Assessing the Legitimacy of Socially Accepted Dietary Myths

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Abstract

Food myths are false and contradictory beliefs of people about certain food groups that lack scientific evidence. The world is a global village where people are highly influenced by social media. The internet has become an affluent source of valuable information but at the same time, it plays a stigmatic role in misleading people through false content provision. Some of the myths that prevail in our society are inherited from generation to generation, the deliverance of wrong information from ancestors to descendants. Food myths have an essential role in compromising the nutritional state of a population. This book chapter was intended to assess the legitimacy of socially accepted myths, people's knowledge and perception about different food groups, and people's eating habits. For this purpose, dietary survey-based studies were collected, and their results were discussed. Myths related to certain foods, food groups, pregnancy, nutritional supplements, and nutrition labeling were discussed. The results from different studies showed that there is an urgent need to aware people of nutrition and the health benefits of certain foods by improving their knowledge of nutrition. Public and community health education sort to be considered a beneficial approach in this regard.

Introduction

Myths about food are subsistence beliefs that lack a solid scientific foundation or even go against what people generally perceive to be true (Florenca et al 2021). Dietary misconceptions may hinder healthy dietary consumption. There are dietary misconceptions concerning food energy, non-nutrients, macronutrients, and micronutrients (Lesser et al 2015). The web, as well as social networks, tend to be loaded with dietary facts that might assist the public in adopting effective dietary recommendations. Such resources consistently present themselves being an accurate means for guidance on good nutrition, but that's sometimes not the reality (Moreno-rodr et al., 2021). Technical publications (31.0%), Journals of science (43.3%), and the everyday healthcare department web (31.4%) are the primary sources from which people used to obtain nutritional information, and this is consistent with the level of confidence in these sources (Florenca et al., 2021). Three primary types of dietary myths reported by youth center personnel, parents, and teenagers were identified: Myths regarding how to reduce weight, eat nutritiously, and how some foods may change during nursing and pregnancy (Mohamed and Elkaluby, 2020). Food taboos continue to contribute to poor dietary habits during early childhood and pregnancy (Ekwochi et al., 2016).

- **Factors affecting Nutritional Myths**

Food consumption is influenced by cultural factors, especially for pregnant women. Some food-related myths and taboos are still held to be true in many regions (Diana et al., 2018). Sociodemographic, anthropometric, and behavioral factors as well as their level of knowledge affected participants' responses to questions about myths and facts (Florenca et al., 2021). The results demonstrated that a variety of factors, including the relationship between information, social-cultural accepted standards, economic growth, the surrounding environment, and ethnic background, still affect how people acquire food choices (Lusambili et al., 2020) as described in Figure 1.

- **How to Spread Awareness to Crack Dietary Myths**

Public awareness efforts are required to raise adolescent's understanding of the detrimental consequences of consuming high-sodium and sugar-sweetened beverages on their health. Campaigns to raise awareness of food safety are also required at a variety of teen-focused establishments, such as youth-oriented clinics, clubs, and schools. Websites and resources covering healthy nutrition recommendations should be directed at empowering adolescents to dispel myths about unhealthy nutrition (Mohamed and Elkaluby, 2020). Better education could help people choose healthier foods and maintain better health. This will lead to improvements in both public health and individual health as well as a decrease in non-communicable food-related disorders such as heart disease, obesity, and diabetes (Florenca et al., 2021). It has been suggested that maintaining a healthy diet is determined by having a high level of nutrition literacy (NL). It may be especially important to improve seniors'

NL by raising the calibre of their diets (Lobo and Sanclemente, 2021). Customized support would undoubtedly make a positive contribution to society in which consumers will soon have the power to develop a lifestyle practice of a balanced lifestyle by choosing environmentally friendly, wholesome foods that satisfy their particular demands, well-being, and behaviors, minimizing the emergence of persistent, non-communicable health issues (Verbanac, 2019) as described in Figure 2. The data was collected from *in-vivo* and survey-based studies. Interviews, as well as 24-hour recalls through a food frequency questionnaire, were conducted to investigate the eating habits of individuals. The majority of the research publications were acquired from Google Scholar and Sci-Hub over the last 5-10 years.
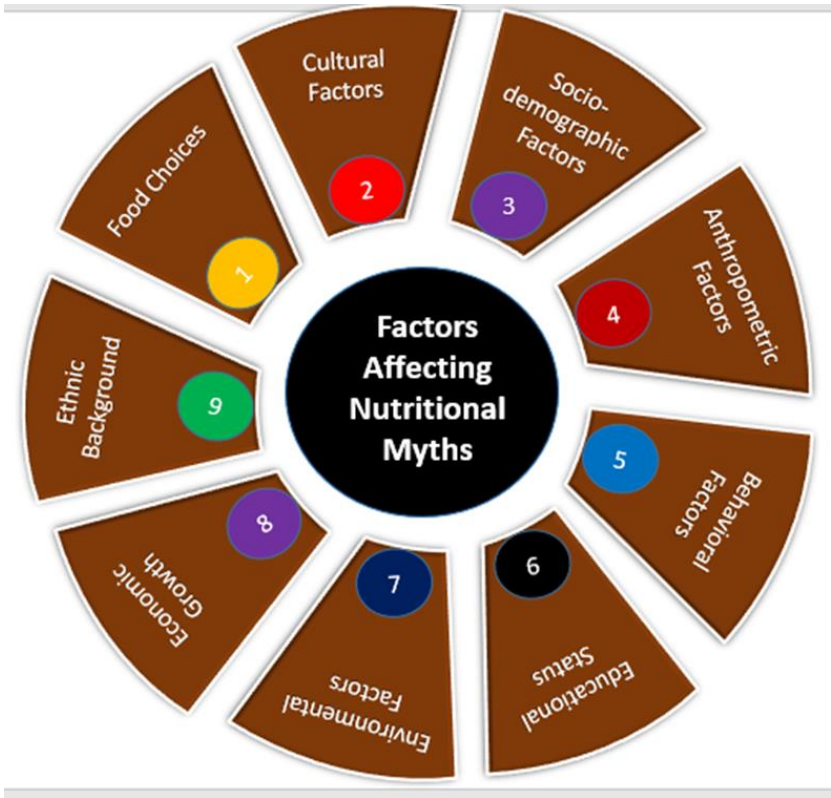

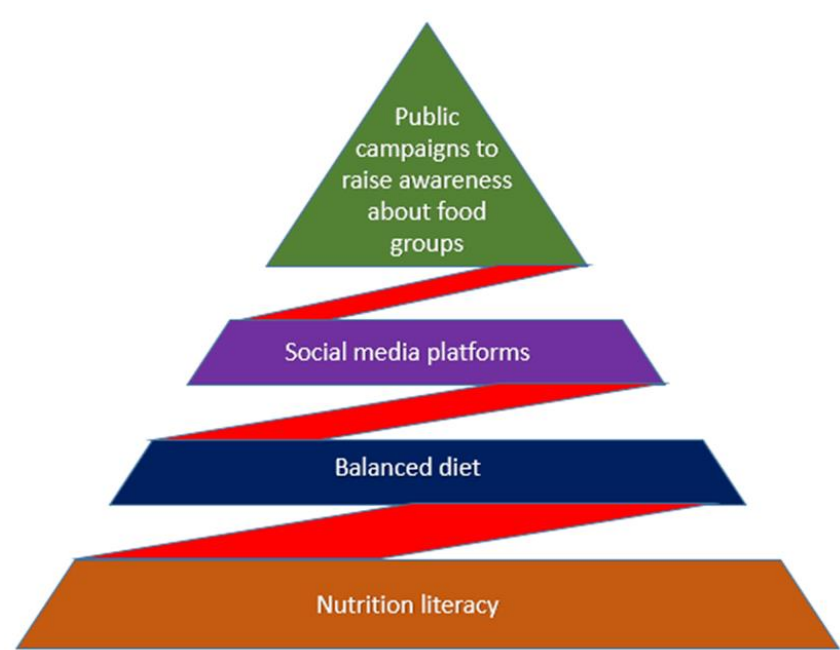**Fig. 1:** Factors that affect dietary myths

Fig. 2: Ways to crack dietary myths

Myths about Eggs

Eggs are a rich source of protein. Daily consumption of eggs provides all the amino acids that are essential for healthy and normal body working and development. Some people believe that the intake of eggs raises the cholesterol level in the body and leads to different heart

diseases. Due to the prevalence of this misconception, they usually avoid eating eggs. A study looked at the correlation of egg intake with cardiovascular disease (CVD) risk/mortality. Using standardized procedures, the data was checked and extracted by two impartial reviewers. No definitive data exists regarding the function of eggs in CVD risk. Nonetheless, modest weekly egg consumption is associated with protection when compared to no intake (Godos et al., 2021). Moreover, in another study, the relationship between the amount and pattern of egg intake and known elevated lipid levels was determined. Volunteers in the research were recruited from the Hellenic Nationwide and Nutrition Health Survey (HNNHS). All people may include eggs in a balanced diet with minimal cholesterol and saturated fats without consuming extravagant amounts of calories because they do not raise the risk of dyslipidemia (Magriplis et al., 2019), as described in Table 1

Table 1: Studies related to dietary misconceptions and eating habits.

Mythical component	Sample size	methodology	results	references
Egg	2 million peoples	The databases Medline, Embase, and Web of science were searched. Two independent reviewers used standardized methods to screen and extract the data. Cohort study.	No evidence of the role of eggs in raising CVD.	(Godos et al., 2021).
Egg	3558 humans	Blood pressure, lipid profile, body weight, and height were assessed. In-home standardized interview.	Does not raise the risk of dyslipidemia. Low in saturated fat.	(Magriplis et al., 2019).
Plant-based high carbohydrate diet	75 humans	Body composition was measured by DEXA (HOMA-IR) The homeostasis model assessment-estimated insulin resistance. Randomized clinical trial.	Beneficial effect on body weight and insulin resistance.	(Kahleova et al., 2018)
Dinnertime eating habits and obesity	833 humans	Eating habits record of 24-hours The association between eating habits and obesity was investigated using the logistic regression-based approach. Cross-sectional study.	There is no correlation between obesity and major dietary patterns.	(Akbarzade et al., 2020)
Wheat derived prebiotics	45 mice	Mice are fed either a controlled diet or WD. Gluten first appeared in diet around WD with 5% gluten or WD with high fat/high sucrose content.	Although gluten may have an impact on metabolic homeostasis.	(Olivares et al., 2019)
Pre-meal water consumption	15 humans	In comparison to consuming test meals under waterless and post-load water settings, individuals consumed less of the test meal when they drank water before eating it.	Results in a significant decrease in energy intake in young, aged adults. Effective in controlling weight.	(Jeong, 2018)
Water	358 participants	Hydration status questionnaire. Anthropometric measures. Body composition was evaluated by the ANOVA test. Cross-sectional study	Result in healthy body composition Beneficial in weight management	(García et al., 2019)
Dietary fruits	1879 elderly of middle age	Blood samples. Food frequency questionnaire. Fecal samples were collected. Prospective cohort study.	Helps to shape the gut microbiota. Lowers the risk of type 2 diabetes and other metabolic diseases.	(Jiang et al., 2020)
Fruit juice	13 groups of rats	Four different fruit juices (4 weeks) with sugary solutions in diabetic GK rats were compared.	Consuming the same amount of sugary liquids did not significantly affect the caloric intake or the oxidative stress but it did worsen fasting glycemia.	(Monteiro-Alfredo et al., 2021)
Milk	52 different species	The fatty acid profile, cholesterol level, and fat and mineral content of milk samples from humans, sheep, cows, goats, and mares were examined in combination.	Fatty acids, fat, cholesterol, and micro and macronutrients are all commonly obtained from milk. Infants are best fed human milk.	(Pietrzak-Fiećko and Kamelska-Sadowska, 2020)
Milk	1001 participants	Analyze the product image of plant milk and cow milk to compare the motivational structure behind the consumption of the product.	Image analysis shows that cow milk is better and healthier than plant-based milk. Plant-based milk is more digestible and allergy-free.	(Haas et al., 2019)

Nutrition labeling	958 university students	24hr dietary recall. HEI-2005. Cross-sectional data.	A higher diet quality is associated with nutrition facts labels.	(Buyuktuncer et al., 2018).
Food label	1000 participants	The likelihood of purchasing changes based on the "all-natural" label was estimated using ordered logit models.	The term "all-natural" is more acceptable to women than to men. Attributes of product matter most	(Dominick et al., 2018)
Pregnancy	12 women	It was an investigation of a qualitative nature. To collect the data, semi-structured interviews were conducted.	Women were stuck to their nutritional beliefs and cultural norms.	(Disease, 2020)
Food myths among Madurese pregnant women	67 people	Qualitative study. Group discussion and interviews.	Pineapple, Kedondong, Shrimp, Squid, cabbage, cold water, Squid, and quick noodles were among the foods that were typically avoided by expectant mothers.	(Diana et al., 2018)
Caffeine	146,365 sample size	US military SMs from a stratified random sample were invited to respond to an online survey on their traits and use of caffeinated items. Cross-sectional study	Greater daily caffeine consumption (mg/day), possibly due to the greater physical and mental occupational demands	(Knapik et al 2022)
Caffeine consumption	500 students	The most widely consumed caffeine source was coffee, which was subsequently followed by tea. The average daily intake of caffeine was determined to be 264 mg. Cross-sectional Study	Caffeine consumption is extremely common among UAE university students.	(Kharaba et al., 2022)
Caffeine	208 people	An online questionnaire Cross-sectional Study	Males and subjects aged 31 to 35 years had higher consumption rates. The primary reasons for consuming caffeinated products were alertness and taste.	(Oliveira-silva, 2022)
Plant-based multivitamin supplementation (PMS)	6 studies	Meta-analysis. Linear mixed model analysis.	Exogenous oxidant scavengers that are provided by PMS reduce oxidative stress.	(Lee et al., 2022)
Un-approved pharmaceutical dietary supplements	776 products	The Food and Drug Administration for Pharmaceutical Evaluation and Investigation, a food and drug leadership, distributed hazardous goods from which the facts were extracted.	Excessive usage, or interactions with other drugs, have the potential to have substantial negative health consequences.	(Tucker et al., 2018)
Nuts	373,293 Participants	Nut consumption, which includes peanut intake, was evaluated using validated country-specific dietary questionnaires. Prospective cohort study.	Lowered chance of gaining weight or becoming obese.	(Freisling et al., 2018)
Raisins and Hazelnuts	37 obese women with hyperlipidemia	The control group followed a cardioprotective diet. While the others had 50 grams of raisins, 50 grams of hazelnuts, or 50 grams of raisins plus 50 grams of hazelnuts each day. Randomized controlled clinical trial.	Anthropometric measures and the lipid profile have improved.	(ÖNGÜN YILMAZ and ÖZYILDIRIM, 2019)
Roasted and raw pistachio nuts	8 pigs per treatment	Pistachio nuts, either uncooked or roasted, served as two distinct sources of proteins in this investigation. Pistachio nuts were heated up in an industrial rotating batch roaster.	Pistachio nuts that have been roasted can be viewed as a high-quality protein source. Roasting might reduce digestibility.	(Bailey & Stein, 2020).
Dietary Fiber	40 mice	As a prebiotic with possible health advantages, WMDF was studied to see how it affected mice with metabolic syndrome brought on by a high-fructose diet.	Increased gut microbiota diversity Relative abundance of microorganisms that produce short-chain fatty acids can help to avoid the metabolic syndrome	(ÖNGÜN YILMAZ and ÖZYILDIRIM, 2019)
Auricularia polytricha-derived dietary fiber (DF)	54 rats	Rats with constipation were given 5% A. polytricha-derived dietary fiber in place of a portion of their normal diet	Favorable impact on rats' digestive hormones High activity that relieves constipation	(Wang et al., 2021)

Myths about Carbohydrates

Carbohydrates are the body's principal source of sustenance to power the heart, brain, central nervous system, kidneys, and muscles of the heart. Carbohydrates are linked to excess body weight gain and also increase the chances of developing diabetes are among the myths that lack evidence. A study examined the repercussions of a plant-based diet low in fat on resistance to insulin and body weight during a 16-week randomized clinical trial. The dual-energy X-ray absorptiometry (DEXA) technique was employed to determine the composition of the body. Increased intake of fiber and carbohydrates as part of a plant-based diet low in fat is linked to a favorable impact on insulin resistance, body weight, and body composition (Kahleova et al., 2018). An investigation of the relationship between significant eating habits during the evening food and obesity among physically fit adults in Tehran was the theme of the study. Three 24-hour dietary recalls were used to assess nutritional consumption, and exploratory factor analysis was used to find the key trends. The findings of the study do not suggest a connection between significant dinner-time food behaviors and overall obesity (Akbarzade et al., 2020). The effects of prebiotics, arabinoxylan and fructooligosaccharides that may be isolated from gluten-containing grains were studied, as well as the Gluten's effect on the establishment of obesity. Control diet, the Western diet (WD), which consists of a high sucrose/high-fat diet, and the Western diet with 5% gluten, were given to mice. Gluten had little impact on ileal inflammation and did not cause a rise in body weight (Olivares et al., 2019) as described in Table 1.

Myths about Water and Fluid Intake

Many bodily processes, like lubricating the joints, distributing oxygen throughout the body, and preventing the kidneys from damage, depend upon water intake. Most people prefer to consume energy drinks and fruit juices instead of water. They consider the intake of fruit juices more nutritious and appealing as compared to water. A study deduced whether drinking water affects satiety and energy intake in young adults who are not obese. In comparison to consuming test meals in waterless and post-load settings, individuals consumed less of the test meal when they drank water before eating it. Energy intake was unaffected by drinking water after a test meal. Pre-meal water drinking was found to significantly lower meal calorie intake in young people, which implies that it may be a useful weight-control technique (Jeong, 2018). Moreover, a study examined the relationship between body composition and hydration status in a sample of healthy Spanish people. Their water intake, excretion, and balance were evaluated using the recently validated "hydration status questionnaire". To avoid overweight and obesity, increasing water consumption and maintaining a balanced water balance may be helpful (García et al., 2019) as described in Table 1

Myths about Fruits

Taking various kinds of fruits may boost overall wellness and decrease the likelihood of illness by supplying the body with nutrients and antioxidants. There is a persistent notion that eating fruits is unhealthy for people with diabetes and can lead to obesity because they are too sweet. A research project was conducted to explore the potential correlation between fruit and vegetable consumption and human gastrointestinal microbiota, as well as the correlations between type 2 diabetes (T2D) risk. Blood samples were taken, and glycated hemoglobin, insulin, and glucose levels were examined. The public diet recommendation to adopt increased fruit consumption to avoid the consequences of T2D is supported by the microbiome of the gut and changes in metabolism linked to a higher intake of fruit led to a lower risk of T2D (Jiang et al., 2020) . With normal and diabetic animal models, the study sought to investigate how fruit juice sugars contribute to obesity, hyperglycemia, glycation, and oxidative stress. The study examined the results of four distinct fruit beverages for four weeks, containing sugary mixtures with identical sugar composition as well as intensity on diabetic Goto-Kakizaki (GK) rats. The findings show the unique role of sugars naturally present in fruit juices and added sugars in the control of energy balance, affecting oxidative stress, glycation, and glucose metabolism (Monteiro-Alfredo et al., 2021).as described in Table 1

Myths about Milk

Milk contains both phosphorus and calcium, which are important in the development and maintenance of healthy, strong teeth and bones. Milk is considered nature's perfect food. Some people avoid drinking milk because they think growth hormones are harmful to human health and are abundant in milk. Daily intake of milk leads to weight gain due to the prevalence of fat in milk. A study conducted a first-of-its-kind analysis of cholesterol concentration, the makeup of fatty acids, and the total amount of fat and minerals. Sheep milk was found to have the fattest, and cattle were found to contain the most cholesterol. Saturated fatty acids in human milk were at their lowest levels. The greatest levels of zinc, magnesium, and potassium were found in goat milk. The greatest calcium and sodium concentrations were found in sheep milk (Pietrzak-Fiećko and Kamelska-Sadowska, 2020).The examination of pictures of products revealed that milk from cows generally has a considerably superior commercial image than milk from plants (Haas et al., 2019) as described in Table 1

Myths about Nutrition Labeling

Nutrition information labels support healthy eating practices and help people maintain a stable level of energy. Some people perceive the misconception that if a nutrition label says "all-natural," it must be true, but it's not the case. An investigation was done to figure out whether using nutrition information labels in young adults is associated with greater diet quality or not. A recall of eating habits for 24 hours was performed to assess nutritional consumption. Scores for the Healthy Eating Index-2005 (HEI-2005) were determined. According to this study, better diets were maintained by young individuals who regularly read the nutritional facts label (Buyuktuncer et al., 2018). A nationally representative poll was performed in April 2011 and asked participants to assess the chance that they would make more purchases because of food goods with the label "all natural." The likelihood of changes in purchase depending on the "all-natural" label was estimated using ordered logit models. The chance of purchase was higher among those respondents who believed that items bearing the "all-natural" label had better flavor, nutritional value, and food safety (Dominick et al., 2018) as described in Table 1

Myths about Pregnancy

More than ever, diet is more crucial throughout pregnancy. Pregnant women have an increased need for numerous essential nutrients than they did before becoming pregnant for the healthy development of the baby. It is a common misconception among pregnant women that they are eating for two. We know from literature and studies that too much weight gain might affect pregnancy. Eating a healthy and balanced diet is encouraged during pregnancy. A research study was carried out to examine the dietary preferences of pregnant women in Yazd city. Semi-structured interviews that were recorded were used to collect the data. The findings showed that the women were steadfast in their nutritional ideas, which are rooted in their culture, and considering that culture related to the context of education is crucial (Disease, 2020). The research intends to investigate dietary taboos and food recommendations among pregnant Madurese women. Data from expectant mothers, traditional birth attendants, and community leaders were gathered. For the most part, foods like squid, shrimp, pineapple, kedondong, cabbage, cold water, and quick noodles were off-limits to expectant mothers. Indigenous knowledge of dietary recommendations can be useful information to help nutrition education for pregnant Madurese women (Diana et al., 2018) as described in Table 1

Myths about tea/ caffeine

Numerous studies have found that many different types of teas could strengthen the immune response, minimize inflammatory processes, and perhaps prevent diseases such as heart disease and cancer. Several misconceptions exist about tea. Some beliefs make you feel frightened, while others prevent you from enjoying a cup of your favorite tea. Nonetheless, the majority of these lack scientific evidence. The cross-sectional study examined daily caffeine use, the frequency of caffeine users, and key elements linked to the use of caffeine among US military service members (SMs) on active duty. Coffee was the most popular caffeinated product (68%), followed by sodas (42%), teas (29%), energy drinks (29%), and gums/candy/medication (4%). SMs had a greater daily caffeine consumption (mg/day), possibly due to the SMs' greater physical and mental occupational demands (Knapik et al., 2022). The study aimed to evaluate the varieties of caffeinated items used, look at how frequently young students consume caffeine and keep track of any negative effects or withdrawal symptoms. In the UAE, caffeine use is very common among university students. emphasizing the significance of health awareness programs in preventing long-term health problems (Kharaba et al., 2022). Another research was conducted to characterize and understand the pattern of caffeine use and the reasons behind it in the Portuguese population. According to the findings, the primary justifications for drinking caffeinated goods were the gain in alertness and the flavor of such items (Oliveira-silva, 2022) as described in Table 1

Myths about Nutritional Supplements

Dietary supplements which comprise minerals and vitamins are items meant to enhance nutrition. Many are free of risks with substantial beneficial impacts, however, few might prove unsafe, in particular when taken frequently. To determine the overall effects of an organic multivitamin supplementation (PMS) on stress caused by oxidation over six to eight weeks. Each study's linear mixed model analysis was first performed to generate individual estimates. After association analysis, plasma free radical scavenging nutrients and plasma oxidized LDL (ox-LDL) levels were shown to be significantly inversely correlated, showing that PMS generally reduces stress caused by oxidation by supplying exogenous oxidant scavengers (Lee et al., 2022). A recent study from the United States proposed that more than 50% of individuals say they use nutritional supplements. Data were used from the FDA's Center for Drug Evaluation and Research (CDER). Even despite FDA warnings, active medications are still being found in dietary supplements, notably those advertised for weight reduction or sexual enhancements (Tucker et al., 2018) as described in Table 1

Myths about Nuts

Nuts provide several significant health advantages. The majority of nuts include omega-3 fatty acids that promote heart health, along with good fats that could lower bad cholesterol (LDL) and triglyceride levels. Since it has long been believed that nuts are a food that makes people gain weight, it is generally believed that eating nuts causes weight gain. The research investigation evaluated the correlation between the intake of nuts and variations in weight throughout the course of five years. Higher nut ingestion is associated with a lesser gain in weight and a lower probability of becoming obese or overweight (Freisling et al., 2018). In another study, the impact of a cardio-protective controlled diet that included hazelnuts, raisins, and a mix of raisins and hazelnuts affected the level of lipids, and anthropometric measurements within obese women with hyperlipidemia were compared. Those with hyperlipidemia might be advised to consume hazelnuts, raisins, or a mix of hazelnuts and raisins in addition to a suitable diet plan (ÖNGÜN YILMAZ & ÖZYILDIRIM, 2019). Moreover, another study was conducted to evaluate the idea that pistachio nuts, whether raw or roasted, have a digestible indispensable AA score (DIAAS) and protein digestibility corrected AA score (PDCAAS) are both more than seventy-five, making them an excellent means of getting protein. The study demonstrates that both raw and roasted pistachio nuts may be regarded as excellent source of protein. Roasting might reduce digestibility (Bailey & Stein, 2020) as described in Table 1

Myths about Dietary Fiber

Our bodies cannot digest or break down fiber, a component of plant foods. Fiber helps minimize cholesterol as well as control glucose concentrations, and also reduces the risk of intestinal cancer. Some people believe that fiber is only important for people with constipation, but this is not true. Consuming dietary fiber is linked to a decreased prevalence of metabolic syndrome. The functional effect on metabolic disorder in mice by consumption of walnut meal dietary fiber (WMDF) generated by a high fructose diet (20% HF) was examined to determine the potential health advantages of WMDF as a prebiotic. The results show that WMDF can be utilized as a prebiotic to avoid metabolic syndrome brought on by HF (ÖNGÜN YILMAZ & ÖZYILDIRIM, 2019). An enzymatic-chemical approach to extracting dietary fiber [DF] was optimized in the work. Secondly, using a model of constipated rats, the activity of DF to relieve constipation was assessed. The outcomes showed that the DF can be successfully extracted from *Auricularia polytricha* using an enzymatic-chemical extraction process and that the DF has a high level of activity for alleviating constipation (Wang et al., 2021) as described in Table 1

Conclusion

The study showed that most people believe in certain myths about foods without any scientific evidence which in turn affects their dietary habits and lifestyle. This change in eating behavior compromises the nutritional status and leads to different health problems and chronic diseases such as obesity, diabetes, cardiovascular diseases, etc. These health complications not only affect an individual alone but also limit health at a community level. The vicious cycle of poor health prevails over generations. A person with multiple disease conditions fails to support his financial stability and is unable to contribute to the economic progress of the country. Proper nutritional education and awareness programs should be kept in place to prevent people from different chronic diseases. Nutrition literacy could be considered one of the best tools in dealing with such baseless dietary myths.

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