Review Article

Nutrition Literacy for Human Health: A Review on Current Global and Sri Lankan Scenario

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Abstract: Food literacy has been used in certain research to define a similar notion as nutrition literacy. This involves comprehending nutrition information and taking action on that knowledge to promote nutrition goals and social well-being. On a broader array, the competence to make decisions that encourage an individual's health and a sustainable food system while focusing on environmental, social, economic, cultural, and political aspects. Preventing non-communicable diseases and malnutrition necessitates multi-level strategies that encourage individuals to take charge of the variables that are directly within their control, such as improving their dietary patterns, avoiding tobacco, and engaging in physical activity. Everyday dietary choices have an impact on a person's health, including their body weight and several non-communicable disease risk factors like cholesterol levels and blood pressure levels. Nutrition and food literacy is essential for anyone's well-being and fights against non-communicable illnesses.

Keywords: Food Literacy, Nutrition Journalism, Nutrition Literacy, Human Health.

1. Introduction

Nutrition literacy can be defined as the ability of individuals to acquire, process, and comprehend basic nutrition information (Zoellner et al., 2009). Liao et al. (2019) have regenerated this definition as the ability to acquire, process, and comprehend nutrition information and the skills required to make appropriate nutritional decisions. Nutrition literacy conception is drawn from health literacy. It is similar to health literacy concerning a nutrition-specific perspective (Aihara and Minai, 2011). It emphasizes that one can use nutrition-related health literacy to improve personal health concerning diet (Liao et al., 2019). A previous study contends that nutrition literacy can be addressed by technological strategies aimed at promoting the quality and dissemination of nutrition education (Silk et al., 2008).

Food literacy has been used in certain research to define a similar notion as nutrition literacy. Most of these studies revealed a positive relationship between food literacy and the healthy dietary intake of young individuals (Liao et al., 2019). Food literacy is intertwined with the idea of health literacy (Krause et al., 2018b). It has lately developed as an element of health literacy (Pendergast et al., 2011), employing Nutbeam's (2008) model with its theoretical concepts of "functional, interactive, and critical health literacy", which involves reading, comprehending, communicating, critically assessing, and applying health information to acquire more control over life events and situations (Krause et al., 2018b).

Health literacy has also been fragmented into several literacy sub-types portraying specific domains, populace, and contexts, including "mental health, eHealth, and digital literacy". As a result, the operationalization and translation of findings have been challenging (Truman et al., 2020). Adding to these challenges, there has been a progressive development of literature focusing on health literacy skills in a dietary context under the umbrella terms nutrition literacy and food literacy (Velardo, 2015). However, each field of study has a unique "intradisciplinary framework" that shapes how the "relationship between education and health" is perceived (Truman et al., 2020).

Pendergast et al. (2011) describe food literacy as an amalgam of functional, interactive, and critical aspects of food and nutrition. It is defined as an individual's ability to acquire, interpret, and comprehend fundamental food and nutrition information and services, including the competence to use that information and available services in a health-promoting manner.

However, according to Cullen et al., (2015), food literacy refers to an individual's capability to comprehend food in such a manner that they establish a positive relationship with it, along with food skills and practices acquired throughout one's life to "navigate, engage, and participate" in a sophisticated food system. It is the competence to make decisions that encourage an individual's health and a sustainable food system while focusing on environmental, social, economic, cultural, and political aspects. Some approaches illustrate that food literacy is viewed as an inclusive notion that encompasses a wide range of skills and abilities required for a healthy relationship with food, as well as participation and engagement in a sustainable food system (Krause et al., 2018b).

Further studies are required to properly operationalize

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the seemingly vague notions of "health literacy, food literacy, nutrition literacy, and health-promoting media literacy" and better understand their dissimilarities (Truman et al., 2020).

Health literacy is an established notion that has changed over the years. It was defined in the medical literature by the American Medical Association's Ad Hoc Committee in 1999 as a "constellation of skills" that includes, yet is not necessarily limited to, preliminary reading and numerical skills, as well as specialized skill sets that permit a variety of health outcomes (Truman et al., 2020).

The conception of food literacy is still an evolving one that first emerged in the public healthcare literature in 2001 and has been consistently used in medical and educational studies since 2010. Vidgen and Gallegos' (2014) concept of food literacy is currently the most often cited (Truman et al., 2020). Vidgen and Gallegos (2014) has established that food literacy is the framework that enables people, households, communities, and nations to protect diet quality and encourages dietary resilience over time. Food literacy is an assemblage of interlinked "knowledge, skills, and behaviors" necessary to plan, manage, choose, prepare, and consume foods to meet needs and decide food intake (Vidgen and Gallegos, 2014).

Consistent with previous studies on health literacy (Nutbeam, 2008; Rubinelli et al., 2009), Block et al. (2011) have specified food literacy considering nutrition facts as it involves the motivation to implement nutrition facts in dietary choices. Food literacy involves comprehending nutrition information and taking action on that knowledge to promote nutrition goals and food well-being.

Food literacy consists of three components: "declarative or conceptual knowledge, procedural knowledge, and the ability, opportunity, and motivation to apply or use that knowledge" (Block et al., 2011). There are not enough studies on nutrition literacy to draw any conclusions about either a particular type of knowledge or consequence. Instead, the skills mentioned highlight the significance of declarative knowledge (obtaining core reading and numerical abilities), procedural knowledge (understanding information relating to nutrition), and subjective knowledge (utilizing information related to nutrition). The above-segmented perspective highlights the shortcomings of the existing construct, one that fails to precisely define the relationship between acquiring knowledge as well as health-related consequences, which can vary from a particular result of nutrition topic knowledge to a comprehensive overall result of constructing healthy eating patterns(Truman et al., 2020).

Nutrition literacy is a vague concept. Nevertheless, it differs from food and health literacy in that it emphasizes a specific group of skills that assist people in making knowledgeable nutrition decisions, such as consuming the recommended daily portions of vegetables and fruits (Truman et al., 2020).

Nutrition literacy is explained in three areas functional, interactive, and critical nutrition literacy (Silk et al., 2008; Slater, 2013). The use of essential reading and writing skills required to understand and follow simple nutrition information is referred to as functional nutrition literacy. The term "interactive nutrition literacy" refers to more complex literary capabilities, including evaluating the authenticity and value of nutrition information and regulating nutrition preferences, frequently made in collaboration with expert guidance. Furthermore, critical nutrition literacy refers to the capacity to critically examine nutritional values and take actions to eliminate limitations to food availability and consumption(Doustmohammadian et al., 2019).

Vettori et al. (2019) have published their work that reviews the literature in terms of developing and proposing a comprehensive conceptualization of food literacy and nutrition literacy to the scientific community. In their systematic review, Krause et al. (2018a) have examined whether the terms "nutrition literacy" and "food literacy" have similar meanings or whether there is a subtle difference. Carroll et al. (2021) have identified existing tools that measure food literacy and nutrition literacy among children and/or adolescents and have described the psychometric properties in their work. Mythraye and Kanozia (2021) have reviewed the potential of using different media sources to support improving nutrition literacy in the community. Many other similar reviews have been found in the literature that addresses the concepts of nutrition, food, and health literacy. However, none were found to discuss nutrition literacy in a Sri Lankan context. Therefore, this study fills a gap in the existing literature. This work aims to use the evidence in the existing literature to review the global and Sri Lankan consequences due to poor nutrition, nutrition literacy statistics, parameters to assess nutrition literacy, and the impact of journalism on nutrition literacy.

2. Global consequences of nutrition literacy

Food-related health problems are rising, posing a threat to the workforce's future productivity (Slater et al., 2018). Obesity, diabetes, cardiovascular disease, and hypertension, among other non-communicable diseases, are the leading contributors to premature death worldwide. In low and middle-income nations, around 80% of preventable mortality occurs. Non-communicable disease prevention has emerged as a critical strategy for health systems worldwide (Azevedo et al., 2019).

Diabetes, cardiovascular disease, chronic respiratory diseases, and cancer are Greece's most common causes of morbidity and premature mortality. As found by a study that was conducted among a population in the urban area of the Attica region, Greece, the country has the highest obesity rates in Europe across all age groups (Michou et al., 2019a). Six of the top ten significant reasons for death in the United States are chronic diseases that can be avoided by maintaining a healthy diet. However, the majority of Americans continue to con-

sume unhealthy nutrients and follow unhealthy dietary habits (Gibbs et al., 2018b). According to statistics from the National Health and Nutrition Examination Survey (NHANES 1999–2010) and the 2015 healthy eating index, poor dietary habits account for 16% of all-cause mortality in adults in the United States (Natour et al., 2021). Obesity and overweight in children and adolescents are particularly concerning. In 2011, 32% of males and 27% of females aged 12–19, and 47% of males and 39% of girls aged 20–29, were overweight or obese in Canada. In the United States, 21% of teenagers aged 12–19 years were obese during the same period (Slater et al., 2018). Malnutrition is one of this generation's most significant concerns, causing higher adult fatalities and disabilities than smoking and drinking habits (Mitsis et al., 2019). The World Health Organization's Food and Nutrition Action Plan 2015–2020 report that more than half of European adults are overweight or obese, owing to increased obesity rates in recent decades (Rosas et al., 2020). According to a recent study, the prevalence of being obese or overweight is 65.3%, and metabolic syndrome is 33% in Palestine. Changes in food habits are common in many nations, including Palestine, due to the present embrace of a western lifestyle surrounding crowded urban centers. Obesity and chronic illness epidemics in Palestine could be hindered by having proper nutrition knowledge (Natour et al., 2021). Child stunting, anemia, and micronutrient deficiencies continue to plague Mexico, a middle-income and multiethnic country. These issues adversely impact vulnerable groups, such as indigenous people. Furthermore, the prevalence of obesity has continuously risen in recent decades, affecting those still undernourished (Théodore et al., 2019).

Non-communicable disease prevention necessitates multi-level strategies that encourage individuals to take charge of the variables that are directly within their control, such as improving their dietary patterns, avoiding tobacco, and engaging in physical activity, along with variables that are frequently outside of one's direct control and necessitate state or social action. Everyday dietary choices have an impact on a person's health, including their body weight and several non-communicable disease risk factors like cholesterol levels and blood pressure levels. Nutrition and food literacy is essential for anyone's well-being and fights against non-communicable illnesses (Azevedo et al., 2019).

The evidence argues that vulnerable and disadvantaged individuals are more likely to have low health literacy and nutrition literacy skills and poor health outcomes. Michou et al. (2019a) stated that low health literacy and nutrition literacy strategies could be critical in reducing health inequities. Nutrition and diet-related health issues have become a significant challenge for food marketers and policymakers worldwide since many consumers struggle with health issues related to food consumption. Providing more precise information regarding the nutritional value of food products is one widely proposed strategy for encouraging people to

adopt healthier foods (Ikonen et al., 2020). The disease growth associated with diet has been related to a scarcity of skills and knowledge needed to operate in an ever-complex food system. Individuals' education and empowerment are necessary to transform competencies and behaviors to navigate these food systems in the direction of healthier dietary choices, as the majority of industrialized food contexts are presently characterized by heavily processed, ready-to-eat, cheaper foods with poor nutritional content (Rosas et al., 2020).

People's ability to become healthy through dietary habits is hindered by the lack of cooking skills and time spent preparing meals. Knowledge of nutrition, proper eating habits, and maintaining a healthy weight are all critical factors in maintaining health and preventing and managing chronic diseases (Mitsis et al., 2019). By one of the previous studies, less regular family meals and increased intake of food outside the house both contribute to broad declines in fundamental food skills and knowledge. Although studies show that eating meals together as a family can improve diet quality and child socialization, hectic schedules and competing demands reduce the amount of time accessible for preparing meals, familial meals, and sharing knowledge within the family. This includes information on food preparation and nutrition as well as significant foods and foodways from the family and culture that support identity and unity (Slater et al., 2018). Poor eating habits are key risk factors for obesity and are linked to other non-communicable diseases, including cardiovascular disease, diabetes, and some cancers. As a result, healthy eating patterns are essential for preventing and managing chronic diseases and improving the overall quality of life (Rosas et al., 2020).

There were more than 42 million overweight children under the age of five worldwide in 2015, with Asia accounting for nearly half of all these children. As concluded by the Ministry of Health and Welfare of Taiwan, The overweight rates of youngsters in the country were the highest in Asia in 2015, according to data from the World Obesity Federation (boys: 26.1%, girls: 21.4%) (Chien et al., 2018). As stated in the 2004 and 2015 Canadian Community Health Survey-Nutrition, more than 37% of Canadian children aged four to nine years old do not consume sufficient milk products, and one in every five children exceeds their energy needs. According to National Health and Nutrition Examination Survey (NHANES), children aged 4 to 18 in the United States have low healthy eating index scores owing to high sodium, refined grain, and empty calorie consumption (Slater et al., 2018).

The impact of an increasingly ultra-processed food supply and culinary deskilling, along with various "healthy eating" messages, has left citizens perplexed as they navigate the complex modern foodscape. These tendencies have prompted a need to invest in the population's basic food and nutrition knowledge and skills (Slater et al., 2018). In previous research, comple-

mentary foods manufactured by 16 leading manufacturers in Taiwan were sought from September 2015 to February 2016 to found that 54.4% of complementary foods in the market (363 items) had more than 10% sugar calories (Koo et al., 2018). Previous studies have found that when purchasing sugar-sweetened beverages for children, parents preferred items with claims like "low-calorie," "real/natural," "vitamin C," and "antioxidants," although these sugar-sweetened beverages were also low in nutrition. According to a survey conducted online, nutrient claims on products that are not healthy caused parents to believe they were healthier and led them to choose them more likely. Another study discovered that nutrition claims on high-sugar cereals mislead parents into believing that these items are of good nutritional quality and were more eager to buy them. Chien et al. (2018) have concluded that as a result, health and nutrition claims can be deceptive, and parents must have a thorough understanding of nutrition labels and information to discriminate between true and false claims.

College students frequently engage in poor dietary behaviors, consuming excessive amounts of fat, sodium, and calories while consuming insufficient amounts of fruits and vegetables. This leads to weight issues, poor nutrition, and adverse health outcomes. According to the American College Health Association's National College Health Assessment, nearly 97% of college students do not consume the daily recommended amount of fruits and vegetables (five or more servings per day), and 39% are overweight or obese (Lee et al., 2019). According to the 2004 and 2015 Canadian Community Health Survey-Nutrition, seventy percent of Canadian children aged four to eight do not meet the minimum daily standard for fruits and vegetables. The necessity for adequate food skills among kids that can get through formal education, namely home economics programs, is particularly relevant. According to two online surveys in Australia, which were conducted nationwide among 2022 adults (November 2011) and 2146 adults (November–December 2012), home economics education is linked to long-term food knowledge acquisition (Slater et al., 2018).

Some researchers have found that parents with inadequate health literacy engage in less optimal feeding and nutrition behaviors. Mothers with inadequate health literacy are 20% less likely to breastfeed during the first two months of infancy exclusively and are twice as likely to feed formula than human milk. Low parent health literacy is linked to 35% fewer parents engaging in beneficial weight-management activities with their children, such as increasing fruit and vegetable consumption, increasing physical activity, and reducing fat intake. Parents with poor numeracy skills have more difficulty estimating meal sizes, interpreting growth charts, and nutrition label comprehension (Morrison et al., 2019).

In both low and high-income nations, poor nutrition and obesity among reproductive-age women are prevalent concerns, and few pre-pregnancy food and lifestyle interventions are available (Stephenson et al., 2018). From the perspective of preventive medicine, it is vital to adequately inform both men and women about the potential impact of lifestyle factors such as smoking, drinking alcohol, nutrition, infectious diseases, and pollution exposure on their reproductive and future maternal and child health before pregnancy. Furthermore, more risk assessment and mitigation programs are required. The health literacy scale for preconception care developed in this study, which includes both behavior and skills scales as well as knowledge items, will provide respondents with information about preconception health and support the effective implementation of risk assessment and interventions to promote healthy behavioral changes (Suto et al., 2021).

Although many factors influence healthy eating habits, nutrition literacy, or health literacy applied to nutrition, may be one of the most underestimated. Health literacy is an essential mediator of health outcomes since nearly half of all people in the United States have difficulties understanding and applying commonly presented types of health information. These health literacy weaknesses are linked to less utilization of preventative care services, difficulty self-managing disease, and worsening health status. Low nutrition literacy may be particularly troublesome because nutrition is a significant fundamental component in developing and treating diabetes, hypertension, hyperlipidemia, and obesity (Gibbs et al., 2018b).

3. Nutrition Literacy Statistics

Nutrition literacy statistics from different regions in the world contrasting economic and cultural behavior are summarized in Figure 1 in Appendix A.

Michou et al. (2019b) reported that 89.2% of the sample met the criteria for marginal health literacy. This cross-sectional survey was conducted in the Attica region of Greece's urban area. The Greek-validated version of the nutrition literacy scale was used to assess nutrition literacy.

Another study focusing on Caregivers' Nutrition Knowledge and Dietary Intake of Type 1 Diabetic Children, Aged 3 – 14 Years in Uganda adopted the type 1 diabetes nutrition knowledge survey (NKS) questionnaire and used it to evaluate the caregiver's specific and general diabetic nutrition knowledge based on four domains: carbohydrate counting, healthy eating, reading nutrition labels, and blood glucose response to meals. The data extrapolate that 93.2% of the sample met the criteria for low type 1 diabetes nutrition knowledge, and the remaining 6.8% met the criteria for medium type 1 diabetes nutrition knowledge. Furthermore, none of the individuals met the criteria for high type 1 diabetes nutrition knowledge. These observations suggest a lack of Type 1 diabetes nutrition knowledge among Ugandan caregivers of children with Type 1 diabetes, particularly among those with a poor level of education (Ndahura et al., 2021).

Adjei-Banuah et al. (2021) have studied the association between nutrition knowledge and the consumption of iron-rich foods among pregnant women from a rural district in Northern Ghana. The data was gathered using a questionnaire adapted from the Food and Agriculture Organization of the United Nations guidelines for analyzing nutrition-related knowledge, attitudes, and practices manual. Around 73% had heard of iron deficiency anemia, 55% could recognize anemia's symptoms and signs, and 72.1% knew what caused anemia—only 16.3% knew which meals aid iron absorption and utilization.

Natour and others used a cross-sectional design to evaluate nutrition literacy, food security, and its association with dietary habits in Palestinian society. Nutrition literacy was assessed using the Newest Vital Sign (NVS), a five-item questionnaire. Only 29% of the study participants had adequate nutrition literacy (Natour et al., 2021).

Saribay and Kirbaş (2019) conducted a descriptive study to determine the nutrition knowledge of adolescents engaged in sports in Şanlıufa province; the Nutrition Knowledge Scale for Adolescents (NKSA) was used to assess nutritional knowledge in adolescent athletes. The NKSA has three sub-dimensions: adequate and balanced nutrition, nutrition-related health problems, and essential nutrients. It was discovered that 65.3% of the participants had insufficient nutritional knowledge, whereas 34.7% had adequate knowledge.

In addition, Chien et al. (2018) investigated the knowledge of sugar in mothers and attitudes, as well as the impact of these determinants in the context of the purchase intentions of mothers for infant cereal with sugar-related claims in Taiwan in their study. According to the findings, 40% of mothers misinterpreted "no added sugar" as "sugar-free," and 50–70% of them had the misinterpretation that "no added sugar" means more natural, nutritious, and has lower sugar amount than other products. Infant cereal with "no added sugar" or other infant food items with nutrition claims, on the other hand, may contain more sugar than other infant foods.

According to a Swiss study, two-thirds of the participants incorrectly believed brown sugar is healthier than white sugar. People must rely on substitutes for knowledge if they lack the required knowledge to make informed decisions. People may use simple heuristics to make decisions in such instances. A possible adverse effect of using heuristics is that incorrect conclusions are reached (Sütterlin and Siegrist, 2015). Latino adults in the United States have the lowest health literacy of any racial/ethnic group, and some evidence suggests that health literacy is a crucial mediator of Latino health disparities. Nutrition literacy, more precisely pinpointed within a nutrition context, may be a core factor for poor nutritional quality among Latinos. Many Latinas in a case-control study of 201 Latinas were unfamiliar with the United States Department of Agriculture's serving sizes (which ranged from 44.2 to 93.8% inaccurate),

and only 39.8% knew what saturated fat was. Nutritional awareness was linked to a two-fold increase in the likelihood of using food labels to make healthy decisions, decreased eating of salty snacks, and increased consumption of fruits and vegetables (Gibbs et al., 2018a).

4. Parameters to assess nutrition literacy

Prior research has investigated nutrition literacy using different scales consisting of different parameters. The Nutrition Literacy Assessment Instrument (NLit) was developed to assess print literacy and numeracy within the context of nutrition and the capability to apply nutrition knowledge and skills. The constructions and items of the NLit were developed in a multistep process that involved nutrition professionals and patients. Gibbs et al. (2018b) found moderate to substantial reliability for specific NLit instrument domains and positive linear relationships with diet quality in a previous study. Also, they revised the NLit for the nutrition-related chronic disease population, which resulted in additional changes to improve the clarity of the format and content for the target patient population. Nutrition and health, energy sources in food, household food measurements, food label and numeracy, food groups, and consumer skills were among the six subscales covered by the NLit (Gibbs et al., 2018b).

"Nutrition & Health" assesses reading comprehension of the summarized Dietary Guidelines for Americans; "Energy Sources in Food" assesses knowledge of food's macronutrient sources; "Household Food Measurement" assesses identification of recommended portions; "Food Label and Numeracy" assesses the ability to apply information from the nutrition facts panel; "Food Groups" assesses the ability to classify foods by nutrition category; and "Consumer Skills" assesses the ability to navigate food products to make healthy food choices (Gibbs et al., 2018a). The Newest Vital Sign (NVS) Scale is a health literacy scale that formulates test questions based on nutrition issues (Liao et al., 2019). The original NVS is a six-question tool (Linnebur and Linnebur, 2018) that assesses a person's ability to locate and comprehend text and numerical information on an American ice cream container's nutrition label. This measure evaluates the literacy and numeracy skills needed to complete a common health-related task (Mansfield et al., 2018).

Based on the literature, Doustmohammadian et al. (2017) established two food and nutrition literacy domains. Nutbeam's (2008) concept of health literacy is used to develop nutrition literacy components. They primarily concern the skills required to access, comprehend, and process food and nutrition information. The components of food literacy cover a wide range of skills. Most of the work on food literacy highlighted abilities and skills in three domains: food knowledge and awareness of the effects of food on health; skills needed to select healthy food choices and prepare them; and capacities, such as self-efficacy and creativity. According to the findings of Doustmohammadian et al. (2017), two di-

Table 1: Food and nutrition dimensions and components in children

Domain	Dimensions	Components
Cognitive	Knowledge	Food and nutrition knowledge
		Lifestyle knowledge
		Food safety knowledge
	Understanding	Understanding food and nutrition information
Skills	Functional	Access
		Applying healthy eating behaviors and health
		Applying food choices
	Interactive	Interactive skills
		Emotional skills
		Discussion skills
	Critical	Media literacy
		Analysis of food labeling
		Decision-making and planning

Source: Developing and validating a scale to measure Food and Nutrition Literacy (FNLIT) in elementary school children in Iran (Doustmohammadian et al., 2017)

mensions in the cognitive domain, encompassing knowledge and understanding, have been discovered. Three dimensions of functional, interactive, and critical literacy were identified in the skill domain, as per Nutbeam's (2008) hierarchical model of health literacy. In general, 12 food and nutrition literacy components were discovered (see Table 1), divided into five dimensions.

ÖZ et al. (2016) established the Nutrition Knowledge Scale for Adolescents (NKSA), which includes three sub-dimensions: adequate and balanced nutrition, nutrition-related health problems, and essential nutrients (Saribay and Kirbaș, 2019).

Liu et al. (2018) designed a questionnaire based on the nutrition-related KAP (knowledge, attitudes, and practices) model and the Chinese Dietary Guide (DRIs). It consisted of four sections: Demographic characteristics, Nutrition-related knowledge, Attidutudes related to learning nutrition knowledge, and Practices and behaviors related to learning nutrition knowledge. As per the nutrition-related knowledge, Further, they included seven parameters, namely, knowledge of protein, knowledge of fat, knowledge of vitamins, knowledge of calcium, knowledge of dietary fiber, knowledge of nutrient elements, and knowledge of children's nutrition. Nutrition knowledge learning-related attitudes were measured considering five parameters: confidence in nutrition work, willingness to learn more, satisfaction or dissatisfaction with existing knowledge, willingness to attend nutrition education and training, and willingness to get information through new media (Liu et al., 2018). Nutrition knowledge learning-related practices or behaviors were measured according to four parameters: participation in nutrition education programs or training related to children, focus on children's nutrition knowledge, promotion of children's nutrition knowledge to others, and willingness to learn about child nutrition (Liu et al., 2018).

Rosas et al., (2020) worked on "FOODLIT-PRO: Food

Literacy Project" to assess food literacy by considering: (1) "Domains" - elements that integrate food literacy; (2) "Influential factors" - spheres of influence in the context and vicinity that can influence and be influenced by food literacy; and (3) "Determinants" - what could prevent someone from being food literate. The five categories which were used to categorize the experts' work in the food-related domains are education, which included elementary, secondary, and environmental education; health, which included "nutrition, psychology, and medicine"; "food policy", which included the establishing regulations relating to food and the creation of major national and international projects, among other elements; agricultural industry, which included production and advising; and commercial industry, which comprised new product development, marketing, and brand management. Nine categories were found to be the recognized food literacy domains: (i) Origin; (ii) Safety; (iii) Choice and Decision; (iv) Select and Acquire; (v) Plan; (vi) Preserve; (vii) Prepare; (viii) Cook; and (ix) Knowledge. They compromised 22 codes (see Table 2) that have been interpreted as the traits to define the content of each food literacy domain (Rosas et al., 2020).

More specifically, 50% of the traits found are supported by both hypothetical constructs, while 31.8%are aided by a minimum of one conceptual model. Also, 18.2% of the total traits, for example, "seasonality" in the domain (i) Origin and "matching cooking techniques to products' nutritional value" in the domain (viii) Cook, are not acknowledged in any way by these food literacy frameworks. Specifically, and even though neither of the constructs against which these results were compared mention "declarative" (critical) or "procedural" (functional) knowledge, these traits of the domain (ix) "Knowledge" has been studied in previous food literacy works (Rosas et al., 2020).

Eight categories were found as influential factors in analyzing food literacy-related sectors of influence.: (i) Nutrition; (ii) Psychological; (iii) Health; (iv) Learning

Table 2: Definition of Food Literacy, its domains (categories) and respective attributes (codes)

Category	Code
Origin	Knowing Origin
	Food additives
	How origin relates to quality
	Seasonality
	Bio/Organic: Definition and Impact
Safety	Hygiene and safety practices
	Pesticides and herbicides
Choice and decision	Choice and decision skills
Select and acquire	Selection and acquisition skills
	Nutritionally equivalent foods
Plan	Planning skills
	Plan food intake ahead
Preserve	Preservation skills
Prepare	Preparation skills
Cook	Cooking skills
	Using different cooking techniques
	Matching ingredients
	Using recipes
	Matching Cooking Techniques Ingredients' nutritional value
	Cooking motivation/attitude
Knowledge	Declarative
	Procedural

Source: FOODLIT - PRO: Food Literacy Domains, Influential Factors, and Determinants — A Qualitative Study (Rosas et al., 2020)

Table 3: Determinants of Food Literacy, its domains (categories) and respective attributes (codes)

Category	Code
External	Access to food-related information
	Perishable and/or unreliable food-related information
	Food Security: Lack of food access
	Family dynamic and/or identity
	Professionals' unpreparedness for food-related expertise
Internal	Prioritize food
	Convenience and practicality
	Time management
	Financial management
	Previous food-related habits
	Innate flavor preferences
	Learned flavor preferences

Source: FOODLIT - PRO: Food Literacy Domains, Influential Factors, and Determinants — A Qualitative Study (Rosas et al., 2020)

Contexts; (v) Policy; (vi) Industry; (vii) Sustainability; and (viii) Social and Cultural. The study developed 46 codes, which defined the content and were interpreted as the attributes of the influential factors. The attributes included in the category nutrition are; (i) Awareness of food nutrition, (ii) Awareness of nutritional needs, (iii) Tracking food intake, (iv) Interpreting nutritional labels, and (v) Language (Rosas et al., 2020).

Two key categories of determinants of food literacy were identified during the study: (i) external determinants, which consist of five traits, and (ii) internal determinants, which consist of seven traits (see Table 3) (Rosas et al., 2020).

Slater et al., (2018) have developed competencies in food literacy (Table 4). This work suggests that young people need a wide range of food literacy competencies as they transition to independent living. These are incorporated into a comprehensive framework that emphasizes functional, relational, and systems competencies, as well as fundamental knowledge of diet, nutrients, and food safety; "food skills; emotional and cultural aspects"; and critical focuses on food systems, all of which reflect the complexity of food. Youth need more than fundamental nutrition knowledge and "food skills" To navigate the complex food environment and improve their well-being.

Table 4: Food literacy competencies

Domain	Competency Area
Functional Competencies: Confidence and Empowerment with Food	Have basic nutrition knowledge
	Have food preparation skills
	Have food safety and hygiene knowledge
	Have knowledge o where food comes from
	Have food budgeting skills
	Have a healthy food relationship
	Be able to successfully navigate the grocery store to make healthy and economical food choices
	Be able to think critically about and act on food and nutrition issues
Relational Competencies: Joy and Meaning through Food	Have a positive relationship with foods
	Have experienced new and varied foods
	Value local food systems
	Enjoy cultural foods
	Recognize the importance of preparing and eating food with/for others
Systems Competencies: Equity and Sustainability for Food Systems within the framework	Understand social justice issues in the food system
	Understand aspects of environmentally sustainable food systems
	Understand the influence of food corporations and lobbying interests

Source: A short food literacy questionnaire (SFLQ) for adults: Findings from a Swiss validation study (Slater et al., 2018)

Digital healthy diet literacy (DDL) guides individuals toward healthier dietary habits, enhancing immune resistance during the COVID-19 pandemic. As a result, DDL refers to the ability to access, comprehend, judge, and use "digital healthy diet-related information" to enhance healthy dietary patterns and health results, which are crucial for the pandemic. Duong et al., (2020) modified the health literacy conceptual framework. They added four new items to the DDL domain to evaluate information processing capability that consists of the capability to (1) Discover reliable and accurate healthy dietary information on the Internet, (2) Comprehend nutritional dietary facts and guidelines on the web, (3) Judge whether dietary nutritional information on the web is implied for people, and (4) applying healthy eating patterns from the web into daily lives of individuals to eat well.

5. Impact of journalism on nutrition literacy

Individuals seeking health, food, and nutrition information in modern countries primarily rely on magazines, newspapers, television, and the Internet. According to researchers, the media significantly determines how dominant and repeating representations impact public perceptions of controversial scientific problems, imagery, and metaphors (Marinescu, 2020). In a study by Spiteri Cornish and Moraes (2015), participants explained that they managed to learn about healthy eating from a variety of sources, in addition to government health messaging and food labels, including friends (i.e., word of mouth), television shows, promotions, newspapers, public transportation, and web searches.

Reporting on nutrition and other health issues has become significantly more challenging in recent years due to the rising complexity of the scientific research being reported and significant changes in the reporting media, namely the news media. Because of the changing nature of the information environment, many journalists in the mainstream media have been degraded: reporters who used to be trained and experts in health science have been replaced by general assignment reporters who are less well equipped to understand what they are reporting (Rowe and Alexander, 2019): "Part of the problem with complex data sets inherent to today's science is that you cannot pick them up and know instantly that something is fishy" (Gewin, 2009). One reason certain science news may be "fishy" or rely on "fishy" work is that emerging forms of curiosity are supplanting the old means of science, partly thanks to rapidly evolving computer technology and partly thanks to rapidly-evolving science and science communication (Rowe and Alexander, 2019).

Regarding nutrition or food-related topics in the news, they span various topics. Nutrition stories in magazines aimed at different demographics cover a wide range of topics. For example, over a decade ending in 2005, the most common issues in 40 national and local US news outlets were fat intake and disease prevention or risk reduction. Other prominent themes in nutrition include the association between diet and disease, allergic reactions, weight loss, genetically modified foods, and vitamin and mineral intakes (Marinescu, 2020).

The majority of customers appear to have a limited understanding of nutrition. In a Swiss study, two-thirds of

the participants incorrectly concluded that brown sugar is significantly healthier than white sugar (Spiteri Cornish and Moraes, 2015). A group of reviewers from HealthNewsReview.org, many of whom are physicians, evaluated news on new medical treatments, tests, products, and procedures reported by organizations in the United States of America. The reviewers examined nearly 2000 papers, with newspaper articles accounting for 43%, wire or new services stories for 30%, online content for 15%, and network television stories for 12%. Most publications received an unsatisfactory rating on five of the ten review criteria: costs, benefits, harms, evidence quality, and comparison of the new strategy to alternatives. Medical equipment, drugs, and other interventions were generally reported positively, with potential impacts reduced and prices not mentioned; similar patterns may be found in some of the recommended Covid-19 treatments. The enormous amount of scientific papers has generated a similarly awkward situation in the healthcare sciences, exacerbated by the rise of scientific journals, questionable peer review methods, and insufficient measurements (Correia, 2020).

In Western societies, healthy eating and its impact on longevity are becoming increasingly essential concerns. As a result, numerous pull strategies have been developed, including medical communications and social advertising strategies, informing and attracting customers' interest and inspiring them to alter their problematic dietary behaviors. While UK healthy eating campaigns successfully increased the target population's awareness of the advantages of eating well, they have little influence on altering consumer behavior. Although many people know dietary information and guidelines, they rarely follow them (Spiteri Cornish and Moraes, 2015).

People must rely on substitutes for knowledge if they lack the understanding to make educated decisions. Attribute substitution is a common aspect of heuristic judgment. When the attribute of the item that a person wishes to appraise (target attribute) is not readily accessible, a person analyzes this target attribute by replacing a supposedly semantically or associatively comparable quality that comes to mind more quickly (heuristic attribute). Heuristic qualities might be informational attributes having solid symbolic importance. Applying heuristics may result in biased conclusions because the replaced heuristic attribute differs from the intended attribute (Sütterlin and Siegrist, 2015).

The clarity of the message, particularly the specificity of its suggestions, is one component of healthy eating communication that significantly influences its effectiveness. Healthy eating messages are more complex than other health scenarios in which a single recommendation (e.g., quit smoking) serves as the cornerstone of all campaign messaging for many reasons. First, there is no consensus as to which eating patterns are often beneficial. Specific policy messages may be poorly targeted and contradictory since various research produces mixed results on the same nutrition issue. Second, while angst pleas in this

kind of communication can aid in capturing the interest of customers in crowded multimedia situations, they can also cause customers to overlook critical health-related information and acquire unfavorable attitudes and intents toward the specific health activity. Third, many communication methods exacerbate issues because they are opaque. Specifically, saturated fat is required for normal brain function, making health information that opposes consuming this fat problematic. Finally, many healthier dietary initiatives tend to be ambiguous or unclear in their suggestions to customers, which is likely to significantly diminish their influence (Spiteri Cornish and Moraes, 2015). The term "fruit" has a high symbolic significance in food judgments since "fruit" usually represents healthiness. As a result, if the phrase "fruit sugar" invokes healthy connotations due to the inclusion of the word "fruit," it may have a positive impact on the perceived healthiness of a product having "fruit sugar" over a product containing "sugar". Synthetic and natural characteristics appear to be important when evaluating food products. Natural products are preferred by Western consumers, who appear to view synthetic products negatively. Consequently, symbolic information that emphasizes the naturalness of food or reminds people that it contains artificial ingredients may influence a product's perceived healthiness and sensory evaluation. A symbolic meaning ascribed to an aspect of a product or a term used in the ingredient description (e.g., "fruit sugar") is based on people's interpretations of that aspect (e.g., a natural ingredient that is relatively healthy). The meaning is symbolic as it transcends the available facts, and stereotypical information related to food shapes perception. According to this argument and the findings of a recent qualitative study, youngsters perceive honey to be healthier than white sugar because they associate it with naturalness (Sütterlin and Siegrist, 2015).

In a study by Spiteri Cornish and Moraes (2015), participants revealed that they learn about healthy eating from various sources, resulting in an ambiguous picture of what a balanced diet might entail. More than 50% of the respondents stated that they received competing nutritional information from several sources, frequently "incomplete, contradictory, and confusing". According to the existing studies, such information can be vague and misleading, causing consumers' baseline nutrition knowledge to suffer. They constantly change their suggestions and never tell us exactly what we need to accomplish (Spiteri Cornish and Moraes, 2015).

Scientific publications on communicating nutrition and food to the community revealed that these facts are not correctly elaborated in existing media channels. They further noted that much of the coverage is sensationalist, with headlines that do not fully reflect scientific research and rely on portraying preliminary results as a "breakthrough." However, as a previous study pointed out, because the news media now play an essential role in disseminating scientific facts to the community about rising health hazards related to diet and nutrition, it

Table 5: Exposure to contradictory nutrition information by channel

Channel	n %			
	Not at all	A little	Some	A lot
Online news	51.1	20.0	19.3	5.0
Social Media	59.8	15.8	14.2	5.2
Medical or health websites	55.4	21.5	14.9	2.9
Television	32.1	26.9	27.7	8.2
Print newspapers or magazines	46.9	24.2	20.3	4.4

Source: Source-specific Exposure to Contradictory Nutrition Information: Documenting Prevalence and Effects on Adverse Cognitive and Behavioral Outcomes (C. J. Lee et al., 2018)

is necessary to evaluate both its substance and effect (Marinescu, 2020).

The media can influence healthy and unhealthy perspectives, understandings, and meanings. However, in terms of the dimensions "good-bad," the approach is overly simplistic and dualistic. According to some, public health experts should be more proactive and cooperate with the media because of the accessibility and availability of mass media. As for their capacity to influence customers' health by how customers relate to the media, public health experts would be able to identify topics of interest for investigation and supply the necessary information (Lubi, 2020).

The issue of the source's credibility is of utmost importance in an altering media environment that classifies anyone who uses them as a potent content creator. Food risk communication processes, like those for other issues, begin with a search for relevant sources, and both institutes and people are identified as sources of information. The meaning of a source and its legitimacy are evolving as the role of regular people as content creators continue to grow. The overall reliability of the message is closely tied to the spokesperson and the source, according to research (Lubi, 2020).

Nutrition is a topic that the German media frequently covers. It is often presented in German media as a central theme, dealing with "healthy food, sustainable nutrition, nutritional behavior, and diets", as well as a problem related to other major topics, particularly "health and illness, the environment, animal husbandry, and various social issues" (Rodat, 2020).

In democratic nations, the media have a critical role in shaping public opinion and values, and nutrition, food, and health reporting are no exception. Food scandals, animal husbandry, food industry production circumstances, and the impact of nutrition practices and habits on the environment and even the planet's future are covered by current media. On the other hand, many journalists who cover nutrition appear to prioritize food, cooking, and health content, rather than critically examining nutritional information materials. As a result, information from non-commercial primary communicators may have a strong chance of making it into newspapers with little or no modification (Rodat, 2020).

Chronic disease risk is increased by modifiable behavioral risk factors such as poor eating or food habits. Raising public awareness of scientific knowledge about diet and nutrition can help people live healthier lives and avoid chronic diseases (Rabassa et al., 2020).

The media has been found to affect public knowledge and awareness of nutrition-related health issues potentially. This information, however, is frequently misleading and contradictory. According to new research, the general population is frequently exposed to mediocre or poor-quality nutrition information on websites and in publications. Approximately two-thirds of newspaper nutrition advice articles are based on low-quality scientific evidence (Rabassa et al., 2020).

Lee et al. (2018) examined how people were exposed to contradicting dietary information from different sources and wondered if source-specific exposure had different effects on cognitive and behavioral results. The weighted distributions of source-specific exposure to contradictory or conflicting nutrition information are summarized in Table 5. Across all sources, most respondents stated they had been exposed to at least some contradicting dietary advice, with only 22.3% saying they had not. A majority (75.6%) said they had noticed conflicting dietary information in the media, which matches previous population-based figures. The most common source of contradicting exposure was television (67.9%), followed by 60.9% reporting exposure from interpersonal sources (family, friends, or coworkers) and 40.4% reporting exposure from medical sources (doctor or other healthcare professional).

The findings suggest that contradictory nutrition information causes more confusion and backlash, which leads to lower engagement in a recommended nutrition behavior (e.g., fruit and vegetable consumption). Notably, such exposure appears to have different effects depending on the source. People who reported seeing contradictory nutrition advice on television showed more uncertainty about nutrition over time than those who reported seeing such information in print media. This finding aligns with other research that has linked television consumption to unhealthy health views or practices. Furthermore, print media allows people to read, save, and revisit health-related information for longer. Suppose a reader comes across contradictory nutrition

information in print media. In that case, he or she can study the item attentively and even evaluate the contents by finding information from other sources (e.g., the Internet, past newspaper issues). Consequently, it is possible that when people are exposed to print rather than other media, they will think more critically about contradictory facts and make more informed decisions. Such disparities in information processing patterns dependent on communication modality could explain the disparities observed here (Lee et al., 2018).

6. Local Scenario

6.1. Consequences due to poor nutrition literacy

Under-nutrition among children is still a significant health problem in Sri Lanka, according to previous studies, and it is linked to inadequate sanitation and personal hygiene, low socio-economic position, overcrowding, and a lack of education (Galgamuwa et al., 2017).

The plantation community in Sri Lanka has the lowest educational levels, health and nutrition conditions, and death rates in the twenty-first century. According to the 2006 Demographic and Health Survey (DHS), 30% of children under five in Sri Lanka's plantation sector were underweight, 42% stunted, and 13% wasted. The literacy rate in Sri Lanka's plantation industry was 86.1%, compared to 95.7% nationally. Infant mortality and low birth weight (less than 2.5 kg) were 29% and 31% percent in the plantation sector, respectively, compared to less than 20% in the urban and rural sectors. The plantation sector has 52.4% access to safe water, whereas the urban and rural sectors have 98.9% and 90.9% access to safe water, respectively. In 2012, about 73% of families in the plantation sector had latrine facilities, compared to 86.7% nationally (Galgamuwa et al., 2017). Herath et al. (2017) evaluated knowledge, attitude, and practice towards diabetes in a cohort of the general public in Sri Lanka. Around 37% of the participants scored 19 or more out of 26 and were categorized as having a good level of knowledge. Out of the total score of 26, 23% of participants scored less than 14 (poor knowledge), and 39% scored between14 to 18 points (moderate knowledge). Concerning the pathophysiology of diabetes, 87% were aware that diabetes is a dis-ease characterized by elevated blood sugar. Also, they evaluated diabetes knowledge, attitude, and practice in a cohort of Sri Lankans. Around 37% of those who participated scored 19 or higher on a scale of 26 and were classified as having an excellent level of expertise. Out of 26, 23% of participants received a score of less than 14 (low knowledge), and 39% received a score of 14 to 18 points (moderate knowledge). When it came to the pathophysiology of diabetes, 87 percent knew it was a disease marked by high blood sugar levels.

Even though most participants had above-average knowledge, their attitudes toward diabetes mellitus did not reflect this. Consequently, this research can be utilized as a baseline for national diabetes awareness efforts,

and the method of diabetes education can be modified to place a greater emphasis on attitude change (Herath et al., 2017).

One-sixth of women in Sri Lanka have a low BMI, while 17% of newborn babies have a low birth weight. 16.2% of pregnant women and 19.6% of breastfeeding mothers had anemia. Anemia affects 32.6% of reproductive-age women. Around 15% of mothers with children aged 6 to 60 months suffer from vitamin A insufficiency. Other micronutrient deficiencies have been reported in various age groups, including iron shortage, iodine deficiency, zinc deficiency, and vitamin D inadequacy. According to WHO 2018, non-communicable diseases (NCDs) such as cancer, chronic respiratory diseases, cardiovascular diseases, and diabetes will account for 83 percent of deaths in Sri Lanka (Weerasekara et al., 2020).

These nutrition statistics reveal that issues in Sri Lanka contribute to low food quality and unhealthy eating habits. Women who are aware of good nutrition can help to reduce the onset of various nutritional issues. As a result, women's education is associated with enhanced nutritional status in the family. Previous research has revealed that women's nutritional knowledge of traditional foods may impact the family's nutritional status. According to a study, women with higher levels of education had the most nutritional understanding of folic acid and iodine shortages during pregnancy.

Similarly, compared to the cultural framework of Sri Lanka, where women are primarily assigned the duty of food preparation and management within the household, the position of women in terms of household food security is not dissimilar to that of many other developing nations. Since ancient times, women have played an essential part in food preparation in Sri Lankan society. Positive attitudes and habits, according to studies, improve nutritional status in addition to an understanding of good health practices. As a result, in Sri Lanka, women's nutritional knowledge impacts dietary practice, and women's dietary practice impacts a healthy lifestyle. As a result, women's nutrition knowledge is critical to their overall health and nutrition. Women's nutritional knowledge, behavioral attitudes, and practices are crucial because women in Sri Lanka often regulate and oversee their entire family's food consumption (Weerasekara et al., 2020).

6.2. Nutrition literacy statistics

According to the study by Weerasekara et al. (2020), 71.75% had no idea what vitamins and minerals were. Most women (80.5%) reacted incorrectly to food and nutrition diseases, and the majority (57.2%) had no idea what a balanced diet was. Three-quarters of the women (75%) were unaware that low-iron diets induce anemia, and 94.6% were unaware of which minerals and vitamins are beneficial to bone and brain development (see Table 6) (Weerasekara et al., 2020).

Table 6: Knowledge level of reproductive-age women in urban and rural areas in Sri Lanka regarding nutrition

Knowledge Level	Rural Areas (%)	Urban Areas (%)	Total (%)
Knowledge about vitamins and minerals	39.5	17	28.2
Knowledge about vitamins, fat, and diet	30.5	16.5	23.5
Knowledge about iron-related food	30.5	16.5	23.5
Knowledge about micro-nutrients	15.5	15.5	15.5
Knowledge about food and nutrients	40	73.5	56.8
Knowledge about dietary fiber	74	97	95.8
Knowledge about water and food consumption	61	36	48.5
Knowledge about food and nutrition-related diseases	35.5	3.5	19.5

Source: Food and nutrition-related knowledge, attitudes, and practices among reproductive-age women in marginalized areas in Sri Lanka (Weerasekara et al., 2020)

Complementary feeding (CF) is the introduction of safe and nutritious foods at about six months of age in addition to breastfeeding (BF). Around 86% of primary caregivers were aware that oil could be used to boost calorie content, 38% of primary caregivers were aware that oil does not harm a kid by raising cholesterol levels, and 92% of primary caregivers were aware that oil improves palatability, and 94% were aware that oil increases a child's weight gain. Oil is advised for infants under nine months, and 73.6% of primary caregivers were aware of this (Seram and Punchihewa, 2017).

6.3. Impact of mass media on nutrition literacy

According to a previous study, food companies in Sri Lanka use various modes for advertising their food and beverages to their customers, including television, radio, newspapers, and others. Television is considered the most effective advertising mode on the island, owing to its widespread popularity as a mode of communication throughout the country, with 86.3 percent TV penetration, which is higher than all other mass media networks available. In Sri Lanka, unhealthy food marketing is far more successful and impactful than healthy food advertisements regarding customer purchase intent. As a result, Sri Lankans consume more unhealthy foods than healthy ones. Sri Lankans are likely to unwittingly notice these adverts and alter their lifestyles and food consumption habits (Dissanayake et al., 2020).

In order to improve the nutrition literacy levels of children, it is vital to educate the mothers with essential nutrition knowledge as mothers' nutrition literacy has a substantial impact on children's nutrition and nutrition literacy. The schools should pay more attention to educating students with necessary nutrition knowledge and practice students to imply the knowledge in day-to-day life. More attention should be given to the articles published in newspapers, magazines, and websites that significantly provide nutrition-related information to the community. These sources should be strictly monitored to publish only scientifically accurate information written by qualified writers.

7. Conclusion

In an era where communication networks are so developed, food and nutrition literacy in the global context remains at an unsatisfactory level. It is of utmost importance that world organizations, governments, and scientists reach the "common person" more efficiently to minimize health issues resulting from a lack of nutrition literacy in public.

8. Acknowledgment

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Appendix A

Year	Study	Results												
2019	Health and nutrition literacy levels in Greek adults with chronic disease (Michou et al., 2019b)	Nutrition literacy Score Mean			Inadequate NL			Marginal NL			Adequate NL		
		Men	Women	Total	Men	Women	Total	Men	Women	Total	Men	Women	Total
		21.3	22.6	22.1	6.00%	3.80%	4.70%	7.10%	5.40%	6.10%	86.90%	90.80%	89.20%

Year	Study	Results						
2021	Caregivers' Nutrition Knowledge and Dietary Intake of Type 1 Diabetic Children Aged 3 – 14 Years in Uganda (Ndahura et al., 2021)	Nutrition Literacy Mean		Inadequate NL		Marginal NL		Adequate NL	
		Healthy Individuals	Participants with health issues	Healthy Individuals	Participants with health issues	Healthy Individuals	Participants with health issues	Healthy Individuals	Participants with health issues
		23.1	19	1.80%	13.30%	4.10%	12.00%	94.10%	74.70%

Year	Study	Results			
2021	Nutrition Knowledge is Associated with the Consumption of Iron Rich Foods: A Survey Among Pregnant Women from a Rural District in Northern Ghana (Adjei-banuah et al., 2021)	Mean Knowledge Score	Could recognize the symptoms and signs of anemia	Knew the causes of anemia	Knew the foods that help the body absorb and use iron
		54.70%	55.00%	72.10%	16.30%

Year	Study	Results		
2021	Nutrition literacy is associated with income and place of residence but not with diet behavior and food security in Palestinian society (Natour et al., 2021)	High likelihood of limited nutrition literacy	Possible limited nutrition literacy	Adequate nutrition literacy
		18.40%	52.40%	29.10%

Year	Study	Results	
2019	Determination of Nutrition Knowledge of Adolescents Engaged in Sports (Saribay and Kirbaş, 2019)	Inadequate Nutrition Knowledge	Adequate Nutrition Knowledge
		65.30%	34.70%

Figure 1: Summary of nutrition literacy statistics from different regions in the world contrasting economic and cultural behavior