

Review Article



Food Literacy in South Korea: Operational Definition and Measurement Issues

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Conflict of Interest

The authors declare that they have no
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ABSTRACT

Since chronic diseases have emerged as a major cause of death worldwide, people has been exposed to large amounts of information on healthy eating practices that are important aspects of its prevention and management. Food literacy, the functional, interactive, and critical ability to manage dietary information with the aim of improving health, is of global interest. In South Korea (hereafter Korea), there is currently a lack of food literacy research, despite its pertinence for the development of public health policies that are tailored to recipients' ability to understand and address health and nutrition issues. In this study, the research trend and policy implications of food literacy are derived through reviewing preceding studies related to food literacy in Korea and elsewhere. Existing literature on food literacy in Korea placed much emphasis on the functional ability of food literacy. Future research on the operational definitions of interactive and critical food literacy and their health effects in Korea is necessary. In addition, there is a lack of research on the development and validation of measurement tools that evaluate integrative concepts of food literacy. To accurately examine the relationships among food literacy, diet, and health, standardized measurement tools that can comprehensively evaluate food literacy frameworks for various Korean sub-population groups should be developed. Based on such future studies, an investigation of health promotion programs or policies on reducing the cognitive burden of food literacy would contribute to improving healthy eating practices in Korea.

Keywords: Health literacy; Healthy eating; Consumer health information; Food labelling; Health education

INTRODUCTION

The high prevalence and mortality rate of chronic diseases are important public health concerns globally. In South Korea (hereafter Korea), chronic diseases account for 80% of all deaths; related medical expenditure accounts for 84% of the country's total medical expenses [1]. Given the non-reversible and untreatable nature of chronic diseases, modern medical systems are changing from a treatment-driven approach to a prevention-driven and self-managing approach [2]. Public awareness of healthcare is also changing from a focus on treating and managing illnesses to further exploring health information available on various channels, including information on diet and, exercise, and applying it of their own volition [3,4].

However, health information can have a negative health impact if it is unreliable or if the consumer is unable to understand it. A survey of health information consumers in Korea found that only 11.8% of people obtained health information from medical experts, while 40.8% and 66.4% obtained it through broadcasting media and the internet, respectively [5]. With this in mind, the importance of health literacy, which is not only about the ability to properly understand health information but to also apply it in a way that improves health, is increasingly highlighted in contexts where a wide variety of health information is available [6]. Food literacy, one of the components of health literacy, is particularly important as dietary and nutritional information is known to be one of the major areas of interest for health information consumers [5].

The Korean government has recognized the importance of “enhancing people's ability to understand and practice healthy diets” to reduce the burden of chronic diseases, and has selected this as a major task area for the promotion of public health and nutrition [7]. Despite the government's efforts, improvement in domestic health and nutrition issues related to literacy, including increases in rate of nutritional education or counseling experience and nutrition-labeling utilization, has been minimal [8]. The inefficiency of the government's policies is largely due to nutrition-related information being provided without considering the target population's ability to understand and utilize it. In fact, a recent study found that the major causes of dissatisfaction with food information was reported as limited information provision and difficulty understanding [9]. However, there is a lack of research in Korea to apply the concept of effective health information provision and health literacy issues in public health nutrition, and more studies are necessary to develop effective strategies for disseminating information on health and nutrition at a level suitable for the average level of health literacy of the target population [10,11].

By reviewing relevant studies on health and food literacy, the current study aimed to compare domestic and international literature in terms of their application of conceptual frameworks and focus areas for the development of food literacy measurement scales, and to identify areas where further research is needed to better apply the concept of food literacy.

HEALTH LITERACY: DEFINITION, MEASUREMENT TOOLS, AND HEALTH EFFECTS

Since “literacy” is a complex and abstract concept [12,13], studies are currently under way to accurately define and measure the availability and impact of health and food literacy to reveal their health impact and availability. Health and food literacy is known to be greatly influenced by race/ethnicity and culture [14,15], which underscores the need to conduct studies that are appropriate to the unique cultural characteristics of Korea. Health literacy studies on antecedents, attributes, and consequences of poor health literacy are actively carried out in Korea, and can serve as reference points for food literacy studies [3,16].

Defining health literacy

Nutbeam and colleagues [17,18] suggested the widely used conceptual definition of health literacy, which divides the concept into functional, interactive and critical health literacy. Functional health literacy is the ability to learn more about health problems by obtaining, understanding, and using health information. Interactive health literacy is the ability to use various forms of communication effectively to obtain, provide, and apply health information,

and individuals with this ability are likely to actively participate in a healthy lifestyle. Critical health literacy is the ability to critically evaluate and reflect on health information and recommendation and to understand and recognize broader social determinants of health. This ability allows people to interpret health information in broad social contexts.

Along with Nutbeam's conceptual model, a recent domestic study suggested that it is important to understand health literacy from an integrated point of view of healthcare including disease management, disease prevention, and health promotion [16]. This research defines health literacy as the ability to find or learn about health information and understand statistical meaning of medical test results-the ability to communicate by writing health-related documents and expressing intentions, and the cognitive and social skills that are needed to navigate and utilize healthcare services. In another study, health literacy was defined as the ability to understand health information and the pursuit, understanding, and utilization of information derived as attributes of the concept [3]. These aspects of health literacy are necessary to actively manage health, prevent disease, and carry out activities for improving health.

Measurement of health literacy

Many studies on the development of measurement scales have been conducted to accurately assess and apply health literacy. In the medical field, the Test of Functional Health Literacy in Adults (TOFHLA) [19] is widely used to evaluate reading ability and numerical comprehension of medical information. The Rapid Estimate of Adult Literacy in Medicine (REALM) [20] is used to assess reading ability in terms of medical terminology. Tools such as the Health Activity Literacy Scale (HALS) [21] and European Health Literacy Survey Questionnaire (HLS-EU-Q) [22] have been developed to track various areas of health information used in everyday life. These tools have been translated and modified to fit the Korean cultural contexts (e.g., Korean Health Literacy Assessment Tool and Korean Functional Health Literacy Test) [6,23]. In addition, unique scales including those measuring health literacy on medication instruction and health risk of heavy metals, have also been developed, reflecting the characteristics and needs of the Korean healthcare system [24,25]

Health effects of health literacy

According to World Health Organization (WHO), health literacy is one of the main determinants of health [26]. Previous studies have shown that people with low health literacy are more likely to have health problems [27] and have more difficulty managing chronic disease conditions than those with high health literacy [28]. The association between health literacy and health has been consistently reported across various Korean studies. For instance, previous research reported that a higher health literacy level was linked to a subjective perception of better health [23,29]. Other studies have also showed that health literacy predicted number of diseases, number of medications [30], level of self-care [31], medication knowledge, and medication abuse [24].

Based on the systemic review of Berkman et al. [32] about health literacy studies, the process through which health literacy affect health and quality of life is demonstrated in **Figure 1** [16]. Health literacy affects the use of healthcare services and health outcomes by affecting risk perception and knowledge, which in turn influence perceived social norms, self-efficacy and health behaviors. It demonstrates the importance of health literacy, which affects the entire health promotion process, from perception and knowledge to behavior. This model could be informative for investigation of the process by which food literacy affects eating behaviors

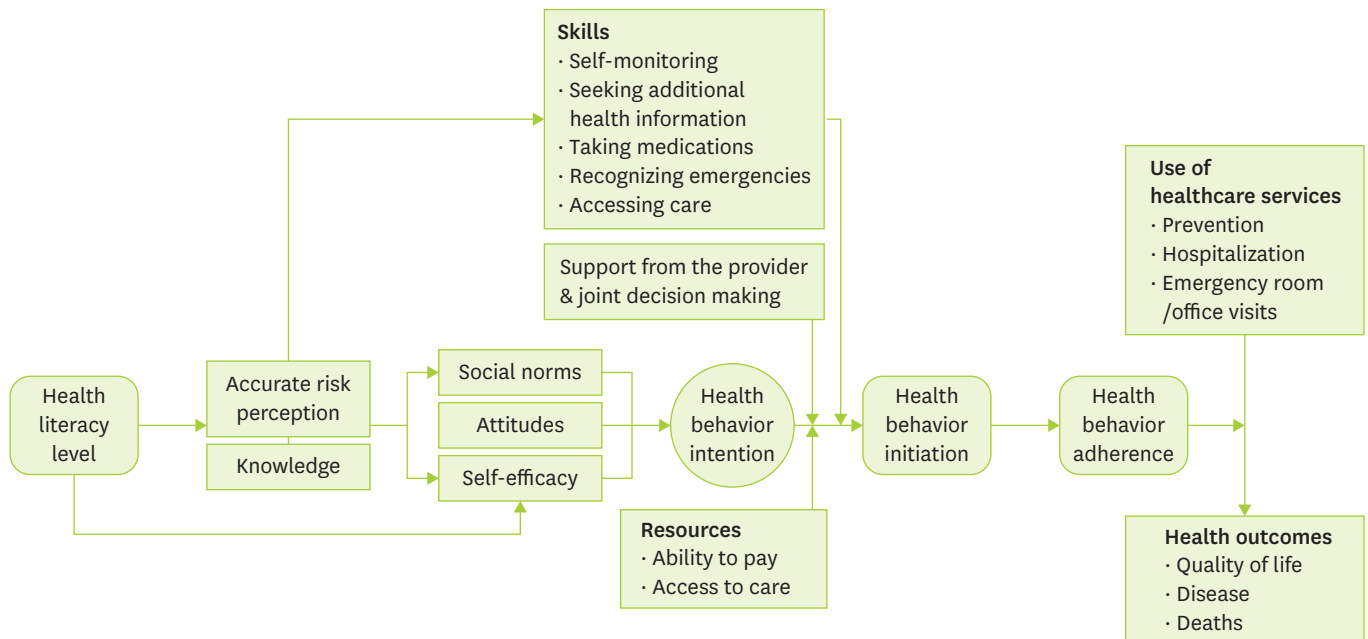


Figure 1. Impact of health literacy on health. Figure was adapted from Berkman et al. (2011) [32].

and health, as the common components of literacy, health behaviors, and health service use in the health literacy model can be applied to an equivalent food literacy model.

FOOD LITERACY DEFINITIONS

Recently, food literacy studies have been evolved from studying its definition as a single construct to investigating integrative frameworks to define various areas in the social and ecological systems that are involved in healthy eating [33]. According to a review article on 67 studies on food literacy [34], most studies have characterized food literacy as an ability to search and understand nutrition-related information. Some studies have examined critical and functional literacy, and there has been an increasing tendency to consider food systems in social or ecological contexts rather than an individual person's ability. In another review [35], 49 food literacy studies were analyzed and 5 main topics derived: 1) food & nutrition knowledge, 2) skills, 3) self-efficacy and confidence, 4) ecological context, and 5) food decision. Finally, in a review of 173 studies by Krause and colleagues [33], food literacy was further classified into the 3 conceptual elements of Nutbeam's health literacy definition [17]: functional, interactive, and critical food literacy.

In Korea, food literacy studies have focused on the concept as an individual's ability to manage their diet, or “dietary management competency” [36]. The latter is defined as a self-care ability that can be viewed as a key skill to be developed over the course of one's education. It comprises the basic ability to manage one's own diet entirely, from food selection to nutrition management, healthcare, and preparation of a sustainable diet in consideration of the environment and others [36,37]. However, this poses limitations in that not only the meaning of the ability to understand information is omitted, but the adaptation of the food literacy framework in the context of social ecological systems was limited.

Table 1. Conceptual framework of food literacy

Research	Food literacy components		
	Functional food literacy	Interactive food literacy	Critical food literacy
Nutbeam (2008) [17]	Understanding and applying information	Communicating and interacting	Critically evaluating information and recognizing social contexts
Vidgen & Gallegos (2014) [13]	<ul style="list-style-type: none"> - Planning and managing (money, time, food intake, nutrition balance) - Selecting (sources, store, quality) - Preparing (cooking, safety) - Eating (understanding impact of food on wellbeing) 	<ul style="list-style-type: none"> - Collaborating in a social way 	<ul style="list-style-type: none"> - Judging or evaluating information about nutrition and food
Cullen et al. (2015) [34]	<ul style="list-style-type: none"> - Recognition ability (searching & understanding) - Functional ability 		<ul style="list-style-type: none"> - Food systems in social or ecological contexts
Azevedo Perry et al. (2016) [35]	<ul style="list-style-type: none"> - Food and nutrition - Knowledge & skills - Self-efficacy and confidence 	<ul style="list-style-type: none"> - Food decisions (dietary behavior) 	<ul style="list-style-type: none"> - Ecological factors (food systems, social determinants of health)
Gréa Krause et al. (2018) [40]	<ul style="list-style-type: none"> - Understanding information & official recommendations - Composing a balanced meal at home 	<ul style="list-style-type: none"> - Finding information - Helping friends with concerns regarding nutritional issues 	<ul style="list-style-type: none"> - Managing information relevant to you - Judging if the media is a trustworthy source of information - Evaluating the longer-term impact of dietary habits on health - Sustainable dietary life
Kim & Lee (2014) [36]	<ul style="list-style-type: none"> - Food selection - Preparation and eating - Nutrition management - Self-assessment 		<ul style="list-style-type: none"> - Sustainable dietary life

Food literacy is a complex concept that not only includes the pursuit, understanding, and utilization of food-related information but also encompasses the dietary environment that makes this possible. Studies in food literacy encourage the use of the well-established health literacy model by Velardo [38] and modify it for specific contexts related to food literacy.

The conceptual framework of food literacy used in previous studies are summarized in **Table 1**. Korean research was found to be insufficient in that it did not address the interactive and critical aspects of food literacy. For example, interactive food literacy includes the ability to communicate nutritional issues and to collaborate socially to help each other in diet improvement. Critical food literacy can be exemplified through judging the reliability of nutritional information, recognizing the effect of the food system, and evaluating the impact of dietary habits on health. Future studies on the role of interactive and critical food literacy in the health of the Korean population are likely to provide rich evidence that can be used to prepare people to better utilize their social and ecological environment to initiate and maintain healthy eating.

DEVELOPMENT AND APPLICATION OF TOOLS MEASURING FOOD LITERACY

Tools for measuring food literacy are actively being developed around the world. The traditional measures mostly focus on a single technique such as nutrition knowledge or cooking skills, and the ability to read and understand nutritional information [12]. While the latest tools measure a wide range of factors related to food literacy, they remain limited due to being tested on samples with limited age ranges [39].

The short food literacy questionnaire (SFLQ) [33,40,41], recently developed for adults is a measurement tool covering the entire range of functional, interactive, and critical factors

related to food literacy: “ability to find nutritional information”, “ability to understand diverse types of nutritional information such as leaflets, food labels, media on nutrition, and oral recommendations from professionals”, “recognizing official dietary guidelines”, “ability to compose a balanced meal at home”, “ability to manage the nutritional information relevant to oneself”, “ability to judge if media information on nutritional issues can be trusted”, and “ability to evaluate whether a specific food or dietary habits are healthy”. In another study, Jacob and colleagues developed the self-perceived food literacy (SPFL) scale [42]. This scale was developed to assess the food literacy level of individuals, including the collection of interrelated knowledge, skills and behaviors to plan, manage, select, prepare and eat food healthily. It covers the following aspects: “food preparation skills”, “resilience and resistance”, “healthy snack styles”, “examining food labels”, “healthy budgeting”, and “healthy food stockpiling”. Nevertheless, few comprehensive tools to measure food literacy within a broad socio-ecological system are available [40]. Further studies on the relationship between food literacy, dietary intake and health effects are necessary the development of comprehensive and evidence-based tools.

In Korean research on the subject, the measure for dietary management competency developed by Kim and Lee [36] is the most widely used. Dietary management competency can be defined as basic living ability to manage the whole dietary life, from food choice to nutrition and health management, as well as setting up a sustainable pattern of diet by oneself. This tool divides dietary management competency into 5 areas: food selection, meal preparation, nutrition management, sustainable eating, and self-health assessment. In a separate study [43] a 22-item questionnaire measuring dietary management competency was developed, deriving similar focus areas through factor analysis. Questions that assess dietary management competency were classified into 4 groups: dietary knowledge, cooking, dietary hygiene and safety, and environment. While both tools are in use in Korea, no validation studies have been carried out. In addition, these 2 tools do not include a comprehensive range of factors related to food literacy and are limited only to aspects of functional food literacy. They were also not designed to assess different dietary needs and contexts across the lifespan. A standardized measurement tool, relevant to the Korean context, that can comprehensively evaluate food literacy across different stages of life needs to be developed [36,43].

RESEARCH TRENDS IN FOOD LITERACY

To the best of our knowledge, there has been no study to directly examine food literacy in Korean nutrition science literature [36,43-48]. However, there has been relevant studies on dietary life competency that can be linked with food literacy skills or functional aspects of food literacy (**Table 1**). For example, several descriptive studies evaluated the “dietary life competency” of the subjects. Dietary life competency can be defined as basic living ability to manage the whole dietary life from food choice to nutritional and health management as well as setting up a sustainable pattern of diet by oneself [36]. In one study on development of a nutrition education program, the concept was redefined as “dietary management competency” to more accurately convey the meaning of one’s ability to self-manage a healthy diet [47]. Although these studies have recognized the importance of food literacy and cited its conceptual discussions, they did not adapt the integrative concept of food literacy on its own but followed previous literature focusing on teaching practical skills for managing diet without considering broad contexts underlying acquisition and usage of information on nutrition and health.

Korean food literacy research in Korea has largely been restricted to educational fields and study subjects were limited to students, their parents, and university students as prospective educators within the contexts of educational institutes. Previous experimental studies examined the effects of dietary education programs on dietary management competency. The dietary education programs focused on improving the recipients' dietary management competency, especially the teaching ability of pre-service teachers [46-48]. More studies on positive and negative health effects of food literacy levels outside of educational settings are needed to advance the health literacy literature in Korea.

International food literacy studies have been conducted in the fields of nursing, public health, and nutrition education, among others. International studies are also being conducted to draw policy implications by investigating the association among food literacy, nutrition, and health [12], or by developing programs to improve health through enhancing food literacy in a variety of populations [49]. In contrast to the absence of research on the concept and measurement tools of food literacy in Korea, there have been many international studies on standardized measurements of food literacy such as the SFLQ [40] and SPFL scale [42].

A CONCEPTUAL MODEL FOR THE RELATIONSHIP BETWEEN FOOD LITERACY AND NUTRITION

Using earlier assessments of food literacy, previous studies have reported the positive relationship between food literacy and healthy dietary intake among various populations [12]. For example, adolescents with good food knowledge and a habit of preparing their own food showed healthy dietary practices. However, other studies have had mixed findings. While the frequency of helping to prepare dinner was associated with healthy diet, the frequency of buying food was related to practicing a less healthy diet. These studies improved our understanding of factors relevant to food literacy, thereby contributing to the formulation of a conceptual model for the relationship between food literacy and nutrition. According to Vidgen and Gallegos [37], food literacy affects nutrition and health status through the following parameters: “vegetable and fruit consumption”, “frequency of using basic ingredients for preparation of meals”, “confidence in cooking”, “buying less convenience foods”, “increased likelihood of tasting and experimenting with new foods”, and “increased awareness of food preparation a production”. Their suggested mechanism underlying the relationship between food literacy and nutrition is presented in **Figure 2**.

The food literacy studies in Korea reported a significant correlation between healthy dietary habits and food literacy. The group with higher food literacy scores showed healthier dietary habits and more frequent cooking than their counterparts. Food literacy was associated with individual characteristics such as socioeconomic status [36], gender [44], and personality [45] in a Korean population sample of various age groups. Another study reported that there was a significant difference in food purchasing behavior and eating habits of elementary school students according to their dietary management attitudes, which was defined as the positive perceptions and interests in dietary management such as food purchasing, meal preparation, diet, and cleaning-up after a meal [50]. However, there is still a lack of comprehensive studies that can show the unique mechanisms underlying the health effects of food literacy in Korean populations with different nutritional needs and life contexts.

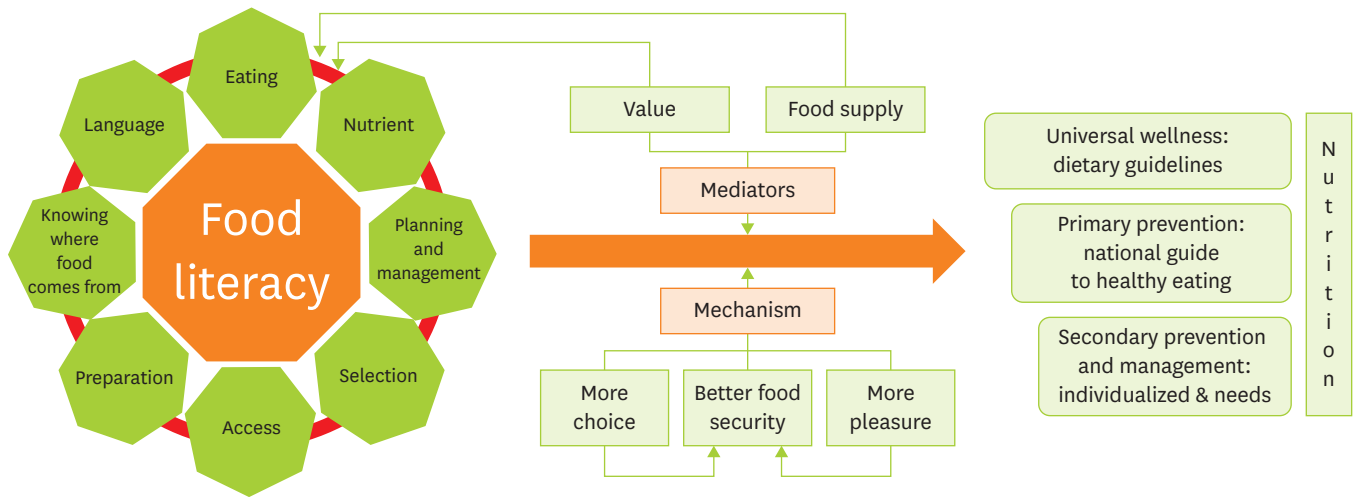


Figure 2. A conceptual model for the relationship between food literacy and nutrition. Figure was adapted from Vidgen and Gallegos (2011) [37].

HEALTH PROMOTION THROUGH FOOD LITERACY

Studies on food literacy enhancement programs reported that interventions focusing on the core concept of food literacy and incorporating appropriate techniques to suit different generations is likely to have a positive effect on dietary habits [49]. Improvements in food literacy are likely to induce changes in dietary habits, especially for adolescents at critical points of development in cognition and self-management skills [51]. Past nutrition education programs have used an approach that conveys knowledge based on nutritional science such as type of nutrients in food [52]. This traditional approach, however, has created a gap between knowledge and practice due to lack of skills and experience [12,52]. Thus, approaches using food literacy, as an ability to use knowledge to practice healthy eating behaviors as well as acquire knowledge related to diet, is expected to be more effective for helping individuals establish healthy eating practices [13,53].

A systemic review of 545 articles on food literacy programs for adolescents [49] found the role of food literacy in positive changes in dietary habits and recommended that food literacy should be incorporated in adolescents' dietary intervention programs. However, the review recognized the lack of relevant research on the degree to which food literacy should be included in the interventions, as well as the lack of appropriate measurements for adolescent-specific food literacy. Future studies on these topics would assist in increasing the effectiveness of program design and, evaluation methods, and to evaluate food literacy changes over time.

Previous studies that are related to food literacy were summarized in **Table 2**. Most studies examined the effects of dietary educational programs in school settings. Although earlier Korean studies reported an improvement in dietary management competency and dietary education ability after a dietary education program, dietary habits remained unchanged after the program in one of the studies [47]. This result may be due to the limitation of the programs, but the level of food literacy should be incorporated in future studies on nutrition educational programs in order to verify if poor food literacy acts as a barrier to convert dietary knowledge into action.

Table 2. Included studies on food literacy in Korea

Authors (year)	Study field	Contents	Study design	Population	Instrument
Kim & Lee (2014) [36]	Education	Evaluation of dietary habits and dietary management competency of elementary school students.	Descriptive	Elementary school students	Dietary management competency (20 questions)
Kim & Lee (2015) [44]	Food science	An evaluation of dietary habits and dietary management competency of elementary school parents.	Descriptive	Adults (parents)	Dietary management competency (20 questions)
Kim & Kim (2016) [46]	Education	Prospective elementary teachers' evaluation of a dietary life education program for improving their dietary life education, food literacy, and agricultural literacy.	Experimental	University students	Dietary management competency (20 questions)
Jung (2016) [47]	Education	The development and evaluation of a dietary education program for preservice elementary teachers.	Experimental	University student	Dietary management competency (20 questions)
Lee (2017) [45]	Education	A study on dietary life competency and personality of 6th grade elementary school students in Gwangju.	Descriptive	Elementary school students	Dietary management competency (20 questions)
Kim & Kim (2018) [48]	Education	The effects of a dietary life education program for prospective elementary teachers.	Experimental	University student	Dietary management competency (20 questions)
Kim (2018) [43]	Education	The awareness of the dietary education and dietary management competency of (preliminary) teachers in primary and secondary schools.	Descriptive study	University student	Dietary management competency (22 questions)

CONCLUSION

Food literacy is the functional, interactive, and critical ability to manage dietary information with the aim of improving health. Individual factors such as socioeconomic status, education level, and gender have been associated with food literacy. The higher the food literacy, the more beneficial the effects of practicing a healthy diet. However, this review of studies on food literacy in Korea showed that domestic research on the subject was insufficient to further the public health goal of improving health through food literacy. First, it is necessary to derive the core concept of food literacy and develop effective measurement tools that can accurately assess its multi-dimensional aspects. Specifically, research on food literacy should be expanded with regards to the interactive and critical aspects of food literacy, in addition to its functional aspect. Developing accurate measurement tools for food literacy and taking an integrative approach will set a solid foundation for the development of effective programs that utilize food literacy to promote healthy eating.

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