Systematic Review

Mapping the Landscape of Food Literacy: A Comprehensive Scoping Review

ABSTRACT

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| The importance of Food Literacy (FL) has grown significantly on a global scale, as it plays a key role in promoting food security and supporting sustainable development. This study aims to explore and map the current landscape of food literacy research, with a focus on identifying key areas of study, existing gaps, and the need for culturally relevant measurement tools. The research is guided by the hypothesis that a comprehensive understanding of food literacy (FL) can contribute to healthier dietary practices and improved public health outcomes. Using a scoping review approach and following the PRISMA guidelines, this study aims to examine how food literacy has been conceptualized and measured across various populations and contexts, particularly concerning health behaviors, education, and social factors. |

*Keywords: Food Literacy, Food Literacy Domains, Health Outcomes, Measurement Tools, Nutrition, PRISMA*

1. INTRODUCTION

Food is essential for every living organism to survive. Humans require healthy food to maintain health and prevent communicable and non-communicable diseases (NCDs) such as cancer, heart disease, respiratory issues, and diabetes. It's essential to know how to make wise food choices and sustain healthy habits for a long time. Knowing the role of Food Literacy (FL) is vital in this context, as it connects individuals to their daily food consumption and nutritional needs (UNICEF, 2001).

According to the World Health Organization (WHO) in 2023, people of all ages, regions, and countries are affected by NCDs, and deaths are frequently linked to older adults. Nevertheless, they occur before 70, with 86% occurring in low-middle-income countries. Also, unhealthy diets, a lack of physical activity, tobacco use, harmful alcohol use, and air pollution are among the factors that contribute to risk factors. It also claimed that rapid, unplanned urbanization, the spread of unhealthy dietary habits, unhealthy lifestyles, and an aging population are all factors that drive NCDs. Moreover, unhealthy dietary habits can lead to high blood pressure, high blood sugar, high cholesterol, and obesity, which are metabolic risk factors for cardiovascular disease, which happens to be the leading cause of early death from NCDs. In light of all the above, it can be claimed that a safe food supply is crucial for economies, trade, tourism, and sustainable development.

However, encouraging healthier habits is challenging. Due to urbanization and changing consumer habits, more people are eating food that is prepared in public places. Furthermore, as stated by the WHO in 2022, globalization has led to an increase in the demand for different foods, which has led to a more sedentary lifestyle, more fast food, and changes in diet. This results in a cycle of disease and malnutrition that particularly affects infants, young children, the elderly, and the sick. Consequently, understanding preventative measures and making informed health decisions has become more challenging in a global setting because of a lack of knowledge about health, food, and nutrition (WHO, 2022).

Recent studies, such as Bhawra et al. (2023), highlight the challenges in comparing nutrition knowledge across countries due to the use of disparate tools. Their introduction of the Food Processing Knowledge (FoodProK) score provides a functional, cross-culturally applicable tool to assess understanding of food processing and nutrition knowledge. This underscores the global variation and complexity of nutrition knowledge and emphasizes the urgent need for standardized and culturally relevant measurement tools in food literacy research.

FL highlights the need for countries to create initiatives that support both food security and FL, as they are essential for sustainable development. Vidgen, (2016) provided an empirically defined explanation for FL, describing it as "a composite set of interconnected knowledge, skills, and behaviors necessary for the planning, management, selection, preparation, and consumption of foods to fulfill nutritional needs and regulate food intake." They further described it as "the scaffolding that empowers individuals, households, communities, or nations to protect diet quality through change and support dietary resilience over time”. Moreover, Perry et al. (2017) highlighted that this comprehensive definition represents a significant improvement in understanding FL and is widely recognized in the field. Another study by Desjardins & Azevedo in 2013 claimed that individuals can adopt healthy lifestyles by incorporating FL, which includes knowledge, cooking skills, and daily food planning abilities. Also, accessing information and external support, as well as favorable living conditions and positive sociocultural environments, can help to increase a high level of FL. Making informed decisions about dietary choices and overall well-being necessitates FL. According to Kolasa et al. in 2001 and Vidgen in 2016, understanding the nutritional value and contents of consumed food enables individuals to align their choices with their health goals. In addition, FL goes beyond typical health suggestions, emphasizing the complex links between food, health, and the environment.

Silva et al. in 2023 claimed that the lack of FL among the general population can lead to several issues, including health problems such as malnutrition and obesity, economic issues due to increased healthcare costs and lost productivity, and social challenges like food insecurity and poor dietary habits. Every day, people worldwide struggle with knowing what to eat for their health. They want science-based advice but get overwhelmed by the huge amount of information. Furthermore, comparing and generalizing findings can be difficult due to the variation in key domains and dimensions between existing research studies on FL. It seems like scientists keep changing their recommendations and are unable to agree with each other. This makes it hard for even well-educated people to understand what to eat and how much exercise they need. Silva et al. (2023) explain that because of this confusion, people often end up making unhealthy choices. The concerns mentioned above have received limited attention so far, and hence, there is a need for a developed framework that comprehensively covers a wide range of aspects of FL.

This research aims to fill this gap by exploring the current scope and the nature of FL literature worldwide, identifying the main strands of literature, domains, and determinants that allow monitoring of the relationship among FL, nutrition, and well-being. As a result, the researcher hopes to contribute to the knowledge of FL and support the development of sustainable, health-promoting food systems worldwide.

2. Methodology

Numerous studies (Amouzandeh et al., 2019; Peters et al., 2015; Truman et al., 2017) have shown the importance of employing a thorough review to identify key concepts, making the scoping review procedure a valuable approach. Most of the researchers (Carroll et al., 2022; Liberati et al., 2009; Stanley et al., 2022; Vettori et al., 2019) have used Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines to ensure thorough and transparent reporting of published literature. For this scoping review, the PRISMA guidelines have been followed accurately as demonstrated in the following sections.

**2.1 Search Strategy and Data Abstraction**

A complete search of FL has been undertaken by researchers across varied dimensions through major bibliographic databases: Web of Science, PubMed, and Scopus published during 2013-2023. For this purpose, a Boolean operator; ("FL" OR "FNL" OR "nutrition literacy" OR "food knowledge" or "Food skills") AND ("definitions" OR "frameworks" OR "Factors" OR "conceptual framework" OR "define" OR "measurement tool"), was employed. The search strategy covers articles containing specified keywords related to FL, nutrition literacy, food knowledge, and associated concepts, including definitions, frameworks, conceptual frameworks, scales, definitions, or measurement tools. The data abstraction process methodically captured information for each included document, encompassing details such as the source, study methods, author, country, population(s) of interest, determinants of FL, and corresponding descriptors (domains, attributes, and components).

## **2.2 Inclusion and Exclusion Criteria**

After obtaining 1306 articles through the search strategy, they were imported to the Mendeley reference manager and duplicates were removed. Figure 1 depicts the application of inclusion and exclusion criteria. Articles that described FL as well as focused on the description of food knowledge, food skills, food interventions, or outcomes of interventions without addressing the conceptualization and/or definitions of FL, were intentionally excluded from this broad exploration.

The primary aim of this study was to find papers that measured FL and those that used FL measurement as a component of their research design. To ensure accuracy, the screening process consisted of two stages. First, titles and abstracts were checked. Any papers that were not published in recognized journals or did not focus on topics related to FL were excluded from further consideration. The focus was on papers related to children/adult populations, the development of measurement tools, conceptual framework development, and tools for evaluating FL interventions. Second, the full text of the remaining papers was checked following the same exclusion criteria used in stage one. Studies were excluded if they focused on tools already identified in the review, solely on health literacy, or were not relevant to the scoping review. Priority was given to articles that originally published FL measurement tools, conceptual frameworks, and determinants. Publications were included if they mentioned 'FL'/’Food and Nutrition Literacy’ in their design or development and their FL measurement tool.

Articles included

n = 40

Papers excluded (full-text review)

n = 14

 (reasons for exclusion: focus on health literacy only, not relevant to scoping review)

Records excluded

n = 729

(Reasons for exclusion: did not support the objective)

Records identified through database searching

 

Records screened after duplicates removed n= 783

Full-text articles assessed for eligibility (11+24+19)

n = 54

+

=

PubMed

161

Scopus

679

1306

WOS

466

Figure 1. Articles yield (PRISMA flow chart)

3. results and discussion

Out of the 783 unique records identified by searching the three databases, 40 studies met the inclusion criteria and provided insight into various measuring tools, domains, and components (Figure 1). 729 studies were excluded from the screening process that didn't introduce or discuss FL-related aspects. The evaluation of the full text of the remaining 54 articles led to the exclusion of 14 studies. Among the exclusions, four papers solely addressed health literacy, four did not give significant attention to FL, two lacked full-text availability, three were about FL tools already published elsewhere, and one did not focus on a measurement tool referring to FL in its conceptualization or development.

## **3.1 Descriptive Numerical Analysis**

Examining FL discloses significant locational differences in research contributions and focus areas globally. The number of papers published annually from 2013 to 2023 is depicted in Figure 2. A notable trend is revealed in the data: the number of publications surpassed its peak in 2017 and 2018. In 2020, there was a decline that was attributed to various external factors after this peak. Following this dip, the number of publications commenced a gradual increase. The upward trend continued, resulting in the most publications in 2022. In 2023, there was a small decrease after the two-year gradual increase, likely due to the data only covering publications up to that point. As researchers continue to be interested in studies related to FL, it is expected that the final count for 2023 will be similar to 2022. After the temporary decline, this pattern indicates a strong recovery and increasing interest or advancements in the relevant field. Collaborations and research efforts globally highlight the different approaches to FL, addressing gaps and enriching the global understanding of this important field.

A description of the characteristics of the included papers can be found in Table 1, including information about the countries where the research was conducted and the type of research that was conducted. Canada (which had the most research studies, with 6 papers, 15%), the USA, and Australia (which had 5 papers, each with 12.5%), were the most popular destinations for research studies. In 19 papers, 48% of the reviewed papers focused on measuring and assessing FL, which included conceptual frameworks, definitions, and the development of proficiency models. The number of papers that addressed cross-cultural adaptation and validation or provided a comprehensive conceptualization of FL was smaller, with only 3 papers (7.5%). Moreover, eight common strands: measuring and assessing FL across different populations, developing and validating tools, and exploring the relationship between FL and health outcomes the respective descriptions along with the citations are presented in Table 2.

**Figure 2. Number of papers of FL by publication year**

**Table 1. Characteristics of included papers**

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| --- | --- | --- |
| Country | N (Total=40) | Percentage |
| Australia | 5 | 12.5 |
| Bangladesh | 1 | 2.5 |
| Brazil | 1 | 2.5 |
| Canada | 6 | 15 |
| China | 2 | 5 |
| Germany | 1 | 2.5 |
| Indonesia | 1 | 2.5 |
| Iran | 2 | 5 |
| Italy | 2 | 5 |
| Malaysia | 1 | 2.5 |
| Netherland | 1 | 2.5 |
| Norway | 1 | 2.5 |
| Portuguese | 2 | 5 |
| Spain | 2 | 5 |
| Switzerland | 4 | 10 |
| UK | 3 | 7.5 |
| USA | 5 | 12.5 |
| Type of paper (Strands of Literature) |  |  |
| Measurement and assessment of FL | 11 | 27.5 |
| Relationships between FL and health outcomes | 7 | 17.5 |
| Conceptual frameworks and definitions of FL | 5 | 12.5 |
| Cross-cultural adaptation and validation | 2 | 5 |
| Consumer behavior and food safety knowledge | 5 | 12.5 |
| Comprehensive conceptualization of FL | 1 | 2.5 |
| Development of FL proficiency models | 3 | 7.5 |
| Understanding domains and influential factors of FL | 6 | 15 |

**Table 2. Identified Strands of Extracted Literature**

|  |  |  |
| --- | --- | --- |
| Identified Strands (08) | Description | Citations |
| Measurement and Assessment of FL | Eleven studies aimed to develop or validate tools and measures for assessing FL in different populations, such as adults, young adults, students, and children. They focused on identifying the components and dimensions of FL and the psychometric properties of measurement tools. | (Annarumma et al., 2017; Begley et al., 2018; Chau et al., 2015; Gibbs et al., 2017; Gréa Krause et al., 2018; Guttersrud et al., 2014; Lahne et al., 2017; Palumbo et al., 2017; Poelman et al., 2018; Ringland et al., 2016; Sarkis et al., 2022) |
| Relationships Between FL and Health Outcomes | Seven studies investigated the connections between FL and various health-related outcomes, including dietary behaviors, academic performance, weight management, and the prevalence of conditions like non-alcoholic fatty liver disease (NAFLD). | (Blaschke et al., 2023; Boucher et al., 2017; Cornish & Moraes, 2015; Doustmohammadian et al., 2022b; Gibbs et al., 2018; Thompson et al., 2021; Vamos et al., 2021; Wijayaratne et al., 2018)  |
| Conceptual Frameworks and Definitions of FL | Five studies aimed to clarify the meaning and components of FL. They worked on developing conceptual frameworks and definitions for FL and related terms, such as nutrition literacy and health literacy. | (Consavage Stanley et al., 2022b; Cullen et al., 2015; Desjardins & Azevedo, 2013; Doustmohammadian et al., [year]; Krause et al., 2016; Liu et al., 2021) |
| Cross-Cultural Adaptation and Validation | Two types of research focused on the cross-cultural adaptation and validation of FL questionnaires and tools for specific populations, like the Brazilian and Chinese populations. | (Zeminian et al., 2022; Zhang et al., 2022) |
| Consumer Behavior and Food Safety Knowledge | Five studies examined factors influencing consumer behavior in purchasing street-vendor food and consumer knowledge regarding food safety. | (Cardoso & Ferreira, 2023; Incedal-Sonkaya et al., 2018; Ishra et al., 2022; Rodríguez-Entrena & Salazar-Ordóñez, 2013; Zulmi & Suzianti, 2021) |
| Comprehensive Conceptualization of FL | There's a study of comprehensive conceptualization, aimed to provide a broader understanding of FL and its relationship to health literacy and other factors influencing dietary behaviors. | (Boslooper-Meulenbelt et al., 2019) |
| Development of FL Proficiency Models | Three types of research were carried out to develop models of FL proficiency and explore the relationships between nutrition education and health-related outcomes. | (Carroll et al., 2022; Consavage Stanley et al., 2022b; Doustmohammadian et al., 2019; Versele, Stok, et al., 2021b) |
| Understanding Domains and Influential Factors of FL | Six types of research were identified to understand the domains, influential factors, and determinants of FL. | (Amouzandeh et al., 2019; Fingland et al., 2021; Perry et al., 2017; Rosas et al., 2020a; Truman et al., 2017; Yuen et al., 2018) |

## **3.2 Domains, and Determinants of FL**

Interconnected concepts such as domains and determinants of FL help us understand how people interact with food. Various domains and determinants have been found in research studies related to FL. Domains refer to specific aspects that contribute to the overall understanding and competence of a particular area. Factors that affect outcomes in various domains are called determinants. Together, these concepts help us comprehend the various aspects of FL and their impact.

The sample of papers resulted in the identification of eight FL domains (Table 3) and over 13 dimensions (Table 4) The domains include various aspects crucial for understanding FL, including Food and Nutrition Literacy, Dietary Behavior, Food and Nutrition Knowledge, Food Skills, Food System, Health and Health-Related Factors, Cognitive and Information Processing, and Social and Sociocultural Factors. The multifaceted nature of food processing is highlighted in these domains by exploring aspects such as planning, selecting, and preparing food, nutrition knowledge, essential skills, and the broader social and cultural contexts that affect food behaviors.

In addition, the review found over 13 common factors that influence FL, as discussed in the extracted sample papers and the references mentioned in those studies (refer to Table 4). Significant determinants include Self-Efficacy and Confidence, Individual Food Skills and Values, Ecologic and Ecological Factors, Social, Sociocultural, and Sociopolitical Determinants, Information Processing Abilities, Demographic Factors, Psychological Factors, Sustainable and Equitable Food Systems, Community Food Security, Components of Information Processing Abilities, Sociocultural Aspects, Attitude and Environmental Concern, and Eco Literacy and Cultural Literacy. These determinants shed light on the psychological, demographic, and cultural factors influencing food-related decision-making and behaviors. The findings generally show how many elements in the FL domain have a complex relationship.

**Table 3. Portrayal of Identified FL Common Domains**

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| **Common Domains (8)** | **Description** | **Citations** |
| Food and Nutrition literacy | Functional, interactive, and critical elements are included in this multifaceted domain, as explained in the literature. It is a dynamic field that gives people the knowledge, skills, and attitudes they need to navigate the food system and promote health and well-being for themselves and their communities. | (Blaschke et al., 2023; Block et al., 2011; Cardoso & Ferreira, 2023; Consavage Stanley et al., 2022b; Krause et al., 2016; Li et al., 2023; Nutbeam, 2000; Park et al., 2020b; Perry et al., 2017; Poelman et al., 2018; Renwick & Columbia, 2018; Rosas et al., [year or full citation needed]; Truman & Elliott, 2019; Vamos et al., 2021; Vettori et al., 2019; Vidgen & Gallegos, 2014; Watts et al., 2023; Wijayaratne et al., 2018; Zareimanesh & Namdar, 2022; Zeminian et al., 2022) |
| Dietary Behavior | Planning, selecting, preparing, and eating food are all part of this domain. In all three databases, it is a common motif. | (Bauer & Sánchez, 2020; Begley et al., 2019; Blaschke et al., [year]; Meyn et al., 2022; Park et al., [year]; Poelman et al., 2018; So et al., 2021; Spiteri Cornish & Moraes, 2015; Versele, Stok, et al., 2021a; Vidgen & Gallegos, 2014) |
| Food and Nutrition Knowledge | The knowledge of food and nutrition is a recurring domain across databases, often related to understanding the nutritional aspects of food. | (Consavage Stanley et al., 2022b; Guiné et al., 2023; Luque et al., 2022; Mogendi et al., 2016; Park et al., 2020b; Perry et al., 2017; Rosas et al., 2020c) |
| Food Skills | In all three databases, food preparation and cooking skills are given priority. Cooking techniques, food safety practices, and meal preparation are among the skills mentioned above. | (Cullen et al., 2015; Doustmohammadian et al., 2019; Fingland et al., 2021; Mo et al., 2022; Park et al., 2020b; Perry et al., 2017; Rosas et al., 2020a; Vidgen & Gallegos, 2014) |
| Food System | The food system domain is brought out, which includes various parts of the food supply chain, including production, processing, distribution, and disposal of food. | (Cullen et al., 2015; Park et al., 2020b; Rosas et al., 2020a; Zareimanesh & Namdar, 2022; Zhou et al., 2022) |
| Health and Health-Related Factors | Studies commonly focus on topics such as health consciousness, impact on health, and outcomes that relate to health. | (Blaschke et al., 2023; Meyn et al., 2022; Perry et al., 2017; Rosas et al., 2020a; Stanley et al., 2022; Thomas et al., 2019; Versele, Stok, et al., 2021a; Vettori et al., 2019) |
| Cognitive and Information Processing | The importance of the cognitive domain in understanding FL has been indicated by several studies that have mentioned cognitive and information processing related to FL. | (Doustmohammadian et al., 2019; Lee et al., 2022a; Mogendi et al., 2016; Perry et al., 2017; Rosas et al., 2020a; Stanley et al., [year]; Zeminian et al., 2022) |
| Social and Sociocultural Factors | In regards to aspects like culture, societal features, and social determinants, social and sociocultural dimensions are frequently considered. | (Bhawra et al., 2023; Di & Chen, 2020; Mogendi et al., 2016; Perry et al., 2017; Rosas et al., 2020a; Vettori et al., 2019) |

**Table 4. Identified FL Determinants/Components and Description through the Extracted Literature.**

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| **Common Determinants (13+)** | **Description** | **Citations** |
| Self-Efficacy and Confidence | Individuals have confidence in their capacity to comprehend, select, and prepare healthy foods. It is defined as being confident in navigating nutritional information, cooking skills, meal planning, and making informed food choices. | (Boslooper-Meulenbelt et al., 2019; Carroll et al., 2022; Colatruglio & Slater, 2014; Doustmohammadian et al., 2022; Krause et al., 2016; Kulandaivelu et al., 2023; Lavelle et al., 2017; Naigaga et al., 2018; Nutbeam, 2000; Park et al., 2020b; Paynter et al., 2021; Poelman et al., 2018; Rosas et al., 2021; Vamos et al., 2021; Versele, Debekker, et al., 2021; Yoo et al., 2022; Zareimanesh & Namdar, 2022) |
| Individual Food Skills and Values | FL is a significant place for individuals to develop their food skills, knowledge, access, values, culture, and beliefs. | (Blaschke et al., 2023; Boedt et al., 2022; Carroll et al., 2022; Consavage Stanley et al., 2022b; Cullen et al., 2015; Doustmohammadian et al., 2019; Krause etl., 2018; Luque et al., 2022; McGowan et al., 2017; Perry et al., 2017; Poelman et al., 2018; Rosas et al., 2020a; Slater et al., 2018; Truman & Elliott, 2019; Vidgen & Gallegos, 2014; Wijayaratne et al., 2018; Zeminian et al., 2022) |
| Ecologic and Ecological Factors | The larger environmental factors that affect people's food-related actions and decisions. These factors include not just personal characteristics but also factors like access to healthy food options, community food environments, cultural norms around eating, socioeconomic status, and policies related to food and nutrition. | (Cullen et al., 2015; Fingland, Thompson, & Vidgen, 2021; Slater et al., 2018; Vidgen & Gallegos, 2014; Zareimanesh & Namdar, 2022b) |
| Social, Sociocultural, and Sociopolitical Determinants | FL is shaped by factors related to society, culture, and politics, with Social, sociocultural, and sociopolitical dimensions playing a key role in shaping it. | (Boslooper-Meulenbelt et al., 2019b; Cullen et al., 2015; Doustmohammadian et al., 2019; Fingland, Thompson, & Vidgen, 2021; Lavelle et al., 2016; Liu et al., 2021; Malan et al., 2020; Mishra, Khanal, & Collins, 2022; Nutbeam, 2000; Ramli et al., 2014; Rosas et al., 2020; Tang et al., 2023; Truman, Bischoff, & Elliott, 2020; Versele, Stok, et al., 2021b; Wijayaratne et al., 2018; Zareimanesh & Namdar, 2022b) |
| Information Processing Abilities | The importance of cognitive determinants in FL is highlighted by the mention of information processing abilities. | (Azevedo Perry et al., 2017; Consavage Stanley et al., 2022; Doustmohammadian et al., 2019; Hemmer et al., 2021; Lee, Kim, & Jung, 2022a; Rosas et al., 2021; Zeminian et al., 2022) |
| Demographic Factors | The determinants of things are sometimes based on demographic factors like age, gender, and socioeconomic status. | (Boedt et al., 2021; Consavage Stanley et al., 2022; Dahyun Park et al., 2020b; Desjardins & Azevedo, 2013; Doustmohammadian et al., 2019; Gibbs et al., 2015; Gibbs, Ellerbeck, et al., 2016; Lavelle et al., 2017; Lee, Kim, & Jung, 2022a; Luque et al., 2022; Paynter et al., 2021; Poelman et al., 2018; Rosas et al., 2021; Slater et al., 2018; Tang et al., 2023; Truman & Elliott, 2019; Vidgen & Gallegos, 2014; Yuen, Thomson, & Gardiner, 2018; Zareimanesh & Namdar, 2022b) |
| Psychological Factors | In some studies, psychological factors like managing emotions, psychological aspects of nutrition, and psychological determinants are discussed. | (Amouzandeh, Fingland, & Vidgen, 2019; Begley et al., 2019; Cornish & Moraes, 2015; Desjardins & Azevedo, 2013; Di & Chen, 2020; Lavelle et al., 2017; Lee, Kim, & Jung, 2022a; Luque et al., 2022; Mogendi et al., 2016; Poelman et al., 2018; Tang et al., 2023; Slater et al., 2018; Wijayaratne et al., 2018; Zeminian et al., 2022) |
| Sustainable and Equitable Food Systems | In some research articles, the sustainability and equity of food systems are regarded as determinants. | (Consavage Stanley et al., 2022; Cullen et al., 2015; Fingland, Thompson, & Vidgen, 2021; Karpouzis et al., 2021; Malan et al., 2019; Vidgen & Gallegos, 2014) |
| Community Food Security | The studies identify indicators that relate to community food security, which include policies, programs, availability, and culture. | (Doustmohammadian et al., 2019; Kulandaivelu et al., 2023; Park, Choi, et al., 2022; Rosas et al., 2019; Truman, Bischoff, & Elliott, 2020; Vidgen & Gallegos, 2014; Zhou, Chen, & Li, 2021) |
| Components of Information Processing Abilities | FL is influenced by cognitive and skill domains that are related to information processing abilities. | (Park et al., 2022) |
| Attitude and Environmental Concerns | Food-related behaviors can be influenced by attitudes, environmental concerns, and willingness to purchase. | (Boslooper-Meulenbelt et al., 2019b; Cullen et al., 2015; Doustmohammadian et al., 2022a; Krause et al., 2016; Lavelle et al., 2017; Luque et al., 2022; Park et al., 2020b; Perry et al., 2017; Poelman et al., 2018; Rosas et al., 2021; Slater et al., 2018; Truman, Bischoff, & Elliott, 2020; Vidgen & Gallegos, 2014; Wijayaratne et al., 2018; Zhou, Chen, & Li, 2021) |
| Eco Literacy and Cultural Literacy | Some research has identified Eco literacy, cultural literacy, and other specialized literacies as determinants. | (Cullen et al., 2015; Doustmohammadian et al., 2022a; Maudrie et al., 2021; Qian et al., 2022; Rosas et al., 2021; Yiga et al., 2022a; Yoo et al., 2022) |

The graphical analysis of empirical research is depicted in Figure 3, showing eight strands of literature, eight common domains, and over 13 components and dimensions in FL.

**C**

**A**

**B**

C. 13+ Determinants

 B. Common Domains

1. Strands


###

**Figure 3. Strands of the Literature, Domains, and Determinants Identified in Research Articles**

Almost all studies that discuss FL, food and nutrition literacy, or related terms deal with similar dimensions by utilizing different but similar terminology. This paper presents eight main domains derived from a thorough review of the collected literature, following a comprehensive examination of the reviewed studies. These discussions are in line with the study's primary goal of providing a comprehensive overview of the key areas of FL.

**3.2.1 Food and Nutrition Literacy**

In literature, related concepts are often studied using terms such as FL, nutrition literacy, and food and nutrition literacy. As Krause et al. (2016) state, both FL and nutrition literacy are subsets of health literacy, with overlapping yet distinct components, reflecting functional, interactive, and critical health literacy. Nutrition literacy is often grouped under food and nutrition literacy, resulting in the term food and nutrition literacy, which covers the knowledge, skills, and attitudes required to navigate the food system and make informed nutritional choices. According to Perry et al. (2017), Poelman et al. (2018), Renwick and Columbia (2018), Truman and Elliott (2019), and Vettori et al. (2019), FL includes the ability to deal with food to stay healthy, while nutrition literacy focuses on understanding and using nutritional information, like reading food labels. Also, FL is frequently seen as a primary domain with elements like functional, interactive, and critical literacy. Studies by Park et al. (2020) and Li et al. (2023) have introduced comprehensive FL measurement tools that integrate the food system and sustainability, examining dimensions like preparation, cooking, production, selection, intake, and disposal. Additionally, in 2022, Stanley et al. introduced a Multi-dimensional Digital Food and Nutrition Literacy model, while Vidgen and Gallegos (2014) grouped FL into planning, selection, preparation, and eating. Other studies by Zeminian et al. (2022) and Wijayaratne et al. (2018) claim the importance of FL scores and dietary gatekeepers in promoting healthy eating. Furthermore, Rosas et al. (2019, 2021) and Blaschke et al. (2022) explored specific domains affecting dietary behavior and health, and Block et al. (2011) integrated factors like nutritional, psychological, health, and societal considerations. Overall, food and nutrition literacy is crucial for enabling individuals to make informed food choices, promoting health and well-being, and contributing positively to communities (Thompson, Adams, & Vidgen, 2021; Mo et al., 2022).

**3.2.2 Dietary Behavior**

Dietary behavior, which includes the planning, selection, preparation, and consumption of food, is a core component of food literacy (FL). This domain plays a major role in shaping individuals’ food preferences and their ability to make informed dietary decisions. Several empirical studies have emphasized its importance for promoting health, managing weight, and preventing diet-related conditions such as non-alcoholic fatty liver disease (NAFLD). For instance, Poelman et al. (2018), Park et al. (2020b), Fingland et al. (2021), Paynter et al. (2021), Meyn et al. (2022), Park et al. (2022), and Blaschke et al. (2023) collectively highlight the influence of dietary behavior on both physical health and broader food-related outcomes. Versele, Debecker, et al. (2021) further explore how physiological and psychological changes during pregnancy and postpartum significantly impact eating behavior. They argue that understanding these changes is critical to designing effective, family-based nutritional interventions during this vital life stage. The importance of nutrition knowledge as a foundation for dietary behavior is also underlined by Cornish and Moraes (2015), who discuss how consumer confusion around nutrition information can negatively affect nutrition literacy, dietary habits, and perceptions of what constitutes healthy food. They argue that limited or inaccurate nutrition knowledge often leads to misinformed food choices and compromised health behaviors. To refine the understanding of FL, So et al. (2021) propose an expanded definition that positions dietary behavior as a central pillar in achieving a healthy, enjoyable, and sustainable diet. Their research further supports the use of dietary behavior-focused food literacy questionnaires, especially as valuable tools for enhancing healthcare outcomes among elderly populations.

**3.2.3 Food and Nutrition Knowledge**

Food and Nutrition Knowledge is a foundational domain within the broader concept of food literacy (FL), encompassing individuals’ understanding of the nutritional properties of food. This includes the ability to acquire and apply knowledge about the nutritional content, benefits, and health impacts of different foods. Mogendi et al. (2016), Park et al. (2020b), Rosas et al. (2021), and Consavage Stanley et al. (2022) emphasize that strong food and nutrition knowledge empowers individuals to make healthier, more informed dietary choices. Duan et al. (2022) further stress the importance of adequate nutrition knowledge in promoting health and preventing chronic diseases, while Rosas et al. (2021) identify key domains of food literacy, such as food origin, safety, decision-making, and knowledge itself, underscoring the centrality of nutrition education in these areas. Similarly, Azevedo and Perry (2017) include food and nutrition knowledge as a critical attribute of food literacy, highlighting its role in fostering lifelong health habits. Additional studies by Luque et al. (2022), Lee, Kim, and Jung (2022a), and Cardoso and Ferreira (2023) demonstrate the positive influence of nutrition knowledge on individuals’ eating behaviors, health-related decisions, and overall food literacy. For example, Luque et al. (2022) and Cardoso and Ferreira (2023) found that nutrition knowledge significantly shaped the dietary practices of students within Spain’s university system and among higher education students in Portugal. Together, these empirical studies make it clear that food and nutrition knowledge is not only a measurable element of food literacy but also one of its most influential components, playing a critical role in shaping healthy behaviors and informed food choices across diverse populations.

**3.2.4 Food Skills**

The practical dimension of food literacy (FL) is deeply rooted in the development and application of food skills, which are essential for effective food engagement. As noted by Patel et al. (2013), Vidgen and Gallegos (2014), Perry et al. (2017), Doustmohammadian et al. (2019), Rosas et al. (2019), and Fingland et al. (2021), food skills encompass a wide range of abilities from basic tasks like chopping vegetables and measuring ingredients to more advanced techniques such as frying, baking, interpreting recipes, and practicing kitchen safety. These skills also include food safety awareness and proper meal preparation methods, all of which are essential for confident and competent food handling. Perry et al. (2017) further defined food skills as the techniques involved in purchasing, preparing, handling, and storing food. Within this domain, they identified two key attributes: (i) Food Techniques and (ii) Food Skills Across the Lifespan. These attributes emphasize that food skills are not only necessary for everyday tasks but are also adaptable to different stages of life, helping individuals maintain healthy eating habits as their needs and circumstances change. Overall, food skills form a vital part of food literacy, enabling individuals to make nutritious meals, manage their food environments safely, and remain resilient in the face of personal or societal changes.

**3.2.5 Food System**

An essential component of food literacy (FL) is an understanding of food systems, which includes the interconnected processes of food production, processing, distribution, and disposal. Rosas et al. (2019), Park et al. (2020b), Rosas et al. (2021), and Zareimanesh and Namdar (2022a, 2022b) emphasize the importance of incorporating food systems into FL frameworks to help individuals understand how their food choices are shaped by and influence broader systems. Li et al. (2023) highlight the value of tools like the Food and Nutrition Systems Dashboards in making the complexity of food systems more accessible and understandable. In their two-dimensional framework of food literacy, Park et al. (2020b) include domains such as food production, processing, and sustainability, showing how these aspects are directly tied to daily food decisions. Cullen et al. (2015) further explain that understanding food systems empowers individuals to make more informed and sustainable dietary choices. These choices, in turn, can contribute to strengthening local food systems and promoting a safe, equitable, and nutritious food supply for communities.

**3.2.6 Health and Health-Related Factors**

Food literacy (FL) research is deeply rooted in the context of health and health-related factors, with a strong focus on the relationship between individuals’ food behaviors and their overall well-being. Numerous studies have emphasized the need to examine a wide range of factors to better understand the multifaceted nature of FL. Rosas et al. (2019), Thomas et al. (2019), Consavage Stanley et al. (2021), Rosas et al. (2021), and Consavage Stanley et al. (2022) all highlight the importance of broadening the scope of FL research to capture its health implications more fully. In particular, Perry et al. (2017), Yiga et al. (2020), and Versele et al. (2021) have examined how combining physical activity with dietary practices can support metabolic health in women, indicating the value of integrated lifestyle approaches within FL frameworks. Vettori et al. (2019a) also stress the influence of key health components, including nutrition knowledge, familiarity with dietary guidelines, use of food labels, and cooking skills, in shaping individuals' dietary decisions. Further, Blaschke et al. (2023) provide compelling evidence linking food literacy with the prevention and management of non-alcoholic fatty liver disease (NAFLD), underscoring the practical role of health literacy in managing chronic conditions. Together, these studies reinforce the importance of health-focused elements within food literacy research. By recognizing and incorporating these factors, FL frameworks can better promote informed, health-conscious food choices and support more comprehensive assessments that contribute to healthier, more sustainable lifestyles.

**3.2.7 Cognitive and Information Processing Skills**

Cognitive and information-processing skills play a critical role in food literacy (FL), enabling individuals to comprehend, interpret, and apply food-related information effectively. Zeminian et al. (2022) emphasize the significance of these cognitive skills in shaping individuals’ understanding and engagement with food. Similarly, Perry et al. (2017) identify decision-making and the interpretation of food information as essential cognitive components influencing FL outcomes. The importance of cognitive abilities in children’s food-literacy development has also been recognized. Doustmohammadian et al. (2022b) and Mogeni and Ouma (2022) note that skills such as reading food labels and understanding nutritional information foster food awareness from an early age. Moreover, Stanley et al. (2021, 2022) stress that cognitive and information-processing skills are vital for navigating digital food environments, particularly among low-income adults. Rosas et al. (2021) further explore how psychological and cognitive dimensions intertwine within FL. Supporting this perspective, Hemmer et al. (2021) and Lee, Kim, and Jung (2022a) link food literacy with health-promotion literacy among young adults in South Korea. Collectively, these studies show that strong cognitive and information-processing abilities are essential for interpreting food information, making sound dietary decisions, and promoting health across diverse populations and settings.

**3.2.8 Social and Sociocultural Factors**

# Understanding social and sociocultural factors is essential to advancing the field of food literacy (FL), as these elements significantly influence how individuals interact with food. Cultural norms, social traditions, and community practices play a vital role in shaping dietary preferences, meal-preparation methods, and food-related behaviors. Mogendi et al. (2016), Rosas et al. (2019), Vettori et al. (2019a), Fingland et al. (2021), and Rosas et al. (2021) collectively emphasize the importance of exploring these dimensions within FL research. Their studies demonstrate that recognizing the impact of social and cultural contexts is key to understanding food choices and behaviors. Perry et al. (2017) also highlight the relevance of sociocultural factors, such as traditional food practices and learning environments, in fostering food literacy. In addition, Di and Chen (2020) identify sociocultural influences as major determinants of general food choice, alongside sensory and cognitive considerations. Bhawra et al. (2023) found that nutrition knowledge varied significantly with factors such as age, sex, literacy, and self-perceived dietary knowledge. These findings underline the need for context-specific yet internationally relevant tools like the PFLS, especially in countries with diverse population characteristics such as Sri Lanka. Taken together, these studies underscore the need to incorporate social and cultural understanding into FL education and intervention efforts, ensuring they are relevant, inclusive, and effective in diverse settings.

# 3.3 Discussion

While the literature delivers valuable insights, it reveals a significant need for personalized frameworks that consider a country's unique Indigenous Food Culture, geographical and seasonal factors, daily food intake and regular physical activity, adherence to dietary guidelines, and digital literacy of food knowledge. Important elements such as traditional cooking styles, healthy herbs and spices, nutrition knowledge, community and social aspects, daily food intake and regular physical activities, motivation, behavioral elements, food waste disposal, and food consumption are central. Frequently, these components are handled separately instead of as part of a whole unit. How these factors are interrelated is not fully addressed by the current literature's irregular approach. Studies often limit their scope by focusing on specific regions and populations. Geographical and cultural differences have a major effect on FL, which greatly affects dietary behaviors and health outcomes. Food traditions, cooking styles, herbs and spices used, and water quality can influence certain health outcomes that are specific to specific countries or regions. Regrettably, these vital considerations are rarely combined, probably because most studies are conducted in Western and European regions, with very few in Asian contexts.

Furthermore, despite some studies focusing on specific aspects or only two or three aspects, like nutrition knowledge, skills, self-efficacy, and confidence, or physical activity, they usually ignore the wider social and cultural context. Due to the variations between places, cultures, habits, religions, and nations, measuring FL among humans is extremely difficult. There is no uniformity among these factors. The main domains that most researchers use often provide a broad picture of FL for a specific group or geographical area through established measuring tools. This research aims to identify the scope and the nature of FL within a community by identifying the necessary components and main domains.

4. Conclusion

This paper outlines 40 studies on FL, highlighting key strands of literature like the development of measurement tools, health outcome relationships, conceptual frameworks, cross-cultural adaptation, consumer behavior, and influential factors. Eight major domains came up: FL, dietary behavior, food and nutrition knowledge, food skills, food system, health and health-related factors, cognitive and information processing, and social and sociocultural factors. Additionally, FL's multifaceted nature is emphasized by the presence of over 13 determinants. Physical activity, culture, and Indigenous food sovereignty receive limited attention in current research studies, which mostly concentrate on the Western world and Europe. This gap emphasizes the need for a comprehensive approach to aid healthy decision-making. As Bhawra et al. (2023) demonstrate, tools like the FoodProK score can be instrumental in evaluating policy impacts and guiding nutrition education. Our proposed PFLS framework aims to serve a similar role in Sri Lanka, offering a culturally grounded yet methodologically robust tool to support food literacy advancement and inform national health strategies. The review, limited to English-language articles, may have overlooked non-English studies. The findings can enable researchers to create an adaptable conceptual framework for FL that can be utilized by the general public in any country. Those frameworks will be enabled to eliminate the confusion caused by the excessive amount of information available on FL. Regardless of their location, people can make informed and healthy food choices with the help of a clear and adaptable guide. Also, researchers, policymakers, and curriculum developers can use these findings as a foundation to design effective programs, ultimately promoting informed, health-conscious food choices in diverse contexts.

Competing interests

The authors declare that there are no conflicts of interest.

Disclaimer (Artificial intelligence)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

References

Ahmadpour, M., Omidvar, N., Shakibazadeh, E., Doustmohammadian, A., & Rahimiforoushani, A. (2022). Development and evaluation of an intervention to improve food and nutrition literacy among Iranian Kurdish primary school children: An application of intervention mapping approach. *Frontiers in Public Health*, *10*, 1059677. https://doi.org/10.3389/fpubh.2022.1059677

Amouzandeh, C., Fingland, D., & Vidgen, H. A. (2019). A Scoping Review of the Validity, Reliability and Conceptual Alignment of Food Literacy Measures for Adults. *Nutrients*, *11*(4). https://doi.org/10.3390/nu11040801

Annarumma, C., Palumbo, R., Troiano, E., & Vezzosi, S. (2017). A heuristic assessment of food literacy. Evidence from a preliminary study. *Mecosan*, *25*(102), 61–83. https://doi.org/10.3280/MESA2017-102004

Azevedo Perry, E., Thomas, H., Samra, H. R., Edmonstone, S., Davidson, L., Faulkner, A., Petermann, L., Manafò, E., & Kirkpatrick, S. I. (2017). Identifying attributes of food literacy: a scoping review. *Public Health Nutrition*, *20*(13), 2406–2415. https://doi.org/10.1017/S1368980017001276

Bauer, E. B., & Sánchez, L. (2020). Chapter 5: Living nan lonbraj la: Haitian immigrant young people writing their selves into the world. *Teachers College Record*, *122*(13). https://www.scopus.com/inward/record.uri?eid=2-s2.0-85105961226&partnerID=40&md5=fff8df3678db32382105f2a59c0c15b1

Begley, A., Paynter, E., Butcher, L. M., & Dhaliwal, S. S. (2019). Effectiveness of an adult food literacy program. *Nutrients*, *11*(4). https://doi.org/10.3390/nu11040797

Begley, A., Paynter, E., & Dhaliwal, S. S. (2018). Evaluation Tool Development for Food Literacy Programs. *Nutrients*, *10*(11). https://doi.org/10.3390/nu10111617

Bhawra, J., Kirkpatrick, S. I., Hall, M. G., Vanderlee, L., & White, C. M. (2023). Patterns and correlates of nutrition knowledge across five countries in the 2018 international food policy study. *Nutrition Journal*, 1–12. https://doi.org/10.1186/s12937-023-00844-x

Blaschke, S., Schad, N., Schnitzius, M., Pelster, K., & Mess, F. (2023). The Connection between Non-Alcoholic Fatty-Liver Disease, Dietary Behavior, and Food Literacy in German Working Adults. *Nutrients*, *15*(3). https://doi.org/10.3390/nu15030648

Block, L. G., Grier, S. A., Childers, T. L., Davis, B., Ebert, J. E. J., Kumanyika, S., Laczniak, R. N., Machin, J. E., Motley, C. M., Peracchio, L., Pettigrew, S., Scott, M., & Van Ginkel Bieshaar, M. N. G. (2011). From nutrients to nurturance: A conceptual introduction to food well-being. *Journal of Public Policy and Marketing*, *30*(1), 5–13. https://doi.org/10.1509/jppm.30.1.5

Boedt, T., Steenackers, N., Verbeke, J., Vermeulen, A., De Backer, C., Yiga, P., & Matthys, C. (2022). A Mixed-Method Approach to Develop and Validate an Integrated Food Literacy Tool for Personalized Food Literacy Guidance. *Frontiers in Nutrition*, *8*. https://doi.org/10.3389/fnut.2021.760493

Boslooper-Meulenbelt, K., Patijn, O., Battjes-Fries, M. C. E., Haisma, H., Pot, G. K., & Navis, G. J. (2019). Barriers and facilitators of fruit and vegetable consumption in renal transplant recipients, family members and healthcare professionals— a focus group study. *Nutrients*, *11*(10). https://doi.org/10.3390/nu11102427

Boucher, B. A., Manafò, E., Boddy, M. R., Roblin, L., & Truscott, R. (2017). The Ontario Food and Nutrition Strategy: identifying indicators of food access and food literacy for early monitoring of the food environment. *HEALTH PROMOTION AND CHRONIC DISEASE PREVENTION IN CANADA-RESEARCH POLICY AND PRACTICE*, *37*(9), 313–319. https://doi.org/10.24095/hpcdp.37.9.06 WE - Science Citation Index Expanded (SCI-EXPANDED)

Cardoso, A. P., & Ferreira, M. (2023). *Food Literacy Scale : Validation through Exploratory and Confirmatory Factor Analysis in a Sample of Portuguese University Students*.

Carroll, N., Perreault, M., Ma, D. W. L., & Haines, J. (2022). Assessing food and nutrition literacy in children and adolescents: A systematic review of existing tools. *Public Health Nutrition*, *25*(4), 850–865. https://doi.org/10.1017/S1368980021004389

Chau, P. H., Leung, A. Y. M., Li, H. L. H., Sea, M., Chan, R., & Woo, J. (2015). *Development and Validation of Chinese Health Literacy Scale for Low Salt Consumption - Hong Kong Population ( CHLSalt-HK )*. 1–15. https://doi.org/10.1371/journal.pone.0132303

Colatruglio, S., & Slater, J. (2014). Food Literacy: Bridging the Gap between. *Sustainable Well-Being: Concepts, Issues, and Educational Practices*, *November*, 37–55.

Consavage Stanley, K., Harrigan, P. B., Serrano, E. L., & Kraak, V. I. (2021). Applying a Multi-Dimensional Digital Food and Nutrition Literacy Model to Inform Research and Policies to Enable Adults in the U.S. Supplemental Nutrition Assistance Program to Make Healthy Purchases in the Online Food Retail Ecosystem. *International Journal of Environmental Research and Public Health*, *18*(16). https://doi.org/10.3390/ijerph18168335

Consavage Stanley, K., Harrigan, P. B., Serrano, E. L., & Kraak, V. I. (2022a). A systematic scoping review of the literacy literature to develop a digital food and nutrition literacy model for low-income adults to make healthy choices in the online food retail ecosystem to reduce obesity risk. *Obesity Reviews*, *23*(4). https://doi.org/10.1111/obr.13414

Consavage Stanley, K., Harrigan, P. B., Serrano, E. L., & Kraak, V. I. (2022b). A systematic scoping review of the literacy literature to develop a digital food and nutrition literacy model for low‐income adults to make healthy choices in the online food retail ecosystem to reduce obesity risk. *Obesity Reviews*, *23*(4). https://doi.org/10.1111/OBR.13414

Cullen, T., Hatch, J., Martin, W., Higgins, J. W., & Sheppard, R. (2015). Food literacy: Definition and framework for action. *Canadian Journal of Dietetic Practice and Research*, *76*(3), 140–145. https://doi.org/10.3148/cjdpr-2015-010

Desjardins, E., & Azevedo, E. (2013). Making something out of nothing: Food literacy among youth, young pregnant women and young parents who are at risk for poor health. *Locally Driven Collaborative Projects Food Skills Ontario*, 1–89. http://www.osnpph.on.ca/upload/membership/document/food-literacy-study.ldcpontario.final.dec2013.pdf

Di, I., & Chen, P. (2020). *Conceptual Models of Food Choice : Influential Factors Related to Foods ,*. *2019*, 1–21.

Doustmohammadian, A., Keshavarz Mohammadi, N., Omidvar, N., Amini, M., Abdollahi, M., Eini-Zinab, H., Amirhamidi, Z., Esfandiari, S., & Nutbeam, D. (2019). Food and nutrition literacy (FNLIT) and its predictors in primary schoolchildren in Iran. *Health Promotion International*, *34*(5), 1002–1013. https://doi.org/10.1093/heapro/day050

Doustmohammadian, A., Omidvar, N., Keshavarz-Mohammadi, N., Eini-Zinab, H., Amini, M., & Abdollahi, M. (2022a). The association and mediation role of Food and Nutrition Literacy (FNLIT) with eating behaviors, academic achievement and overweight in 10-12 years old students: a structural equation modeling. *Nutrition Journal*, *21*(1), 45. https://doi.org/10.1186/s12937-022-00796-8

Doustmohammadian, A., Omidvar, N., Keshavarz-Mohammadi, N., Eini-Zinab, H., Amini, M., & Abdollahi, M. (2022b). Development of a conceptual framework of food and nutrition literacy in children. *BMC Nutrition*, *8*(1), 91. https://doi.org/10.1186/s40795-022-00590-z

Fingland, D., Thompson, C., & Vidgen, H. A. (2021). Measuring Food Literacy: Progressing the Development of an International Food Literacy Survey Using a Content Validity Study. *International Journal of Environmental Research and Public Health*, *18*(3). https://doi.org/10.3390/ijerph18031141

Gibbs, H. D., Camargo, J. M. T. B., Owens, S., Gajewski, B., & Paula, A. (2017). Measuring Nutrition Literacy in Spanish-Speaking Latinos : An Exploratory Validation Study. *Journal of Immigrant and Minority Health*, *0*(0), 0. https://doi.org/10.1007/s10903-017-0678-1

Gibbs, H. D., Ellerbeck, E. F., Gajewski, B., Zhang, C., & Sullivan, D. K. (2018). The Nutrition Literacy Assessment Instrument is a Valid and Reliable Measure of Nutrition Literacy in Adults with Chronic Disease. *Journal of Nutrition Education and Behavior*, *50*(3), 247-257.e1. https://doi.org/10.1016/j.jneb.2017.10.008

Gréa Krause, C., Beer-Borst, S., Sommerhalder, K., Hayoz, S., & Abel, T. (2018). A short food literacy questionnaire (SFLQ) for adults: Findings from a Swiss validation study. *Appetite*, *120*, 275–280. https://doi.org/10.1016/j.appet.2017.08.039

Guiné, R. P. F., Florença, S. G., Aparício, M. G., Cardoso, A. P., & Ferreira, M. (2023). Food Knowledge for Better Nutrition and Health: A Study among University Students in Portugal. *Healthcare (Basel, Switzerland)*, *11*(11). https://doi.org/10.3390/healthcare11111597

Guttersrud, O., Dalane, J. Ø., & Pettersen, S. (2014). Improving measurement in nutrition literacy research using Rasch modelling: examining construct validity of stage-specific “critical nutrition literacy” scales. *Public Health Nutrition*, *17*(4), 877–883. https://doi.org/10.1017/S1368980013000530

Incedal-Sonkaya, Z., Balci, E., & Ayar, A. (2018). University students food literacy and food safety knowledge, attitudes and behaviors “Example of Amasya University Sabuncuoğlu Şerefeddin Health Services Vocational School.” *Turk Hijyen ve Deneysel Biyoloji Dergisi*, *75*(1), 53–64. https://doi.org/10.5505/TurkHijyen.2018.99710

Ishra, R., Khanam, R., & Soar, J. (2022). Influence of food safety concerns on safe food purchasing at rural and urban consumers in Bangladesh. *Appetite*, *179*. https://doi.org/10.1016/j.appet.2022.106306

Khorramrouz, F., Doustmohammadian, A., Amini, M., Pourhosein Sarivi, S., Khadem-Rezaiyan, M., Shadmand Foumani Moghadam, M. R., & Khosravi, M. (2022). Validity of a modified food and nutrition literacy questionnaire in primary school children in Iran. *British Journal of Nutrition*, *127*(10), 1588–1597. https://doi.org/10.1017/S0007114521001586

Krause, C., Sommerhalder, K., Beer-Borst, S., & Abel, T. (2016). Just a subtle difference? Findings from a systematic review on definitions of nutrition literacy and food literacy. *Health Promotion International*, *33*(3), 378–389. https://doi.org/10.1093/heapro/daw084

Kulandaivelu, Y., Hamilton, J., Banerjee, A., Gruzd, A., Patel, B., & Stinson, J. (2023). Social Media Interventions for Nutrition Education Among Adolescents: Scoping Review. *JMIR Pediatrics and Parenting*, *6*, e36132. https://doi.org/10.2196/36132

Lahne, J., Wolfson, J. A., Trubek, A., Science, F., Arbor, A., & Sciences, F. (2017). *Development of the Cooking and Food Provisioning Action Scale ( CAFPAS ): A new measurement tool for individual cooking practice*.

Lavelle, F., McGowan, L., Hollywood, L., Surgenor, D., McCloat, A., Mooney, E., Caraher, M., Raats, M., & Dean, M. (2017). The development and validation of measures to assess cooking skills and food skills. *International Journal of Behavioral Nutrition and Physical Activity*, *14*(1), 1–13. https://doi.org/10.1186/s12966-017-0575-y

Lee, S., Park, S., & Kim, K. (2023). Food literacy and its relationship with food intake: a comparison between adults and older adults using 2021 Seoul Food Survey data. *Epidemiology and Health*, *45*, e2023062. https://doi.org/10.4178/epih.e2023062

Lee, Y., Kim, T., & Jung, H. (2022). Effects of University Students’ Perceived Food Literacy on Ecological Eating Behavior towards Sustainability. *Sustainability (Switzerland)*, *14*(9). https://doi.org/10.3390/su14095242

Li, Z., Zhou, Y., Tan, Y., Zhu, X., Liu, W., Chen, Y., Qin, Y., Li, R., Yu, L., Zhao, R., & Xu, Y. (2023). Development and Validation of Nutrition Literacy Assessment Instrument for Chinese Lactating Women: A Preliminary Study. *Nutrients*, *15*(15). https://doi.org/10.3390/nu15153488

Liu, T., Su, X., Li, N., Sun, J., Ma, G., & Zhu, W. (2021). Development and validation of a food and nutrition literacy questionnaire for Chinese school-age children. *PloS One*, *16*(1), e0244197. https://doi.org/10.1371/journal.pone.0244197

Luque, B., Villaécija, J., Ramallo, A., de Matos, M. G., Castillo-Mayén, R., Cuadrado, E., & Tabernero, C. (2022). Spanish Validation of the Self-Perceived Food Literacy Scale: A Five-Factor Model Proposition. *Nutrients*, *14*(14). https://doi.org/10.3390/nu14142902

McGowan, L., Caraher, M., Raats, M., Lavelle, F., Hollywood, L., McDowell, D., Spence, M., McCloat, A., Mooney, E., & Dean, M. (2017). Domestic cooking and food skills: A review. *Critical Reviews in Food Science and Nutrition*, *57*(11), 2412–2431. https://doi.org/10.1080/10408398.2015.1072495

Meyn, S., Blaschke, S., & Mess, F. (2022). Food Literacy and Dietary Intake in German Office Workers: A Longitudinal Intervention Study. *International Journal of Environmental Research and Public Health*, *19*(24). https://doi.org/10.3390/ijerph192416534

Mo, G., Han, S., Gao, T., Sun, Q., Zhang, M., & Liu, H. (2022). Development and validation of a novel short-form nutrition literacy measurement tool for Chinese college students. *Frontiers in Public Health*, *10*, 962371. https://doi.org/10.3389/fpubh.2022.962371

Mogendi, J. B., De Steur, H., Gellynck, X., & Makokha, A. (2016). Consumer evaluation of food with nutritional benefits: A systematic review and narrative synthesis. *International Journal of Food Sciences and Nutrition*, *67*(4), 355–371. https://doi.org/10.3109/09637486.2016.1170768

Naigaga, D. A., Pettersen, K. S., Henjum, S., & Guttersrud, O. (2018). Assessing adolescents’ perceived proficiency in critically evaluating nutrition information. *International Journal of Behavioral Nutrition and Physical Activity*, *15*(1). https://doi.org/10.1186/s12966-018-0690-4

Nutbeam, D. (2000). Health literacy as a public health goal: A challenge for contemporary health education and communication strategies into the 21st century. *Health Promotion International*, *15*(3), 259–267. https://doi.org/10.1093/heapro/15.3.259

Palumbo, R., Annarumma, C., Adinolfi, P., Vezzosi, S., Troiano, E., Catinello, G., & Manna, R. (2017). Corrigendum to “Crafting and applying a tool to assess food literacy: Findings from a pilot study” [Trends in Food Science & Technology 67 (2017) 173–182](S0924224416304447)(10.1016/j.tifs.2017.07.002). *Trends in Food Science and Technology*, *69*, 190. https://doi.org/10.1016/j.tifs.2017.09.011

Park, D., Park, Y. K., Park, C. Y., Choi, M.-K., & Shin, M.-J. (2020a). Development of a comprehensive food literacy measurement tool integrating the food system and sustainability. *Nutrients*, *12*(11), 1–13. https://doi.org/10.3390/nu12113300

Park, D., Park, Y. K., Park, C. Y., Choi, M.-K., & Shin, M.-J. (2020b). Development of a Comprehensive Food Literacy Measurement Tool Integrating the Food System and Sustainability. *Nutrients*, *12*(11). https://doi.org/10.3390/nu12113300

Paynter, E., Begley, A., Butcher, L. M., & Dhaliwal, S. S. (2021). The Validation and Improvement of a Food Literacy Behavior Checklist for Food Literacy Programs. *International Journal of Environmental Research and Public Health*, *18*(24). https://doi.org/10.3390/ijerph182413282

Perry, E. A., Thomas, H., Samra, H. R., Edmonstone, S., Davidson, L., Faulkner, A., Petermann, L., Manafò, E., & Kirkpatrick, S. I. (2017). Identifying attributes of food literacy: A scoping review. *Public Health Nutrition*, *20*(13), 2406–2415. https://doi.org/10.1017/S1368980017001276

Poelman, M. P., Dijkstra, S. C., Sponselee, H., Kamphuis, C. B. M., Battjes-Fries, M. C. E., Gillebaart, M., & Seidell, J. C. (2018). Towards the measurement of food literacy with respect to healthy eating: the development and validation of the self perceived food literacy scale among an adult sample in the Netherlands. *The International Journal of Behavioral Nutrition and Physical Activity*, *15*(1), 54. https://doi.org/10.1186/s12966-018-0687-z

Renwick, K., & Columbia, B. (2018). *What is Food Literacy ?* 1–8.

Ringland, E. M., Gifford, J. A., Denyer, G. S., Thai, D., Franklin, J. L., Stevenson, M. M., Prvan, T., & O’connor, H. T. (2016). Evaluation of an electronic tool to assess food label literacy in adult Australians: A pilot study. *Nutrition and Dietetics*, *73*(5), 482–489. https://doi.org/10.1111/1747-0080.12271

Rodríguez-Entrena, M., & Salazar-Ordóñez, M. (2013). Influence of scientific-technical literacy on consumers’ behavioural intentions regarding new food. *Appetite*, *60*(1), 193–202. https://doi.org/10.1016/j.appet.2012.09.028

Rosas, R., Pimenta, F., Leal, I., & Schwarzer, R. (2020a). FOODLIT-PRO: Food literacy domains, influential factors and determinants—A qualitative study. *Nutrients*, *12*(1). https://doi.org/10.3390/nu12010088

Rosas, R., Pimenta, F., Leal, I., & Schwarzer, R. (2020b). FOODLIT-PRO: Food Literacy Domains, Influential Factors and Determinants—A Qualitative Study. *Nutrients*, *12*(1). https://doi.org/10.3390/NU12010088

Rosas, R., Pimenta, F., Leal, I., & Schwarzer, R. (2020c). FOODLIT-PRO: Food Literacy Domains, Influential Factors and Determinants-A Qualitative Study. *Nutrients*, *12*(1). https://doi.org/10.3390/nu12010088

Rosas, R., Pimenta, F., Leal, I., & Schwarzer, R. (2021). FOODLIT-PRO: conceptual and empirical development of the food literacy wheel. *International Journal of Food Sciences and Nutrition*, *72*(1), 99–111. https://doi.org/10.1080/09637486.2020.1762547

Rosas, R., Pimenta, F., Leal, I., & Schwarzer, R. (2022). FOODLIT-tool: Development and validation of the adaptable food literacy tool towards global sustainability within food systems. *Appetite*, *168*. https://doi.org/10.1016/j.appet.2021.105658

Sarkis, L. B. da S., Teruel-Camargo, J., Gibbs, H. D., Nakano, E. Y., Ginani, V. C., de Aguiar, A. S., Chaves, C. D. S., Zandonadi, R. P., & Bastos, M. G. (2022). The Nutrition Literacy Assessment Instrument for Brazilians, NLit-Br: An Exploratory Cross-Cultural Validity Study. *Nutrients*, *14*(22). https://doi.org/10.3390/nu14224914

Slater, J., Falkenberg, T., Rutherford, J., & Colatruglio, S. (2018). Food literacy competencies: A conceptual framework for youth transitioning to adulthood. *International Journal of Consumer Studies*, *42*(5), 547–556. https://doi.org/10.1111/ijcs.12471

So, H., Park, D., Choi, M. K., Kim, Y. S., Shin, M. J., & Park, Y. K. (2021). Development and validation of a food literacy assessment tool for community-dwelling elderly people. *International Journal of Environmental Research and Public Health*, *18*(9). https://doi.org/10.3390/ijerph18094979

Spiteri Cornish, L., & Moraes, C. (2015). The impact of consumer confusion on nutrition literacy and subsequent dietary behavior. *Psychology and Marketing*, *32*(5), 558–574. https://doi.org/10.1002/mar.20800

Thompson, C., Adams, J., & Vidgen, H. A. (2021). Are We Closer to International Consensus on the Term “Food Literacy”? A Systematic Scoping Review of Its Use in the Academic Literature (1998-2019). *Nutrients*, *13*(6). https://doi.org/10.3390/nu13062006

Truman, E., & Elliott, C. (2019). Barriers to Food Literacy: A Conceptual Model to Explore Factors Inhibiting Proficiency. *Journal of Nutrition Education and Behavior*, *51*(1), 107–111. https://doi.org/10.1016/j.jneb.2018.08.008

Truman, E., Lane, D., & Elliott, C. (2017). Defining food literacy: A scoping review. *Appetite*, *116*, 365–371. https://doi.org/10.1016/j.appet.2017.05.007

Vamos, S. D., Wacker, C. C., Welter, V. D. E., & Schlüter, K. (2021). Health Literacy and Food Literacy for K-12 Schools in the COVID-19 Pandemic. *Journal of School Health*, *91*(8), 650–659. https://doi.org/10.1111/josh.13055

Versele, V., Debekker, P., Stok, F. M., Aerenhouts, D., Clarys, P., Deforche, B., D’hondt, E., Devlieger, R., Bogaerts, A., & Deliens, T. (2021). Relative importance of determinants of changes in eating behavior during the transition to parenthood: Priorities for future research and interventions. *Nutrients*, *13*(7). https://doi.org/10.3390/nu13072429

Versele, V., Stok, F. M., Aerenhouts, D., Deforche, B., Bogaerts, A., Devlieger, R., Clarys, P., & Deliens, T. (2021a). Determinants of changes in women’s and men’s eating behavior across the transition to parenthood: a focus group study. *The International Journal of Behavioral Nutrition and Physical Activity*, *18*(1), 95. https://doi.org/10.1186/s12966-021-01137-4

Versele, V., Stok, F. M., Aerenhouts, D., Deforche, B., Bogaerts, A., Devlieger, R., Clarys, P., & Deliens, T. (2021b). Determinants of changes in women’s and men’s eating behavior across the transition to parenthood: a focus group study. *The International Journal of Behavioral Nutrition and Physical Activity*, *18*(1), 95. https://doi.org/10.1186/s12966-021-01137-4

Vettori, V., Lorini, C., Milani, C., & Bonaccorsi, G. (2019). Towards the Implementation of a Conceptual Framework of Food and Nutrition Literacy: Providing Healthy Eating for the Population. *International Journal of Environmental Research and Public Health*, *16*(24). https://doi.org/10.3390/ijerph16245041

Watts, S., Lloyd-Williams, F., Bromley, H., & Capewell, S. (2023). Putting a price on healthy eating: public perceptions of the need for further food pricing policies in the UK. *JOURNAL OF PUBLIC HEALTH*. https://doi.org/10.1093/pubmed/fdad152

Wijayaratne, S. P., Reid, M., Westberg, K., Worsley, A., Mavondo, F., Wijayaratne, S. P., Reid, M., Westberg, K., Worsley, A., Mavondo, F., Reid, M., Westberg, K., Worsley, A., & Mavondo, F. (2018). *Food literacy , healthy eating barriers and household diet barriers*. https://doi.org/10.1108/EJM-10-2017-0760

Yoo, H., Jo, E., Lee, H., & Park, S. (2022). Development of a Food Literacy Assessment Tool for Healthy, Joyful, and Sustainable Diet in South Korea. *Nutrients*, *14*(7). https://doi.org/10.3390/nu14071507

Yuen, E. Y. N., Thomson, M., & Gardiner, H. (2018). Measuring Nutrition and Food Literacy in Adults: A Systematic Review and Appraisal of Existing Measurement Tools. *Health Literacy Research and Practice*, *2*(3), e134–e160. https://doi.org/10.3928/24748307-20180625-01

Zareimanesh, B., & Namdar, R. (2022). Analysis of food literacy dimensions and indicators: A case study of rural households. *Frontiers in Sustainable Food Systems*, *6*. https://doi.org/10.3389/fsufs.2022.1019124

Zeminian, L. B., Corona, L. P., Batista, I. D. N., da Silva, M. C., & da Cunha, D. T. (2022). Translation, Adaptation, and Validity of the Short Food Literacy Questionnaire for Brazil. *Foods*, *11*(24). https://doi.org/10.3390/foods11243968

Zhang, Y., Sun, Q., Zhang, M., Mo, G., & Liu, H. (2022). Nutrition Literacy Measurement Tool With Multiple Features for Chinese Adults. *Food and Nutrition Bulletin*, *43*(2), 189–200. https://doi.org/10.1177/03795721211073221

Zhou, B., Liang, S., Monahan, K. M., Singh, G. M., Simpson, R. B., Reedy, J., Zhang, J., Devane, A., Cruz, M. S., Marshak, A., Mozaffarian, D., Wang, D., Semenova, I., Montoliu, I., Prozorovscaia, D., & Naumova, E. N. (2022). Food and Nutrition Systems Dashboards: A Systematic Review. *Advances in Nutrition*, *13*(3), 748–757. https://doi.org/10.1093/advances/nmac022

Zulmi, M. A., & Suzianti, A. (2021). Measuring the Preference of Street Food Consumers on Food Safety Knowledge: An Integrated TPB Approach. *ACM International Conference Proceeding Series*, 88–93. https://doi.org/10.1145/3468013.3468314