

2.º CICLO

NUTRIÇÃO COMUNITÁRIA E SAÚDE PÚBLICA

Health professionals' cooking skills and their relevance in the transmission of health messages.

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Habilidades culinárias dos profissionais de saúde e sua relevância na transmissão de mensagens de saúde.

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Dedicatória

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Resumo

Introdução: As habilidades culinárias (HC) têm sido amplamente debatidas nas últimas duas décadas, com crescente atenção à sua importância na nutrição e na saúde pública. As HC envolvem competências físicas, cognitivas e comportamentais essenciais para o planejamento de refeições, preparação de alimentos e modificação de receitas. O declínio das práticas tradicionais de culinária, impulsionado por mudanças socioeconômicas, com a redução de hábitos alimentares saudáveis e o aumento da prevalência de doenças crônicas não transmissíveis (DCNT), está colocando uma pressão substancial nos sistemas de saúde pública e necessita de intervenções inovadoras. As evidências sugerem que os programas de intervenção culinária podem aumentar a autoeficácia e promover comportamentos alimentares mais saudáveis. No entanto, existe uma lacuna significativa no treinamento culinário prático de profissionais de saúde, o que dificulta sua capacidade de fornecer aconselhamento dietético eficaz. A incorporação de HC nos currículos de saúde pode preencher a lacuna entre o conhecimento teórico sobre alimentação e nutrição e a aplicação culinária prática e, subsequentemente, pode auxiliar na transmissão de mensagens de saúde.

Objetivos: 1) realizar uma revisão sistemática para identificar estudos que já tenham discutido HC em profissionais de saúde; 2) realizar discussões em grupos focais entre estudantes e profissionais de nutrição para entender as dificuldades nas HC e o impacto na transmissão de mensagens de saúde.

Metodologia: O estudo envolveu duas fases: uma revisão sistemática que seguiu o protocolo de checklist *Preferred Reporting Items for Systematic Reviews and Meta-Analyses* (PRISMA) e cuja busca foi realizada nas bases de dados Scielo, Pubmed, Scopus e Web of Science, e além de livros na biblioteca base, FCNAUP SID; um estudo qualitativo sobre HC, utilizando a técnica de grupo focal, com estudantes e profissionais de nutrição (n=19).

Discussão e Resultados: Na Revisão Sistemática a busca identificou 534 estudos potencialmente relevantes, dos quais 9 preencheram os critérios de inclusão. 5 estudos relataram o uso de um estudo piloto para desenvolver ferramentas que mensuram a HC em profissionais de saúde, 3 estudos conduziram e avaliaram cursos para profissionais de saúde e 1 estudo realizou um estudo piloto qualitativo. Os estudos analisados abordam tópicos como integração da HC na formação profissional, perspectivas dos profissionais de saúde e avaliação dos impactos dessas habilidades. Eles usam uma variedade de métodos, incluindo questionários, workshops e avaliações de programas.

O presente estudo qualitativo, com a técnica de grupos focais, envolveu dezenove participantes, explorando suas HC, percepções da mídia culinária e a adequação da educação acadêmica nutricional. Os participantes destacaram a importância de integrar o treinamento culinário aos currículos de nutrição, enfatizando a necessidade de habilidades culinárias práticas para promover uma alimentação saudável. O estudo revelou um consenso sobre a necessidade de treinamento mais robusto e oportunidades de pós-graduação, identificando lacunas significativas na educação acadêmica nutricional atual.

Conclusões: Estes estudos enfatizam o papel crítico das HC para profissionais de saúde, particularmente nutricionistas. Tanto a revisão sistemática como os grupos focais revelaram lacunas significativas no treinamento em HC, cobertura acadêmica limitada e oportunidades de pós-graduação insuficientes. As descobertas destacam a necessidade de uma educação acadêmica aprimorada em HC para capacitar os profissionais na promoção de práticas alimentares saudáveis.

Palavras-Chave: Habilidades culinárias; Revisão; Profissionais de saúde; Pesquisa Qualitativa; Alfabetização Alimentar; Profissionais de Nutrição.

Abstract

Introduction: Cooking skills (CS) have been widely debated over the past two decades, with growing attention to their significance in nutrition and public health. CS involve physical, cognitive, and behavioral competencies critical for meal planning, food preparation, and recipe modification. The decline of traditional cooking practices, driven by socio-economic shifts, with the reduce in healthy eating habits and an increase prevalence of non-communicable diseases (NCD), is placing a substantial strain on public health systems and necessitating innovative interventions. Evidence suggests that cooking intervention programs can enhance self-efficacy and foster healthier dietary behaviors. Nonetheless, a significant gap exists in the practical cooking training of healthcare professionals, which hinders their capacity to deliver effective dietary counseling. Incorporating CS into healthcare curricula could bridge the gap between theoretical food and nutrition knowledge and practical culinary application, and subsequently may aid in the delivery of health messages.

Objectives: 1) to perform a systematic review to identify studies that have already been discussing CS in health professionals; 2) to perform focus groups discussions among nutrition students and professionals to understand CS difficulties and the impact on the transmission of health messages.

Methodology: The study involved two phases: a systematic review that followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) checklist protocol and whose search was performed in Scielo, Pubmed, Scopus and Web of Science databases, and in addition books in the library base FCNAUP SID; a qualitative study on CS, using the focus group technique, with nutrition students and professionals (n=19).

Discussion and Results: In the Systematic Review the search identified 534 potentially relevant studies, of which 9 met the inclusion criteria. 5 studies reported using a pilot study to develop tools that measure CS in health professionals, 3 conducted and evaluated courses to health professionals and 1 study carried out a qualitative pilot study. The studies analyzed address topics such as integration of CS into professional training, perspectives of health professionals, and assessment of the impacts of these skills. They use a variety of methods, including questionnaires, workshops, and program evaluations.

The present qualitative study, with the focus group technique, involved nineteen participants, exploring their CS, perceptions of cooking media, and the adequacy of academic nutrition education. Participants highlighted the importance of integrating culinary training into nutrition curricula, emphasizing the need for practical cooking skills to promote healthy eating. The study revealed a consensus on the necessity of more robust training and post-graduate opportunities, identifying significant gaps in current nutrition education curricula.

Conclusions: These studies emphasize the critical role of CS for healthcare professionals, particularly nutritionists. Both the systematic review and the focus groups revealed significant gaps in CS training, limited academic coverage, and insufficient post-graduation opportunities. The findings highlight the need for improved CS academic education to empower professionals in promoting healthy dietary practices.

Keywords: Cooking Skills; Review; Health Professionals; Qualitative Research; Food Literacy; Nutrition Professionals.

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List of Abbreviations

APN - Portuguese Nutrition Association

COVID-19 - Coronavirus Disease 2019

CS - Cooking Skills

DCNT - Doenças crônicas não transmissíveis

FCNAUP - Faculty of Nutrition and Food Sciences of the University of Porto

FICF - Free Informed Consent Form

HC - Habilidades Culinárias

NCD - Non-Communicable Diseases

ON - Portuguese Professional Order of Nutritionists

P - Participant

PRISMA - Preferred Reporting Items for Systematic Reviews and Meta-Analyses

PROSPERO - Prospective Register of Systematic Reviews

UP - University of Porto

WHO - World Health Organization

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1.Introduction

The topic of Cooking Skills (CS) has been extensively studied and debated for over two decades, with growing attention in the past ten years. Considerable discourse has emerged regarding the conceptualization of Cooking Skills, alongside attempts to define "Cooking" itself. The definition can vary widely, from the basic act of applying heat to transform raw ingredients, to more intricate interpretations depending on the analytical framework employed ⁽¹⁻⁶⁾.

In food and nutrition education, the shift from theoretical knowledge to practical implementation is essential. An individual's capacity to apply dietary information is directly related to their proficiency in food preparation and culinary techniques. Consequently, cooking skills should be regarded as a core component of the broader concept of food and nutrition literacy ⁽⁶⁻⁸⁾.

A notable example of research that conceptualized these ideas through a graphic representation is the Food Literacy Wheel (Figure 1), which places the definition of food literacy at its core. Key components of food literacy, as illustrated in the wheel, include "cooking skills", "preserve and analyze", "choice and acquisition", and "search and plan". Furthermore, the Food Literacy Wheel incorporates the domain of knowledge, distinguishing between "procedural knowledge" and "declarative knowledge" ⁽⁹⁾.

This investigation chose to use a broader definition of CS that's involve a multifaceted combination of physical dexterity, knowledge, and behavioral abilities that enable individuals to effectively navigate the culinary process in their daily lives. These skills range from meal planning, purchasing ingredients, and ensuring food safety to adapting recipes based on family preferences and

understanding how to balance flavors and textures. Confidence is also a crucial and foundational factor in the development of an individual's CS ^(3, 5, 6, 10).

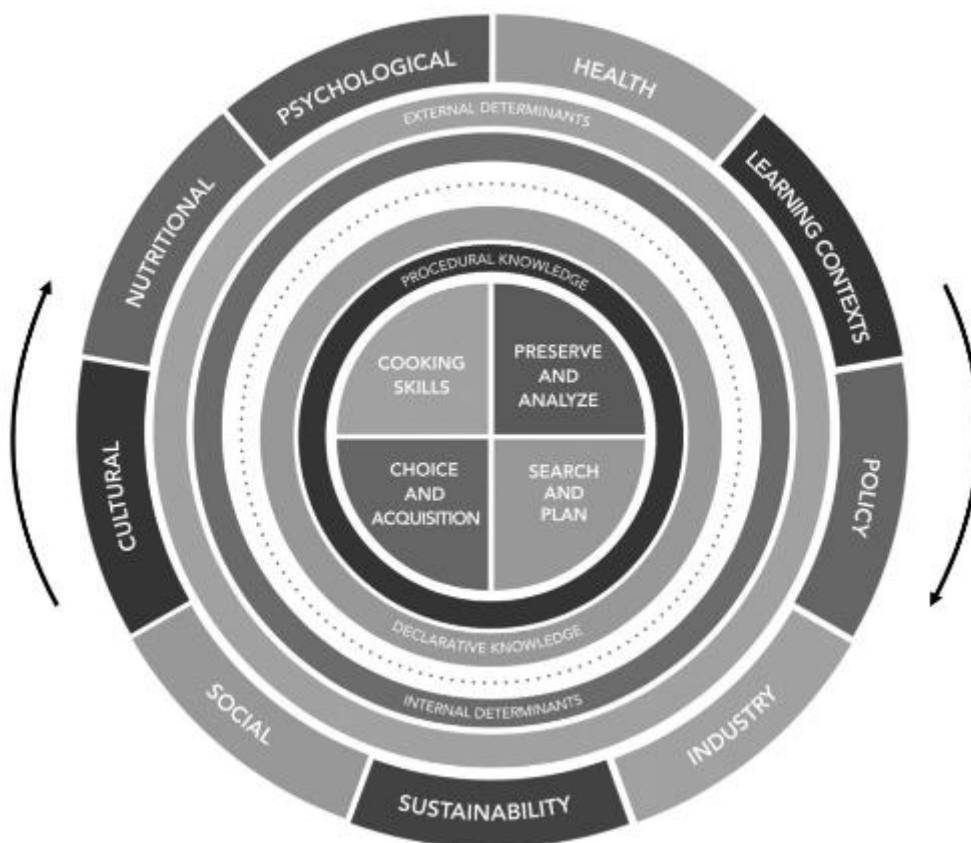


Figure 1. Food Literacy Wheel (Extracted from Rosas, 2021) ⁽⁹⁾.

Historically, the transmission of CS was deeply rooted in family structures, where knowledge was passed down through generations, often from mother to daughter. However, economic and social changes, particularly the Industrial Revolution and the increased workforce participation of women, have restructured traditional cooking practices ⁽²⁾. As a result, many families now rely more heavily on processed foods and ready-to-eat meals, leading to a decline in CS across generations and an increase in fast food consumption in daily diets ^(2-5, 11).

As early as 1996, doctors and nutritionists expressed concern that “more people are killing themselves with a fork and spoon than by any other means”, further emphasizing that “they are actually killing themselves with can openers and microwave” ⁽¹⁾. By 1999, Caraher ⁽²⁾ observed that, regrettably, fast food had become the default solution for food consumption, particularly among individuals who either lacked the time to cook or were disinterested in acquiring cooking skills.

This transformation in cooking habits coincides with a growing public health crisis: the rise of non-communicable diseases (NCD). NCD, including heart disease, diabetes, and cancer, are the leading cause of death worldwide, responsible for an estimated 41 million deaths annually according to 2023 data from the World Health Organization (WHO), representing 74% of global mortality ⁽¹²⁾. A major risk factor for these diseases is inadequate dietary patterns, which are closely tied to the rise in ultra-processed food consumption and the decreasing prevalence of home-cooked meals ^(1, 3, 13).

Over the past few decades, concerns about the progressive increase in NCD, as well as associated diseases across various age groups, have been well-documented ^(13, 14). Despite growing awareness of these issues, public health systems worldwide continue to be overburdened by the prevalence of NCD, prompting the need for innovative and practical approaches to combat these challenges ⁽¹⁵⁾.

Nutritional education programs effectively prevent NCD and involve participants, their families, and communities ⁽¹⁶⁻¹⁸⁾. Cooking programs as Cooking Camp ⁽⁴⁾, Cook Like a Chef ⁽¹⁹⁾ and others ^(11, 20) can enhance culinary engagement. These programs improve CS and boost confidence in home food preparation.

Individuals with robust CS, with confidence or frequency in cooking food at home, are more likely to adopt healthier diets, characterized by higher fruit and vegetable intake and a greater awareness of nutritious food choices ^(4-6, 19).

It is crucial to have practical skills in food preparation. Nutrition professionals' recommendations on healthier food preparation are useless without consumers having the necessary skills ⁽³⁻⁵⁾. The literature shows that less individual's CS is something that will impact negatively on the type of food that is consumed ^(4-6, 13, 19).

Preparing meals with unprocessed foods requires individuals to engage in advance preparation, such as washing and cleaning vegetables, a step often unnecessary with processed or ultra-processed foods, which demand minimal culinary effort. This discrepancy in preparation time can be a contributing factor to the challenge of adopting healthy eating habits ^(6, 21-23).

Many people lack the practical skills needed to prepare healthy meals, contributing to their reliance on convenient, processed options that are typically high in fats, sugars, and salts ^(3, 24). As a result, cooking shows, magazines, and social media have emerged as tools for educating people about food preparation, yet these platforms may not suffice for those lacking basic skills, appropriate equipment, or an understanding of how to source healthy ingredients ^(3-5, 11, 13, 19).

Furthermore, while nutrition intervention programs often focus on promoting healthier habits, they frequently overlook the importance of practical culinary training. This gap is particularly concerning in the context of healthcare professionals, who are often expected to provide dietary guidance but may lack the basic CS necessary to offer practical, real-world advice to patients ⁽²⁵⁻²⁷⁾.

Studies have shown that one of the barriers patients face in making healthier food choices is the lack of simple, actionable cooking guidance provided by their healthcare providers ^(27, 28). Despite the assumption that nutrition professionals possess adequate CS due to their academic training, limited research exists on the actual culinary competencies of this group. This gap raises critical questions about their ability to transmit effective culinary knowledge to the public, especially considering the increasing prominence of cooking skills ⁽²⁹⁾.

Given these concerns, it is essential to evaluate the necessity of incorporating CS into the training of healthcare professionals, empowering them to bridge the possible gap between scientific and food nutrition knowledge and practical culinary application. By equipping professionals with the necessary skills, they can play a pivotal role in promoting healthier dietary habits within their communities, offering concrete solutions to address the dietary risk factors contributing to NCD ⁽²⁵⁻²⁸⁾.

Some studies ^(14, 29-34) have demonstrated that CS training for health professionals enhances their perceived abilities in dietary and lifestyle counseling, improves interdisciplinary communication, and deepens their understanding of nutrition and food preparation. Additionally, such training strengthens their capacity to promote healthy lifestyles and wellness within the community. These experiences have also been shown to increase health professionals' awareness of their own eating habits, equipping them to better assist patients in making healthy changes ^(14, 29-34).

McWhorter (2022) ⁽²⁹⁾ identified a gap in the literature concerning the training of nutritionists in culinary skills. However, the increasing popularity of this topic presents a unique opportunity for these professionals to enhance patient

outcomes in clinical or community settings through effective implementation. While most dietitians receive training and information in nutrition and food science, the development and instruction of culinary skills can enable these professionals to emerge as leaders within CS programs ^(29, 35, 36).

The approach of emphasizing the enhancement of CS among healthcare professionals is particularly compelling, considering the limited number of studies on the topic. In exploring this subject, qualitative data offers valuable details and context, allowing for a deeper understanding of the phenomena being analyzed. This methodology is instrumental in explaining underlying reasons behind outcomes, such as perceptions, motivations, and nuanced interpretations of human behavior ⁽³⁷⁾.

Documentary research is a form of qualitative analysis in which documents serve as the primary sources of investigation. This approach allows for the extraction of valuable information, facilitating the expansion and integration of understanding from different authors and perspectives. The methods employed in documentary research can vary depending on the techniques selected by the researchers, which must be suited to the appropriate handling and analysis of the documents. Among documentary research is the systematic review, which uses primary studies, that is, scientific articles that report the results of original research ^(38, 39).

Another widely employed method of qualitative analysis for information collection is the focus group technique, which serves as a valuable complementary strategy, particularly in evaluative research. The focus group has gained prominence as a methodology in social research, and its use in the health field has become increasingly common since the mid-1980s. This approach facilitates open

discussions among participants centered around a specific theme, enabling the exploration of diverse perspectives ⁽⁴⁰⁾.

The combination of systematic review and focus group methods on this investigation enhances both the breadth and depth of qualitative analysis. The systematic review offers a structured approach to synthesizing existing studies, identifying patterns, and highlighting gaps in the literature ⁽³⁹⁾. In contrast, the focus group provides a dynamic setting for gathering diverse, enriching the understanding of nuanced viewpoints ⁽⁴⁰⁾. Together, these methods complement each other, offering a comprehensive exploration of Cooking Skills by integrating evidence from literature with participant insights.

This investigation aims to explore these issues through health professionals, providing valuable insights into culinary competencies and the broader implications for public health and disease prevention.

2.Objectives

The general objective of the present study was to understand the cooking skills difficulties of health professionals and how these impact on the transmission of health messages to the population.

The specific objectives were defined as: 1) to perform a systematic review to identify studies that have already been discussing cooking skills in health professionals, particularly in diet and nutrition professionals; 2) to perform focus groups discussions among diet and nutrition students and professionals to understand their cooking skills difficulties and how these impacts on the transmission of health messages to the population.

3. Methodology, Results and Discussion

The development of this dissertation, aligned with the defined objectives, resulted in the production of two manuscripts, which are presented in this chapter to detail the methodology, report the findings, and provide a discussion of the results obtained.

Manuscript 1- Cooking Skills in Health Professionals: A Systematic Review.

Manuscript 2 - Nutrition Professionals' Cooking Skills and their relevance in the transmission of Health Messages

3.1 Manuscript 1

COOKING SKILLS IN HEALTH PROFESSIONALS: A SYSTEMATIC REVIEW

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Abstract

Cooking skills (CS) encompass both physical and behavioral abilities, and their transmission has evolved due to social changes and the rise of fast food as a convenient but unhealthy option. Intervention programs have shown promise in improving CS, promoting balanced diets, and reducing reliance on processed foods. However, studies have less focus on the CS that health professionals have in teaching and imparting CS. This study carried out a systematic review to identify what has already been discussed about it. The objective of this study was to understand the culinary difficulties of health professionals. PRISMA guidelines were followed and Scielo, Pubmed, Scopus and Web of Science databases and books in the library base FCNAUP SID were selected between 2018 and 2023. The search identified 534 potentially relevant studies, of which 9 met the inclusion criteria. 5 studies reported using a pilot study to develop tools that measure CS in health professionals, 3 conducted and evaluated courses to health professionals and 1 study carried out a qualitative pilot study. The studies analyzed address topics such as integration of CS into professional training, perspectives of health professionals, and assessment of the impacts of these skills. They use a variety of methods, including questionnaires, workshops, and program evaluations. Study

results suggest that developing CS can improve professionals' nutritional understanding, practical skills, and eating behaviors, potentially benefiting community health.

Keywords: Cooking Skills; Review; Health Professionals; Food Preparation; Culinary Inheritance; Food Literacy.

INTRODUCTION

Cooking skills (CS) at home involve physical skills, knowledge, and behavioral skills, combining the person who cooks and their environment, practical experience, adaptation to meet family preferences, planning for buying and cooking food, knowledge of food safety, and knowing how to combine flavors and textures [1, 2].

Due to changes in the economy and society, such as the Industrial Revolution and women working outside the home, the transmission of CS has been restructured over time. Cooking was once associated with women's domestic life, but social movements in the 20th century aimed to free them from these tasks [3]. Men are more involved in household chores and cooking nowadays, and the traditional transmission of cooking skills from mother to daughter is being lost [1, 3-5].

An article, in 1996, expressed concern among nutrition researchers and educators at the time, regarding cooking, about the decline of CS, with fewer young people being educated on these. At that time, the expansion of the ultra-processed food market across Europe was already noticeable, in which fast food was increasingly dominating household diets [6].

Stitt (1996) modifies a statement previously made by doctors and nutritionists that “more people are killing themselves with a fork and spoon than by any other means”, addressing that “they are actually killing themselves with can openers and microwave” [6]. Caraher (1999) found that, unfortunately, fast food is often the easiest solution for those who lack CS and don't have the time or interest in learning to cook [3].

Cooking shows can educate viewers by showing food preparation and cooking techniques, not just entertainment, as well as cooking books and magazines. Consumers may struggle to choose and consume healthy foods due to a lack of CS, which can result in an inferior product even with proper equipment and ingredients [1, 5, 7].

Nutrition intervention programs traditionally aim to change attitudes and behaviors, for example, but it is not enough to only have knowledge about nutrition and healthy habits. It is also crucial to have practical skills in food preparation. Nutrition professionals' recommendations on healthier food preparation are useless without consumers having the necessary skills [1, 8, 9].

Cooking programs as Cooking Camp [8], Cook Like a Chef [10] and others [11 12] can enhance culinary engagement. These programs improve CS and boost confidence in home food preparation [8-10]. Moreover, nutritional education programs effectively prevent chronic non-communicable diseases and involve participants, their families, and communities [13-15]. Individuals who have CS are more likely to consume a balanced diet and less to rely on ultra-processed foods [8-10, 16].

Culinary skills programs are important, but studies have less focus on the skills that healthcare professionals and students have in teaching or imparting

culinary skills [17, 18]. They were also people who had this modified and restructured [1, 3]. Health professionals who acquire CS have the chance to bridge their scientific knowledge with people's lives and promote healthy eating. Health courses should review their pedagogical proposals to train qualified professionals who improve food quality and ensure the right to adequate food [19].

OBJECTIVES

The general objective of the present study is to understand the cooking skills difficulties of health professionals. The specific objective was defined as: to perform a systematic review to identify studies that have already been discussing cooking skills in health professionals, particularly in diet and nutrition professionals.

METHODOLOGY

The protocol of this systematic review was registered on the International Prospective Register of Systematic Reviews (PROSPERO) database [20] (registration number CRD42023492997) and is available in Appendix A. A systematic review, using the checklist PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) [21], was conducted on the concept of CS and which tools already exist to evaluate the concept in adults health professionals.

This literature review encompasses articles published up to January 18, 2024, in databases such as Scielo, Pubmed, Scopus and Web of Science, in addition to books in the base library, FCNAUP SID, of the Faculty of Nutrition and Food Sciences of the University of Porto. Additionally, the references within the

located articles were annexed to ensure the inclusion of any potentially overlooked studies.

The search terms included in all databases were: (“cooking skills” or “learning” or “food preparation” or “teaching styles” or “food literacy” or “cooking abilities” or “culinary inheritance” or “validation studies”) and “health professionals”.

Study selection

This review encompassed articles meeting the following criteria: 1) addressing cooking skills in health professionals; 2) provide descriptions of the study and analysis processes, whether original or adapted. No restrictions were applied based on publication year, country of origin, or language. Articles that introduced original instruments or reported on cross-cultural adaptations of tools designed to measure cooking skills in children and adolescents, or those whose instruments were inaccessible (either within the article or upon request to the authors), were excluded.

For initial, two authors independently screened citation abstracts and titles to identify potentially relevant studies. Full-text articles were obtained and reviewed for further assessment in accordance with the inclusion and exclusion criteria. Any uncertainties or disagreements between the reviewers concerning article inclusion or exclusion were resolved by a third reviewer. In cases where the full text was unavailable, the contact with corresponding authors via email or other means, such as ResearchGate [22], were attempted.

Data extraction and analysis

Two authors independently conducted data extraction using a preformatted spreadsheet within EndNote. In cases of disagreements or uncertainties during this

process, a third reviewer intervened to compare the data extracted by the two reviewers. If discrepancies arose, the third reviewer facilitated a discussion between the two authors to clarify their interpretations. If an agreement could not be reached by the two reviewers, the third reviewer would provide their perspective. Additionally, the third reviewer was consulted to address any uncertainties related to the inclusion of potentially pertinent articles identified at this stage of the systematic review.

The information extracted encompassed descriptive study details, including the year of publication, country of origin, the purposes under study, profession of the participants, sample size, type of analyses, development methodology, statistical analyses, and main results.

RESULTS

Search results

The electronic search identified 534 potentially relevant studies, and after removing duplicate articles, 459 articles remained for analysis. Following the initial screening based on titles and abstracts, 349 articles were deemed irrelevant due to their lack of relevance to human health (e.g., veterinary medicine), association with alternative health topics (e.g., enzymes, vaccines), or duplication, resulting in 110 articles eligible for subsequent analysis. Within this subset, 29 articles pertained to nutritional literacy concepts, it does not include cooking skills, family dynamics, children, or adolescents, while 81 articles focused on adult populations, with 26 addressing health professionals. Of the articles concerning health professionals, 2 were inaccessible in full text, prompting requests from the authors.

After reviewing the titles and abstracts, 26 articles were full-text examined and 10 were excluded due to participant inclusion from non-health-related fields or can not having participants in the research, 6 were excluded as the studied phenomena were unrelated to cooking skills or were for a specific disease, and 1 were still inaccessible in full text, so it was excluded of the research. Subsequently, 9 articles meeting the study's criteria were selected for further detailed evaluation.

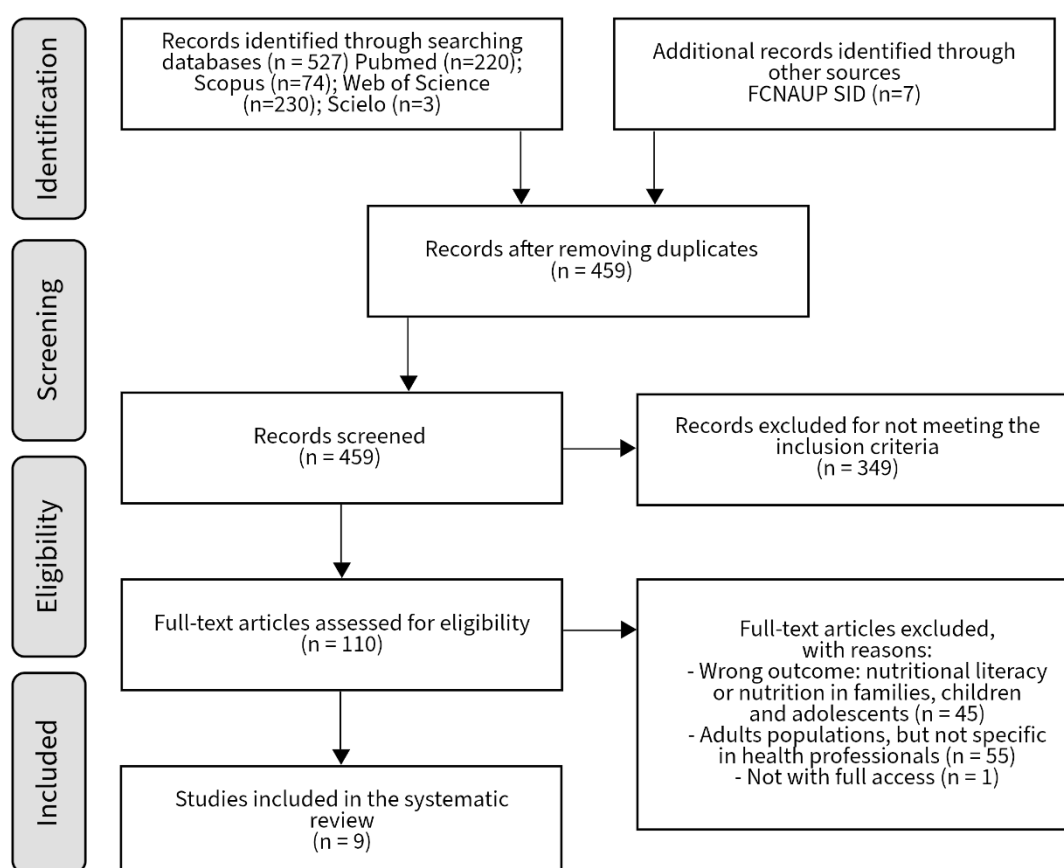


Figure 1. PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) flow chart of the results. Cooking Skills in Health Professionals: a Systematic Review, 2024.

Characteristics of the studies

Most part of the articles were studies carried out in the United States of America (6) [23-28], 2 in Australia [29, 30] and 1 in Israel [31]. All of them were published in English and most of the articles in this review were published in the last two years, with the publication period for all of them being from 2018 to 2023.

The articles included had different purposes while concurrently addressing analogous thematic threads, thereby warranting subdivision into the following categories: 1) deliberations regarding the suitability of culinary skills as a professional competency, 2) exploration of health professionals' viewpoints regarding culinary aptitude, 3) evaluation of programmatic outcomes among healthcare personnel, and 4) assessment of the effects of enhanced food-related competencies among professionals (Table 1).

All investigations provided the outline of the studies, always accompanied by a conceptual structure or a convincing foundation to elucidate the definition of the instruments' respective constructs. There was minimal variation in the phenomena under examination, centering on nutritional educational initiatives, culinary training programs, and discourse pertaining to culinary competencies.

Among the participants in each article analyzed, the most recurrent were doctors (students or residents) ($n = 4$), followed by other health professionals ($n = 3$) and dietitians ($n = 2$), that is possible to see in Table 1. The number of participants varied greatly among the articles analyzed and depending on the type of intervention developed. For example, Aboueid (2019), using structured interviews, had a smaller number of participants, and Lang (2019), which was a pilot study and developed cooking workshops, also had a smaller sample [23, 29].

Many of the articles describe the evaluation of specific programs, with the aim of determining the effectiveness of health and nutrition interventions. Consequently, a recurring aspect in these studies entailed quantitative analyses, encompassing pre- and post-intervention assessments, which could comprise various modalities such as courses (n = 3), culinary skills training (n = 3), culinary workshop (n = 1), or seminar (n = 1).

Lang (2019) conducted a pilot study and other studies built on pilot studies to develop the intervention and then further analyze [19]. Aboueid (2019), D'Adamo (2022) and Brennan (2023) incorporated qualitative analysis methodologies within their research findings [24, 26, 29].

Regarding outcomes, the studies underscore enhancements in comprehension of nutritional principles, CS, and counseling techniques; increasing the confidence of healthcare professionals in providing nutrition and healthy lifestyle advice; changes in participants' dietary behaviors; and the impact of interventions on participants' health status, thereby extending influence on the wider community.

Characteristics of the instruments

In Hasson's study (2018), a pilot questionnaire was utilized, initially refined for readability, and ease of administration. Two pilot courses were conducted to develop the program and validate the questionnaire, followed by six sequential courses. These courses integrated interactive lectures, workshops on motivating behavioral changes, balanced eating, and physical activity. Participants engaged in group cooking and exercise sessions to enhance self-efficacy, along with receiving step counting devices. Counseling materials like posters and healthy recipes were provided, and participants were incentivized to conduct workshops

and counseling sessions using acquired skills and materials. The questionnaires, administered before and after the course, assessed knowledge, attitude, and behavior regarding nutrition and physical activity, while also capturing demographic data such as age, years of experience, gender, and birthplace [31].

Aboueid's research (2019) involved a pilot project with three Registered Dietitians to test an interview protocol. Feedback from the pilot led to refinements in the protocol, incorporating more probing questions to better address research objectives. The interview protocol aimed to explore dietitians' perspectives on patients' barriers and facilitators to weight control. Individual interviews, recorded for literal transcription, covered four topics with a focus on themes like lack of knowledge, emotional eating, and the obesogenic food environment [29].

Lang's study (2019) developed culinary medicine workshops for preventive medicine, for a 2-year cohort of general preventive medicine residents. Through participatory processes including community planning and literature review, curriculum learning objectives were established. Workshops covered topics such as cooking for health, essential kitchen ingredients, reading recipes and food labels, and purchasing healthy foods affordably. Also, one of the workshops concentrated on developing skills to read recipes [23].

D'Adamo's pilot test (2022), in 2018-2019, had two sessions of 3 hours in length. The training provided evidence-based nutrition instruction and involved group cooking of recipes discussed in the lecture. Participants shared meals and discussed the potential application of the training to patient care and personal self-care. Based on pilot feedback, a single 3-hour training session was offered to first-year medical students in the 2019-2020 academic year, including a 1-hour

lecture on basic human nutrition concepts. Pre- and post-training quantitative questionnaires, along with open-ended qualitative questions, were administered. These questionnaires assessed various aspects including nutrition knowledge, skills, and attitudes. Post-training assessment included two additional survey questions exploring the applicability of culinary medicine training to patient care and self-care, allowing respondents to provide detailed feedback [24].

McWhorter (2022) employed a pre-post study design to assess the pilot testing of a train-the-trainer curriculum for Registered Dietitian Nutritionists within a diverse population from September 2019 to January 2020. This curriculum, spanning six sessions and offering 18 hours of continuing professional education, encompassed various components such as hands-on culinary medicine education, training in food insecurity, cultural humility, group facilitation, counseling, and communication strategies. The evaluation utilized pre- and post-training electronic questionnaires employing Likert scales, alongside provisions for open-ended feedback at each workshop session [25].

Asher's survey (2023) featured a combination of closed quantitative data questions and one open-ended inquiry, requiring approximately 20 minutes for completion. Prior to its implementation, the questionnaire underwent pre-testing with five practicing health and education professionals to ensure content validity and usability. Feedback from this pre-test prompted revisions to the wording of certain questions. The survey covered various domains, including confidence in CS, nutrition knowledge, diet quality, meal planning, typical practices related to cooking provision, nutrition and health behavior change advice, as well as barriers and facilitators [30].

Brennan's (2023) study was structured around weekly coursework consisting of three main components: online didactic pre-work, hands-on cooking labs accompanied by interactive discussions on nutrition topics, and patient case study sessions. Prior to each course day, students engaged in approximately one hour of online learning, spanning an 8-week. During the sessions, students participated in 90 minutes of supervised cooking in small groups, followed by a 30-minute shared meal and interactive discussion. Case study discussions occurred either in the classroom or online. The study employed pre- and post-training electronic questionnaires, utilizing a 5-point Likert scale. The pre-course survey comprised 23 questions, while the post-course survey expanded to 30 questions, each with a duration of 8 to 10 minutes [26].

Donovan (2023) organized a seminar aimed at enhancing providers' comprehension of food, nutrition, and their implications for chronic disease management across three key learning domains: nutrition knowledge, nutrition counseling, and CS. Prior to commencement, participants received an electronic course manual, intended as a comprehensive resource for both the course content and accompanying recipes. The study incorporated pre- and post-training electronic questionnaires utilizing a 5-point Likert scale, where "1" (Not Confident) and "5" (Very Confident) and to assess their personal diet/nutrition and exercise habits on a scale from 1 to 10, with "1" (Very Unhealthy) and "10" (Very Healthy) [27].

Shafto's (2023) study implemented a course consisting of six weekly sessions, with three hours each. Survey questions were developed based on feedback from a pilot course, emphasizing key content areas such as personal wellbeing, dietary habits, and skills to assist patients in adapting recipes to their

dietary needs. These surveys were administered both before and after the course to gauge changes in knowledge and skills. The questionnaire was structured around five themes: Demographics, Personal Habits and Food Approach, Knowledge and Skills in Food and Culinary Practices, Knowledge in Clinical Practice, and Clinical Application. Certain questions utilized a five-point Likert scale to assess participant responses [28].

DISCUSSION

General view of the studies and instruments

Most of the articles reviewed hail from the United States of America and, all publications were in English, with a significant concentration of articles emerging within the past two years. Despite their varied purposes, the studies collectively gravitate around analogous thematic threads, clustering into distinct categories such as discussions on the integration of culinary skills as a professional competency, exploration of healthcare professionals' perspectives on culinary aptitude, assessment of programmatic outcomes among healthcare personnel, and evaluation of the effects of augmented food-related competencies among professionals.

Each investigation presented a comprehensive outline, often supported by a solid conceptual framework to elucidate the definition of the respective instrument constructs. The study by Hasson (2018), D'Adamo (2022), McWhorter (2022), Asher (2023), and Shafto (2023) used pilot questionnaires to conduct research evaluation and/or to structure courses to improve understanding of participants about nutrition and physical activity, integrating practical elements such as group cooking sessions [24, 25, 28, 30, 31]. Aboueid's (2019) research

focused on refining an interview protocol to explore nutritionists' perspectives on weight management barriers, reflecting a qualitative approach to understanding healthcare professionals' views[29].

Lang (2019) developed culinary workshops for preventive medicine residents, emphasizing participatory processes to establish curricular goals, as do Brennan (2023) and Donovan (2023) [23, 26, 27]. Brennan (2023) structured the course around online pre-work and cooking labs to enhance students' skills and knowledge [26]. All the studies analyzed enrich our understanding of how culinary education can be effectively integrated into professional training programs, covering diverse methodologies and objectives.

The articles also exhibited a range of sample sizes, influenced by the nature of interventions. Many studies centered on program evaluation, employing quantitative analyses to gauge pre- and post-intervention impacts, while others integrated qualitative methodologies to enrich their findings, collectively highlighting enhancements in nutritional understanding, culinary skills, counseling techniques, and participants' dietary behaviors, thereby extending potential influence on broader community health outcomes.

General view of cooking skills in health professionals

Based on our comprehensive literature search, it appears that this systematic review is the first to aggregate studies focusing on Cooking Skills within the realm of health professionals. These studies encompass the conceptualization of CS, methods for measuring these skills, and their application in real-world settings, particularly in contexts closely related to patient care. This review aims to elucidate how CS can influence health outcomes and impact the communities served by these professionals.

Food literacy is widely recognized as pivotal in fostering healthy dietary practices and mitigating diet-related diseases. Various factors, including socioeconomic status, cultural background, level of education, and environmental influences, shape an individual's food literacy. The incorporation of CS into this discourse not only enriches our understanding but also bridges the gap between theoretical knowledge and practical culinary abilities among individuals.

The proliferation of processed foods and fast-food consumption in contemporary society has contributed to a surge in chronic health conditions like obesity and diabetes. Integrating culinary training into professional healthcare education can fortify the patient-professional relationship, bolster treatment adherence, enhance intervention efficacy, and facilitate enduring lifestyle modifications. Nevertheless, practical, and infrastructural challenges, such as resource availability and time constraints, must be addressed to effectively integrate culinary education into professional training programs.

Our systematic review elucidates a discernible enhancement in professionals' knowledge, attitudes, and practices concerning their personal health and well-being. Moreover, there is a perceived shift in organizational culture towards prioritizing health among healthcare professionals. Offering culinary courses throughout healthcare training programs could instill an appreciation for the role of nutrition in disease prevention and management, thereby complementing interdisciplinary and multidisciplinary training paradigms.

McWhorter (2022) underscores the indispensable role of CS for dietitians in fostering healthy dietary behaviors and preventing diet-related illnesses [25]. Begley (2010) previously emphasized the significance of culinary proficiency in dietary practice, igniting discussions about the inclusion of CS in conventional

nutrition education [32]. Similarly, Nanayakkara (2017) highlighted the pivotal role of food studies curricula in equipping professionals to address food and nutrition-related challenges. Discrepancies in professional opinions regarding existing curricula underscore the imperative for ongoing evaluation and refinement [33].

Tailored training programs designed to cultivate cooking skills and enhance food literacy among dietitians and nutritionists represent a promising strategy for empowering these professionals to advocate for healthy dietary behaviors and improve public health outcomes. Collaborative efforts with other healthcare and educational stakeholders can amplify the impact of these initiatives, fostering interdisciplinary approaches to address complex nutritional challenges and promote holistic well-being.

Limitations and strengths

Some limitations should be noted in this review. Firstly, there is a possibility that certain studies were overlooked due to their absence from the databases searched or their publication non-indexed. Secondly, despite adapting criteria from previous studies, there remains a degree of subjectivity in the interpretation of the included studies, which may have led to both underestimation and overestimation of their difficulty level.

However, given the relatively small exploration of CS in health professionals, this review is seen as an interesting starting point toward further investigation, poised to advance the development of intervention programs and stimulate broader discussions.

CONCLUSIONS

This systematic review, employing rigorous evaluation criteria, successfully identified studies that merged CS with the practices of healthcare professionals, clarifying their challenges in this domain. The assessment of CS covers multifaceted domains, intertwining with several constructs relevant to health habits. There is a pressing need to formulate a more cohesive definition of CS as a construct, in future studies, that helps to evaluate it on a more regular basis, thus improving our understanding of the barriers and facilitators linked to healthy culinary practices.

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CONFLICT OF INTEREST

The authors declare no conflict of interest

REFERENCES

1. Michaud, P., M. Condrasky, and S.F. Griffin, Review and application of current literature related to culinary programs for nutrition educators. *Topics in Clinical Nutrition*, 2007. 22(4): p. 336-348.
2. Jomori, M.M., et al., The concept of cooking skills: A review with contributions to the scientific debate. *Revista de Nutrição*, 2018. 31.
3. Caraher, M. and T. Lang, Can't cook, won't cook: A review of cooking skills and their relevance to health promotion. *International Journal of Health Promotion and Education*, 1999. 37(3): p. 89-100.
4. Caraher, M.L., T., Can't cook, won't cook: A review of cooking skills and their relevance to health promotion. *International Journal of Health Promotion and Education*, 1999. 37(3): p. 89-100.

5. Condrasky, M., A. Quinn, and K. Cason, Cooking camp provides hands-on nutrition education opportunity. *Journal of Culinary Science and Technology*, 2008. 5(4): p. 37-52.
6. Stitt, S., An international perspective on food and cooking skills in education. *British Food Journal*, 1996. 98(10): p. 27-34.
7. Chavez-Martinez, A., et al., Assessment of predisposing, enabling, and reinforcing factors toward food choices and healthy eating among hispanics in South Carolina. *Topics in Clinical Nutrition*, 2010. 25(1): p. 47-59.
8. Condrasky, M., A. Quinn, and K. Cason, Cooking camp provides hands-on nutrition education opportunity. *Journal of Culinary Science and Technology*, 2008. 5(4): p. 37-52.
9. Chavez-Martinez, A., et al., Assessment of predisposing, enabling, and reinforcing factors toward food choices and healthy eating among hispanics in South Carolina. *Topics in Clinical Nutrition*, 2010. 25(1): p. 47-59.
10. Condrasky, M.D., et al., Culinary nutrition camp for adolescents assisted by dietetic student counselors. *Topics in Clinical Nutrition*, 2010. 25(4): p. 362-370.
11. Utter, J., A.P. Fay, and S. Denny, Child and Youth Cooking Programs: More Than Good Nutrition? *Journal of Hunger and Environmental Nutrition*, 2017. 12(4): p. 554-580.
12. Bennett, A.E., et al., A Review of Experiential School-Based Culinary Interventions for 5-12-Year-Old Children. *Children (Basel)*, 2021. 8(12).
13. Al-Ali, N. and A. Arriaga Arrizabalaga, Los elementos de efectividad de los programas de educación nutricional infantil: la educación nutricional culinaria y sus beneficios. *Revista Española de Nutrición Humana y Dietética*, 2016. 20: p. 61-68.
14. Garcia, A.L., et al., Community Interventions to Improve Cooking Skills and Their Effects on Confidence and Eating Behaviour. *Curr Nutr Rep*, 2016. 5(4): p. 315-322.
15. Hasan, B., et al., The effect of culinary interventions (cooking classes) on dietary intake and behavioral change: a systematic review and evidence map. *BMC Nutr*, 2019. 5: p. 29.
16. McGowan, L., et al., Domestic cooking and food skills: A review. *Critical Reviews in Food Science and Nutrition*, 2017. 57(11): p. 2412-2431.
17. Tan, J., et al., Exploring culinary medicine as a promising method of nutritional education in medical school: a scoping review. *BMC Med Educ*, 2022. 22(1): p. 441.

18. Kowalkowska, J., R. Póinhos, and S. Rodrigues, Cooking skills and socio-demographics among Portuguese university students. *British Food Journal*, 2018. 120(3): p. 563-577.
19. Teixeira AR, C.J., Miguel FS, Mega HC, Slater B, Instrumentos para mensurar habilidades culinárias domésticas na atenção primária à saúde. 2022: p. 56:78.
20. International Prospective Register of Systematic Reviews (PROSPERO database). [cited 2023 December 15]; Available from: <http://www.crd.york.ac.uk/PROSPERO/>.
21. Google Meet. [cited 2024 Jun 18]; Available from: <https://meet.google.com/landing>.
22. ResearchGate. [cited 2024 January 18]; Available from: www.researchgate.net.
23. Lang, R.D., et al., Community Culinary Workshops as a Nutrition Curriculum in a Preventive Medicine Residency Program. *MedEdPORTAL*, 2019. 15: p. 10859.
24. D'Adamo, C.R., et al., Culinary Medicine Training in Core Medical School Curriculum Improved Medical Student Nutrition Knowledge and Confidence in Providing Nutrition Counseling. *Am J Lifestyle Med*, 2022. 16(6): p. 740-752.
25. McWhorter, J.W., et al., Training of Registered Dietitian Nutritionists to Improve Culinary Skills and Food Literacy. *J Nutr Educ Behav*, 2022. 54(8): p. 784-793.
26. Brennan, B.R., et al., Impact of Culinary Medicine Course on Confidence and Competence in Diet and Lifestyle Counseling, Interprofessional Communication, and Health Behaviors and Advocacy. *Nutrients*, 2023. 15(19).
27. Donovan, K., et al., Eat to Treat: The Methods and Assessments of a Culinary Medicine Seminar for Future Physicians and Practicing Clinicians. *Nutrients*, 2023. 15(22).
28. Shafto, K., et al., Experiential Culinary, Nutrition and Food Systems Education Improves Knowledge and Confidence in Future Health Professionals. *Nutrients*, 2023. 15(18).
29. Aboueid, S., et al., Dietitians' perspectives on patient barriers and enablers to weight management: An application of the social-ecological model. *Nutr Diet*, 2019. 76(3): p. 353-362.
30. Asher, R.C., et al., Facilitators and barriers to providing culinary nutrition, culinary medicine and behaviour change support: An online cross-sectional survey of Australian health and education professionals. *Journal of Human Nutrition and Dietetics*, 2023. 36(1): p. 252-265.

31. Hasson, R., et al., "Practice What You Teach" Public Health Nurses Promoting Healthy Lifestyles (PHeeL-PHiNe): Program Evaluation. *J Ambul Care Manage*, 2018. 41(3): p. 171-180.
32. Begley, A. and D. Gallegos, Should cooking be a dietetic competency? *Nutrition & Dietetics*, 2010. 67(1): p. 41-46.
33. Nanayakkara, J., C. Margerison, and A. Worsley, Food professionals' opinions of the Food Studies curriculum in Australia. *British Food Journal*, 2017. 119(12): p. 2945-2958.

Table 1. Summary of the characteristics of the included articles. Cooking Skills in Health Professionals: a Systematic Review, 2024.

Title of the article	Authors	Year	Country	Purposes under study	Participants	Sample size	Type of Analysis	Main results
Practice What You Teach Public Health Nurses Promoting Healthy Lifestyles (PHeeL-PHiNe): Program Evaluation [31]	R. Hasson, A. H. Stark, N. Constantini, R. Polak, G. Verbov, N. Edelstein, et al.	2018	Israel	Health Education Program	Public health nurses	114 participants in pre - post questionnaires and 104 follow-ups	Quantitative: Experimental (pre- and post-test study)	The PHeeL-PHiNe program was effective in increasing nurses' knowledge and skills in nutrition. Nurses reported positive changes in their practices.
Dietitians' perspectives on patient barriers and enablers to weight management: An application of the social-ecological model [29]	S. Aboueid, C. Pouliot, T. Nur, I. Bourgeault e I. Giroux	2019	Austrália	Barriers and facilitators to weight control in patients	Dietitians	14 participants	Qualitative: Semi-structured interviews	Dietitians identified several barriers and facilitators to patient weight control. Results can inform interventions to improve weight control.
Community Culinary Workshops as a Nutrition Curriculum in a Preventive Medicine Residency Program [23]	R. D. Lang, M. C. Jennings, C. Lam, H. C. Yeh, C. Zhu e T. Kumra	2019	USA	Nutrition education for preventive medicine residents	Residents in preventive medicine	11 participants in initial workshop and 9 in the final workshop	Pilot study	The culinary workshops were well received by residents. Residents reported an increase in culinary knowledge and skills.

Culinary Medicine Training in Core Medical School Curriculum Improved Medical Student Nutrition Knowledge and Confidence in Providing Nutrition Counseling [24]	C. R. D'Adamo, K. Workman, C. Barnabic, N. Retener, B. Siaton, G. Piedrahita, et al.	2022	USA	Cooking Training for medical students	First year medical students	119 participants	Quantitative: Experimental (pre- and post-test study) Qualitative: open-ended survey questions	Increased students' knowledge about nutrition. More confidence in students to provide nutritional advice.
Training of Registered Dietitian Nutritionists to Improve Culinary Skills and Food Literacy [25]	J. W. McWhorter, D. M. LaRue, M. Almohamad, M. P. Danho, S. Misra, K. C. Tseng, et al.	2022	USA	Cooking Training for Dietitians	Dietitians	25 participants	Quantitative: Experimental (pre- and post-test study)	Culinary training improved dietitians' culinary skills and food literacy. Culinary-trained dietitians reported greater confidence in providing culinary advice.
Facilitators and barriers to providing culinary nutrition, culinary medicine and behaviour change support: An online cross-sectional survey of Australian health and education professionals [30]	R. C. Asher, T. Bucher, V. A. Shrewsbury, E. D. Clarke, J. Herbert, S. Roberts, et al.	2023	Austrália	Barriers and facilitators to providing culinary nutrition	Health professionals and education professionals (cooking and/or nutrition)	277 participants	Quantitative: Cross-sectional online survey	Participants identified several barriers and facilitators to providing culinary nutrition. Results can inform the development of training programs.

Impact of Culinary Medicine Course on Confidence and Competence in Diet and Lifestyle Counseling, Interprofessional Communication, and Health Behaviors and Advocacy [26]	B. R. Brennan, K. A. Beals, R. D. Burns, C. J. Chow, A. B. Locke, M. P. Petzold, et al.	2023	USA	Culinary Medicine Education	Doctors and medical students	84 participants	Quantitative: Experimental (pre- and post-test study) Qualitative: open-ended survey questions	The culinary medicine course increased participants' confidence and competence. Participants reported positive changes in their practices.
Eat to Treat: The Methods and Assessments of a Culinary Medicine Seminar for Future Physicians and Practicing Clinicians [27]	K. Donovan, O. W. Thomas, T. Sweeney, T. J. Ryan, S. Kytomaa, M. Zhao, et al.	2023	USA	Culinary Medicine Education	Medical students	39 participants	Quantitative: Experimental (pre- and post-test study)	Increased knowledge in culinary medicine and self-perception of skills in culinary medicine. Positive change in attitudes towards culinary medicine.
Experiential Culinary, Nutrition and Food Systems Education Improves Knowledge and Confidence in Future Health Professionals [28]	K. Shafto, N. Vandenburg, Q. Wang and J. Breen	2023	USA	Effectiveness of a culinary education course	Health professionals	65 participants	Quantitative: Experimental (pre- and post-test study)	Increased cooking knowledge and self-perception of cooking skills. Reports of positive and valuable experience on the course and recognition of the importance of cooking, nutrition and food systems for individual and population health.

Table 2. Characteristics of the instruments. Cooking Skills in Health Professionals: a Systematic Review, 2024.

Title of the article	Instrument	No. of items	Format
Practice What You Teach Public Health Nurses Promoting Healthy Lifestyles (PHeeL-PHiNe): Program Evaluation [31]	Questionnaire to assess attitudes and behaviors	4 (Attitudes toward a healthy lifestyle, Physical activity to aerobic exercises, Physical activity to workout sessions, Balanced diet).	Questionnaire before and after the courses, using the Likert scale (1 = disagree; 4 = very strongly agree).
Dietitians' perspectives on patient barriers and enablers to weight management: An application of the social-ecological model [29]	Semi-structured interviews	4 topics (Individual level enablers, Relationship-level barriers, Community-level barriers, Societal-level barriers), with a total of 20 themes.	Individual semi-structured interviews, 30 to 61 min long.
Community Culinary Workshops as a Nutrition Curriculum in a Preventive Medicine Residency Program [23]	Questionnaire to demographic and additional questions	Voluntary 19-item questionnaire, including two demographic questions and 17 additional questions (about self-perceived culinary experience, frequency of preparing meals at home, and their beliefs about the impact of culinary medicine education).	Questionnaire at the end of each workshop, using a 5-point Likert scale (Strongly Disagree, Disagree, Neutral, Agree, Strongly Agree).
Culinary Medicine Training in Core Medical School Curriculum Improved Medical Student Nutrition Knowledge and Confidence in Providing Nutrition Counseling [24]	Quantitative and qualitative questionnaire	4 questions Assessing Perceived Nutrition Preparation, Confidence, and Knowledge in Clinical Care; 5 questions Assessing Preparation to Address Common Barriers to Healthy Eating Among Patients; 2 open-ended qualitative questions.	Pre- and post training quantitative questionnaires and open-ended qualitative questions.
Training of Registered Dietitian Nutritionists to Improve Culinary Skills and Food Literacy [25]	Quantitative electronic questionnaires	6 topics in the questionnaire: Sociodemographic factors, Perception of culinary nutrition skills, Confidence in teaching food literacy, Communication, Process evaluation measures, Comment card feedback themes and findings.	Pre- and post-training electronic questionnaires with Likert ranking, lasting approximately 10 min, and a space for open-ended feedback at each workshop session.

Facilitators and barriers to providing culinary nutrition, culinary medicine and behaviour change support: An online cross-sectional survey of Australian health and education professionals [30]	Quantitative electronic questionnaires	33 questions with an eight-point Likert scale, ranging from 7 'never/rarely' (0) to 'very good' (7).	Pre- and post-training electronic questionnaires with Likert ranking, lasting approximately 20 min, and one open-ended question
Impact of Culinary Medicine Course on Confidence and Competence in Diet and Lifestyle Counseling, Interprofessional Communication, and Health Behaviors and Advocacy [26]	Quantitative electronic questionnaires	5 categories of questions: (1) general course feedback, (2) dietary assessment and advice, (3) lifestyle counseling topics, (4) interdisciplinary communication, and (5) students' health behaviors and wellness advocacy.	Pre- and post-training electronic questionnaires with 5-point Likert scale ranging. The pre-course survey had 23 questions, and the post-course survey had 30 questions. Duration 8 to 10 minutes.
Eat to Treat: The Methods and Assessments of a Culinary Medicine Seminar for Future Physicians and Practicing Clinicians [27]	Quantitative electronic questionnaires	13 questions in 3 domains (nutrition knowledge, nutrition counseling and culinary skills).	Pre- and post-course electronic questionnaires with 5-point Likert scale ranging.
Experiential Culinary, Nutrition and Food Systems Education Improves Knowledge and Confidence in Future Health Professionals [28]	Quantitative electronic questionnaires	11 questions in 5 themes (Demographics, Personal Habits and Approach to Food, Knowledge/Ability Related to Food and Culinary Practices, Knowledge in Relation to Clinical Practice, Clinical Application)	Pre- and post-course electronic questionnaires with 5-point Likert scale ranging.

3.2 Manuscript 2

NUTRITION PROFESSIONALS' COOKING SKILLS AND THEIR RELEVANCE IN THE TRANSMISSION OF HEALTH MESSAGES

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Abstract

Non-communicable diseases (NCD), or chronic diseases, result from diverse factors like genetics, environment, and behavior, contributing to 41 million deaths annually, per 2023 WHO data. Risk factors, such as poor diets, increase global mortality rates. The rising prevalence of NCD strains public health systems and necessitates innovative strategies. This study carries out a qualitative study on cooking skills (CS), using the focus group technique, with students and professionals of nutrition, an area little explored. The objective of the present study was to understand the CS difficulties of these health professionals and how they impact the transmission of health messages to the population. The study involved the participants (n=19) exploring their culinary skills, perceptions of cooking media, and the adequacy of nutrition education. Participants highlighted the importance of integrating culinary training into nutrition curricula, emphasizing the need for practical skills to promote healthy eating. The study revealed a consensus on the necessity of more robust training and post-graduate opportunities, identifying significant gaps in current nutrition education. This

research underscores the critical role of culinary skills in nutrition practice and the need for improved educational frameworks.

Keywords: Learning; Cooking Skills; Food Preparation; Teaching Styles; Qualitative Research; Food Literacy.

INTRODUCTION

Non-communicable diseases (NCD), also referred to as chronic diseases, are typically of prolonged duration and arise from a multifactorial etiology, involving genetic predispositions, physiological mechanisms, environmental exposures, and behavioral influences. According to 2023 data from the World Health Organization (WHO), NCD are responsible for an estimated 41 million deaths annually, representing 74% of global mortality. Key risk factors, including suboptimal dietary patterns, play a critical role in elevating the likelihood of mortality associated with these conditions [1].

Concerns about the progressive increase in overweight and obesity, and the diseases associated, across various age groups have persisted for years, supported by numerous studies and statistical analyses [2, 3], and public health systems are increasingly overburdened. Additionally, the number of multidisciplinary teams has grown annually, along with recommendations for adopting a healthy diet and engaging in physical activity. The challenges in reducing the increasing NCD globally are evident and alarming, necessitating innovative and effective strategies [4].

In this context, the present study investigates a topic that has been relatively unexplored among health professionals: cooking skills (CS). But why

focus on this topic? The skills of cook are often linked to improved diet quality, reflected by increased fruit and vegetable consumption and increased awareness of healthier food choices [5, 6]. CS encompass a range of abilities, from physical dexterity and knowledge about cooking and food safety to behaviors and environmental influences on the cook [6, 7]. For instance, a family may require weekly meal planning, with a single person managing the preparation of meals for multiple members [3, 7].

Since the Industrial Revolution, the entry of women into the workforce has led to significant changes in family food consumption. Cooking, once associated with domestic life and the transmission of knowledge from mother to daughter, has become less common, with fast food increasingly dominating family diets [7]. Ready-to-eat meals not only simplified daily life for families but also served as an alternative for those who either lacked the desire or the skills to cook. Unfortunately, many people continue to rely on these options, that are frequently associated to inadequate nutritional compositions, mainly high fat, sugar and salt content [6-8].

Numerous cooking programs have emerged as educational tools [9-12], teaching culinary techniques through magazines, internet channels, and social media. However, these resources may be insufficient for individuals who lack basic CS, necessary equipment, or knowledge on how to procure appropriate ingredients [3, 7].

Moreover, intervention programs focused on healthy habits often emphasize changes in attitudes and behaviors but rarely provide practical culinary training, possibly due to the lack of appropriate and well-located physical spaces

[7, 9-11]. It is also important to note that few intervention programs target the teaching of CS to healthcare professionals, who can have similarly experienced or the similar difficult shifts in the transmission of these skills [13-15].

Additionally, some studies regarding patients' barriers to follow healthy food choices, often include the health professionals inability for providing diet counseling that is simple and practical, focusing on cooking methods and providing guidance to address lifestyle challenges [13-16].

It is often assumed that nutrition professionals possess adequate culinary knowledge due to their academic training; however, there is limited research exploring CS within this professional group. Given the rising prominence of culinary medicine, this gap in the literature presents an opportunity for nutritionists to receive specialized training that could position them as leaders in this field [17, 18].

The lack of evidence raises questions about whether nutritionists truly have the CS expected of them and whether they encounter difficulties in effectively transmitting this knowledge to the public. This study addresses these questions through focus groups with nutrition students and professionals, providing a deeper insight into the culinary competencies of this population.

OBJECTIVES

The general objective of the present study was to understand the cooking skills difficulties of nutrition professionals and how these impact on the transmission of health messages to the population.

METHODOLOGY

Study design and sample

To pursue the objective, a qualitative study using the focus group methodology was designed and the population was assumed to comprise nutrition professionals and those studying to enter the profession. Thus, the sample inclusion criteria were being a nutrition student or a practicing nutritionist.

The Portuguese Professional Order of Nutritionists (ON) and the private, non-profit Portuguese Nutrition Association (APN) were approached to help on contacting registered nutrition professionals and nutrition students. For data protection reasons, it was agreed that ON and APN would send the invitation for the focus group and a link to a form, for those who wanted to participate, requesting the completion of some sociodemographic data, such as name, telephone number, email, study or activity category and availability to participate in the focus group. This initial data was requested to make possible to later contact potential participants .

Unfortunately, the response rate was low. Consequently, an alternative strategy was considered, and new invitations were distributed via email by the University of Porto (UP) institutional resources. ON and APN were also asked to resend the invitations in a renewed effort to reach a larger audience. As, after a week, the number of responses remained low, an alternative approach was adopted. The snowball sampling technique [19], a method involving the identification of key participants who meet the study criteria and subsequently requesting them to refer similar individuals within their networks, was implemented within social media groups with students and professionals of

nutrition. This approach effectively facilitated participant recruitment and the organization of focus groups.

With the data previously collected in the forms, a follow-up email was sent to these individuals (n=26), requesting them to complete the Free Informed Consent Form (FICF) and provide their availability within the predefined dates for participation in the focus groups. Participants who did not complete the FICF were excluded from the study (n=4). Those who signed the FICF (n=22) received an email with the final date for the focus group and a reminder of the activity one week prior.

The researchers did not establish any prior personal contact with participants to minimize the risk of bias. Participants were recruited and given a clear explanation of the study's purpose. To prevent pre-prepared responses, participants were not provided with the focus group protocol before their participation. There were 3 dropouts on the day of the last focus group, a few minutes before it began, being the final sample of 19 participants.

Three different focus groups were conducted, involving nutrition students and professionals, with a variation in the distribution of the number of participants between the groups (8 participants in the first, 7 participants in the second and 4 participants in the third). The focus groups were guided by the main researcher with the help of another research student from the same university.

Participant Reception and Interaction

The reception of participants in focus groups should not be underestimated, as participants may experience nervousness due to being observed and unfamiliarity with other participants. Providing a thoughtful and attentive

reception facilitates a more relaxed interaction between participants and the research team and encourages disinhibition. Additionally, it is crucial to ensure a quiet environment with minimal external interference during participants' speeches, to avoid compromising the recording quality and to enable participants to listen to each other clearly [20, 21].

In this study, given the virtual environment, where physical contact was absent, special efforts were made to facilitate participants' introductions and help them become comfortable with being observed. The group dynamics technique, as cited by Vieira (2013) [20], proved effective in encouraging participants to share their personal and professional experiences. During the focus groups, the topic of culinary aptitude and skills was addressed, encompassing definitions and experiences in predefined scenarios.

Implementation and development of focus groups

The focus group is a data collection strategy that involves group discussions centered on a specific topic. A moderator facilitates these discussions and must prepare an interview guide beforehand to assist during the discussion and in the subsequent analysis and reporting of results. The focus group should be conducted in an unstructured and natural way and can be conducted either in person or online. Group sessions can be held in various environments, fostering a welcoming atmosphere, privacy, and social interaction. The online modality mirrors the structure of in-person sessions, with the primary difference being the virtual setting [21-23].

With the widespread use of the internet, the proliferation of Digital Information and Communication Technologies, increased digital literacy, and the

growing use of technologies for data collection, particularly accelerated by the Coronavirus Disease 2019 (COVID-19) pandemic, the virtual environment has become increasingly prominent for conducting health sector research. Moreover, the rising adoption of internet use across all age groups and demographics has led researchers to employ virtual data collection methods in both quantitative and qualitative research [21-23].

In this study, due to the national dissemination of the research, participants from different regions of the country expressed interest. Therefore, due to the aforementioned and also to avoid greater loss of participants due to travel, the virtual environment approach was preferred. Google Meet [24] technology was used to carry out the focus groups, held on the 17th, 18th and 30th of July, lasting between 70 and 90 minutes. The main objective of the focus group in the present study was to understand the participants' difficulties with cooking skills and how these challenges affect the communication of health messages to the public.

At the beginning of each focus group, participants were asked to define culinary aptitude and skill and to express their interest in the subject. After participants shared their opinions, the moderator presented a standardized definition. Subsequently, participants were introduced to scenarios involving digital media and cooking programs, as well as the training and work of nutrition professionals. Ethical considerations were then addressed, including any concerns about the topics discussed and the use of the collected material. Participants were also asked about their feelings before concluding the session with thanks for their participation.

Data collection

Over the span of the three focus groups, conducted in July 2024, the interviewers approached the sessions without prior assumptions or biases, and only the interviewer and focus group participants were present during the sessions. Field notes were taken throughout the interviews, facilitating reflexivity, a crucial process that enabled the research team to reflect on their own biases and assumptions. All participants were informed and allowed group recordings. The sessions were recorded in audio and video, using the Open Broadcaster Software [25], allowing, later, the literal transcription of the data and a subsequent more detailed analysis of the participants' emotions and reactions.

Data extraction and analysis

Adobe Premiere Pro [26] software was used to carry out the transcriptions, and then 2 more checks were made to ensure that the entire transcription was done, in addition to scoring the participants' reactions. Researchers trained in qualitative research methods independently analyzed the material collected from the focus groups, during July and August 2024. Initially, the researchers employed a conventional content analysis approach to inductively identify themes.

Ethics

The research project was approved by the Ethics Committee of the Faculty of Nutrition and Food Sciences of the University of Porto in December 2023 (nº 154/2023/CEFCNAUP).

RESULTS AND DISCUSSION

Characteristics of Participants

Table 1 provides an overview of participant characteristics. Of the nineteen participants, nine were nutrition students, and ten were nutrition professionals. Among the students, two were pursuing bachelor's degrees, four were in master's programs, and three were enrolled in specialization courses. Only one master's student and one specialization student were simultaneously studying and working. Regarding professional experience, among the students-professionals and professionals, one had less than 5 years, one had 5 to 10 years, five had 11 to 15 years, one had 16 to 20 years, and four had over 20 years of experience.

The participants' areas of professional activity varied, including nine in Clinical Nutrition (with 2 in hospital settings, 1 in primary health care, and 6 in private practice focusing on maternal and childcare, women's health, oncology, obesity, and allergies and intolerances); one in Community Nutrition and Public Health; and one in Food Technology/Food Science.

The sample of study were geographically distributed across four of the five regions of mainland Portugal (9 from the North, 4 from the Center, 4 from Lisbon and Vale do Tejo, and 1 from Alentejo), as well as one of the two autonomous regions (Azores). The study encompassed participants of various nationalities, including 9 Portuguese, 8 Brazilian, and 2 Angolan individuals. Participants' ages ranged from 22 to 56 years, with an average age of 36 (+8,62) years.

Table 1. Summary of the characteristics of the participants. Health professionals' cooking skills and their relevance in the transmission of health messages, 2024.

Characteristics of the participants	
Self-identified gender	
Female	18
Male	1
Age range (years)	
≥20-30	4
>30-40	10
>40-50	4
≥51	1
Occupational category	
Bachelor student	2
Master's Degree student	4
Specialization student	3
Professional	10
Experience in the profession (years)	
Less than 5	1
Between 6 and 10	1
Between 11 and 15	5
Between 16 and 20	1
More than 20	3
Areas of Professional Activity	
Clinical Nutrition	9
Community Nutrition and Public Health	1
Food Technology/Food Science	1
Geographic region	
North	9
Center	4
Lisbon and Vale do Tejo	4
Alentejo	1
Algarve	0
Azores	1
Madeira	0
Nationality of participants	
Portugal	9
Brazil	8
Angola	2

Analysis of Focus Groups

Content analysis revealed three themes: "Culinary Aptitude and Skill: Definition and Interest", "Cooking Media and Programs: Perception and Influence", and "Training and Perceptions as Nutrition Students and Professionals".

Culinary Aptitude and Skill: Definition and Interest

The definitions provided by participants revealed a wide range of perspectives on culinary skills and abilities. Some participants emphasize the practical and technical aspects of cooking, highlighting its fundamental role, particularly for children, in shaping taste preferences and dietary habits that can persist throughout life. "The skills, this issue of cooking, of making, is very related. It helps a lot, especially for children, to help them develop their tastes." (P2), as cited by a participant.

These skills, especially when acquired in early age [5, 27], encompass the ability to transform food to meet both nutritional needs and personal preferences, as well as the technical knowledge required for proper handling, preparation, selection, sanitation, combination, and preservation of food to support healthy eating [3, 7]. This is in line with what one participant stated, "... cooking has a lot to do with health, and health has to do with cooking..." (P1).

In community settings cooking demonstrations are often utilized, emphasizing the importance of practical and straightforward methods for applying these skills in everyday life [28], as mentioned by a participant: "The tools they used most, especially in community work, were usually culinary prediction tools." (P5). Acquiring culinary skills not only enhances personal experience but also facilitates the transfer of knowledge to others [29].

Some participants highlighted the emotional and cultural dimensions of cooking, noting that exposure to a family environment that values culinary practices can significantly impact skill development.

“Food, there’s this thing about affective memory, it’s a demonstration of affection, of affection. And, I always saw my mother, my grandmothers cooking...” (P3).

“...if you were exposed to a family that really cooked and cooked with love, a family member or anyone else, I think you end up absorbing that and then reproducing it.” (P16).

Additionally, some participants addressed the dimensions of health and sustainability, explaining that cooking, meal planning, and food selection require a balance between innate ability, necessity, and environmental considerations.

“Knowing what happens afterwards also helps, such as how to dispose of it, how you can use other parts of the food that are considered unimportant, such as the skin, the sprout...” (P10)

“... represents to me a little bit of half gift, half necessity, half environment, a lot of environment.”(P16)

Continuous practice enhances these skills and contributes to creating a healthy environment by introducing new options and disrupting established eating patterns. This diversity of opinions underscores the complexity and multifaceted nature of cooking, encompassing technical, physical, and behavioral skills as well as emotional, cultural, and environmental factors [30].

Participants demonstrated a deep interest in exploring how cooking integrates with nutrition, with some expressing a desire to master various

international recipes and cuisines. Discussions revealed a growing concern about preparing food in a healthy manner to support families in adopting better eating practices. As Garcia (2016) [28] suggests, cooking programs can be effective in increasing confidence in performing culinary skills such as meal preparation.

Some participants believe that a diverse and appealing meal plan is crucial for patient adherence and view cooking as a vital tool for promoting health and nutrition, like the participant 3: “I think it is very important, because having a meal plan that is appealing and diverse makes a huge difference to patient adherence.”; and the participant 5: “It is very important that we teach people to cook and enjoy their cuisine and see cooking as an act, as a vehicle for promoting health, better nutrition and health, of course.”.

There is also recognition in this sample that the ability to cook is becoming increasingly rare in the general population, highlighting the importance for professionals in the field to master these skills and effectively transmit them. Teaching culinary techniques and promoting the comprehensive use of food are deemed essential, especially in the context of contemporary sustainability discussions [30].

Culinary education is emerging as a significant trend that warrants further attention, like the participant 3 said: “And today a trend begins for culinary education as well, to make people develop these skills...”. Facilitating the transfer of culinary knowledge and assisting individuals in overcoming kitchen challenges are viewed as critical and rewarding aspects of the nutrition profession, despite the difficulties associated with imparting this knowledge.

Cooking Media and Programs: Perception and Influence

Perceptions and influences of media and cooking programs among participants are diverse. Some express concerns regarding superficiality and the pressure for perfection, while others recognize the inspirational potential of media, provided it is grounded in solid and accessible foundations. The vast array of information and recipes available can be confusing and frustrating for individuals lacking basic cooking knowledge. Quick recipes and appealing images often do not align with reality, leading to frustration when expectations are not met due to insufficient prior knowledge, as the experience that some participants have with patients in clinical nutrition.

“Then for me, as a professional, it's not, there's a big risk here, that the more these recipes are promoted, thinking that we're helping the public, and thinking that we're here to help people, or whoever makes them thinking that they're helping and that it comes from, I don't know the word, but it unmask a little bit, it distorts a little bit what cooking really is and that it doesn't seem done, that it really takes some time... And the second, the second point is the issue of recipes looking like they're just an image, with a cover, with a little mask of being healthy.” (P5).

This frustration aligns with the findings of van Kesteren (2020) [31], who argued that cooking is not simply a matter of rational choice or intention, but is instead a practice shaped by a network of interconnected elements, including knowledge acquisition influenced by socioeconomic factors. The study reveals that socioeconomic deprivation can impair access to resources, skills, and cultural meanings surrounding food, thereby influencing both the types of meals prepared

and the degree of attentiveness in the cooking process. These insights collectively highlight the ways in which media and socioeconomic factors interact to shape culinary practices, ultimately affecting individuals' capabilities and expectations in distinct manners.

While the abundance of information can inspire healthier eating and serve as a preferable alternative to ultra-processed foods, it is critical to establish a solid foundation for the patients evaluate the efficacy of recipes and avoiding misinformation, especially regarding recommendations for specific health conditions.

One participant noted, "... they generalize everything and often talk about very serious things, aimed, for example, at recommending recipes for illnesses and things like that, and they don't have all the basic knowledge..." (P6).

The rise of celebrity chefs and cooking shows, propelled by the internet, social media, and television, has introduced a variety of techniques and ideas but has also resulted in an overwhelming flood of information. This can be difficult to comprehend or execute, particularly due to variability in equipment, ingredients, and techniques. Consequently, guidance and foundational knowledge become even more crucial. As a participant mentioned, "... sometimes, when handling food, you don't have the same equipment, you don't have the same material. Sometimes it's not the same brand's ingredient... there are so many different factors that will influence..." (P19).

The vast amount of online information and recipes poses challenges for both amateurs and nutrition professionals. Many individuals purchase recipe books but abandon them when initial difficulties arise, unable to replicate the recipes, as

mentioned in a focal group: “If a person buys a book, tries the first recipe, it doesn't work well, and doesn't open the book again, etc. And then on the internet this problem still exists, even more so.” (P1). This issue extends to the internet, where a lack of detailed descriptions can lead to frustration, particularly regarding time requirements, as seemingly quick preparations often demand more time.

Some videos that thoroughly detail the preparation process and present dishes effectively can particularly influence and spark interest in cooking. For instance, “... I've followed several cases of people who learned to cook, using social media... having the motivation to go to the kitchen.” (P12) and “... it helps many people, especially those who want to change eating habits... it really influences people to take the first step, to at least have the desire to do so.” (P18).

While social media can motivate people to cook and experiment, it can also disseminate unreliable or erroneous information. Therefore, it is essential for professionals to guide patients in critically evaluating this information and considering their individual needs. The diversity of information, though beneficial in many respects, necessitates a critical and personalized approach.

Participants highlighted the importance of having a basic knowledge base and knowing where to find reliable recipes to avoid problems. A common practice is adaptation, where patients send recipes to professionals who test and adapt them before sharing with patients. The general concern in the focal groups is that excessive information can be dangerous if not properly evaluated, underscoring the need for professional guidance to tailor recipes to individual needs. However,

the constraints of consultation time pose difficulties in conveying extensive information.

“Social networks are full of information, often contradictory... and this ends up being very difficult, both in terms of consultation time, because we don't have time to explain everything we have to explain.” (P15).

Another concern is that while social networks and videos can be useful for motivation and teaching techniques, they can also contribute to food fads, with many people replicating the same recipes and neglecting local foods. In the study by Burlingame (2012) [30] it was seen that this oversight about diets with little environmental preoccupation can affect sustainability and increase greenhouse gas emissions due to the transportation of food produced far from its consumption point.

Overall, the reflections of the sample in this study on the complexity of cooking media and programs indicate that they can both inspire and create challenges for the general population.

Training and Perceptions as Nutrition Students and Professionals

Many nutrition professionals express that their academic training often insufficiently covers subjects like gastrotechnics and dietary techniques, which are minimally explored in the curriculum. Although universities provide a theoretical foundation and some practical classes, many graduates feel they leave with lingering doubts and an inadequate understanding of practical application.

This gap is problematic, as culinary skills are essential for imparting nutritional knowledge and tailoring diets to specific needs [17]. Those in the sample population that have taken more hands-on classes recognize the value,

especially when these classes included cooking and adapting recipes for specific diets.

“...there was a gastronomy course, and it literally took us into a kitchen. So those who didn't know how to cook still had to learn.” (P16).

“... learning to cook even the food groups and then in my college we always had a lot of each discipline. At least, for example, oncology, at least one class in the kitchen, making things, preparations, recipes, using some of some supplements...” (P2).

General training as nutritionists does not fully prepare them for the demands of professional practice, highlighting the need for continuous and specialized learning post-graduation [17]. Culinary techniques, though beneficial, were often cited, in the focus groups, as insufficient in quantity and depth within the curriculum. The lack of focus on these techniques during the course is a common criticism, and there is a strong desire for greater integration of CS across all subjects. Despite slight improvements in the curriculum over the years, integrating theory and practice remains an area needing more attention.

“... the knowledge that we have in the course is very little...” (P9).

“Dietary techniques end up being one or two semesters, whereas it should always be all subjects, linked to dietary techniques.” (P11)

“...this part of culinary techniques was very, very, very forgotten. Throughout the academic path. It was thus something that was very little covered and within the curriculum itself.” (P13).

During their studies, some participants and their peers displayed low interest in culinary skills. Participant 14 mentioned that a colleague once said:

“but I’m here to do nutrition and not to be in a kitchen...”. This lack of interest often leads to a realization upon graduation that they are not fully prepared. However, some professionals dispute the necessity of CS, as one participant stated, “... I’ve had some colleagues here who say to me, ‘No, but I’m not a cook, I’m just a nutritionist.’ I completely disagree with that. I think a nutritionist really has to know how to cook. Our main source of work is food. We have to know how to use it and how it behaves in the kitchen.” (P8).

Many participants believe that prior contact with cooking and personal experience are more beneficial than university training alone yet acknowledge the necessity for additional knowledge through practical experience.

Spreading misinformation about nutrition and cooking can be harmful, and dietitians should exercise caution when dealing with patients' health. Motivating both patients and professionals to engage in cooking is essential, as it directly impacts health outcomes. Nutritionists should not only be knowledgeable about nutrition but also proficient in cooking techniques and food behavior in the kitchen. This expertise is vital for teaching personalized recipes and for effectively treating or preventing diseases. Incorporating culinary practice into nutritionist training equips them to better understand, manipulate, and communicate food-related information, ultimately enhancing patient care [17].

As mentioned by a participant: “... it needs to be considered from all parts of our training process, among them the issues of culinary practice, of you recognizing that food, of knowing what you can do with that food, of knowing how to work with that, how to pass on this information.” (P10).

Finally, the importance of tailoring recommendations to patients' specific routines and needs is emphasized in the focus groups. This corroborates findings in the literature, which addresses the importance of nutritionists being prepared to adapt their guidance to individual circumstances, ensuring practical and applicable recommendations. Also, it is seen as necessary to have more emphasis on practical training for nutritionists to effectively teach cooking skills, promote healthy eating, and inspire individuals to learn [17, 32].

“Not everyone is willing to stay for a while and learn, and this will also be an area that needs more work... the motivation to learn how to cook.” (P7).

Participants' perceptions and experiences vary, but there is a consensus on the importance of practical and technical skills in nutrition. There is a strong emphasis on the need for solid and integrated training, as well as the necessity for continuous development. These comparisons underscore the importance of comprehensive training that combines theory and practice, along with ongoing professional development to meet the demands of nutritional practice.

Limitations and strengths

A limitation of the study was the sample selection, that can be a bias in the study, since participants may have knowledge acquired throughout college or a greater tendency to like or have skills in cooking and not be representative of this population. However, it successfully engaged participants from diverse geographical locations, experiences, cultures, and nationalities, thereby providing a more comprehensive perspective on the subject.

It is crucial to emphasize the significance of this research given the insufficient focus on culinary skills among nutrition students and professionals,

with a scarcity of related scientific literature. Cooking skills are fundamental tools for nutrition professionals, so that they can transmit, teach and help the general population to have these skills, and, consequently, improve health issues.

CONCLUSIONS

The participants in the study reported having insufficient CS, as they were covered in a very basic way and have little depth during academic training. Post-graduation, these professionals still face limited access to specializations, courses, or workshops that could further develop these essential skills. This study highlights this critical gap, demonstrating significant potential for improvement in nutrition education, as better culinary training for nutrition professionals is crucial to improving the quality of health messages and promoting healthier eating behaviors in the population.

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CONFLICT OF INTEREST

The authors declare no conflict of interest

REFERENCES

1. (WHO), W.H.O. Noncommunicable diseases. Fact Sheets 2023 [cited 2024 26/06]; Available from: <https://www.who.int/news-room/fact-sheets/detail/noncommunicable-diseases>.

2. Lang, R.D., et al., Community Culinary Workshops as a Nutrition Curriculum in a Preventive Medicine Residency Program. *MedEdPORTAL*, 2019. 15: p. 10859.
3. McGowan, L., et al., Domestic cooking and food skills: A review. *Crit Rev Food Sci Nutr*, 2017. 57(11): p. 2412-2431.
4. Tiwari, A. and P. Balasundaram, Public Health Considerations Regarding Obesity, in *StatPearls*. 2024, StatPearls Publishing Copyright © 2024, StatPearls Publishing LLC.: Treasure Island (FL).
5. Lavelle, F., et al., Learning cooking skills at different ages: a cross-sectional study. *Int J Behav Nutr Phys Act*, 2016. 13(1): p. 119.
6. Jomori, M.M., et al., The concept of cooking skills: A review with contributions to the scientific debate. *Revista de Nutrição*, 2018. 31.
7. Michaud, P., M. Condrasky, and S.F. Griffin, Review and Application of Current Literature Related to Culinary Programs for Nutrition Educators. *Topics in Clinical Nutrition*, 2007. 22(4): p. 336-348.
8. Horning, M.L., et al., Reasons Parents Buy Prepackaged, Processed Meals: It Is More Complicated Than "I Don't Have Time". *J Nutr Educ Behav*, 2017. 49(1): p. 60-66.e1.
9. Condrasky, M., A. Quinn, and K. Cason, Cooking camp provides hands-on nutrition education opportunity. *Journal of Culinary Science and Technology*, 2008. 5(4): p. 37-52.
10. Chavez-Martinez, A., et al., Assessment of predisposing, enabling, and reinforcing factors toward food choices and healthy eating among hispanics in South Carolina. *Topics in Clinical Nutrition*, 2010. 25(1): p. 47-59.

11. Condrasky, M.D., et al., Culinary nutrition camp for adolescents assisted by dietetic student counselors. *Topics in Clinical Nutrition*, 2010. 25(4): p. 362-370.
12. Utter, J., A.P. Fay, and S. Denny, Child and Youth Cooking Programs: More Than Good Nutrition? *Journal of Hunger & Environmental Nutrition*, 2017. 12(4): p. 554-580.
13. Tan, J., et al., Exploring culinary medicine as a promising method of nutritional education in medical school: a scoping review. *BMC Med Educ*, 2022. 22(1): p. 441.
14. Kowalkowska, J., R. Poínhos, and S. Rodrigues, Cooking skills and socio-demographics among Portuguese university students. *British Food Journal*, 2018. 120(3): p. 563-577.
15. Teixeira AR, C.J., Miguel FS, Mega HC, Slater B, Instrumentos para mensurar habilidades culinárias domésticas na atenção primária à saúde. *Rev. Saúde Pública*, 2022. 56(78).
16. Kapur, K., et al., Barriers to changing dietary behavior. *J Assoc Physicians India*, 2008. 56: p. 27-32.
17. McWhorter, J.W., et al., Training of Registered Dietitian Nutritionists to Improve Culinary Skills and Food Literacy. *J Nutr Educ Behav*, 2022. 54(8): p. 784-793.
18. Aboueid, S., et al., Dietitians' perspectives on patient barriers and enablers to weight management: An application of the social-ecological model. *Nutr Diet*, 2019. 76(3): p. 353-362.
19. Patton, M.Q., *Qualitative evaluation and research methods*. 1990: SAGE Publications, inc.

20. Vieira, C.M., et al., Aplicação da técnica de grupo focal em pesquisa da Rede-SANS sobre as ações de alimentação e nutrição na atenção básica em saúde. Cadernos Saúde Coletiva, 2013. 21.
21. Trad, L.A.B., Grupos focais: conceitos, procedimentos e reflexões baseadas em experiências com o uso da técnica em pesquisas de saúde. Physis: Revista de Saúde Coletiva, 2009. 19.
22. Alves, J.G., et al., Grupo focal on-line para a coleta de dados de pesquisas qualitativas: relato de experiência. Escola Anna Nery, 2023. 27.
23. Duarte, A.B.S., Grupo focal online e offline como técnica de coleta de dados. Informação & Sociedade: Estudos, 2007. 17(1): p. 75-85.
24. Google Meet. [cited 2024 Jun 18]; Available from: <https://meet.google.com/landing>.
25. OBS Studio - Open Broadcaster Software. [cited 2024 July 11]; Available from: <https://obsproject.com/>.
26. Adobe Premiere Pro. [cited 2024 Jun 20]; Available from: <https://www.adobe.com/pt/products/premiere.html>.
27. Bennett, A.E., et al., A Review of Experiential School-Based Culinary Interventions for 5-12-Year-Old Children. Children (Basel), 2021. 8(12).
28. Garcia, A.L., et al., Community Interventions to Improve Cooking Skills and Their Effects on Confidence and Eating Behaviour. Curr Nutr Rep, 2016. 5(4): p. 315-322.
29. Gordillo, P. and M.P. Prescott, Assessing the Use of Social Cognitive Theory Components in Cooking and Food Skills Interventions. Nutrients, 2023. 15(5).

30. Burlingame, B.A., et al., Sustainable Diets and Biodiversity: Directions and Solutions for Policy, Research and Action. 2012: FAO.
31. van Kesteren, R. and A. Evans, Cooking without thinking: How understanding cooking as a practice can shed new light on inequalities in healthy eating. *Appetite*, 2020. 147: p. 104503.
32. Brennan, B.R., et al., Impact of Culinary Medicine Course on Confidence and Competence in Diet and Lifestyle Counseling, Interprofessional Communication, and Health Behaviors and Advocacy. *Nutrients*, 2023. 15(19).

4. Conclusions

This study, through both a systematic review and a focus group analysis, underscores the critical importance of culinary skills (CS) in the practice of healthcare professionals, particularly nutritionists. The systematic review rigorously evaluated existing literature on the intersection of CS and healthcare practice, revealing significant challenges in how these skills are developed and applied. It also identified the need for a more cohesive definition and regular assessment of CS, to better understand the barriers and facilitators that shape healthy culinary practices. Despite the limited exploration of this topic, the review provides a foundation for future research and intervention development.

The focus group component further illuminated the practical gaps in CS training among nutrition students and professionals. Participants from diverse geographical and cultural backgrounds consistently highlighted the superficial coverage of CS in academic settings and the scarcity of post-graduation opportunities to deepen these skills. This gap hampers professionals' ability to teach and promote effective culinary practices to the general population, which is essential for addressing public health concerns related to diet and nutrition.

By combining insights from both the systematic review and the focus group, this research offers a comprehensive perspective on the current state of CS education in healthcare. It also points to significant opportunities for improving nutrition curricula and professional training. Moving forward, integrating more robust and practical CS instruction into healthcare education is crucial for empowering professionals to influence positive dietary behaviors and improve public health outcomes.

5. Bibliographic References

1. Stitt S. An international perspective on food and cooking skills in education. *British Food Journal*. 1996;98(10):27-34.
2. Caraher ML, T. Can't cook, won't cook: A review of cooking skills and their relevance to health promotion. *International Journal of Health Promotion and Education*. 1999;37(3):89-100.
3. Michaud P, Condrasky M, Griffin SF. Review and Application of Current Literature Related to Culinary Programs for Nutrition Educators. *Topics in Clinical Nutrition*. 2007;22(4):336-48.
4. Condrasky M, A. Quinn, and K. Cason. Cooking camp provides hands-on nutrition education opportunity. *Journal of Culinary Science and Technology*. 2008;5(4): 37-52.
5. Chavez-Martinez A, et al. Assessment of predisposing, enabling, and reinforcing factors toward food choices and healthy eating among hispanics in South Carolina. *Topics in Clinical Nutrition*. 2010;25(1):47-59.
6. Jomori MM, Vasconcelos FdAGd, Bernardo GL, Uggioni PL, Proença RPdC. The concept of cooking skills: A review with contributions to the scientific debate. *Revista de Nutrição*. 2018;31.
7. Velardo S. The Nuances of Health Literacy, Nutrition Literacy, and Food Literacy. *J Nutr Educ Behav*. 2015;47(4):385-9.e1.
8. Asher RC, Bucher T, Shrewsbury VA, Clarke ED, Herbert J, Roberts S, et al. Facilitators and barriers to providing culinary nutrition, culinary medicine and behaviour change support: An online cross-sectional survey of Australian health

and education professionals. *Journal of Human Nutrition and Dietetics*. 2023;36(1):252-65.

9. Rosas R, Pimenta F, Leal I, Schwarzer R. FOODLIT-PRO: conceptual and empirical development of the food literacy wheel. *Int J Food Sci Nutr*. 2021;72(1):99-111.

10. Wolfson JA, Bleich SN, Smith KC, Frattaroli S. What does cooking mean to you?: Perceptions of cooking and factors related to cooking behavior. *Appetite*. 2016;97:146-54.

11. Utter J, Fay AP, Denny S. Child and Youth Cooking Programs: More Than Good Nutrition? *Journal of Hunger & Environmental Nutrition*. 2017;12(4):554-80.

12. (WHO) WHO. Noncommunicable diseases 2023 [Available from: <https://www.who.int/news-room/fact-sheets/detail/noncommunicable-diseases>].

13. McGowan L, Caraher M, Raats M, Lavelle F, Hollywood L, McDowell D, et al. Domestic cooking and food skills: A review. *Crit Rev Food Sci Nutr*. 2017;57(11):2412-31.

14. Lang RD, Jennings MC, Lam C, Yeh HC, Zhu C, Kumra T. Community Culinary Workshops as a Nutrition Curriculum in a Preventive Medicine Residency Program. *MedEdPORTAL*. 2019;15:10859.

15. Tiwari A, Balasundaram P. Public Health Considerations Regarding Obesity. StatPearls. Treasure Island (FL): StatPearls Publishing Copyright © 2024, StatPearls Publishing LLC.; 2024.

16. Al-Ali N, Arriaga Arrizabalaga A. Los elementos de efectividad de los programas de educación nutricional infantil: la educación nutricional culinaria y sus beneficios. *Revista Española de Nutrición Humana y Dietética*. 2016;20:61-8.
17. Garcia AL, Reardon R, McDonald M, Vargas-Garcia EJ. Community Interventions to Improve Cooking Skills and Their Effects on Confidence and Eating Behaviour. *Curr Nutr Rep*. 2016;5(4):315-22.
18. Hasan B, Thompson WG, Almasri J, Wang Z, Lakis S, Prokop LJ, et al. The effect of culinary interventions (cooking classes) on dietary intake and behavioral change: a systematic review and evidence map. *BMC Nutr*. 2019;5:29.
19. Condrasky MD, et al. Culinary nutrition camp for adolescents assisted by dietetic student counselors. *Topics in Clinical Nutrition*. 2010;25(4):362-70.
20. Bennett AE, Mockler D, Cunningham C, Glennon-Slattey C, Johnston Molloy C. A Review of Experiential School-Based Culinary Interventions for 5-12-Year-Old Children. *Children (Basel)*. 2021;8(12).
21. Lavelle F, Spence M, Hollywood L, McGowan L, Surgenor D, McCloat A, et al. Learning cooking skills at different ages: a cross-sectional study. *Int J Behav Nutr Phys Act*. 2016;13(1):119.
22. Hartmann C, Dohle S, Siegrist M. Importance of cooking skills for balanced food choices. *Appetite*. 2013;65:125-31.
23. Raber M, Chandra J, Upadhyaya M, Schick V, Strong LL, Durand C, et al. An evidence-based conceptual framework of healthy cooking. *Prev Med Rep*. 2016;4:23-8.

24. Horning ML, Fulkerson JA, Friend SE, Story M. Reasons Parents Buy Prepackaged, Processed Meals: It Is More Complicated Than "I Don't Have Time". *J Nutr Educ Behav*. 2017;49(1):60-6.e1.
25. Tan J, Atamanchuk L, Rao T, Sato K, Crowley J, Ball L. Exploring culinary medicine as a promising method of nutritional education in medical school: a scoping review. *BMC Med Educ*. 2022;22(1):441.
26. Kowalkowska J, R. Poínhos, and S. Rodrigues. Cooking skills and socio-demographics among Portuguese university students. *British Food Journal*. 2018;120(3):563-77.
27. Teixeira AR CJ, Miguel FS, Mega HC, Slater B. Instrumentos para mensurar habilidades culinárias domésticas na atenção primária à saúde. *Rev Saúde Pública*. 2022;56(78).
28. Kapur K, Kapur A, Ramachandran S, Mohan V, Aravind SR, Badgandi M, et al. Barriers to changing dietary behavior. *J Assoc Physicians India*. 2008;56:27-32.
29. McWhorter JW, LaRue DM, Almohamad M, Danho MP, Misra S, Tseng KC, et al. Training of Registered Dietitian Nutritionists to Improve Culinary Skills and Food Literacy. *J Nutr Educ Behav*. 2022;54(8):784-93.
30. Brennan BR, Beals KA, Burns RD, Chow CJ, Locke AB, Petzold MP, et al. Impact of Culinary Medicine Course on Confidence and Competence in Diet and Lifestyle Counseling, Interprofessional Communication, and Health Behaviors and Advocacy. *Nutrients*. 2023;15(19).
31. Donovan K, Thomas OW, Sweeney T, Ryan TJ, Kytomaa S, Zhao M, et al. Eat to Treat: The Methods and Assessments of a Culinary Medicine Seminar for Future Physicians and Practicing Clinicians. *Nutrients*. 2023;15(22).

32. D'Adamo CR, Workman K, Barnabic C, Retener N, Siaton B, Piedrahita G, et al. Culinary Medicine Training in Core Medical School Curriculum Improved Medical Student Nutrition Knowledge and Confidence in Providing Nutrition Counseling. *Am J Lifestyle Med.* 2022;16(6):740-52.
33. Hasson R, Stark AH, Constantini N, Polak R, Verbov G, Edelstein N, et al. "Practice What You Teach" Public Health Nurses Promoting Healthy Lifestyles (PHeeL-PHiNe): Program Evaluation. *J Ambul Care Manage.* 2018;41(3):171-80.
34. Shafto K, Vandenburg N, Wang Q, Breen J. Experiential Culinary, Nutrition and Food Systems Education Improves Knowledge and Confidence in Future Health Professionals. *Nutrients.* 2023;15(18).
35. Aboueid S, Pouliot C, Nur T, Bourgeault I, Giroux I. Dietitians' perspectives on patient barriers and enablers to weight management: An application of the social-ecological model. *Nutr Diet.* 2019;76(3):353-62.
36. Begley A, Gallegos D. Should cooking be a dietetic competency? *Nutrition & Dietetics.* 2010;67(1):41-6.
37. Tenny S, Brannan JM, Brannan GD. Qualitative Study. StatPearls. Treasure Island (FL): StatPearls Publishing
Copyright © 2024, StatPearls Publishing LLC.; 2024.
38. Sá-Silva JRA, Cristóvão Domingos
Guindani, Joel Felipe Pesquisa documental: pistas teóricas e metodológicas. *Revista Brasileira De História & Ciências Sociais.* 2009;1(1).
39. Galvão TF, Pereira MG. Revisões sistemáticas da literatura: passos para sua elaboração. *Epidemiologia e Serviços de Saúde.* 2014;23:183-4.

40. Trad LAB. Grupos focais: conceitos, procedimentos e reflexões baseadas em experiências com o uso da técnica em pesquisas de saúde. *Physis: Revista de Saúde Coletiva*. 2009;19.

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Attachment A - Ethical Approval



COMISSÃO DE ÉTICA

Parecer / Rapport

Parecer número / Rapport number: |154/2023/CEFCNAUP|

Título do projeto / Project Title

"Health professionals' cooking skills and their relevance in the transmission of health messages".

Investigador(es) responsável(eis) / Principal investigator and other researchers

Nome: |Sara Rodrigues|; Email: |saraspr@fcna.up.pt|; Função: |Orientadora|.

Nome: |Letícia Conceição|; Email: |up201801257@up.pt|; Função: |Estudante de Mestrado|.

Parecer / Rapport

☒ Favorável / Favourable ☐ Desfavorável / Not Favourable

Comentários e recomendações / Comments and recommendations:

O projeto

Tem como objetivo conhecer as dificuldades culinárias dos profissionais de nutrição e o seu impacto na transmissão de mensagens de saúde à população. Este estudo será constituído por uma análise qualitativa com grupos focais e será desenvolvida uma proposta de questionário para avaliar as aptidões culinárias nesta população.

A amostra será de conveniência e estimada em 385 nutricionistas, que serão recrutados por *email* e que, se derem o seu consentimento informado, serão convidados para participar em grupos focais, com a gravação áudio do seu depoimento. Os registos áudio serão destruídos após a sua transcrição.

A relevância da condução do estudo está justificada e os aspetos metodológicos estão bem descritos. O projeto está desenhado de modo a que estes objetivos sejam atingidos. Não estão previstos riscos pela participação neste estudo.

Os currículos dos investigadores são adequados ao estudo em questão.

Questões éticas envolvidas

Os diversos aspetos do projeto serão adequadamente explicados aos potenciais participantes. A liberdade e a autonomia, estão salvaguardadas no termo de consentimento informado. O direito em recusar a participação neste estudo está explicitamente mencionado. O respeito e a confidencialidade dos dados são garantidos pelos investigadores. Os potenciais participantes serão assim informados de todos os procedimentos, riscos e benefícios e fornecerão o seu consentimento informado por escrito.

Conclusão

Do exposto, somos de opinião de que o projeto de investigação se mostra cientificamente justificado e sem limitações do ponto de vista ético.

A Comissão de Ética solicita o envio do relatório de projeto, após a sua conclusão.

Faculdade de Ciências da Nutrição e Alimentação da Universidade do Porto,

Data, 2023 / 12 /18

O Relator / <i>The rapporteur</i>	A Vice-Presidente / <i>The Vice President</i>
Assinado por: TERESA MARIA DE SERPA PINTO FREITAS DO AMARAL Num. de identificação: 06938005 Data: 2024.01.08 12:10:26+00'00' Prof.ª Doutora Teresa Amaral	Prof.ª Doutora Rita Negrão

Appendix A - PROSPERO Protocol of "Cooking Skills in Health Professionals: a Systematic Review "

Evidence for the culinary skills in health professionals: a systematic review - [CRD42023492997]

Authors: Letícia Mucci da Conceição; Sara Simões Pereira Rodrigues

Review question

What has already been discussed about culinary skills, the concept and instruments, to measure these skills in health professionals?

Searches

We will conduct searches in the subsequent electronic bibliographic databases: SciELO, PubMed, Scopus and Web of Science, in addition to existing books in the library base, FCNAUP SID, of the Faculty of Nutrition and Food Sciences of the University of Porto.

The search plan will include terms related to “learning”, “cooking”, “skills”, “food preparation”, “teaching styles” OR “food literacy” OR “cooking abilities” OR “culinary inheritance” AND “validation studies” AND “health professionals”. Another inclusion criterion will be articles published in English, Spanish and Portuguese.

There will be no limitations on publication periods.

Types of study to be included

Inclusion:

As inclusion criteria, we will consider studies with:

As inclusion criteria, we will consider studies with:

- 1) They use a tool designed to assess cooking proficiency in adults;
- 2) They present an instrument that evaluates of culinary skills in health university students or health professionals;
- 3) They are available in publications in English, Portuguese or Spanish;
- 4) They detail the development of the instrument, whether based on literature or involving group deliberations;

5) They clarify the steps taken to validate and establish the reliability of the instrument.

Exclusion:

Instruments evaluated in children and adolescents or lacking the instrument itself will be disqualified.

Condition or domain being studied.

Food guides have been valued in public policies and national health instruments, such as the Food Wheel of the National Program for the Promotion of Healthy Eating in Portugal, and appear to be important for the individual, helping to choose and combine foods that should be part of the diet. daily nutrition.

Although the Food Wheel is widely publicized among the population, it is necessary to check whether culinary skills have an influence on food choices and preparation, based on what is already available in the literature and checking what is known about culinary skills in food health professionals.

Participants/population

Adults, students and health professionals, specifically in the area of nutrition sciences.

Intervention(s), exposure(s)

Information on culinary skills in health professionals.

Comparator(s)/control

Not applicable.

Main outcome(s)

Enhancements in Health and Nutrition: Assessed through dietary consumption (food categories or nutritional elements), energy intake, and dietary excellence. Enhancement in Culinary Proficiency: Evaluated through the Cooking Skill Index, confidence in cooking, self-efficacy in the kitchen, culinary knowledge, or culinary expertise.

Measures of effect

Not applicable.

Additional outcome(s)

None.

Measures of effect

Not applicable.

Data extraction (selection and coding)

Once the descriptors have been established and a search for articles in the databases has been conducted, the obtained results will undergo a screening process to determine their relevance.

The titles and abstracts of the retrieved studies will be independently evaluated and selected by two authors. Any study that does not meet the inclusion criteria will be excluded from the review. In this process, we will use the EndNote software. The selected articles will be grouped by database, eliminating duplicate titles. Subsequently, a consensus will be reached, classifying the selected articles as "Yes" (for inclusion in the review), "No" (for exclusion from the review) or "Not sure" (when there are doubts or lack of the full text).

Any disagreements between researchers will be resolved by a third reviewer. After consensus, studies classified as "No" will be excluded. The full texts of included articles will be obtained and read. If they are not available in the databases, the authors will be contacted by email or through other tools, such as www.researchgate.com. Selected studies will be reviewed to ensure they answer the review's guiding question and meet eligibility criteria. Any study that does not meet these criteria will be rejected.

Again, any disagreements between reviewers will be resolved by a third reviewer. In addition, secondary references will also be analyzed. Data extraction in studies selected for inclusion will be carried out independently by two reviewers, using EndNote software. Any disagreements between reviewers at this stage will also be resolved by a third reviewer. For each included study, information extracted will include: country of origin, participants, context, sample size, instrument format, target audience, number of instrument items, instrument development, instrument domains, and psychometric properties of the instrument.

Risk of bias (quality) assessment

The attributes of reliability and validity play a pivotal role in the development or adaptation of research measurement tools. This is because studies can yield consistent results that may be compromised or contain missing data.

The criteria encompassed by this rating system encompass the following aspects:

a) Reliability, which encompasses internal consistency (Cronbach's alpha between 0.70 and 0.95).

b) Validity: content (providing a comprehensive description of the instrument's objectives, the target population, the concepts being measured, item selection, and information about the investigators or experts involved in item selection), construct (involving factor analyses carried out on an adequate sample size, with a minimum ratio of 5:1 and a sample size greater than 100, as well as Bartlett's sphericity test with $p < 0.005$, KMO adequacy test exceeding 0.7, factors explaining more than 60% of the variance, RMSEA < 0.07 , GFI and AGFI exceeding 0.95, SRMR < 0.08 , and CFI exceeding 0.95), and criterion validity (requiring compelling arguments that the chosen "gold standard" for comparison with the developed instrument is indeed a valid standard, and that the correlation with the gold standard exceeds 0.70).

Two independent authors will apply this rating system, and any disparities between them will be resolved by a third reviewer.

Strategy for data synthesis

We shall offer a narrative overview of the results derived from the studies we have incorporated, organized according to the methodology employed and the attributes of the target population.

We will also supply summaries and conduct a comparative analysis of each study's outcomes in accordance with the guidance provided by authors cited within the field of psychometric literature.

The chosen studies will be classified based on their country of origin, the language of publication, the quantity and composition of participants, the nature of the instrument developed, and the domains covered by the instrument.

Analysis of subgroups or subsets

The studies we've chosen will be grouped based on their country of origin, the language of publication, the quantity and characteristics of participants, the nature of the developed instrument, and the domains covered by the instrument.

Contact details for further information

Letícia Mucci da Conceição

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Organizational affiliation of the review

Faculdade de Ciências da Nutrição e Alimentação da Universidade do Porto

Review team members and their organizational affiliations

Mrs Letícia Mucci da Conceição. Faculdade de Ciências da Nutrição e Alimentação da Universidade do Porto

Professor Sara Simões Pereira Rodrigues. University of Porto

Type and method of review

Systematic review

Anticipated or actual start date

15 December 2023

Anticipated completion date [1 change]

25 June 2024

Funding sources/sponsors

No funding

Conflicts of interest

None

Language

English

Country

Portugal

Stage of review [1 change]

Review Completed not published

Subject index terms status

Subject indexing assigned by CRD

Subject index terms

MeSH headings have not been applied to this record

Date of registration in PROSPERO

23 December 2023

Date of first submission

12 December 2023

Appendix B - Free and Informed Consent Form

TERMO DE CONSENTIMENTO LIVRE E ESCLARECIDO

DADOS SOBRE A PESQUISA CIENTÍFICA

1. TÍTULO DO PROTOCOLO DE PESQUISA: **Health professionals' cooking skills and their relevance in the transmission of health messages.**

2. PESQUISADOR: **Leticia Mucci da Conceição**

CARGO/FUNÇÃO: **Estudante de Mestrado em Nutrição Comunitária e Saúde Pública - Faculdade de Ciências da Nutrição e Alimentação da Universidade do Porto**

1 - Convite e justificativa

Gostaria de convidar a participar desta pesquisa, parte do mestrado realizado na Faculdade de Ciências da Nutrição e Alimentação da Universidade do Porto, e que pretende compreender as dificuldades culinárias dos estudantes e profissionais de nutrição e como elas impactam na transmissão de mensagens de saúde à população.

2 - Procedimentos do estudo

Para a realização deste estudo, estudantes e profissionais da nutrição serão convidados para participar de grupos focais para discutir sobre habilidades e dificuldades culinárias, assim como a transmissão dessas habilidades para a população. Os grupos focais serão realizadas em plataforma online de reuniões com estudante de mestrado acompanhando. Os participantes serão informados previamente sobre a data de realização por email. Todos os materiais necessários para os grupos focais serão de responsabilidade dos pesquisadores e não haverá nenhum custo aos participantes.

3 - Riscos e Desconfortos relacionados ao Estudo

Não haverá risco/dano para sua saúde na participação desta pesquisa e nem para sua família.

4 - Direito de Confidencialidade

As informações obtidas durante o estudo serão divulgadas em estudo científico, mantendo o anonimato dos sujeitos do estudo (não será divulgada qualquer identificação).

5 - Despesas e Compensações

Não haverá nenhuma despesa para o sujeito em qualquer fase do estudo e também não há compensação financeira relacionada a sua participação no estudo.

6 - Compromisso do Pesquisador de atualizar o os dados e o material coletado somente para este estudo

Os dados obtidos serão utilizados somente no estudo em questão.

Sua participação é livre e voluntária e a qualquer momento da entrevista o participante poderá desistir. Acredito ter sido suficiente informado a respeito das informações que li ou que foram lidas para mim, descrevendo o estudo **“Health professionals’ cooking skills and their relevance in the transmission of health messages.”** Eu estou ciente sobre a minha decisão em participar nesse estudo. Ficaram claros para mim quais são os propósitos do estudo, as garantias de confidencialidade e de esclarecimentos permanentes. Ficou claro também que minha participação é isenta de despesas. Concordo voluntariamente em participar deste estudo e poderei retirar o meu consentimento a qualquer momento, antes ou durante o mesmo, sem penalidades ou prejuízo ou perda de qualquer benefício que eu possa ter adquirido, ou no meu atendimento neste Serviço.

Se você tiver alguma consideração ou dúvida sobre a ética da pesquisa, entre em contato com Letícia Mucci da Conceição, por telemóvel (+351 914933786) ou email (up201801257@up.pt).

Assinatura do participante

Data / 07 / 2024

Letícia Mucci da Conceição

Data / 07 / 2024

Declaro que obtive de forma apropriada e voluntária o
Consentimento Livre e Esclarecido deste participante ou
representante legal para a participação neste estudo.

Appendix C - Discussion guide for focus groups

Guião de discussão para os grupos focais.

“Gostaria de dar as boas-vindas a todos e agradecer por concordarem em participar nesta investigação. O meu nome é Letícia e sou aluna do MNCSP da FCNAUP. A minha função é guiar a discussão e tomar algumas notas.

Durante esta discussão gostaria de falar convosco sobre aptidões culinárias. Durante esta discussão queremos conhecer as vossas opiniões, não há respostas certas ou erradas; apenas queremos saber o que pensam. Gostaríamos de recordar que a vossa participação é voluntária e de lembrar que as discussões serão gravadas por áudio, mas todos os pormenores serão tornados anónimos. Quero pedir que se respeitem uns aos outros, permitindo a todos exprimir a sua opinião e não falando ao mesmo tempo que outra pessoa.

Finalmente, espero que todos gostem de participar nesta discussão. Vamos começar por nos apresentar ao grupo apenas com o primeiro nome...”

Introdução

- i) Para iniciar a discussão, gostaria de saber o quanto vocês se interessam sobre o preparo dos alimentos.
- ii) Gostaria também de saber o quanto vocês acham que a aptidão culinária pode impactar na saúde das pessoas.

Aptidão culinária: Conhecimento e Compreensão

- i) Gostaria agora de discutir sobre aptidão culinária. Alguém já ouviu falar desse assunto?
 - *Se sim, onde ouviram falar sobre esse assunto?*
 - *Se sim, já tiveram alguma experiência própria de aptidão culinária? Pedir aos participantes que deem exemplos.*
 - *Se não, ver questão seguinte.*
- ii) Nessa investigação, estamos interessados em saber o que entendem pelo termo “aptidão culinária”. Dar tempo aos participantes para comunicarem o seu entendimento, e depois clarificar: “Deixem-me dar-vos uma definição de aptidão culinária: Aptidão culinária, também conhecida como

cokking skills abrangem habilidades físicas e comportamentais para o preparo dos alimentos.” (Pista visual 1).

- *Conseguem pensar em exemplos de aptidão culinária?*
- *Onde é que as pessoas poderiam aceder a um serviço que lhes forneça ferramentas para adquirir aptidão culinária?*
- *Como é que isso poderia acontecer?*

Cenários de Aptidão Culinária

Agora gostaria de discutir três cenários diferentes sobre o tema.

Primeiro gostaria que imaginassem a relevância da alteração da alimentação para melhorar a qualidade de vida, a saúde. (Pista visual 2). Para tal as pessoas podem recorrer à *internet*, à televisão ou aos profissionais de saúde. Que informações essas pessoas poderiam receber?

- *Que informação ou feedback esses locais forneceria?*
- *Quem esperariam que estivesse a fornecer estes serviços?*
- *Quem prefeririam que estivesse a fornecer estes serviços? Porquê?*

Cenário 1: (Pista visual 3) Imaginem que no cenário das mídias digitais, como *internet*, é possível encontrar uma diversidade de informações sobre receitas, dietas, em *sites* ou com *influencers digitais*. O que achariam disto?

- *O que esperam que as pessoas possam obter destes serviços?*
- *Vocês acham que as pessoas estão interessadas em buscar nesse meio de comunicação?*
- *Quem acham que deveria proporcionar este conteúdo?*

Cenário 2: (Pista visual 4) Imaginem o cenário de programas de culinária. O que vocês acham da influência desses programas na alimentação das pessoas?

- *Vocês acham que é possível uma mudança de hábitos alimentares?*
- *Acreditam que as pessoas possam aprender ou melhorar as aptidões culinárias?*
- *Se sim, como isso é possível?*

Cenário 3: (Pista visual 5) Imaginem agora uma pessoa que procura um profissional de saúde. O quanto vocês acham que esses profissionais podem influenciar na mudança de hábitos?

- *Que informações os locais estariam dispostos a fornecer?*
- *Quem fornece e quem poderia fornecer essas informações?*
- *Pensando nos nutricionistas, como é feita a abordagem da mudança de hábitos?*
- *Quem acha que seria importante abordar como os alimentos podem ser preparados?*
- *Vocês se sentem seguros ao fazer essas recomendações?*
- *Se sim, como fazem para orientar os utentes?*
- *Acreditam as aptidões culinárias de vocês podem influenciar de algum modo na mudança de hábitos dos utentes?*
- *Como isso é possível?*

Questões Éticas

- i) Estamos interessados em saber se têm questões ou alguma preocupação sobre a forma como a informação dos cenários anteriores possa ser usada e armazenada.
- ii) Estamos interessados em saber se têm questões ou alguma preocupação sobre a forma como vos seria dado ou entregue o *feedback* pessoal.
- iii) Estamos interessados em saber se têm questões ou alguma preocupação sobre a forma como a informação de *feedback* possa ser usada.

Preparação para a Finalização

- i) Açam que aptidões culinárias poderia ser um assunto bem sucedido para a melhora dos hábitos alimentares? Porquê? *Aprofundar/pistas.*
- ii) O que o tornaria bem sucedido? *Aprofundar/pistas.*
- iii) Têm mais alguma coisa que gostassem de acrescentar?

Esclarecimentos, Encerramento e Agradecimentos

Informar os participantes de que a discussão está a chegar ao fim, e.g. “Estamos a chegar ao final da discussão.”

Perguntar como é que os participantes se estão a sentir, e.g. “Gostaria de lhes perguntar como se sentem acerca da discussão e seus conteúdos.”

Agradecer aos participantes pelo seu tempo e contribuição.

**Health professionals' cooking skills and
their relevance in the transmission of
health messages.**

Leticia Mucci da Conceição

SEDE ADMINISTRATIVA FACULDADE DE CIÊNCIAS DA NUTRIÇÃO E ALIMENTAÇÃO
FACULDADE DE MEDICINA
INSTITUTO DE CIÊNCIAS BIOMÉDICAS ABEL SALAZAR

