ABSTRACT

Objective: To understand if a culinary medicine training program increases food literacy, culinary skills, and knowledge among practicing registered dietitian nutritionists (RDN).


Results: On average, results indicate an increase in culinary nutrition skills (mean difference, 6.7 ± 4.4; P < 0.001; range, 10−30) and a significant increase in 5 of the 8 food literacy factors. Through process evaluation, RDNs rated the training as extremely useful to their practice (mean, 4.4 ± 0.3).

Conclusions and Implications: Registered dietitian nutritionist participants increased culinary nutrition skills with statistically significant scores across all individual measures. This study describes an RDN training curriculum in culinary medicine across a diverse group of practicing RDNs from a large county health care system. Culinary medicine shows a promising impact on promoting nutrition skills and confidence; however, it warrants further assessment.

Key Words: culinary medicine, cultural humility, food insecurity, food prescription, teaching kitchen (J Nutr Educ Behav. 2022;54:784−793.)

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INTRODUCTION

Culinary medicine (CM) is an emerging educational and nutritional approach that adds to current nutrition education interventions by incorporating the practical hands-on preparation skills and pleasure of food and the scientific knowledge of how nutrition and dietary patterns affect health outcomes.1−6 Although multiple varieties of culinary medicine programs2,3,7−9 exist, a key common thread is that they focus on the importance of practical hands-on nutrition education. Culinary medicine programs operate in dietetic, medical, public health, physician assistant, and nursing schools to train health care providers, using a food-first model, in addressing diet-related chronic diseases.1,3,4 Furthermore, many programs implement CM with patient populations struggling with chronic conditions in locations across the US.3,4,10 Preliminary data from various culinary medicine studies report positive increases in healthy food consumption among providers and patients.10−13 There is a gap in the literature involving registered dietitian nutritionist (RDN) training, but the quick rise in popularity of CM has created a unique opportunity for the RDN to improve patient outcomes in a clinical or community setting by implementing CM.4,6,14

Strong evidence shows a protective effect between healthy dietary patterns rich in fruits, vegetables, and whole grains and a lower risk of chronic diseases, including type 2 diabetes, cardiovascular disease, cancer,
and all-cause mortality.\textsuperscript{15−17} Despite well-supported studies and public health campaigns promoting healthy eating, the average adult in the US falls well short of dietary recommendations.\textsuperscript{18,19} Low levels of food literacy coupled with poor dietary consumption behaviors among the US population warrant the need for innovation in nutrition education and intervention approaches.\textsuperscript{7,20,21}

Although most RDNs receive training solely in nutrition and food, further development and teaching of advanced culinary skills can position the RDN as a leader within CM programs.\textsuperscript{4,6,21,22} This paper describes an RDN training curriculum in CM and fills the gap in the literature by presenting the results of its implementation across a diverse group of practicing RDNs from a large county health care system. The Nourish Program at the University of Texas Health Science Center at Houston (UTHealth) School of Public Health is a nutrition research and education hub consisting of a holistic teaching garden, a culinary teaching kitchen, and a clinical simulation laboratory.\textsuperscript{23} The 3 resources provide experiential CM training and education opportunities for dietetic students and practicing RDNs to address the linkages between food insecurity, food systems, dietary consumption, health promotion, and chronic disease prevention and treatment. Recently, A Prescription for Healthy Living, a project collaboration between UTHealth School of Public Health, Harris Health System, and the Houston Food Bank included the implementation and evaluation of comprehensive RDN CM training.\textsuperscript{23} The purpose of this paper was to determine the acceptability, feasibility, and potential impact of this RDN train-the-trainer CM curriculum and training program on improving food literacy, culinary knowledge, and skills among RDNs.

**METHODS**

**Culinary Medicine Training Program Theoretical Framework and Description**

The intervention mapping process\textsuperscript{24} was used to systematically develop the RDN and patient curricula tailored to the needs of a culturally diverse, food insecure, and low-income minority patient population receiving care at Harris Health in Harris County, TX\textsuperscript{25,26} using Social Cognitive Theory (SCT) as a framework.\textsuperscript{27,28} The RDN training and patient curricula were grounded in 3 main concepts of SCT: (1) taste: consume delicious healthy food to change negative outcome expectations of healthy food tasting bad; (2) see: demonstration of recipes (cooking techniques) for modeling and observational learning; and (3) do: the ability to increase behavioral capacity and self-efficacy through hands-on experiential preparation of recipe(s) (cooking techniques). Finally, holding the series of classes in a group setting with an open group discussion and goal setting promotes group learning, changes in social norms, and continued reinforcement of positive behaviors.\textsuperscript{27}

**Study Design**

A prepost study design was used to evaluate the pilot testing of the RDN train-the-trainer curriculum in a diverse RDN population from September, 2019 to January, 2020. The UTHealth Committee for Protection of Human Subjects Institutional Review Board approved the study as exempt because it was a quality improvement activity for RDNs.

The RDN training curriculum included 6-sessions and provided 18 hours of continuing professional education units (CPEU). A total of 6 3-hour training sessions were held on weekdays during regular business hours (Table 1). Program components included hands-on CM education and training in food insecurity, cultural humility, group facilitation, counseling, and communication strategies. To promote adult learning and reduce the classroom time burden, the 6 sessions used a flipped classroom format by including readings and video instruction before session attendance.\textsuperscript{29,30} All 3-hour sessions revolved around 4 common themes: (1) patient-centered communication, (2) culinary skill development, (3) leading mock cooking sessions, and (4) group discussion and feedback. Each session included a combination of experiential and didactic learning rooted in motivational interviewing to provide an opportunity for learning and practical application.

**Study Setting and Participants**

The CM training took place at the Nourish teaching kitchen at UTHealth with the RDN staff (n = 29) employed across 2 hospitals and 18 community health centers within the Harris Health System. A system-wide training for the entire RDN population of the Harris Health System took place; therefore, no sample size calculations were done. As a large county health care system, Harris Health serves a patient population suffering from significantly higher food insecurity, obesity, and type 2 diabetes rates than Texas and the US.\textsuperscript{25,26} All RDNs were registered and licensed RDNs in the state of Texas. Registered dietitian nutritionists were split into 2 cohorts (cohort 1, n = 14 RDNs; and cohort 2, n = 15 RDNs) and participated as part of their employment, receiving 3 CPEUs for attending each session (18 CPEUs total).\textsuperscript{31} If participants missed a session, they were eligible to attend the equivalent session with the other cohort. No other compensation was provided.

**Data Collection Measure**

Pretraining and posttraining survey data were collected using electronic surveys administered through Qualtrics by UTHealth project staff. Surveys were administered in English and took approximately 10 minutes to complete. Process evaluation measures were taken, including attendance and feedback; these data were collected using a tracking database and comment cards which included a Likert ranking of the usefulness of session topics and space for open-ended feedback at each workshop session. The postsurvey was administered immediately after training, with several reminder emails sent to participants for completion. Further information regarding the content of the surveys and process evaluation measures will be discussed in subsequent sections.
**Table 1. Culinary Medicine Train-the-Trainer Curriculum Outline for A Prescription for Healthy Living**

**Culinary Medicine Train-the-Trainer Curriculum Outline**

Common themes for each session:
- Presession readings (electronic)
- Patient-centered communication (eg, motivational interviewing, facilitation vs lecture)
- Culinary skills development (eg, knife skills, vegetable roasting, etc)
- Mock session practice (eg, facilitating experiences)
- Group discussion and feedback
- Presession readings (electronic)

<table>
<thead>
<tr>
<th>Session</th>
<th>Topics Covered</th>
<th>Objectives</th>
</tr>
</thead>
</table>
| 1       | Communication/ counseling strategies, culinary nutrition training (knife skills and vegetable roasting), and food choice discussion | (1) Participants will increase their knowledge of counseling strategies. 
(2) Participants will increase their knowledge of food choice 
(3) Participants will increase their knife and vegetable roasting skills |
| 2       | Motivational interviewing workshop, culinary nutrition training (vegetable roasting and sautéing), and food language discussion | (1) Participants will increase their knowledge and skills in motivational interviewing  
(2) Participants will increase their ability to discuss nutrition in food-first language  
(3) Participants will increase vegetable roasting and sautéing skills |
| 3       | Cultural humility workshop and culinary nutrition training (vegetable microwaving and grains) | (1) Participants will increase their knowledge of various cultures.  
(2) Participants will increase their ability to discuss nutrition in the culturally relevant language  
(3) Participants will increase vegetable microwaving and whole-grain skills |
| 4       | Food insecurity workshop and culinary nutrition training (soups & stews & vegetable microwaving) | (1) Participants will increase their knowledge of food insecurity.  
(2) Participants will increase their ability to discuss nutrition with a food-insecure population  
(3) Participants will increase vegetable microwaving and soups and stew skills |
| 5       | Mock group facilitation session facilitated group practice, and cooking demonstration using *Healthy Eating Active Living* (HEAL) program model | (1) Participants will increase their knowledge of leading facilitated culinary, nutrition, and physical activity demonstrations relating to maternal health  
(2) Participants will increase confidence in leading facilitated culinary, nutrition, and physical activity demonstrations relating to maternal health |
| 6       | Experiential culinary nutrition practice and facilitated hands-on culinary nutrition practice | (1) Participants will increase their knowledge of leading facilitated culinary nutrition workshops  
(2) Participants will increase confidence in leading facilitated culinary nutrition workshops |
Sociodemographic factors. Self-reported sociodemographic information shown to be important in a previous large-scale population-based survey included age, gender (response options included male, female, or other), race/ethnicity, languages spoken fluently, position, length of time in position, prior culinary skills training, and prior prenatal nutrition training.

Perception of culinary nutrition skills. This self-report survey consisted of questions on the self-perception of various culinary nutrition skills (6 items: knife skills, roasting, sautéing, microwaving, recipe building, and group facilitation) covered during training. Responses ranged from 1 (no skill) to 5 (highly skilled). A summative scale consisted of adding all culinary nutrition skill scores (scores ranged from 6 to 30). Some of the constructs were adapted from previous studies, such as the itemized, group-administered food behavior checklist; 5-point scale confidence ratings of dietary habits, healthy eating, and food choices, mindful eating practices, and overall rating of well-being; prepost surveys to evaluate the adoption of healthy behaviors guided by SCT. The investigative team also conducted face validity. Face validity was measured qualitatively and quantitatively. Subjects were interviewed about the difficulty or ambiguity in the questions administered. Furthermore, subjects were asked to rate the level of importance of each question in the questionnaire. The average rating was calculated and multiplied by the percentage of people who rated the question on some level of importance, calculating a final score, determining the validity through the appearance or importance of the construct tool (StataCorp). We adapted the Nutrition Literacy Assessment Instrument, validated among adults with a correlation coefficient = 0.88 through test-retest analysis. Not only was this previously validated and reliable tool used, but additional questions to measure food literacy were needed because an overall comprehensive tool to measure food literacy in our paper was more complex than nutrition literacy alone.

Confidence in teaching food literacy skills. This self-report survey regarding self-efficacy in teaching food literacy skills was developed by the investigative team (8 items: why to eat healthy, how to eat healthy, how to cook healthy, how to make a grocery list, how to cook with leftovers, how to cook from scratch, how to meal plan, and how to eat for prenatal care) covered during training. Responses ranged from 1 (not confident) to 5 (extremely confident). A summative scale consisted of the addition of all confidence in teaching food literacy skills scores (scores ranged from 8 to 40), with higher scores indicating higher self-efficacy. Several validated, reliable tools were used by the current researchers as a guide for developing a survey with additional items to measure food literacy because we conducted a full needs assessment and had very specific items to address when developing the training. Previous studies used scales to measure food and nutrition-related self-efficacy and confidence through test-retest reliability with \( r = 0.63-0.88 \) for 3 scales and internal consistency of the sample = 0.76–0.85; cooking skills scale to measure self-efficacy of preparing certain food items with test-retest reliability \( r = 0.8 \); and a questionnaire for cooking skills programs measuring the confidence of using a recipe and cooking behavior and consumption of fruits of vegetables confirmed through test-retest reliability with a Spearman correlation coefficients between 0.46–0.91 at \( P < 0.001 \). A fully validated and reliable tool is yet to be discovered measuring the full scope of food literacy among individuals. This was a pilot study, so the validity and reliability of the instrument were not assessed.

Communication. This nonsummative self-report 3-item survey regarding the ease and frequency of communication with providers about nutrition and the ease of communication with patients about the role of food and nutrition in health was developed by the investigative team. Responses for communicating with patients and providers ranged from 1 (not at all easy) to 5 (extremely easy). Response options for the frequency of talking with providers about nutrition ranged from 1 (never) to 5 (always).

Process evaluation measures. All participants signed in at the beginning of each session to track attendance for continuing education credits. At the end of each session, participants completed a process evaluation survey that included 3–5 questions to provide input on the overall usefulness and satisfaction with the program components, instruction delivery, and workshop information. All responses ranged from 1 (not at all useful) to 5 (extremely useful), with an option for qualitative comments on each survey.

Comment card feedback themes and findings. Select quotes representing the major areas of training session feedback are presented in the results section.

Statistical Analysis

Data analyses were conducted using Stata software (version 14.1, StataCorp, 2015). Descriptive statistics, including means, SD, and frequencies, were computed to describe the demographic factors of participants and the perceived usefulness of training. Paired \( t \) tests were conducted to evaluate the changes in survey items between pretraining and posttraining sessions. \( P < 0.05 \) was considered statistically significant. The primary researcher initially reviewed all comment card feedback and iteratively coded and categorized responses through thematic analysis; 2 research team members subsequently coded all data for reliability. Selective quotes representing the major feedback areas are illustrated in the results.

RESULTS

Twenty-nine of the maximum 31 Harris Health RDNs (1 on leave and 1 had employment conflict) participated in the training, with 93% attending 5 or more sessions out of the total 6 available sessions (5.6 ± 0.74). Twenty-five of the RDNs completed prepost surveys (86% survey completion rate; 2 were no longer employed, and 2 were lost to follow-
Impact on Culinary Nutrition Skills and Food Literacy

At baseline, on a scale of 1–5, average scores for each culinary nutrition skill indicated a moderate self-perception of culinary nutrition skills, including knife skills, roasting, sautéing, microwaving, recipe building, group facilitation, and summative scores (Table 2). There was a significant increase in scores across all individual measures of culinary nutrition skills as well, with the greatest reported increase in scores for roasting skills ($P < 0.001$). Overall, the results of the prepost survey indicate that RDN participants increased culinary nutrition skills ($P < 0.001$) (Table 2).

At baseline, a scale of 1–5, average scores for each item indicated high self-reported confidence in teaching food literacy skills and behaviors, including how to cook healthy food, how to make a grocery list, how to cook healthy with leftovers, how to cook meals from scratch, how to eat healthy for prenatal care, and summative scores (Table 2). Results of the pretraining to posttraining analysis demonstrate a significant increase in the summative scale scores for the self-efficacy in teaching food literacy skills and behaviors ($P < 0.001$) (Table 2). There was a significant increase in 5 of the 8 food literacy factors, with the greatest reported increase in scores for how to cook healthy with leftovers ($P < 0.001$) and how to cook healthy food ($P < 0.001$) (Table 2).

Impact of a Training Program

Results from the process evaluation showed, on average, RDNs rated the training as extremely useful to their practice ($4.4 \pm 0.26$), with session 6 receiving the lowest ($4.2 \pm 0.90$) and session 2 receiving the highest ($4.6 \pm 0.6$) overall usefulness rating (Table 3). On average, cohort 1 ($4.3 \pm 0.22$) rated the training lower than cohort 2 ($4.5 \pm 0.14$).

Registered dietitian nutritionists frequently described the enjoyment and practicality of learning/improving cooking skills, the exposure to new/different flavors and foods, and the deliciousness and simplicity of the dishes prepared in-class sessions.
<table>
<thead>
<tr>
<th>Variable</th>
<th>Scoring Range</th>
<th>Cohort 1</th>
<th>Cohort 2</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Training Usefulness</td>
<td>1–5</td>
<td>4.3 ± 0.22</td>
<td>4.5 ± 0.14</td>
<td>4.4 ± 0.26</td>
</tr>
<tr>
<td>Session 1: Overview of culinary nutrition, knife skills, and roasting vegetables&lt;sup&gt;b&lt;/sup&gt;</td>
<td></td>
<td>n = 15</td>
<td>n = 14</td>
<td>n = 29&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Overall usefulness</td>
<td>1–5</td>
<td>4.4 ± 0.96</td>
<td>4.7 ± 0.41</td>
<td>4.5 ± 0.75</td>
</tr>
<tr>
<td>Overview of culinary nutrition</td>
<td>1–5</td>
<td>4.3 ± 1.03</td>
<td>4.6 ± 0.50</td>
<td>4.5 ± 0.50</td>
</tr>
<tr>
<td>Knife skills instruction</td>
<td>1–5</td>
<td>4.3 ± 0.96</td>
<td>4.6 ± 0.50</td>
<td>4.5 ± 0.83</td>
</tr>
<tr>
<td>Roasting instruction</td>
<td>1–5</td>
<td>4.5 ± 1.06</td>
<td>4.7 ± 0.47</td>
<td>4.6 ± 0.82</td>
</tr>
<tr>
<td>Session 2: Motivational interviewing, roasting vegetables, and sautéing vegetables&lt;sup&gt;b&lt;/sup&gt;</td>
<td></td>
<td>n = 13</td>
<td>n = 16</td>
<td>n = 29&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Overall usefulness</td>
<td>1–5</td>
<td>4.5 ± 0.65</td>
<td>4.7 ± 0.46</td>
<td>4.6 ± 0.55</td>
</tr>
<tr>
<td>Motivational interviewing</td>
<td>1–5</td>
<td>4.5 ± 0.66</td>
<td>4.8 ± 0.45</td>
<td>4.6 ± 0.56</td>
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<tr>
<td>Cooking instruction</td>
<td>1–5</td>
<td>4.4 ± 1.12</td>
<td>4.6 ± 0.62</td>
<td>4.5 ± 0.87</td>
</tr>
<tr>
<td>Food tasting</td>
<td>1–5</td>
<td>4.6 ± 0.51</td>
<td>4.7 ± 0.61</td>
<td>4.7 ± 0.55</td>
</tr>
<tr>
<td>Session 3: Cultural diversity, whole-grain cookery, and sautéing vegetables&lt;sup&gt;b&lt;/sup&gt;</td>
<td></td>
<td>n = 12</td>
<td>n = 16</td>
<td>n = 28&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Overall usefulness</td>
<td>1–5</td>
<td>4.5 ± 0.66</td>
<td>4.5 ± 0.61</td>
<td>4.5 ± 0.62</td>
</tr>
<tr>
<td>Cultural humility</td>
<td>1–5</td>
<td>4.4 ± 0.67</td>
<td>4.5 ± 0.73</td>
<td>4.5 ± 0.69</td>
</tr>
<tr>
<td>Cooking instruction</td>
<td>1–5</td>
<td>4.5 ± 0.67</td>
<td>4.5 ± 0.63</td>
<td>4.5 ± 0.64</td>
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<tr>
<td>Food tasting</td>
<td>1–5</td>
<td>4.5 ± 0.67</td>
<td>4.4 ± 0.63</td>
<td>4.5 ± 0.64</td>
</tr>
<tr>
<td>Session 4: Food literacy, food insecurity, soups and stews, and microwaving vegetables&lt;sup&gt;b&lt;/sup&gt;</td>
<td></td>
<td>n = 12</td>
<td>n = 16</td>
<td>n = 28&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Overall usefulness</td>
<td>1–5</td>
<td>4.3 ± 0.66</td>
<td>4.5 ± 0.53</td>
<td>4.4 ± 0.59</td>
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<tr>
<td>Food insecurity</td>
<td>1–5</td>
<td>4.0 ± 1.28</td>
<td>4.3 ± 0.77</td>
<td>4.1 ± 1.01</td>
</tr>
<tr>
<td>Cooking instruction</td>
<td>1–5</td>
<td>4.6 ± 0.51</td>
<td>4.7 ± 0.48</td>
<td>4.6 ± 0.49</td>
</tr>
<tr>
<td>Food tasting</td>
<td>1–5</td>
<td>4.5 ± 0.52</td>
<td>4.8 ± 0.45</td>
<td>4.6 ± 0.49</td>
</tr>
<tr>
<td>Meal planning</td>
<td>1–5</td>
<td>3.9 ± 0.24</td>
<td>4.2 ± 0.91</td>
<td>4.1 ± 1.05</td>
</tr>
<tr>
<td>Session 5: Group facilitation and leading mock cooking session&lt;sup&gt;b&lt;/sup&gt;</td>
<td></td>
<td>n = 12</td>
<td>n = 16</td>
<td>n = 28&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Overall usefulness</td>
<td>1–5</td>
<td>4.3 ± 0.81</td>
<td>4.3 ± 0.89</td>
<td>4.3 ± 0.84</td>
</tr>
<tr>
<td>Group facilitation</td>
<td>1–5</td>
<td>4.2 ± 0.94</td>
<td>4.3 ± 0.79</td>
<td>4.3 ± 0.84</td>
</tr>
<tr>
<td>Leading food demonstration</td>
<td>1–5</td>
<td>4.3 ± 0.78</td>
<td>4.3 ± 1.01</td>
<td>4.3 ± 0.90</td>
</tr>
<tr>
<td>Session 6: Leading culinary nutrition classes&lt;sup&gt;b&lt;/sup&gt;</td>
<td></td>
<td>n = 14</td>
<td>n = 14</td>
<td>n = 28&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Overall usefulness</td>
<td>1–5</td>
<td>3.8 ± 1.08</td>
<td>4.6 ± 0.48</td>
<td>4.2 ± 0.90</td>
</tr>
<tr>
<td>Hands-on cooking class discussion</td>
<td>1–5</td>
<td>3.6 ± 1.40</td>
<td>4.4 ± 0.84</td>
<td>4.0 ± 1.20</td>
</tr>
<tr>
<td>Food demonstration coaching</td>
<td>1–5</td>
<td>4.1 ± 1.14</td>
<td>4.6 ± 0.50</td>
<td>4.4 ± 0.91</td>
</tr>
<tr>
<td>Leading food demonstration</td>
<td>1–5</td>
<td>4.0 ± 1.11</td>
<td>4.8 ± 0.43</td>
<td>4.4 ± 0.92</td>
</tr>
</tbody>
</table>

RDN indicates registered dietitian nutritionists.

<sup>a</sup>Variation in population because of incomplete/missing comment cards; <sup>b</sup>Scoring: (1) not at all useful, (2) slightly useful, (3) somewhat useful, (4) useful, and (5) extremely useful.

Note: Values are mean ± SD based on 2 independent sample t tests.
as reasons for enjoying the sessions. One RDN described, “Enjoyed cooking the different grains and learning how to celebrate different cultures.” Furthermore, several comments requested additional time in the hands-on culinary portion of the class, especially in comparison with didactic education.

Registered dietitian nutritionists overwhelmingly reported the training’s culinary skills and practical hands-on cooking as the most enjoyable portion. One RDN explained, “Love hands on, love activities, love instructors.” Furthermore, experiential activities and discussions were valued over traditional didactic lectures.

Areas for Improvement

A consistent comment across sessions was that, despite the average of 90 minutes per session for cooking skills, participants wanted more time allocated for hands-on cooking to improve culinary knowledge and skills. Others voiced concerns about the time commitment required to complete scientific readings and lectures before attending sessions. Finally, some participants struggled with the practicality of teaching CM programming in clinical settings. As one participant acknowledged, “I enjoyed the entire program; while I’m not a fan of public speaking, the cooking demo was very useful for having to teach patients different techniques. Thanks for the info and skills.”

Application to Practice

Overall, RDNs reported satisfaction with the practical application of the training for their respective practice. Some RDNs described feelings of anxiety and stress when leading cooking demonstrations but reported satisfaction in the perceived benefits for their patients. As one RDN noted, “I am very grateful for being able to participate in this training; majority of patients know what are healthy foods but they do not eat them because they don’t enjoy them due to not using herbs, spices, variety or not knowing how to cook, so more tips, ideas in this training will help me give direction to my patients.”

DISCUSSION

This paper describes an RDN training curriculum in CM and presents the results of its implementation across a diverse group of practicing RDNs from a large county health care system. This collaborative partnership with Harris Health allowed for a systemwide training of RDNs with > 93% participation. Furthermore, the retention rate in the CM training was high, with > 90% attending all the training sessions and > 82% completing all evaluation measures. That, coupled with the ethnic and language diversity of RDNs, and the patient population served by Harris Health, allowed for rich feedback on the evaluation, which will further help improve the CM curriculum components, cultural humility, and delivery. The baseline results of our study also indicated that 80% of the RDNs had no prior training in culinary skills. These results concur with other literature suggesting that health care students and trainees, including dietetics students and interns, need additional practice to develop the required confidence and culinary skills to deliver CM programming. Considering this, many newly credentialed and long-practicing RDNs require education and practice to develop these same skills fully. Thus, continuing education and training strategies, such as those offered in this study, are needed to successfully level-set these practical skills and position RDNs as leaders of the CM interdisciplinary team. We echo the call for RDNs to seek educational and training opportunities to position themselves as collaborative and skilled leaders in CM; otherwise, another profession will fill the void.

Data from program evaluation indicate strong acceptability and feasibility of the in-person CM program curricula and positive improvements across many areas of behavioral capability, including culinary nutrition skills and food literacy knowledge and skills. Furthermore, self-efficacy in teaching several healthy behaviors, such as cooking with leftovers, grocery shopping, cooking from scratch, and so on, also improved significantly following training. Culinary medicine is currently not offered as part of the regular RDN training curriculum. This type of training can empower practicing RDNs with the needed knowledge, skills, and self-efficacy to promote healthy cooking behaviors in a patient population to help ultimately improve their health outcomes. Given the burgeoning rates of diet-related chronic diseases, especially among low-income, minority populations, calls for strategies such as those used in CM to help promote improved dietary behaviors by improving the healthy culinary skills of the patient population in a budget-friendly, culturally humble manner. Culinary Medicine programs are rapidly increasing nationwide with the work of the Nourish Program at UTH, the Teaching Kitchen Collaborative, a joint and shared effort of > 35 organizations across the US, the Goldring Center for Culinary Medicine’s Health Meets Food programming, the Food and Culinary Dietetic practice group, and several individual programs in Universities, hospitals, and community locations across the US. Culinary medicine programming can be a key strategy to increase interprofessional collaboration in nutrition communication across health professions.

This study demonstrated the effectiveness of implementing a CM program training RDNs with positive outcomes. Compared with other CM research and interventions that have found significance in their findings, CM in our study shows a promising impact on promoting nutrition skills and confidence. Moreover, all RDNs in our program could use CM training with their clients because training sessions were broadened to be relevant to all practice areas within the hospital and community clinics.

Although our study found some improvement in precommunication to postcommunication skills, these results were not statistically significant. A ceiling effect could have prevented further increases because of high
Participants reported higher use of the culinary instruction and food tasting (sessions 1–4) over the mock teaching (sessions 5–6). These results are consistent with the comment card feedback in which participants described anxiety and stress related to public speaking, similar to a previous study. In addition, it is possible that the discrepancy in the ranking of sessions between cohorts is associated with improvements in the curriculum delivery for the second cohort. Areas of improvement included the online prereading component, which had limited reach because of reported time constraints by the participants. These preliminary results demonstrate the feasibility of implementing a training framework for RDNs planning or currently undertaking CM initiatives.

We did not quantitatively evaluate how RDNs completed preclass readings and online activities, although qualitative data suggested that these prereadings were uniformly read by all before class. This needs to be considered in future iterations of the curricula by incorporating online assessments on completion of the virtual modules. Another limitation of our study was using self-reported data, which can result in social desirability bias, response bias, and measurement bias. The lack of a control or comparison group limits the attribution of outcomes seen to the training itself. Future studies should assess the longer-term impact of such training programs on RDN practice in the field and subsequently on patient satisfaction with care and behavioral and health outcomes.

The RDN training curriculum is comprehensive and aims to improve culinary skills to promote healthy eating in a low-income patient population struggling with diet-related chronic conditions, encouraging focus on financial and cultural considerations of their patient population. The study population consisted of a diverse set of outpatient and inpatient RDNs from Harris Health, thus representing the diversity of the patient population served. Although our RDN population was relatively diverse, this is atypical for the RDNs in general. Even with our diverse group, participants were happy to be exposed to education regarding cultural humility and diverse foods. The exposure to cooking and tasting different types of vegetables, grains, and spices was an important component of the curriculum and may facilitate the RDNs’ ability to relate to patients in terms of food.

Most importantly, almost all practicing Harris Health RDNs participated in the training as part of their systemwide strategy to train their RDNs in CM. Systems integration is necessary to effectively change workflow to successfully sustain group-education classes like A Prescription for Healthy Living in the patient population. Finally, the availability of CPEU credits offers a strong incentive for participation in the program, as seen in our study, in which we had very high retention across the 6 sessions.

**IMPLICATIONS FOR RESEARCH AND PRACTICE**

Our study provides the framework and results of implementing an innovative culinary medicine-based RDN training curriculum as part of a systemwide training of a diverse group of RDNs practicing in a large urban county health care system. Furthermore, this practical, food-based education provides an interactive and engaging medium for communicating nutrition education and dietary concepts. Not surprisingly, this innovative method was overwhelmingly positive with crucial timing as the burden of food insecurity, systemic inequalities, diet-related diseases, and the gap in practical nutritional education continues to rise. Subsequently, our study encompasses the framework to empower RDNs to provide culturally inclusive and practical food-based solutions to help patients struggling with these diseases. Although the preliminary findings show promise, future research warrants more rigorous assessments of outcome measures using a stringent study design, measuring the impact of this training on RDN practice behaviors and evaluating patient dietary and health outcomes.

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