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ORIGINAL ARTICLE

Cooking up better doctors as teachers globally: a novel integrated nutrition and cooking class curriculum for pediatric residents to boost their competencies and attitudes in patient counseling

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Abstract The objective of the study was to identify competencies, attitudes, and health habits of pediatric residents, during the initial phase of a trial tracking the impact of a novel 21-h multi-disciplinary nutrition curriculum with hands-on cooking skills to improve patient education. We conducted a 44-question baseline survey of pediatric residents ($n = 52$) from 2012 to 2013 in New Orleans, Louisiana. Univariate analyses using appropriate test statistics were performed with subsequent multivariate adjusted logistic regression. Residents reported a low perceived importance of providing nutrition education to patients and low competencies on validated education topics, as well as personal intake of fruits and vegetables below national dietary guidelines. In multivariate regression models controlling for nutritional attitudes, the significant relationship remained between inadequate daily fruit intake predicting decreased competencies for educating patients on identifying antioxidant-rich produce (OR = 0.13, 95 % CI = 0.0269–0.5833, $p = 0.008$), and between adequate vegetable intake and competency for daily hydration education (OR = 0.12, 95 % CI 0.0244–0.5873, $p = 0.009$). This survey details the barriers facing physician residents in providing effective nutrition-based preventative medicine education for patients. This study supports continued development of a longitudinal nationally scalable model of curriculum improvement from the premedical student stage of training to the attending physician stage.

Keywords Patient nutrition education · Culinary medicine

Introduction

Despite mounting evidence regarding the lowered morbidity and mortality risk with improved diet [1–3], less than half of primary care physicians regularly track body mass index (BMI) or provide nutrition education for their patients [4]. Recognizing this shortcoming, the Institute of Medicine's 2012 Report on Accelerating Progress in Obesity Prevention specifically recommended that physicians serve as role models and advocates for obesity prevention in their communities. Evidence has shown that when physicians assume the position of a role model with regard to their own dietary practices, their beliefs regarding the causes of obesity (excessive calorie-dense and processed foods) and their willingness to counsel patients on portion control and fast food reduction are positively influenced [4]. Medical professionals are increasingly faced with the responsibility of accurately understanding factors that support or inhibit their abilities and willingness

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to provide adequate nutrition education for patients. Physician dietary practices have been previously shown to correlate with beliefs about causes of obesity (including calorie-dense and processed foods) and subsequent increased physician counseling of patients about reductions in restaurant high-calorie dishes and portion sizes [5].

An increasing number of studies recently have suggested that a potentially associated challenge to physicians providing nutritional counseling is their lack of competencies, with 48 % of pediatricians and internists reporting inadequate proficiency for providing basic nutrition treatment options [6]. The academic community has yet to reach a consensus on evidence-based interventions to improve physicians' perceived competencies or attitudes toward nutrition education. Early attempts to establish an effective model within medical training programs are few, as evidenced by the fact that only 22.6 % of pediatric residencies provide a formal childhood obesity curriculum, while 67.9 % of primary care residencies report limited effectiveness of their standard didactic courses [7]. This is true even at the undergraduate medical education level, where attempts to create an effective nutrition curriculum for medical students have been limited to small group efforts [15], suggesting that the issue may begin even before residency. Nonetheless, evidence has shown that implementing innovative teaching tools improves medical professionals' competencies in preventive medicine and patient education [16].

To respond to these substantial hurdles, Tulane University School of Medicine launched The Goldring Center for Culinary Medicine (GCCM) in 2012. It serves as a medical school-based teaching kitchen under a physician and chef's guidance with a committed research team for curriculum improvement and patient outcomes monitoring. GCCM has created a disease and wellness-oriented nutrition curriculum that integrates clinical nutrition with hands-on cooking skills for premedical students, medical students, residents, and practicing physicians, with the ultimate goal of improving their skills in patient nutrition education and thus patient outcomes [8]. Through longitudinal monitoring of medical students' USMLE Step exam scores, residency match rates, and school-wide surveys, GCCM is tracking the impact of elective curriculum participation on students' competencies, attitudes, health habits, and clinical readiness [9, 10].

However, less is known regarding the impact of the GCCM or similar nutrition curriculums on physician residents, despite studies supporting improved adherence to effective treatment plans later in life when patients received successful patient education in childhood [11, 12]. Past studies have demonstrated that pediatric residents' lack of nutrition competencies can be improved through nutrition education interventions, but these studies were limited due to small sample sizes, minimal resident education time, and no known longitudinal follow-up [13, 14]. Additionally, those studies did not report controlling in their statistical analyses for such potential confounders as nutrition attitudes affecting the association of residents' perceived competencies and dietary habits.

Methods

We conducted a 44-question baseline convenience survey among pediatric residents ($n = 52$) prior their participation in a 21-h multi-disciplinary nutrition curriculum with hands-on cooking skills for patients' overall wellness improvement. This resident curriculum is in contrast to other institutions' nutrition education centered on 20–60 min lectures restricted mostly to obesity reduction [13, 14]. The survey was designed to identify baseline competencies, dietary habits, and attitudes toward nutrition education among pediatric residents prior to their curriculum participation for comparison after their participation. Responses using a five-point Lickert scale were aggregated from the 2012 entering class and 2013 entering class (completion rates of 97.1 and 88.9 %, respectively).

Mean scores for competencies and attitudes according to dietary habits were tested using Chi-square tests for categorical results and Fischer's exact test as appropriate in STATA 12.0. Multivariate logistic regression models were run for predicting dichotomous outcomes of competencies using significant predictors of dietary habits from univariate analysis. Covariates controlled for in the regression models include residents' attitudes toward nutrition education and physicians' effect on patient health when this education is provided to patients.

Results

Prior to implementation of GCCM's nutrition curriculum, pediatric residents reported low perceived importance in providing nutrition education to patients, competencies for doing so, and personal intake of fruits and vegetables below national dietary guidelines. A minority of pediatric residents reported strong agreement that nutrition education should be part of routine patient care (36.7 %) and that physicians can influence patients' dietary habits (37.5 %). For their own dietary habits, only 6.1 % reported adequate daily intake of dark green vegetables, 20.4 % for other vegetables such as carrots and squash, and 24.5 % for adequate daily fruit intake. The majority of residents reported less than total competencies in patient education on health effects of a low fat diet (93.9 %), identifying

antioxidant-rich grocery produce (75.5 %), and assessing total calories and saturated fat by food labels (63.3 %).

There were also significant associations between resident dietary habits and perceived competencies in patient nutrition education. If residents had adequate daily fruit intake, they were 89 % less likely to report a lack of antioxidant competency (OR = 0.11, 95 % CI 0.0253–0.4928, $p = 0.004$) and 84 % less likely to report deficits in daily hydration proficiencies (OR = 0.16, 95 % CI 0.0390–0.6621, $p = 0.011$). With adequate daily intake of non-dark green vegetables such as carrots and squash, they were 89 % less likely to report deficits in competencies for osteoporosis prevention (OR = 0.17, 95 % CI 0.0334–0.8787, $p = 0.034$) and 76 % less likely to report deficits in daily hydration education (OR = 0.15, 95 % CI 0.0319–0.6836, $p = 0.014$). In multivariate regression models controlling for the degree of perceived impact of physicians on patients' nutritional lifestyles, the significant inverse relationship still remained between adequate daily fruit intake and identifying antioxidant-rich produce (OR = 0.13, 95 % CI = 0.0269–0.5833, $p = 0.008$), and the relationship between adequate intake of other vegetables and competencies for daily hydration education (OR = 0.12, 95 % CI 0.0244–0.5873, $p = 0.009$).

Discussion

This needs assessment allows GCCM to further tailor its curriculum to subsequently better equip residents globally to improve their own dietary habits, competencies, and nutrition attitudes through the positive reinforcement of cooking skills, integrated with clinical nutrition in a robust seven-module format for a nationally scalable model. These findings provide a detailed snapshot of strengths and weaknesses in resident competencies, nutrition attitudes, and dietary habits to strengthen nutrition curriculums for resident physicians and thus their provision of nutrition education for their patients. Future multi-center studies are needed to determine the dose-dependent impact of this curriculum not only on residents, as measured by their completion of annual surveys, but also by such objective endpoints as patient-reported frequency of nutrition education provided by residents in addition to patient clinical outcomes. Ongoing GCCM studies are in the final stages of data collection for the second year of pediatrician responses following two full years of the GCCM curriculum. The results analysis, as part of the rigorous longitudinal monitoring of premedical and medical students, residents, and attending physicians as they matriculate through the GCCM curriculum at the different stages of their training, will allow assessment of the curriculum's impact on current and future physicians and their patients, and thus provide the preliminary data for the multi-center randomized controlled trials.

Limitations of this study include the smaller sample size, single-site design, and compulsory yet undesired diet modifications (i.e., inadequate time to eat fruits and vegetables during busy clinical rotations). Study strengths include a comprehensive needs assessment of residents for GCCM's novel nutrition education curriculum integrating cooking and nutrition, rigorous statistical analyses controlling for previously less well-characterized covariates, and the establishment of baseline data for longitudinal tracking of residents with their patient outcomes through their eventual positions as attending physicians. This is particularly important in light of previous evidence illustrating that there is a knowledge and competency gap between residents in the midst of training and new practicing physicians who have graduated from residency [17].

This study reports an association between significant competency deficits in patient nutrition education and the personal dietary habits of pediatric residents. The relationship remains even after controlling for reported attitudes toward nutrition education in the patient-physician encounter. These results suggest that pediatricians might provide enhanced patient care through improved nutrition education when pediatric residents improve their own health habits, particularly daily fruit and vegetable intake. Follow-up studies are underway with GCCM's current national expansion to nine other medical schools across America testing the curriculum impact on residents and the patients they counsel, with planned expansion globally to partner medical schools through their American partnering institutions.

Conflict of interest The authors have no conflicts of interest.

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