Effect of Culinary Medicine Curriculum on Biometric Outcomes and Dietary Quality of Heart Failure Patients

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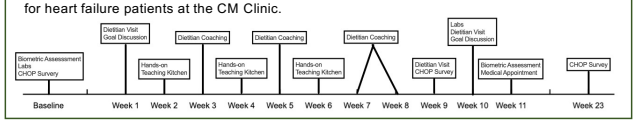
Introduction

Diet is an important component of heart failure management, and good dietary quality improves heart failure symptoms and reduces hospitalization. However, the implantation of dietary recommendations remains challenging, with inadequate food literacy as a key barrier. Culinary medicine demonstrates great potential to improve food literacy.

Aim 1: Test the hypothesis that Culinary Medicine courses positively influence the dietary quality of heart failure patients.
Aim 2: Test the hypothesis that Culinary Medicine courses lead to improved biometric outcomes in heart failure patients.
Aim 3: Test the hypothesis that patients maintain improved dietary quality long-term after finishing Culinary Medicine courses.

Methods

This is a single-center, multi-disciplinary, prospective feasibility study to determine the effectiveness of an intensive culinary intervention on dietary quality and biometric outcomes for heart failure patients at the CM Clinic.



Results

There are 28 people enrolled in the study and 23 (82%) participants completed the whole study.

Participant characteristics at baseline are described in Table 1. Most participants were male (65%), and greater than 65 years of age (65%). All participants have a BMI greater than 25, 74% of whom are obese. Participant HbA1c levels span from 5.2 to 8.3, with an average of 6.22. Participant waist-to-hip ratio has a mean of 1.00. There is a large variation in blood pressure, cholesterol, and BNP levels among all participants. Female participants have a significantly smaller waist-to-hip ratio compared to the male participants ($p < 0.05$). Otherwise, there were no statistically significant differences in baseline characteristics between females and males, and between the two age groups.

Table 1. Biometric and Biochemistry parameters at baseline by demographic groups

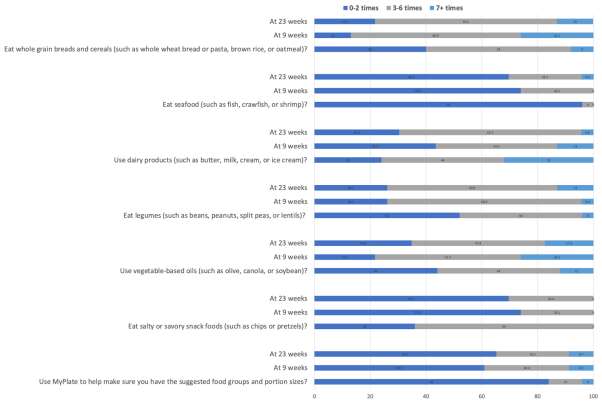
		All	Sex		Age	
			Female	Male	< 65	≥65
BMI	N	23	8	15	8	15
	Mean (± SD)	35.26 ± 6.08	36.44 ± 6.55	34.63 ± 5.94	36.96 ± 6.74	34.35 ± 5.72
HbA1C	N	22	7	15	7	15
	Mean (± SD)	6.22 ± 0.96	6.07 ± 1.24	6.29 ± 0.83	5.67 ± 0.49	6.48 ± 1.02
Waist to Hip Ratio	N	22	7	15	7	15
	Mean (± SD)	1.00 ± 0.08	0.93 ± 0.05*	1.02 ± 0.07*	0.98 ± 0.09	1.00 ± 0.08
SBP	N	23	8	15	8	15
	Mean (± SD)	129.78 ± 22.64	129.63 ± 16.16	129.87 ± 25.97	131.88 ± 21.22	128.67 ± 24.00
DBP	N	23	8	15	15	15
	Mean (± SD)	72.91 ± 13.66	70.75 ± 18.43	74.07 ± 10.93	79.13 ± 9.16	69.60 ± 14.75
LDL	N	23	8	15	8	15
	Mean (± SD)	84.57 ± 41.79	111.63 ± 50.04	70.13 ± 29.18	95.63 ± 37.48	78.67 ± 43.99
HDL	N	23	8	15	8	15
	Mean (± SD)	46.00 ± 12.89	51.00 ± 13.85	43.33 ± 11.97	43.88 ± 9.49	47.13 ± 14.56
BNP	N	23	8	15	8	15
	Mean (± SD)	306.61 ± 260.28	382.50 ± 297.81	266.13 ± 238.88	433.38 ± 317.37	239.00 ± 204.97

Differences in biometric outcomes and biochemistry labs after culinary intervention is summarized in Table 2. No statistically significant difference was observed in covers blood pressure or weight. Biochemistry measurements includes BNP, cholesterol level, and HbA1C.

Table 2. Changes in biometric outcomes and biochemistry labs

Biometric	N	Baseline	11 Weeks	Difference	p-value
BMI	22	32.90 [29.92, 39.97]	32.26 [30.78, 39.11]	- 0.28 [-1.45, 0.41]	0.1559
HbA1C	21	5.90 [5.45, 6.65]	5.90 [5.45, 7.55]	0.00 [-0.25, 0.15]	0.7207
Waist to Hip Ratio	21	0.98 [0.92, 1.06]	0.97 [0.92, 1.05]	-0.02 [-0.05, 0.02]	0.1782
SBP	22	134.0 [111.8, 145.0]	133.0 [119.8, 144.5]	-0.50 [-5.00, 14.00]	0.6030
DBP	22	74.50 [64.25, 87.25]	71.50 [66.75, 85.00]	-0.50 [-9.00, 9.25]	0.6633
LDL	22	74.00 [51.00, 99.75]	73.50 [48.75, 105.5]	-4.00 [-10.75, 6.00]	0.2251
HDL	22	42.00 [37.75, 50.25]	41.50 [34.75, 49.75]	-1.00 [-4.00, 1.25]	0.1403
BNP	23	240.00 [67.00, 481.00]	189.00 [88.00, 858.00]	21.00 [-35.00, 233.00]	0.1361

The changes in behavioral outcomes and dietary quality compared to baseline are summarized in the following Figure. At 9 weeks, immediately following competition of the culinary medicine course, the CHOP survey showed increased frequency of using MyPlate as a meal preparation habit after the culinary course, but it was not statistically significant. There were no statistically significant differences regarding participants' perceptions regarding healthy meals and cooking class. Regarding the eating habits post culinary intervention, there is a statistically significant difference in participant consumption salty or savory snack foods. More participants began using vegetable-based oil, eating seafood, legumes and whole grain breads and cereals; fewer participants reported using dairy products. However, these findings are not statistically significant. At 23 weeks, a similar survey results were found regarding salty or savory snack foods consumption, though it is no longer statically significant. Other eating habit changes at 9 weeks showed similar change patterns in the CHOP survey at 23 weeks.



Conclusions/Discussion

More than 80% of the recruited participants completed the study, which demonstrates the feasibility of our culinary intervention model. Based on the CHOP survey results, we observed some differences of participants' dietary quality after our culinary intervention. Some of the changes were sustained after 14 weeks. However, most of the changes did not demonstrate a statistically significant difference, which is probably due to the small sample size. We did not observe any weight, cholesterol level or other biometric outcome changes, which we believe is related to the short intervention period.

There are approximately 6.5 million heart failure patients in the United States currently, which is estimated to increase to 8 million by 2023[1]. There is increasing realization that dietary in heart failure management is critical for improving symptoms and reducing hospitalization[2]. The implantation of the dietary recommendations remains to be challenging[3]. One of the barriers is inadequate food literacy[4], which is present in approximately one quarter of Americans[5]. Culinary medicine is a combination of the art of food preparation and the science of medicine and nutrition[6], which has great potential to improve food literacy[7].

The results from our feasibility study of application of culinary medicine in the dietary education for heart failure patients will help future design of tailored culinary classes for heart failure patients and help create better assessment tools of dietary literacy and quality. These are valuable for larger studies with larger samples to further investigate the effect of culinary medicine in heart failure management.

References

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CHOP Survey Results