

THE EFFECTS OF A NUTRITION EDUCATION INTERVENTION ON SUPERVISED
PRACTICE STUDENTS' MEAL PREPARATION ATTITUDES AND BEHAVIORS

By

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Abstract

Background Registered dietitian nutritionists (RDNs) are food and nutrition experts who can help individuals make positive lifestyle changes, including the adoption of healthy culinary habits like meal preparation. However, many dietetic students and entry level RDNs themselves may be lacking the culinary and meal preparation knowledge, attitudes and behaviors necessary to prepare them for this role. **Goal** To evaluate the effect of a nutrition education intervention on the meal preparation attitudes and behaviors of supervised practice students. **Methods** Accreditation Council for Education in Nutrition and Dietetics (ACEND) supervised program practice directors received an original email invitation for students to participate and two follow-up emails. The invitation included a link to the study information, details on how to qualify for a chance to win one of two incentives, informed consent, and the baseline survey. A link for the virtual interventions, with instruction on meal preparation, was provided upon completion of the baseline survey. A follow-up survey was made available after viewing the final virtual intervention. The pre and post survey included 20 Likert scale questions designed to evaluate the attitudes and behaviors regarding nutrition education and meal preparation. The survey also examined potential barriers and facilitators associated with meal preparation. **Participants** Students currently enrolled in a ACEND accredited supervised practice program (n = 103) participated in the baseline survey via Qualtrics. The students were invited to participate in virtual interventions identifying the What, Why, and How of meal preparation before completing the post intervention survey (n = 20). **Analysis** The results were imported into SPSS and a repeated-measures paired t-test was used to determine if there was a statistical difference in meal preparation attitude and behaviors following the virtual intervention. **Results** The majority of

participants (87.4%, n = 90) reported they received education in menu development and food science (76.7%, n = 79). Top barriers to meal preparation selected included lack of time to cook (75.7%, n = 78) and hours worked (66.0%, n = 68). The minority of the participants (10.7%, n = 11) reported that farmers markets not accepting electronic benefit transfer cards was a barrier. The top facilitator to preparing meals at home was recipes that take 30 minutes or less to prepare (84.5%, n = 87). Few participants believed tools such as a rice cooker (27.2%, n = 28) or BBQ grill (25.2%, n = 26) were facilitators to home meal preparation. Three participant attitudes about the relationship between meal planning and beneficial outcomes reflected a statistically significant change: higher fruit and vegetable intake ($p < 0.00$), reduced nutrition-related disease ($p < 0.02$), and confidence in the ability to provide meal preparation education ($p < 0.02$). Two behaviors about the relationship between meal planning and benefits of incorporating meal preparation education into their personal life and professional practice reflected a statistically significant change: personally prepare two or more meals in advance at home ($p < 0.01$) and will provide meal preparation education in professional settings ($p < 0.00$). **Conclusions** Meal preparation education has the ability to positively influence the attitudes and behaviors of supervised practice students and the possibility of providing meal preparation education to their clients. **Recommendations/DN Practice Implications** More culinary nutrition education in the ACEND required didactic education, and supervised practice competencies is needed.

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Introduction

The ability to implement the menus and recommendations provided by a registered dietitian nutritionist (RDN) in the home setting can be overwhelming. However, studies show that learning how to make healthy lifestyle choices will profoundly impact individuals' long-term health.¹ Therefore, the nutrition education provided by the RDN needs to help clients enact a plan that instills the knowledge and skills necessary to feel empowered in their pursuit of greater health. RDN's need to receive adequate training in meal planning to be able to teach their clients these skills.²

Literature Review

Registered dietitian nutritionists (RDNs) are advocates for improving the nutrition status of all individuals.³ An RDN receives education in nutrition, food science and some culinary topics to include food safety and sanitation, principles and techniques of food preparation, and the ability to develop, model and evaluate recipes, menus and food products.^{4,5} To meet the qualifications for the national RDN exam, students must complete a minimum of a baccalaureate degree and 1,000 hours of supervised practice, either in a dietetic internship, coordinated program or Individual Supervised Practice Pathway (ISPP).⁶ Registered dietitian nutritionists (RDNs) are uniquely positioned to use their nutrition expertise to help individuals make positive lifestyle changes specific to their needs.³

Today, adults in the United States live a fast-paced life and report that they lack the time needed to put a home-cooked meal on the table.^{1,2,7,8} In the United States, the average individual eats out (or orders in) four to five times per week.⁹ The data suggest that meals eaten away from home are associated with a low-quality diet and a greater risk of being diagnosed with a

nutrition-related disease.³ The exposure to a high-fat, high-sugar, high-salt, energy-dense, and nutrient-deficient diet consumed away from home can be associated with one's risk of being diagnosed with obesity and other, mostly preventable nutrition-related diseases.¹⁰

Correspondingly, a study found that adults who ate out more than three times a week were more likely to be diagnosed with at least one nutrition-related disease in their lifetime.¹¹ Additionally, lack of access to quality and affordable ingredients and cooking equipment are frequently reported barriers that prevent adults from preparing more meals at home.^{7,8} These barriers are a part of the social determinants of health (SDH) and are linked to the prevalence of obesity and chronic disease.⁷

According to the World Health Organization (WHO), incidence of obesity has tripled since 1975, with more than 650 million adults classified as obese ($BMI \geq 30 \text{ kg/m}^2$) worldwide.¹⁰ In the United States, 42.4% of adults were diagnosed with obesity from 2017 - 2018.¹² Along with obesity, nutrition-related diseases are also on the rise. Cardiovascular disease is the number one cause of death globally.¹³ The prevalence of diabetes mellitus type 2 (TDM2) has increased dramatically in all countries of all income levels and is the seventh leading cause of death today.¹⁴ Similarly, 1.13 billion people worldwide have been diagnosed with hypertension (HTN).¹⁵ These diseases, as well as others, have been linked to obesity, and may stem from an unhealthy diet and lifestyle.¹³⁻¹⁵

In contrast, adults who consume more meals made at home appear to have higher intakes of fruit, vegetables, fiber, folate, and vitamin A.¹ This alone indicates the need for more meals prepared in the home. One strategy for achieving this beneficial nutrition goal while also addressing the barrier of insufficient time is through meal planning. In 2017, a study highlighted the benefits of meal preparation, finding that meal planning is associated with food variety, diet

quality, and body weight status in a large sample ($n = 52, 949$) of French adults.¹ Ducrot, et.al., found that meal planning was associated with a healthier diet and lower incidence of obesity, suggesting that meal preparation education could be useful in obesity prevention.¹

Similarly, in 2019, Mendez studied the effects of a six-week meal preparation program with adult volunteers, on the frequency of consumption of home-cooked meals.¹⁶ Mendez found that cooking attitudes ($p = 0.02$) and the consumption of home-cooked meals significantly increased ($p = 0.04$) following the intervention. Likewise, Mendez found that there were significant decreases in weight ($p = 0.03$) and body fat mass ($p = 0.01$), and BMI ($p = 0.03$). The results from Mendez's study suggest that meal preparation at home may contribute to improving one's cooking attitudes and health.¹⁶

Medical professionals, fitness professionals, and health coaches suggest replacing fast-food meals with home-cooked meals, and yet, the challenge is how to accomplish this in light of the many barriers faced by adults in the U.S..¹⁷ It is essential for RDNs to receive training in interventions that result in cost savings, time savings and significant health impacts for their patients, such as meal prepping.

While RDNs appear to be well situated to provide meal preparation education, entry level (EL) RDNs ($n = 2847$) in the 2020 Commission on Dietetic Registration entry-level dietetics practice audit reported minimal involvement in culinary activities. EL RDNs routinely evaluated dietary patterns and counseled clients on nutrition topics that included specific diets and weight loss. In contrast, the sample reported infrequently providing culinary demonstrations and culinary expertise to individuals. Similarly, EL RDNs reportedly occasionally offering nutrition programs to groups and grocery store tours.¹⁸ This causes one to question if dietetic students are receiving adequate instruction in culinary nutrition topics, including meal preparation.

To date, no research has investigated the effect of meal preparation training on supervised practice students' meal preparation knowledge, attitudes, and behaviors (KAB), nor their intent to teach these concepts to clients regularly. The present study sought to address this gap in the literature by implementing a meal preparation education intervention among current supervised practice students, evaluating its impact on the students' meal preparation attitudes and behaviors and intentions for future practice.

Hypothesis

An intervention focused on improving supervised practice students' meal preparation knowledge can positively influence their attitudes and behaviors towards providing meal preparation education to future clients.

Research Question

What is the effect of a nutrition education intervention on supervised practice students' meal preparation attitudes and behaviors?

Goal and Objectives

To evaluate the effect of a nutrition education intervention on the meal preparation attitudes and behaviors of supervised practice students.

Objective #1: Identify the baseline meal preparation attitudes and behaviors of supervised practice students.

Objective #2: Educate the supervised practice students on the what, why, and how and meal preparation benefits with a virtual intervention.

Objective #3: Assess the effect of the virtual intervention on the supervised practice students' meal preparation attitudes and behaviors.

Methods

This study utilized a repeated measures study design to evaluate the effect of a nutrition education intervention on supervised practice students' meal preparation attitudes and behaviors. The target population of this study consisted of approximately 4,000 students participating in supervised practice programs accredited by the Accreditation Council on Education in Nutrition and Dietetics (ACEND).¹⁹ The supervised practice students met the criteria to participate if they were 18 or older and enrolled in an ACEND accredited supervised practice program in the United States (Appendix A). The ACEND supervised program practice directors received an original email invitation for students to participate and two follow-up emails, each one week apart (Appendix B). The invitation included a link to the study information, details on how to qualify for the chance to win one of two incentives, informed consent, and the baseline survey (Appendix C, D, E). The pre-and post-surveys were administered via Qualtrics to the supervised practice students to assess their meal preparation attitudes and behaviors before and after participating in the virtual nutrition intervention (Appendix F, G).

The nutrition education intervention (Appendix H) identifying the What, Why, and How of meal preparation was pre-recorded by the author in a home kitchen and made available with a link immediately following the completion of the baseline survey. The virtual interventions included the meal preparation definition for the present study, as well as why it is essential, who can benefit and how to prepare more meals at home. The viewers were taken through meal preparation steps from start to finish, ending with three days of prepared lunches.

The survey (Appendix H) included 20 Likert scale questions designed to evaluate the supervised practice students' attitudes and behaviors regarding meal preparation. The ten attitude-based questions were written to reveal the supervised practice students' personal attitudes towards meal preparation, while the ten behavior-based questions were written to evaluate personal and professional behaviors. The survey also examined potential barriers and facilitators, as identified in published literature ^{1, 2, 7,8,16,20, 21}, associated with meal preparation. To determine content and initial face validity, the survey was evaluated by four University of Alaska Anchorage faculty who were identified as content experts in the dietetics and nutrition profession. A pilot study (Appendix I, J) was initiated to further establish face validity, using graduate students currently enrolled in an ACEND accredited dietetics graduate program who were excluded from receiving a study invitation, however there were no respondents.

This study was submitted to the University of Alaska Anchorage Institutional Review Board for review and approval before implementation. Informed consent was completed electronically.

Analysis

The results were collected and then imported into SPSS.²³ Categorical variables were reported as frequencies and percents. Continuous variables were reported as means and standard deviations. A repeated-measures paired t-test was used to determine if there was a statistical difference in meal preparation attitudes and behaviors after participating in the virtual intervention.

Results

ACEND supervised program practice directors (n = 340) were emailed, asking for their assistance in recruiting students. Between April 19, 2021, and May 19, 2021, the screening criteria was passed by baseline participants (n = 103). After completing the baseline survey, the participants were invited to view four virtual interventions: Introduction, What, Why, How. After watching the final virtual intervention, the participants were provided with a link to the follow-up survey (n = 20) (Figure).

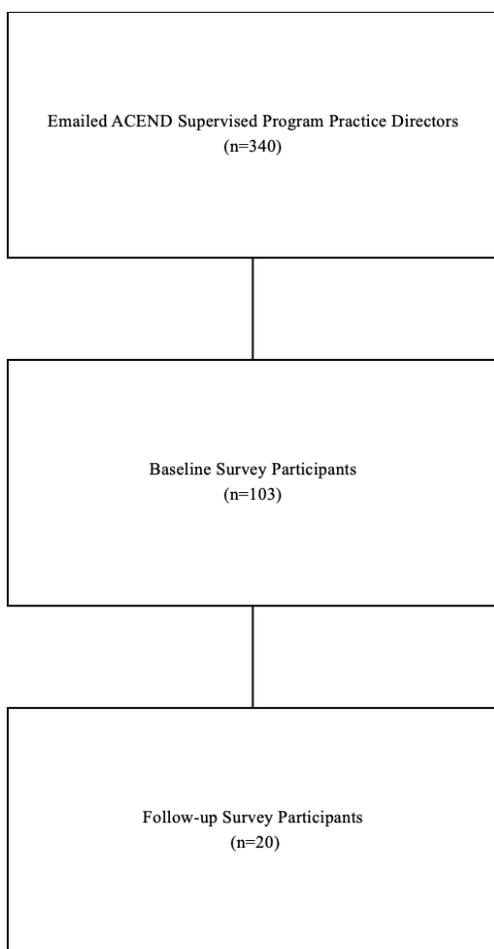


Figure. Flowchart of Participation in the Study

The mean age of the sample was 27.9 years old (S.D. \pm 7.5) (Table 1). Participants worked a mean of 26.8 (S.D. \pm 16.8) hours a week prior to supervised practice, as compared to a mean of 9.2 (S.D. \pm 11.0) hours a week during supervised practice. The sample reported that a mean of 34.4 (S.D. \pm 9.9) supervised practice rotation hours were completed per week.

The gender of the sample was 96.1% female (n = 99), 2.9% male (n = 3), and 1.0% other or self-identifying (n = 1). Results indicated that the majority of the sample (87.4% n = 90) identified as White, where as 8.7% (n = 9) identified as Asian, 3.9% (n = 4) as Black or African American, 1.9% (n = 2) as Native American Indian or Alaska Native, and 1.0% (n = 1) as Hawaiian or Other Pacific Islander. A few participants (1.9%, n = 2) selected “other” or “self-describe,” and 1.0% (n = 1) preferred not to answer. Within the sample, 8.7% (n = 9) identified as Hispanic and 1.9% (n = 2) as Latinx.

The majority of the sample reported having a minimum of a bachelor’s degree (77.5%, n = 79). The most-reported annual income level during their supervised practice program was under \$20,000 (75.2%, n = 76).

The sample was asked to report the meal preparation education received during their didactic training. The majority of participants (87.4%, n = 90) reported they received education in menu development, food science (76.7%, n = 79), and on the use of fresh versus frozen versus canned foods (66.0%, n = 68). Less common meal preparation education topics that were reported included knife skills (55.3%, n = 57), batch cooking (52.4%, n = 54), culinary nutrition (41.7%, n = 43) and pantry shopping (28.2 %, n = 29).

Most of the sample reported their current training status as full-time (92.2%, n = 95). The majority of the participants are members of the Academy of Nutrition and Dietetics (94.2%, n = 97) and (25.3%, n = 26) reported being a Dietetic Practice Group (DPG) member (Table 2,

Appendix K). The participants in this study completed their didactic training and supervised practice programs in every region of the United States (Table 3, Appendix L; Table 4, Appendix M).

Table 1. Participant Demographics

Demographic Data	Mean +/- Standard Deviation
Age (y)	27.9 +/- 7.5
Household adults	2.1 +/- 1.1
Household children	0.3 +/- 0.7
Household helpers with meal prep	1.4 +/- 0.8
Frequency of help ^a	3.3 +/- 3.6
Hours worked prior to supervised practice ^b (wk)	26.8 +/- 16.8
Hours worked during supervised practice (wk)	9.2 +/- 11.0
Supervised practice rotation hours ^a (wk)	34.4 +/- 9.9
	<i>n</i> (%)
Gender	
Male	3 (2.9%)
Female	99 (96.1%)
Other/Self-identify	1 (1.0%)
Ethnicity	
Hispanic	9 (8.7%)
Latinx	2 (1/9%)
Non-Hispanic, Non-Latinx, Non-Spanish Origin	92 (89.3%)
Race	
Native American Indian or Alaska Native	2 (1.9%)
Asian	9 (8.7%)
Black or African American	4 (3.9%)
Native Hawaiian or Other Pacific Islander	1 (1.0%)
White	90 (87.4%)
Unknown	0 (0%)
Other/Self Describe	2 (1.9%)
Prefer Not to Answer	1 (1.0%)
Current annual income level during supervised practice ^a	
Under \$20,000	76 (75.2%)
\$20,001 - \$40,000	8 (7.9%)
\$40,001 - \$60,000	9 (8.9%)
\$60,001 - \$80,000	4 (4.0%)
\$80,001 or over	4 (4.0%)
Didactic training in meal preparation topic	
Menu development	90 (87.4%)
Food science	79 (76.7%)
Use of fresh vs frozen vs canned	68 (66.0%)
Knife skills	57 (55.3%)

Batch Cooking	54 (52.4%)
Culinary nutrition	43 (41.7%)
Pantry shopping	29 (28.2%)
Other ^d	1 (1.0%)
None of the above	0 (0%)
Current training status	
Full – time	95 (92.2%)
Part – time	8 (7.8%)
Academy of Nutrition and Dietetics member	97 (94.2%)
Dietetic Practice Group (DPG) member	26 (25.3%)

^a 2 participants did not respond.

^b 3 participants did not respond; 8 responses that could not be interpreted were removed.

^c 1 participant did not respond.

^d Participants reported other as: sustainable nutrition education

Participants were asked to report barriers that prevented individuals from preparing meals at home. It was assumed that the participants would select barriers and facilitators that applied to their patients, however this was not explicitly stated in the survey. The top five barriers selected were: lack of time to cook (75.7%, $n = 78$), hours worked (66.0%, $n = 68$), lack of energy (65.0% ($n = 67$), lack of time to menu plan (58.3%, $n = 60$) and stress (50.0%, $n = 52$) (Table 5). The minority of the participants (10.7%, $n = 11$) reported that farmers markets not accepting electronic benefit transfer cards was a barrier that prevents individuals from preparing meals at home and 5.8% ($n = 6$) of the sample reported “other” as a possible barrier that prevents individuals from preparing meals at home.

Table 5. Reported Participant Barriers to Preparing Meals at Home

Barriers	<i>n</i> (%)
Lack of time to cook	78 (75.7%)
Hours worked	68 (66.0%)
Lack of energy (i.e., exhausted from other priorities)	67 (65.0%)
Lack of time to menu plan	60 (58.3%)
Stress	52 (50.5%)
Commute time	42 (40.8%)
Lack of time to grocery shop	40 (38.8%)
Extracurricular activities (i.e., sports, gym, club meetings) for self	36 (35.0%)
Lack of patience to cook	36 (35.0%)

Lack of easy recipes	34 (33.0%)
Anxiety	34 (33.0%)
Cost of fresh food	31 (30.1%)
Does not like to cook	29 (28.2%)
Cooking for people (or self) with limited food likes.	26 (25.2%)
Healthy food more costly (i.e., milk costs more than soft drinks)	26 (25.2%)
Lack of cooking confidence	23 (22.3%)
Extracurricular activities (i.e., sports, gym, club meetings) for someone else	21 (20.4%)
Lack of kitchen amenities (i.e., dry cabin, stove, microwave, oven, refrigerator)	19 (18.4%)
Appointments (i.e., medical, dental, work, social) for self	18 (17.5%)
Long distance travel necessary to access healthier food choices	18 (17.5%)
Inadequate access to healthier food options	17 (16.5%)
Appointments (i.e., medical, dental, work, social) for someone else	16 (15.5%)
Cooking for people (or self) with sensory issues.	16 (15.5%)
Supplemental Nutrition Assistance Program benefits not accepted at markets	14 (13.6%)
Farmers market does not accept electronic benefit transfer cards	11 (10.7%)
Other ^a	6 (5.8%)

^a Participants reported other as: no household help, dietary patterns, limited physical ability to cook, food allergies and intolerances.

The participants reported that the top five facilitators to preparing meals at home included recipes that take 30 minutes or less to prepare (84.5%, n = 87) (Table 6). Similarly, a clean kitchen (81.6%, n = 84), enjoyment of cooking (79.6%, n = 82), frozen meal components (i.e., steamed vegetable bags, prepared meats, alternative meats, grains, produce) (75.7%, n = 78), kitchen amenities (i.e., oven, stove, refrigerator, freezer) (73.8%, n = 76) were also reported facilitators to preparing meals at home. Few participants believed a rice cooker (27.2%, n = 28), BBQ grill (25.2%, n = 26), smart oven (13.6%, n = 14) and other (1.9%, n = 2) were facilitators that help an individual prepare meals at home.

Table 6. Reported Participant Facilitators to Preparing Meals at Home

Facilitators	<i>n</i> (%)
Recipes that take 30 minutes or less to prepare	87 (84.5%)
Clean kitchen	84 (81.6%)
Enjoyment of cooking	82 (79.6%)
Frozen meal components (i.e., steamed vegetable bags, prepared meats, alternative meats, grains, produce)	78 (75.7%)
Kitchen amenities (i.e., oven, stove, refrigerator, freezer)	76 (73.8%)
Canned meal components (i.e., produce, beans, meats)	69 (67.0%)
Prepared meal components (i.e., cooked rice, boxed stock or broth)	67 (65.0%)
Fresh meal components (i.e., chopped produce, washed produce, precooked pasta, bag salad)	66 (64.1%)
Good knives	63 (61.2%)
Dishwasher	63 (61.2%)
Pride associated with cooking meals at home	61 (59.2%)
Household members clean up after all the meals	56 (54.4%)
Airfryer	49 (47.6%)
Household members prepares all the meals	41 (39.8%)
Grocery delivery services	41 (39.8%)
Crockpot	41 (39.8%)
Instant-pot	40 (38.8%)
Household members help shop for all the meals	38 (36.9%)
Grocery pick- up services	38 (36.9%)
Meal subscription services (i.e., Hello Fresh, Blue Apron, Nature Box, Green Chef)	36 (35.0%)
Disposable cookware (i.e., paper plates, foil pans)	28 (27.2%)
Rice cooker	28 (27.2%)
BBQ grill	26 (25.2%)
Smart oven	14 (13.6%)
Other ^a	2 (1.9%)

^a Participants reported other as: social connection.

At baseline, the participants agreed, at a level of 7 out of 10 or higher on the Likert scale, with all of the attitude statements regarding meal preparation. Following the completion of the intervention videos, three participant attitudes about the relationship between meal planning and beneficial outcomes reflected a statistically significant change: higher fruit and vegetable intake ($p < 0.00$), reduced nutrition-related disease ($p < 0.02$), and confidence in the ability to provide meal preparation education ($p < 0.02$) (Table 7).

Table 7. Means and Standard Deviations of Reported Participant Attitudes Regarding Meal Preparation: pre-intervention, post-intervention, and within group effect (paired t-test)

Item	<i>Pre</i> ^a		<i>Post</i> ^b		<i>p-Value</i> ^c
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
1. It is important to know how to prepare a variety of meals.	8.5	1.7	9.3	0.9	0.19
2. Meals prepared from home are inherently healthier than meals prepared out of the home (i.e., takeout meals, fast-food, prepared convenience meals).	8.2	2.0	8.5	1.8	0.17
3. Meals made at home are affordable.	8.4	1.7	8.7	1.4	0.72
4. Meal preparation correlates with higher fruit and vegetable intakes.	8.1	1.8	8.5	1.8	0.00
5. Meal preparation correlates with a healthy weight status.	7.0	2.2	7.6	2.6	0.08
6. Meal preparation correlates with reduced time and cost barriers associated with home prepared meal frequency.	7.3	2.3	7.5	2.9	0.27
7. Meal preparation education correlates with reduced nutrition related disease risk among adults in America.	7.8	1.6	8.0	2.5	0.02
8. Meal preparation education should be taught by a registered dietitian nutritionist.	7.9	2.1	8.1	1.9	0.05
9. Meal preparation education is valuable knowledge for the dietetic intern.	9.2	1.1	9.1	1.7	0.51
10. I feel confident in my ability to provide meal preparation education.	7.9	2.1	8.4	1.4	0.02

Note. Significance set at $p \leq 0.05$

M, mean

SD, standard deviation

^a n = 103

^b n = 20

^c Statistical test refers to paired t-test; results included the participants (n = 20) who completed the baseline and follow-up survey

At baseline, the participants agreed that they incorporate meal preparation strategies into their daily life ($M = 7.3$) and benefit from meal preparation nutritionally ($M = 8.5$). However, they were neutral in preparing meals ($M = 4.6$) and snacks ($M = 4.0$) at home at least 2 days in

advance. Similarly, the participants were neutral in stating that without the inclusion of meal preparation, they would have trouble meeting their recommended nutrient intakes ($M = 5.5$). Professionally, the participants agreed, at a level of 7 out of 10 or higher on the Likert scale, with all of the attitude statements regarding meal preparation, with one exception. The participants were less agreeable that without meal preparation their future clients would have trouble meeting their recommended nutrient intakes ($M = 6.2$).

Following the viewing of the intervention videos, two behaviors about the relationship between meal planning and benefits of incorporating meal preparation education into their personal life and professional practice reflected a statistically significant change: personally prepare two or meals in advance at home ($p < 0.01$) and will provide meal preparation education in professional settings ($p < 0.00$) (Table 8).

Table 8. Means and Standard Deviations of Reported Participant Behaviors Regarding Meal Preparation: pre-intervention, post-intervention, and within group effect (paired t-test)

Item	<i>Pre^a</i>		<i>Post^b</i>		<i>p-Value^c</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
<i>Personal</i>					
1. I incorporate meal preparation strategies into my daily life (i.e., crockpot meals).	7.3	2.4	7.1	2.0	0.11
2. I benefit from meal preparation nutritionally.	8.5	1.5	8.5	1.4	1.0
3. I prepare my meals at home at least 2 days in advance.	4.6	3.2	5.3	3.4	0.01
4. I prepare my snacks at home at least 2 days in advance.	4.0	3.0	5.0	3.5	0.16
5. Without the inclusion of meal preparation, I would have trouble meeting my recommended nutrient intake.	5.5	3.0	5.4	3.0	0.84
<i>Professional</i>					

Table 8. (continued)

6. As a registered dietitian nutritionist, I will include meal preparation nutrition education because it is a vital component of my patient's nutrition education.	7.6	1.7	8.1	2.3	0.00
7. As a registered dietitian nutritionist, I will teach meal preparation nutrition education to my patients using printed/online materials.	7.9	1.7	7.8	2.3	0.39
8. As a registered dietitian nutritionist, I will teach meal preparation nutrition education to my patients using cooking demonstrations.	7.2	2.1	6.3	3.0	0.89
9. As a registered dietitian nutritionist, I will teach meal preparation nutrition education to my patients using menu planning demonstrations.	7.8	1.8	7.5	2.3	0.52
10. Without the inclusion of meal preparation, my future client would have trouble meeting their recommended nutrient intake.	6.2	2.4	6.1	2.6	0.21

Note. Significance set at $p \leq 0.05$

M, mean

SD, standard deviation

^a n = 103

^b n = 19

^cStatistical test refers to paired t-test; results included the participants (n = 20) who completed the baseline and follow-up survey

Discussion

The demographics (gender, race, ethnicity, age) of this study's sample are similar to the *2020 Needs Satisfaction Survey* of dietetic students and registered dietitian nutritionists (RDNs) as reported by the Commission on Dietetics Registration (CDR).¹⁸ Both the dietetic students and RDN population were used as a comparison as the participants in this study were close to

completing their RDN education requirements. The average participant in this study was female, white, non-Hispanic, had a minimum of a bachelor's degree, made under \$20,000 annually during their supervised practice program and their training status was full-time, in addition to working an average of 9.2 hours per week and completing homework assignments after rotation hours. The sample was an educated group with little free time, and within a few weeks of qualifying to take the RDN exam.

Didactic Meal Preparation Education Reported

The meal preparation education during the participants' didactic training is limited, however, studies suggest that clients commonly request help finding recipes that are enjoyable and healthy, solutions that fit modified dietary patterns, and foods that are affordable and balanced.² Current literature proposes the benefits and importance of implementing culinary nutrition education, which includes meal preparation, in the nutrition and dietetic didactic programs, suggesting this applied approach for future RDNs would reinforce their ability to provide nutrition education to their patients.²

Barriers to Meal Preparation at Home

At the time of recruitment, adults in the United States were working a national average of 34.4 hours per week,²⁴ suggesting they lack the time needed to put a home-cooked meal on the table.¹ In the present study, the participants reported completing a combination of approximately 44 rotation and work hours per week. As expected, the majority of participants reported lack of time and hours worked as the main barriers to preparing more meals at home. Most of the participants selected lack of energy and stress as potential barriers as well. Cost, voucher acceptance, access to healthy food options, and kitchen amenities were less common selected barriers. It was assumed that the participants would select barriers and facilitators that applied to

their patients, however, the results of the present study suggest the participants' responded personally as the barriers selected the least are barriers commonly selected by the lower socioeconomic communities.^{2,20}

If the directions had specifically included the directive to answer the barriers in context of the patients they served, it is believed that the results may have more closely aligned with published recommendations reflective of challenges facing the general population. It is imperative that dietetic professionals acknowledge the potential barriers experienced by most populations in the United States during a time of increasing food insecurity²⁰. To explain, current literature suggests that cost and lack of access to quality ingredients as well as basic kitchen amenities must be considered^{7,20} when making recommendations to eat more meals prepared at home.

Facilitators to Meal Preparation at Home

Not surprisingly, the results are consistent with the findings from other studies in which cooking confidence was commonly associated with one's desire to prepare more meals at home.^{7,16} In the present study, enjoyment and pride associated with cooking were facilitators selected by more than half of the participants. This aligns with the results of the Mendez study where knowing how to cook increased cooking attitudes and the frequency of meals made at home.¹⁶

Also expected, convenience items were facilitators selected by the majority of participants in this study. Wolfson and Bleich believe convenience items, or industry innovations⁷ such as the ones selected in this study, could have the ability to reduce the most common barriers currently preventing more meals from being made at home. In contrast, the facilitators selected the least included kitchen tools and services of all kinds to include grocery

pick-up services and Instant-pots[®]. Less than half of the participants reported grocery delivery and pick-up services, Crock-pot[®], Instant-pot[®], meal subscription services, disposable cookware, rice cooker, BBQ grill, and smart oven as potential facilitators. However, the tools and services listed above have been shown to reduce the time required to prepare a meal. For example, cooking a batch of dried beans in an Instant-pot[®] (or pressure cooker) takes substantially less time when compared to cooking on the stovetop.²² Professionally, learning about and providing education on the time-saving abilities of the outlined tools and services may have the potential to increase the frequency of meals prepared at home by the client.²³

Participant Attitudes Regarding Meal Preparation

The participants agreed at baseline that it is important to know how to prepare a variety of meals. They were also in agreement that meals prepared at home are inherently healthier than meals prepared out of the home and that meals made at home are affordable. During their study, Ducrot et al., found that the majority of participants planned meals based on their personal collection of recipes, emphasizing the benefits of knowing how to prepare a variety of meals.¹ Their study also found that meal planners were more likely to consume a larger variety of vegetables and fruit¹, linking higher quality nutrition to meal preparation.

The participants also agreed that meal preparation has the ability to reduce the barrier of time (and cost), suggesting that meal preparation could encourage the individual to consume more meals made at home.⁷ These results reinforce the findings of other studies that show people who plan their meals were more likely to cook regularly.^{1,6}

At baseline, the majority of participants strongly agreed that meal preparation education is valuable knowledge for the supervised practice student. This measure had a ceiling effect, thus prohibiting the intervention from further increasing the belief that didactic meal preparation

education is vital. However, while the participants agreed that meal preparation should be taught by a RDN, agreement was still conservative on the Likert scale. It is assumed that the lesser level of agreement may be due to the limited exposure to culinary nutrition education during the students' didactic training. This assumption is reinforced by suggestion that future RDNs as well as current RDNs require additional meal preparation education in order to increase culinary self-efficacy scores and professional confidence.²

Following the virtual intervention, the participants agreed more strongly that meal preparation correlates with higher fruit and vegetable intakes. Participants also more strongly agreed that meal preparation education correlates with a reduced risk of developing a nutrition-related disease. These results were consistent with current literature that suggests consuming more home-cooked meals is associated with improved diet quality^{1,7,21} and higher healthy eating index (HEI) scores without increased cost.²¹

As hypothesized, at post-intervention, the students felt slightly more confident in their ability to provide meal preparation education. The results observed reinforce the importance of incorporating more in-depth meal preparation education into the didactic curriculum.

Participant Behaviors Regarding Meal Preparation

Personal Behaviors

At baseline, the participants agreed that they incorporated meal preparation strategies into their daily lives and strongly agreed they personally benefited from meal preparation nutritionally. However, the participants' behaviors were neutral when asked if they prepared snacks at home in advance and in the belief that the inclusion of meal preparation increased their ability to meet the recommended daily nutrients, with no statistically significant change post-intervention. Similarly, the participants remained neutral that they prepared meals at home at

least two days in advance, following the intervention. These findings could suggest the participants may potentially gravitate toward healthier options, even without advanced meal planning, given that supervised practice students have undergone years of nutrition education that covered a variety of topics and constantly reinforced the benefits of a high-quality diet.

Professional Behaviors

At baseline, the results indicate that the participants agreed that they plan to provide meal preparation education to their clients using a variety of techniques that include printed or online materials, cooking demonstrations, and menu planning demonstrations. The scores were higher than neutral, but the ceiling effect was not observed here, suggesting that education styles and techniques used professionally vary among participants and may be utilized on an individual basis.

Also, the participants were neutral in the belief that their clients would have trouble meeting their recommended nutrient intake without the inclusion of meal preparation strategies. As previously stated, these findings could suggest the participants may be able to quickly prepare a nutritionally balanced meal subconsciously as a result of their education. In contrast, the literature suggests meal planning is linked to the individual's ability to meet nutrition recommendations more consistently, as well as a greater variety of foods consumed.¹ The literature reinforces the need for the RDN to understand the individual populations that they serve.

Strengths and Limitations

The study design was a strength as it allowed an in-depth view of future registered dietitian nutritionists' (RDNs) attitudes and behaviors regarding meal preparation education. The results can be used to further research on the effects of meal preparation education and its link to

healthier dietary habits and potential for disease prevention. Also, the topic of this study was novel. This is the only known study exploring the effects of a nutrition education intervention on supervised practice students' meal preparation attitudes and behaviors. Additionally, this study included students from every region of the United States.

Limitations of this study include the recruitment process having to pass through the program directors rather than having direct contact with the students; face validity was not established due to zero response in the pilot study; the small number of participants who completed the follow-up survey; and the timing of the implementation of the study coinciding with the completion of supervised practice programs. Due to the time of recruitment, there was bound to be less cumulative participation. However, the overall low participation rate could partially be explained by the inability to contact the students directly, thus having to rely on the directors to forward the invitation to participate to their students. Also, the number of participants who completed the post-intervention survey (19.4% retention rate) was substantially less than the participants who participated in the baseline survey, thus limiting the power to find a statistically significant result, if one did exist. The reasons for this may be due to the additional responsibilities of the students as the recruitment process began at the end of the semester, when the supervised practice students were completing final rotation hours and preparing for graduation.

Recommendations for Changes to the Survey Tool

As previously stated, it was assumed that the patients would select the barriers and facilitators that may apply to their patients or the general population. However, this was not stated in the directions, leaving it up to the participant to decide how to respond. In a future

version of the survey tool, to whom the barriers and facilitators applied should be explicitly stated.

The survey question #8 (Appendix F) appeared to have left the participants unsure how to answer or the response format was not compatible with the electronic survey program. The data was not possible to interpret, and it was excluded from the dataset. The question, if formatted correctly, could allow further insight of the amount of work it takes to prepare meals at home and if there is a primary preparer or if there are human facilitators. To explain, meal preparation is all-encompassing and includes everything from planning the menu to cleaning the kitchen.

Conclusions

The hypothesis for this study was met. The results are evidence that meal preparation education has the ability to positively influence the attitudes and behaviors of supervised practice students and the possibility of providing meal preparation education to their clients. In addition, the students agreed that meal preparation could reduce the risk of being diagnosed with a nutrition-related disease and increase the consumption of fruits and vegetables. These results point to the need for more applied culinary nutrition education, allowing for an increase in culinary self-efficacy in the students and the opportunity to solidify their intention to offer meal preparation education professionally. Noteworthy, while the majority of participants strongly agreed that meal preparation education is valuable knowledge for the supervised student, the students mildly agreed that an RDN should teach meal preparation. These results leave one to ponder, if not RDNs, the food and nutrition experts, then who?

Dietetics and Nutrition Practice Implications

Dietetic Education Recommendations

There needs to be more culinary nutrition education in the ACEND required didactic education, and supervised practice competencies. It is recommended that the meal preparation education aligns instruction with the populations to whom future RDNs will have the opportunity to provide education. Also, it is recommended that meal preparation education spotlights social determinants of health, allowing the future RDNs to gain further understanding of the barriers and facilitators that may prevent populations from preparing more meals at home.

Continuing Professional Education Recommendations for Current RDNs

Findings from this research could aid in the development of a meal preparation curriculum used by RDNs during the nutrition intervention phase of nutrition counseling. To increase the entry-level RDN participation in culinary activities, designing continuing professional education in culinary nutrition topics could impact the role modeling provided to supervised practice students, as well as increase RDN involvement in culinary activities.

Recommendations for Future Research

A semester-long intervention designed to build the culinary nutrition skills and culinary self-efficacy of future RDNs could provide insight into the varying levels of cooking experience and interest. This type of study could also provide the ability to examine the type of education they may be comfortable providing in their future practice. Also, subsequent studies could evaluate the intervention delivery mode (virtual asynchronous, virtual synchronous, hybrid, HyFlex, face-to-face, etc.) on degree of participation.

The long-term health outcomes of meal preparation education provided by RDNs would be useful to investigate further. Future studies could examine RDNs' confidence in providing meal preparation education, following interventions in culinary nutrition topics.

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Appendix A – Screening for Eligibility

Inclusion criteria:

1. Are you 18 years old or older?
 - o Yes
 - o No (forced quit)

2. Are you currently enrolled in ACEND accredited dietetic internship, supervised practice rotations as part of a coordinated program, or Individualized Supervised Practice Pathways (ISPP) program in the United States?
 - o Yes
 - o No (forced quit)

Appendix B – Baseline and Follow-Up Recruitment Emails to Program Directors

Email subject line: Participate in a research study and learn about meal preparation nutrition education

Dear Program Director,

My name is Kathy Nuñez and I am a graduate student in the Dietetics and Nutrition program at the University of Alaska Anchorage.

For my graduate project, I am studying the effect of a nutrition education intervention on a dietetic intern or supervised practice student's meal preparation attitudes and behavior.

Would you be willing to assist me with the recruitment process by forwarding the attached invitation to your dietetic interns or students?

Sincerely,

Kathy M. Nunez,
Graduate Student - University of Alaska Anchorage, School of Allied Health

Graduate Committee:
Carrie King, PhD, RD, LD, CDE, Professor and Director Dietetic Internship and Future Graduate Program
Amy Urbanus, MS, RDN, CDE, Assistant Professor, Dietetics & Nutrition
Jana Patterson, Chef, CN, Culinary Instructor

Email subject line: Participate in a research study and learn about meal preparation nutrition education

Dear Program Director,

My name is Kathy Nuñez and I am a graduate student in the Dietetics and Nutrition program at the University of Alaska Anchorage.

I recently sent you a request asking you if you would be willing to assist me with a recruitment process by forwarding the attached invitation to your dietetic interns or students.

For my graduate project, I am studying the effect of a nutrition education intervention on a dietetic intern or supervised practice student's meal preparation attitudes and behavior.

Would you be willing to assist me a second time with the recruitment process by forwarding the attached invitation to your dietetic interns or students?

Sincerely,

Kathy M. Nunez,
Graduate Student - University of Alaska Anchorage, School of Allied Health

Graduate Committee:

Carrie King, PhD, RD, LD, CDE, Professor and Director Dietetic Internship and Future Graduate Program

Amy Urbanus, MS, RDN, CDE, Assistant Professor, Dietetics & Nutrition

Jana Patterson, Chef, CN, Culinary Instructor

Email subject line: Participate in a research study and learn about meal preparation nutrition education

Dear Program Director

My name is Kathy Nuñez and I am a graduate student in the Dietetics and Nutrition program at the University of Alaska Anchorage.

I recently sent you a request asking you if you would be willing to assist me with a recruitment process by forwarding the attached invitation to your dietetic interns or students.

For my graduate project, I am studying the effect of a nutrition education intervention on a dietetic intern or supervised practice student's meal preparation attitudes and behavior.

Would you be willing to assist me one last time with the recruitment process by forwarding the attached invitation to your dietetic interns or students?

Sincerely,

Kathy M. Nunez,
Graduate Student - University of Alaska Anchorage, School of Allied Health

Graduate Committee:

Carrie King, PhD, RD, LD, CDE, Professor and Director Dietetic Internship and Future Graduate Program

Amy Urbanus, MS, RDN, CDE, Assistant Professor, Dietetics & Nutrition

Jana Patterson, Chef, CN, Culinary Instructor

Appendix C – Baseline Recruitment Email and Follow-up Emails to Potentially Eligible Participants

Email subject line: Participate in a research study and learn about meal preparation nutrition education

Dear dietetic intern or student in supervised practice program,

Want an opportunity to:

Increase your understanding of meal preparation?

Participate in a study that uses on-line learning?

Be entered in a drawing for a 3-month membership to eatright[®] PREP for the RDN exam?

If you are currently enrolled in an ACEND accredited dietetic internship, supervised practice rotations as part of a coordinated program, or individualized supervised practice pathways (ISPP) program in the United States

click on the link below to find out more:

Qualtrics link #####

Sincerely,

Kathy M. Nuñez,
Graduate Student - University of Alaska Anchorage, School of Allied Health

Graduate Committee:
Carrie King, PhD, RD, LD, CDE, Professor and Director Dietetic Internship and Future Graduate Program

Amy Urbanus, MS, RDN, CDE, Assistant Professor, Dietetics & Nutrition

Jana Patterson, Chef, CN, Culinary Instructor

Please note: If you do not wish to receive further emails from us, please click the link below, and you will be automatically removed from our mailing list.

(Link for more information)

Email subject line: Participate in a research study and learn about meal preparation nutrition education

Dear ACEND dietetic intern or student in supervised practice program,

I recently sent you an invitation to participate in a research study looking at the effect of a nutrition education intervention.

Want an opportunity to:

Increase your understanding of meal preparation?

Participate in a study that uses on-line learning?

Be entered in a drawing for a 3-month membership to eatright[®] PREP for the RDN exam?

If you are currently enrolled in an ACEND accredited dietetic internship, supervised practice rotations as part of a coordinated program, or individualized supervised practice pathways (ISPP) program in the United States

click on the link below to find out more:

Qualtrics link #####

Sincerely,

Kathy M. Nuñez,
Graduate Student - University of Alaska Anchorage, School of Allied Health

Graduate Committee:
Carrie King, PhD, RD, LD, CDE, Professor and Director Dietetic Internship and Future Graduate Program

Amy Urbanus, MS, RDN, CDE, Assistant Professor, Dietetics & Nutrition

Jana Patterson, Chef, CN, Culinary Instructor

Please note: If you do not wish to receive further emails from us, please click the link below, and you will be automatically removed from our mailing list.

(Link for more information)

Appendix D – Study Information

[Link for more information will provide the following text:]

Dear ACEND dietetic intern or student in supervised practice program,

As a Graduate Student at the University of Alaska Anchorage (UAA), School of Allied Health, I would like to invite you to participate in a research study focused on the principles of meal preparation. The purpose of the research study is to evaluate the effect of a nutrition education meal preparation virtual intervention.

The direct benefit to you in participating is to increase your knowledge of the benefits of providing meal preparation education in your future practice. Upon completion of the study, all participants who complete all study components will be offered an opportunity to be entered into a random drawing for RDN exam preparation course from eatright.org

The study will begin 04/19/2021 and finish 05/19/21. A follow-up questionnaire link will be provided to you immediately upon completion of the virtual interventions.

You may take part in this study if you:

- Are 18 years or older,
- Are currently enrolled in an ACEND accredited dietetic internship, supervised practice rotations as part of a coordinated program, or individualized supervised practice pathways (ISPP) program in the United States,
- Have access to a computer with Internet service,
- Have approximately 3 hours to complete the study components within a four-week timeframe (04/19/2021 – 05/19/2021), and
- Are willing to complete a questionnaire prior to and following the completion of the virtual intervention (The intervention does not have to be viewed in one sitting. You may start and stop the video).

There are no known risks for participating in this study except for the remote possibility that your e-mail address would be inadvertently disclosed. However, the principal investigator has put in place adequate protections for your privacy and data. By participating you are voluntarily agreeing to consent for this research study and giving your permission to use your responses in aggregate form for research purposes.

Your responses will not be shared with anyone outside of the study. Your responses to the questionnaires are confidential. This study has been approved by the University of Alaska Anchorage Institutional Review Board.

I will send out a follow-up e-mail one week and two weeks following this e-mail to encourage participation in the study, which your program director will choose to forward to their interns/students, or not. All participants will receive a reminder to complete the follow-up questionnaire the week of 05/10/2021.

The aggregate results of this study will be e-mailed to participants, upon request, once the study is completed.

If you have any questions regarding this study, feel free to contact me kmnunez@alaska.edu and 907-301-1797 or my committee chair, Carrie King PhD, RD, Professor (cdking@alaska.edu and 907-786-6597). If you have any questions about your rights as a research participant, you can contact the UAA Institutional Review Board at (907-786-1099).

Please complete the following steps if you would like to enroll in this study:

1. To confirm your eligibility and for information on how to participate in this study complete the screening process available in the link at the end of this page.
2. If you meet the study eligibility criteria, decide if you want to participate in the study.
3. If you agree to participate you will be asked to complete a questionnaire that will take approximately 30 minutes to complete. Upon completion of the baseline questionnaire, you will have the opportunity to be entered into a random drawing for a \$50 Starbucks gift card. (The drawing for the RD exam preparation will be held at the conclusion of the study.)
4. After you complete the questionnaire, you will receive a link for the virtual interventions. The interventions will take approximately 2 hours to complete. The interventions do not have to be completed in one sitting. You may start and stop the video.
5. After the virtual interventions, you will receive a link for the follow-up questionnaire. Upon completion of the follow-up questionnaire, you will have the opportunity to be entered into a random drawing for the \$200 3-month subscription to eatright[®] RDN examination preparation.

Thank you very much for considering this opportunity.

Sincerely,

Kathy M. Nuñez
Graduate Student - University of Alaska Anchorage, School of Allied Health, Dietetics and Nutrition

Graduate Committee:

Carrie King, PhD, RD, LD, CDE, Professor and Director Dietetic Internship and Future Graduate Program

Amy Urbanus, MS, RDN, CDE, Assistant Professor, Dietetics & Nutrition

Jana Patterson, Chef, CN, Culinary Instructor

To get started with the screening process click the “Next” button.

[See Screening for Eligibility, Appendix.]

Appendix E – Letter of Informed Consent

PRINCIPAL INVESTIGATOR:

Kathy Nuñez
Dietetics & Nutrition
University of Alaska Anchorage
(907) 301 – 1797
E-mail: kmnunez@alaska.edu

Faculty Advisor

Dr. Carrie King
Professor, Dietetics & Nutrition
University of Alaska Anchorage
(907) 786 – 6597
E-mail: cdking@alaska.edu

DESCRIPTION:

I am interested in learning the effects of a nutrition education intervention on supervised practice students' meal preparation attitudes and behavior.

You, a dietetic intern or student in supervised practice rotations, have been identified as the best person to tell me more about the personal and professional impact of a meal preparation nutrition intervention.

All dietetic interns and supervised practice students in the U.S. will be asked to participate in this study. Dietetic students or interns may choose to opt-out of the study, or to discontinue their participation in the study with no penalty to them.

This research study will involve two data collection sessions, at the beginning and immediately following the virtual interventions, each lasting approximately 30 minutes. The data collection will be electronic and will be given online via Qualtrics. The virtual intervention is estimated to last two hours. The entire process, data collection and viewing the intervention, is estimated to last 3 hours. The intervention does not have to be viewed in one sitting. You may start and stop the video. The entire process needs to be completed prior to (#####).

The aggregate results of this study will be e-mailed to participants, upon request, once the study is completed.

VOLUNTARY NATURE OF PARTICIPATION:

Your participation in this study is voluntary and is not a requirement. If you don't wish to participate, or would like to end your participation in this study, there will be no penalty or loss of benefits to you to which you are otherwise entitled. In other words, you are free to make your own choice about being in this study or not, and may quit at any time without penalty. Student educational advancement or reputation will not be affected by your participation, or lack of participation, in this research study.

CONFIDENTIALITY:

No names or identifiers will be published. You will be asked to develop a unique identification code, known only to you. When you start your questionnaire each time, you will be asked to write down your identification code. There will be no link in the questionnaire to your actual identity. The results of the questionnaire will be compiled and reported in aggregate form. No individual reporting of questionnaires will be done.

BENEFITS to PARTICIPANTS:

All participants will have two opportunities to be entered into a random drawing. Upon completion of the baseline survey, participants will have the opportunity to be entered into a random drawing for a \$50 Starbucks gift card. Upon completion of the follow-up survey, participants will have the opportunity to be entered into a random drawing for a \$200 3-month subscription to eatright[®] RDN examination preparation.

Also, the results of this study may benefit future students who enroll in an ACEND accredited dietetic internship, supervised practice rotations as part of a coordinate program or individualized supervised practice pathway (ISPP) program in the United States through the revision and development of research that this study demonstrates are needed.

RISKS:

There are no known risks to you for participating in this study.

CONTACT PEOPLE:

If you have any questions about this research, please contact the Principal Investigator at the phone number listed above. If you have any questions or concerns about your rights as a research participant, please contact UAA IRB, Sharilyn Mumaw, (907) 786 – 1099.

CONSENT:

I am certifying that I voluntarily agree to participate in this study. I understand that I am free to withdraw my consent and discontinue my participation at any given time. I can request a copy of this informed consent letter to keep.

Sincerely,

Kathy M. Nuñez,
Graduate Student - University of Alaska Anchorage, School of Allied Health

Appendix F – Baseline Survey Tool

Start of questionnaire will include:
Instructions on how to create an identification code.

Demographics:

1. Please indicate your age in years.
 - o (Forced numeric response)
2. What is your gender identity?
 - o Male
 - o Female
 - o Other/Prefer to self-identify
 - o Prefer not to answer
3. Are you of Hispanic, Latino, or Spanish origin?
 - o Hispanic
 - o Latinx
 - o Spanish
 - o Non-Hispanic, Non-Latinx, non-Spanish origin
4. How would you describe your race? (Mark all that apply)
 - o Native American Indian or Alaska Native
 - o Asian
 - o Black or African American
 - o Native Hawaiian or Other Pacific Islander
 - o White
 - o Unknown
 - o Other/Prefer to self -describe
 - o Prefer not to answer

5. How many adults aged 18 or older currently live in your household?
 - o (Forced numeric response)
6. How many children under the age of 18 live in your household?
 - o (Forced numeric response)
7. How many people in your household help with meal preparation each week?
 - o (Forced numeric response)
8. How often do people in your household help with meal preparation each week?
 - o Please indicate the frequency below, include the title (i.e., spouse, child, parent, roommate) of the individual who completes the specified activity.

	Menu plan	Grocery shop	Put away groceries	Wash produce	Chop meal components	Gather meal components	Cook the meal	Clean up
Self								
(insert)								
(insert)								
(insert)								

9. Please indicate the highest degree program completed prior to the start of your dietetic internship, supervised practice rotations or ISPP.
 - o Bachelor's Degree
 - o Graduate Degree
 - o Professional Degree

10. On average, how many hours did you work prior to the start of the dietetic internship, supervised practice rotations, or ISPP?

- (Forced Numeric Response)

11. Please indicate the average weekly hours worked outside of the dietetic internship, supervised practice rotations or ISPP.

- (Forced numeric response)
- Do not work outside of the dietetic internship, supervised practice rotations or ISPP.

12. Please indicate the average weekly hours spent in rotation.

- (forced numeric response)

13. Please indicate your income level prior to the start of the dietetic internship, supervised practice rotations or ISPP.

- Under \$20,000
- \$20,001 - \$40,000
- \$40,001 - \$60,000
- \$60,001 - \$80,000
- \$80,000 - \$100,000
- \$100,001 or over

14. Please indicate your current income level.

- Under \$20,000
- \$20,001 - \$40,000
- \$40,001 - \$60,000
- \$60,001 - \$80,000
- \$80,000 - \$100,000
- \$100,001 or over

15. Where did you complete your ACEND accredited didactic training? Mark all that apply.

- (Drop down State menu)

16. In what state is your ACEND approved dietetic internship, supervised practice rotations or ISPP located in?

17. Please indicate the type of education received during your ACEND accredited didactic training regarding meal preparation. Mark all that apply

- Menu development
- Pantry shopping
- Knife skills
- Batch cooking
- Use of fresh vs frozen vs canned ingredients
- Culinary nutrition
- Culinary medicine
- Food Science
- None of the above
- Other _____

18. Please indicate your current training status.

- Full – time intern or student
- Part – time intern or student

19. Are you a member of any Academy of Nutrition and Dietetics?

- Yes
- No

20. Are you a member of Dietetic Practice Groups?

- Yes
- If yes, please indicate which one(s)

 No

Directions: For the purpose of this study, barriers will be defined as anything (environmentally, mentally, geographically, and financially) that prevents one from preparing meals at home and facilitators is anything (i.e., kitchen tools, person, Instacart) that helps one to prepare meals at home.

1. What barriers prevent one from preparing most of their weekly meals at home? Mark all that apply.
 - a. Lack of time to menu plan
 - b. Lack of time to grocery shop
 - c. Lack of time to cook
 - d. Commute time
 - e. Hours worked
 - f. Extracurricular activities (i.e., sports, gym, club meetings) for self
 - g. Extracurricular activities (i.e., sports, gym, club meetings) for someone else
 - h. Appointments (i.e., medical, dental, work, social) for self
 - i. Appointments (i.e., medical, dental, work, social) for someone else
 - j. Cost of fresh food
 - k. Supplemental Nutrition Assistance Program (SNAP) benefits not accepted at markets
 - l. Healthy food more costly (i.e., milk costs more than soft drinks)
 - m. Farmers market does not accept EBT (electronic benefit transfer) cards
 - n. Inadequate access to healthier food options
 - o. Long distance travel necessary to access presumed healthier food choices
 - p. Lack of cooking confidence
 - q. Lack of easy recipes
 - r. Lack of kitchen amenities (i.e., dry cabin, stove, microwave, oven, refrigerator)
 - s. Cooking for people (or self) with limited food likes
 - t. Cooking for people (or self) with sensory issues
 - u. Lack of energy (i.e., exhausted from other priorities)
 - v. Anxiety
 - w. Stress
 - x. Lack of patience to cook
 - y. Does not like to cook
 - z. Other

2. What facilitators help someone prepare most of their weekly meals at home? Mark all that apply.
 - a. Grocery delivery services
 - b. Grocery pick-up services
 - c. Meal subscription services (i.e., Hello Fresh, Blue Apron, Nature Box, Green Chef)
 - d. Prepared meal components (i.e., cooked rice, boxed stock or broth)
 - e. Canned meal components (i.e., produce, beans, meats)
 - f. Frozen meal components (i.e., steamed vegetable bags, prepared meats, alternative meats, grains, produce)

- g. Fresh meal components (i.e., chopped produce, washed produce, precooked pasta, bag salad)
- h. Household members cleans up after all the meals
- i. Household members prepares all the meals
- j. Household members help shop for all the meals.
- k. Clean kitchen
- l. Kitchen amenities (i.e., oven, stove, refrigerator, freezer)
- m. Dishwasher
- n. Instant-pot
- o. Crockpot
- p. Air fryer
- q. Smart oven
- r. Rice cooker
- s. BBQ grill
- t. Good knives
- u. Cookbooks
- v. Recipes that take 30 minutes or less to prepare
- w. Disposable cookware (i.e., paper plates, foil pans)
- x. Enjoyment of cooking
- y. Pride associated with cooking meals at home
- z. Other

Directions: For this study, *meal preparation* is defined as the act of preparing meals (breakfast, lunch, dinner, and/or snacks) for a period of time longer than 2 days.

Attitude

Likert Scale: 0 – 10 (0 for strongly disagree and 10 for strongly agree)

1. It is important to know how to prepare a variety of meals.
2. Meals prepared from home are inherently healthier than meals prepared out of the home (i.e., takeout meals, fast-food, prepared convenience meals).
3. Meals made at home are affordable.
4. Meal preparation correlates with higher fruit and vegetable intakes.
5. Meal preparation correlates with a healthy weight status.
6. Meal preparation correlates with reduced time and cost barriers associated with home-prepared meal frequency.
7. Meal preparation education correlates with reduced nutrition-related disease risk among adults in America.
8. Meal preparation education should be taught by a registered dietitian nutritionist.
9. Meal preparation education is valuable knowledge for the dietetic intern.
10. I feel confident in my ability to provide meal preparation education.

Behavior

Likert Scale: 0 – 10 (0 for strongly disagree and 10 for strongly agree)

Personally:

1. I incorporate meal preparation strategies into my daily life (i.e., crockpot meals).
2. I benefit from meal preparation nutritionally.
3. I prepare my meals at home at least 2 days in advance.
4. I prepare my snacks at home at least 2 days in advance.
5. Without the inclusion of meal preparation, I would have trouble meeting my recommended nutrient intake.

Professionally:

1. As a registered dietitian nutritionist, I will include meal preparation nutrition education because it is a vital component of my patient's nutrition education.
2. As a registered dietitian nutritionist, I will teach meal preparation nutrition education to my patients using printed/online materials.
3. As a registered dietitian nutritionist, I will teach meal preparation nutrition education to my patients using cooking demonstrations.
4. As a registered dietitian nutritionist, I will teach meal preparation nutrition education to my patients using menu planning demonstrations.
5. Without the inclusion of meal preparation, my future client would have trouble meeting their recommended nutrient intake.

Appendix G – Follow-up Survey Tool

Identification code: _____

Attitude

Likert Scale: 0 – 10 (0 for strongly disagree and 10 for strongly agree)

1. It is important to know how to prepare a variety of meals.
2. Meals prepared from home are inherently healthier than meals prepared out of the home (i.e., takeout meals, fast-food, prepared convenience meals).
3. Meals made at home are affordable.
4. Meal preparation correlates with higher fruit and vegetable intakes.
5. Meal preparation correlates with a healthy weight status.
6. Meal preparation correlates with reduced time and cost barriers associated with home prepared meal frequency.
7. Meal preparation education correlates with reduced nutrition related disease risk among adults in America.
8. Meal preparation education should be taught by a registered dietitian nutritionist.
9. Meal preparation education is valuable knowledge for the dietetic intern.
10. I feel confident in my ability to provide meal preparation education.

Behavior

Likert Scale: 0 – 10 (0 for strongly disagree and 10 for strongly agree)

Personally:

1. I incorporate meal preparation strategies into my daily life (i.e., crockpot meals).
2. I benefit from meal preparation nutritionally.
3. I prepare my meals at home at least 2 days in advance.
4. I prepare my snacks at home at least 2 days in advance.
5. Without the inclusion of meal preparation, I would have trouble meeting my recommended nutrient intake.

Professionally:

1. As a registered dietitian nutritionist, I will include meal preparation nutrition education because it is a vital component of my patient's nutrition education.
2. As a registered dietitian nutritionist, I will teach meal preparation nutrition education to my patients using printed/online materials.
3. As a registered dietitian nutritionist, I will teach meal preparation nutrition education to my patients using cooking demonstrations.
4. As a registered dietitian nutritionist, I will teach meal preparation nutrition education to my patients using menu planning demonstrations.
5. Without the inclusion of meal preparation, my future client would have trouble meeting their recommended nutrient intake.

Appendix H - Meal Preparation Virtual Intervention Outline

1. Part 1: What, why, and who
 - a. What: meal preparation defined
 - b. Why:
 - i. Aids in the prevention of nutrition related diseases
 1. Quick facts, CDC, AHA
 - ii. Increases consumption of nutrient variety
 1. Studies show meal prep increases the variety of nutrients one consumes when they actively plan out and prepare their meals at home.
 - iii. Reduced consumption of fast/convenience foods.
 1. Why?
 - a. To reduce:
 - i. High sat. fat consumption
 - ii. High sugar consumption
 - iii. High sodium intake
 - iv. Nutrition related disease
 - c. Who?
 - i. Everyone! It doesn't matter who, even you can benefit.
 1. Provide an exhaustive list of examples.
 - ii. Why?
 1. Barriers defined, they do not discriminate
 - a. Barriers are enough to justify quick, ready to eat meals regardless of health situations.
 - i. Exhaustive list of barriers
 - b. Facilitators defined
 - i. Tools to ease the process
 1. Appliances
 2. Utensils
 3. People
2. Part 2: How
 - a. First, **Gather**: *the precursor to success*
 - i. Food storage containers
 1. Think:
 - a. Easy to carry, use, clean, store
 - i. Dishwasher, microwave, freezer, oven safe?
 - ii. Tools:
 1. Think: Easy
 - a. Knife: if there is one piece of equipment to buy, it is a good knife.
 - b. Cutting boards (Meat vs produce)
 - c. Sheet pans
 - i. Minimum of two, make sure they fit.
 - d. Tongs: for tossing veg, combing pasta, serving salads.

- e. Measuring cups/spoons/scales
 - f. Electric power equipment (optional time saver)
 - i. Food processor
 - ii. Blender
 - iii. Mixer
 - g. Kitchen towels
- iii. Clean
 - 1. Clean kitchen, towels, hands
- b. Second, **Pick:** *your day, your meal, your plan*
 - i. Choose your day
 - ii. Beginners: pick one meal to prep
 - 1. Breakfast: do you leave early, skip breakfast to save time?
 - 2. Lunch: do you work through lunch or tend to eat out a lot because you forgot your lunch at home?
 - 3. Dinner: do you run through the drive thru because it's 7pm and you need to eat and it's late and your busy and...
 - iii. Plan for 3 days: increase as comfortable
 - 1. Scan the pantry/fridge: What do you already have on hand? Check your spices, too.
 - 2. Decide: what do you like to eat
 - a. Examples:
 - i. Pasta
 - ii. Salad
 - iii. Soup & stew
 - iv. Sandwiches & wraps
 - v. Roasts
 - 3. Find a recipe: reduce, or increase to serve 3
 - 4. Incorporate: vegetables, fruits, whole grains, lean proteins, healthy fats for the meal of choice
 - a. Example:
 - i. Spicy (or not) black bean grain salad
 - 1. Grain: quinoa, brown rice
 - 2. Leafy greens: kale, lettuce of choice
 - 3. Veg: corn, bell peppers, cilantro, onion hot pepper
 - 4. Healthy fats: olive oil, avocado
 - 5. Lean proteins:
 - a. grilled/baked chicken, tofu
 - b. Black beans
 - 5. Shop from the list
- c. Three, **Prepare:**
 - i. Gather all ingredients/equipment (dont forget the seasonings)
 - ii. Multitask:
 - 1. Wash, rinse, drain
 - a. Wash: hands, produce, cans
 - b. Rinse: grains, beans, produce

- c. Drain
- 2. Complete in order
 - a. Preheat oven/grill
 - b. Put beans/grains in separate pots
 - i. Just grain if using canned beans
 - c. Season chicken, put in grill or oven
 - d. Set timer
 - e. Chop
 - i. Produce
 - f. Combine ingredients
- d. Four, **Pack**
 - i. Divide meal into three equal servings
 - ii. Place in meal containers
 - iii. Put in the refrigerator
 - 1. Label with dates.

Appendix I – Recruitment Email to Potential Pilot Study Participants

Email subject line: Participate in a research pilot study and learn about meal preparation nutrition education

Dear UAA DN graduate student or dietetic intern,

My name is Kathy Nuñez and I am a graduate student in the Dietetics and Nutrition program at the University of Alaska Anchorage.

For my graduate project, I am studying the effect of a nutrition education intervention on a dietetic intern or supervised practice student's meal preparation attitudes and behavior.

I am seeking graduate students and interns currently enrolled in the dietetic and nutrition program at the University of Alaska Anchorage to participate in a pilot study.

Would you be willing to assist me with this process, helping to establish face validity while providing insight on understanding and usability and the assurance of the quality and effectiveness?

Sincerely,

Kathy M. Nunez,
Graduate Student - University of Alaska Anchorage, School of Allied Health

Graduate Committee:
Carrie King, PhD, RD, LD, CDE, Professor and Director Dietetic Internship and Future Graduate Program
Amy Urbanus, MS, RDN, CDE, Assistant Professor, Dietetics & Nutrition
Jana Patterson, Chef, CN, Culinary Instructor

[Link for study information]

Appendix J – Pilot Study Evaluation Questions

Part One

Directions: Please answer the following questions regarding the email invitation to the pilot study and the questionnaire that you just completed. Your suggestions will be used to revise the e-mail and questionnaire. Thank you for your time.

1. Was the email that invited you to participate in the study easy to understand and clear? If no, please explain.

- Yes
- No

Comments: _____

2. Did you feel that any of the items in the questionnaire were confusing? If yes, please specify which ones.

- Yes
- No

Comments: _____

3. Do you think that any of the items in the questionnaire lacked any response choices that would have been appropriate? If yes, please specify which ones.

- Yes
- No

Comments: _____

4. Did you think that the questionnaire flowed in a logical order?

- Yes
- No

Comments: _____

5. How long did it take you to complete the questionnaire?

6. Do you think that it took too long to complete the questionnaire?

- Yes
- No

Comments: _____

7. Was there a question that you anticipated but was not asked?

8. How do you feel about the overall quality of the questionnaire?

9. Please share any comments that we can use to improve the questionnaire.

Part Two

Directions: Please answer the following questions regarding the virtual interventions that you just completed. Your responses will help me evaluate the relevance of the virtual intervention discussions. Thank you for your time.

1. Did you have any difficulty accessing the virtual interventions?

- Yes
- No

Comments: _____

2. Was it easy to navigate the virtual interventions?

- Yes
- No

Comments: _____

3. Did you think that the virtual interventions flowed in a logical order?

- Yes
- No

Comments: _____

4. How long did it take you to complete the virtual interventions?

5. Do you think that it took too long to complete the virtual interventions?

- Yes
- No

Comments: _____

6. Was there a topic that you anticipated but was not addressed?

7. How do you feel about the overall quality of the virtual interventions?

8. Please share any comments that I can use to improve the virtual interventions.

9. Finally, we would like to ask for your rating of the relevance of the overall questionnaire and virtual interventions. Please review the research goals, objectives, and anticipated outcomes listed below. Based on this information, please give the overall questionnaire a rating on the scale that follows at the end of this page.

Research Goals:

1. To evaluate the effect of a nutrition education intervention on the meal preparation attitude and behaviors of ACEND accredited dietetic internship, supervised practice rotations as part of a coordinated program, or an individualized supervised practice pathway program in the United States.
2. To motivate participants to examine reasons for meal preparation interest or disinterest.

Research Objectives:

1. Identify the meal preparation attitude and behaviors of dietetic interns or students in a supervised practice program.
2. Educate the dietetic intern or student in a supervised practice program on what, why, who, and how and meal preparation benefits with a virtual intervention.
3. Assess the immediate effects of the virtual intervention on the dietetic intern or student's meal preparation attitudes and behaviors.
4. Evaluate perceived meal preparation barriers and facilitators.
5. Provide knowledge designed to impact personal and professional meal preparation attitudes and behaviors.

Anticipated Learner Outcomes:

1. Describe the top three barriers to eating meals from home.
2. Recognize the available supports and resources for meal preparation and provide suggestions for obtaining additional support or resources.
3. Summarize goals, anticipated barriers, and possible facilitators for changing personal and professional meal preparation attitudes and behaviors.

Please indicate your overall rating of the relevance of this questionnaire for this planned study:

1	2	3	4	5
Not Relevant and Unsuitable	Inadequate	Adequate	Very Suitable	Extremely Suitable

Appendix K - Dietetic Practice Group Memberships

Table 2. Dietetic Practice Group Memberships Reported by Study Participants

Dietetic Practice Group	Frequency
Women's Health	5
Pediatrics	4
Public Health	4
Integrative and Function	2
Sports Nutrition	2
School Nutrition Services	2
Behavioral	1
Cardiovascular	1
Latinos and Hispanics in Dietetics & Nutrition	1
Nutrition Education for the Public	1
National Organization of Blacks in Dietetics & Nutrition	1
Nutrition Entrepreneurs	1
Nutrition Management	1
Nutrition Support	1
Oncology	1
Philly AND	1
Research	1
Sports, Cardiovascular, and Wellness Nutrition	1
SFAND	1
Wellness	1

Appendix L - Location Participant Completed ACEND Accredited Didactic Training

Table 3. Location Participants Completed ACEND Accredited Didactic Training

State	<i>n</i> (%)
Alabama	4 (3.9%)
Alaska	0 (0%)
Arizona	4 (3.9%)
Arkansas	5 (4.9%)
California	9 (8.7%)
Colorado	1 (1.0%)
Connecticut	2 (1.9%)
Delaware	0 (0%)
Florida	2 (1.9%)
Georgia	1 (1.0%)
Hawaii	0 (0%)
Idaho	1 (1.0%)
Illinois	7 (6.8%)
Indiana	2 (1.9%)
Iowa	0 (0%)
Kansas	2 (1.9%)
Kentucky	1 (1.0%)
Louisiana	1 (1.0%)
Maine	0 (0%)
Maryland	0 (0%)
Massachusetts	2 (1.9%)
Michigan	6 (5.8%)
Minnesota	4 (3.9%)
Mississippi	0 (0%)
Missouri	1 (1.0%)
Montana	1 (1.0%)
Nebraska	0 (0%)
Nevada	1 (1.0%)
New Hampshire	1 (1.0%)
New Jersey	3 (2.9%)
New Mexico	1 (1.0%)
New York	8 (7.8%)
North Carolina	2 (1.9%)
North Dakota	0 (0%)
Ohio	6 (5.8%)
Oklahoma	1 (1.0%)
Oregon	2 (1.9%)
Pennsylvania	7 (6.8%)
Rhode Island	0 (0%)
South Carolina	0 (0%)
South Dakota	0 (0%)

Table 3. (continued)

Tennessee	0 (0%)
Texas	8 (7.8%)
Utah	4 (3.9%)
Vermont	0 (0%)
Virginia	1 (1.0%)
Washington	1 (1.0%)
West Virginia	0 (0%)
Wisconsin	2 (1.9%)
Wyoming	0 (0%)

Appendix M - Location Participant is Completing ACEND Accredited Supervised Practice Rotations

Table 4. Location Participants Completed Supervised Practice Rotation

State	<i>n</i> (%)
Alabama	1 (1.0%)
Alaska	0 (0%)
Arizona	2 (1.9%)
Arkansas	3 (2.9%)
California	7 (6.8%)
Colorado	1 (1.0%)
Connecticut	1 (1.0%)
Delaware	0 (0%)
Florida	1 (1.0%)
Georgia	0 (0%)
Hawaii	0 (0%)
Idaho	1 (1.0%)
Illinois	7 (6.8%)
Indiana	2 (1.9%)
Iowa	0 (0%)
Kansas	2 (1.9%)
Kentucky	1 (1.0%)
Louisiana	1 (1.0%)
Maine	0 (0%)
Maryland	1 (1.0%)
Massachusetts	6 (5.8%)
Michigan	6 (5.8%)
Minnesota	4 (3.9%)
Mississippi	0 (0%)
Missouri	0 (0%)
Montana	1 (1.0%)
Nebraska	0 (0%)
Nevada	2 (1.9%)
New Hampshire	0 (0%)
New Jersey	3 (2.9%)
New Mexico	0 (0%)
New York	7 (6.8%)
North Carolina	2 (1.9%)
North Dakota	0 (0%)
Ohio	5 (4.9%)
Oklahoma	10 (9.7%)
Oregon	3 (2.9%)
Pennsylvania	4 (.9%)
Rhode Island	0 (0%)

Table 4. (continued)

South Carolina	0 (0%)
South Dakota	1 (1.0%)
Tennessee	2 (1.9%)
Texas	7 (6.8%)
Utah	5 (4.9%)
Vermont	0 (0%)
Virginia	3 (2.9%)
Washington	2 (1.9%)
West Virginia	0 (0%)
Wisconsin	1 (1.0%)
Wyoming	0 (0%)
