgraduates of very different specializations, including degrees such as biology and physics and chemistry, which, in theory, should have greater knowledge about nutrition than, for example,
graduates of economics, language, or history. Let us not forget that in our societies, science and health teachers are the role models of academic knowledge for young people. If students mirror what they have learned from teachers who have conceptual errors, this can become a problem in the future because it could result in failures in their learning, as well as further perpetuating the transmission of the same mistakes (Fischler 2011).

Regarding the second research objective, it is striking that Myth 2 ‘One glass of wine a day is beneficial for health’ is the most prevailing one. This result is in line with what was found by Samoggia (2016) and Demossier (2010), who studied the role played by social aspects in the rise and continuation of wine consumption myths. In this sense, it is possible that having a long tradition of producing and drinking wine, as in Spain and France, explains the diffusion and maintenance of this myth. The fact that Spain is a country with a great tradition in winemaking may have a decisive influence on the dissemination and maintenance of this myth (Antoñanzas Villar et al. 2008). However, it would be necessary to contrast these results obtained with other similar ones in other countries with different cultures and traditions around wine.

Likewise, free sugars must be studied when we talk about juice. Fruit has its own sugars along with fiber, making them less bioavailable. Free sugars in a juice are very bioavailable to the body. According to Bernstein et al. (2016), free sugars are linked to an increased risk of obesity, cardiovascular disease, diabetes, and tooth decay. The bottom line is that, although lite products provide fewer calories, some do so by replacing fat with sugars and sweeteners that give them greater palatability. Another important aspect is the tendency to consume more of the product thinking that it can be abused because it is lite, which leads to the fact that, in many cases, the consumption of these products is directly associated with weight gain, not with the weight reduction they claim (Sánchez-Cabrero et al. 2019; Sánchez-Cabrero 2020; Zandstra et al. 2001).

Fortunately, we can see that this does not occur with other myths such as legumes and proteins, vegetables and amounts of iron, or eggs and cholesterol, which are less prevailing, probably because of the known beneficial effects of legumes as potential anticarcinogens (Cid-Gallegos et al. 2020), the improved understanding of iron absorption (Hurrell and Egli 2010), and better understanding of cholesterol metabolism (Gray and Griffin 2009).

We did find a trend, but not a significant one, in some myths related to vegan food in general and its calcium intake. The latter is normal since dairy intake is still the easiest, not the only but the simplest way to ingest this mineral (Rodríguez Huertas et al. 2019).

Another inconclusive result, but showing a trend, was regarding the fattening capacity of whole-grain bread. It may indicate a poor understanding of the concept of fiber and most probably a lack of knowledge of what fiber means for the health of the gut microbiota (Holscher 2017; Myhrstad et al. 2020). This is a point to be considered in our future research.

As a limitation, it should be noted that perhaps all these inconclusive, but trending, results could have been corrected or, at least, studied in more depth if a control group of nutrition graduates had been used in the study. In addition, it would be necessary to carry out the same study with Primary Teachers Training Students and check whether they are better or worse trained in nutrition.

Regarding to the media, science journalists and propagators play a crucial role. However, not all of them have the necessary training to understand some pieces of information and the results contained in scientific articles. In this sense, having more scientific advisory committees in those media would be the first step in combating misinformation.

Moreover, we should put more effort into the filters and controls that take place during scientific dissemination. In our country, having scientific awards and fostering and rewarding outstanding scientific blogs and any other initiative of the Spanish Science, Technology, and Innovation System (SECTI) will help in this regard, but may not be enough.

5. Conclusions

From the results of this study, it can be concluded that food literacy is necessary for the training of future teachers, not only of science but of all possible disciplines and levels.
The fact that there are no significant differences between educational professionals with different specialties regarding food myths reflects that the root of the problem lies in the fact that, generally, the population does not know how to recognize reliable and unreliable sources of information in this field. Therefore, it is not so much a problem of truthful information or access to information, but of consumption and food habits, as well as the cultural information dominated by the media.

Perhaps it is a bit daring to propose the creation of a network of dissemination standards by subject or field, for example, nutrition, mental health, sexuality, etc., and that experts should oversee evaluation of what is to be published or shown in the media. We are not suggesting censorship, but rather to control the quality of what is disseminated so we protect knowledge from falling prey to myths in the era of post-truth.


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Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: Data presented in this manuscript is original and is available at https://datadryad.org/stash/share/L6DXywREIpRGzz8EPLxeQ_aqV12YmgIDJ554Hlg (accessed on 26th August 2021). The presented data is not inappropriately selected, manipulated, enhanced, or fabricated. This includes (1) exclusion of data points to enhance significance of conclusions, (2) fabrication of data, (3) selection of results that support a particular conclusion at the expense of contradictory data, (4) deliberate selection of analysis tools or methods to support a particular conclusion (including p-hacking).

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