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Short-Term Patient Centered Nutrition Counseling Impacts Weight and Nutrient Intake in Patients with Systemic Lupus Erythematosus

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Abstract

Background—Patients with systemic lupus erythematosus (SLE) are at risk for cardiovascular disease (CVD) due to increased prevalence of risks factors.

Objective—To evaluate the effect of patient-centered nutrition counseling on changes in nutrient, anthropometric, and lipids in SLE patients enrolled in a CVD prevention counseling program (CVD PCP).

Methods—From March 2009 to June 2011, a subgroup of SLE patients enrolled in our CVD PCP were referred for nutrition counseling. A primary analysis evaluated the 6-month changes in nutrient intake, weight, body mass index (BMI), waist circumference, and lipid levels. A secondary analysis compared the same measurements between the nutrition counseling patients and patients who were referred but did not attend.

Results—Of 71 referrals, 41 (58%) attended nutrition counseling (female: 88%, African American/Hispanic: 73%, mean age of 40.7 ± 12.6 years, and mean disease duration of 12.2 ± 8.2 years). Over a 6-month period, nutritional counseling patients: a) reduced sodium intake ($p = 0.006$), total calories ($p = 0.07$), percent calories from fat ($p = 0.011$) and saturated fat ($p = 0.068$); b) had decreased weight (-1.64 kg, $p = 0.025$); and c) were more likely to report increases in fruits and vegetables ($p < 0.001$), a high fiber diet ($p = 0.011$), 2 servings of fish/week ($p = 0.002$), and a low cholesterol diet ($p = 0.034$). There were no significant changes in lipid levels over the 6 months among nutrition counseling patients. When comparing nutrition counseling patients to those who were referred but did not attend, we found at 6 months a higher percentage of nutrition counseling patients followed a high-fiber diet ($p=0.03$), consumed 2 or more servings of fish per week ($p=0.01$), followed a low-cholesterol diet ($p = 0.03$), and achieved a greater weight loss ($p = 0.04$) compared to the group that did not attend.

Conclusion—At six months we found that patient-centered nutrition counseling appears to be effective for promoting changes in nutrient intake, diet habits and weight in SLE patients.

However, the counseling did not show a significant improvement in lipid levels, possibly due to short follow-up and/or lupus related factors.

Keywords

Diet; systemic lupus erythematosus; nutrition counseling; patient-centered; cardiovascular disease

Introduction

Patients with systemic lupus erythematosus (SLE) have an increased risk for developing cardiovascular disease (CVD) compared to the general population¹, with traditional and non-traditional factors contributing to the risk. There is an increased frequency of traditional CVD risk factors such as elevated low-density lipoprotein cholesterol (LDL), hypertension, diabetes, higher levels of triglycerides, elevated homocysteine, obesity, and early menopause in patients with SLE^{2,3}. Corticosteroid treatment, systemic inflammation, accelerated atherosclerosis, and antiphospholipid antibodies (aPL) are non-traditional risk factors that may also increase CVD risk in SLE patients^{4,5,6}. Several of these risk factors may be amenable to diet interventions, therefore nutritional guidance can be important in the management of SLE patients.

Lupus patients face several challenges, such as complicated medical regimens, chronic fatigue, and presence of comorbidities. Therefore, adherence to a diet intervention may be particularly difficult due to competing issues associated with disease management. A patient-centered counseling model has been suggested as a way to facilitate dietary change and adherence among patients who face multiple challenges or barriers to diet changes^{17,8}. This model provides a tailored nutrition intervention and promotes long-term adherence by emphasizing patients' stage of change, self-efficacy for changing, development of personal goals and addresses the patients' unique challenges towards nutritional goals⁸. Patient-centered counseling has been effective in nutrition interventions for obese and hypertensive patients^{7,9}. Research to understand the effects of patient-centered nutrition counseling on CVD risk factors on patients with SLE is needed in order to understand the extent to which we can anticipate a nutrition intervention to decrease CVD risk in this population.

Hospital for Special Surgery (HSS) created a free-of-charge CVD prevention counseling program (PCP) for SLE patients to address CVD risk factors. Patients who enrolled in the program received an assessment and education of their CVD risk factors, including tailored lifestyle recommendations and referrals for on-going physical therapy sessions and individual nutrition counseling with a registered dietitian (RD). The purpose of this study is to analyze the effects of individualized nutrition counseling using patient-centered counseling on select nutrient, anthropometric, and lipid levels in SLE patients.

Subjects and materials

The CVD-PCP was a free-of-charge counseling program for SLE and/or aPL-positive patients that provided a basic assessment of and education about the CVD risk factors. The *assessment* phase of CVD-PCP included the evaluation of CVD risk factors including BP, cholesterol profile, blood glucose, waist circumference, BMI, diet and exercise habits,

smoking status, Framingham 10 year CVD risk calculation, aPL-profile, and medications. All patients were asked five questions about their general diet habits as part of the CVD-PCP. These items were yes/no responses as to whether or not patients were following several dietary recommendations. The *education* phase included detailed discussion of the above risk factors as well as CVD and thrombosis prevention strategies. At the end of the counseling, patients: a) receive tailored lifestyle recommendations and a written summary report; and b) are referred to nutrition counseling based on pre-set criteria. Patients are followed every 3-6 month based on their CVD risk-profiles¹⁰. This study was approved by the Institutional Review Boards of Hospital for Special Surgery and Teachers College, Columbia University, New York, NY.

Nutrition counseling using patient-centered nutrition counseling methods was provided in the form of individual face-to-face initial consultation (60 minutes) and follow-up visits (30 minute each) over a 6-month period by the same registered dietitian (ST). Patients were recommended to attend nutrition counseling at least once a month over the 6-month period. Weight, height, BMI levels, and 24-hour dietary recalls were repeated by the RD at each visit. Food data were converted into macro- and micronutrients of interest (calories, total fat, saturated fat, dietary cholesterol, omega-6 fatty acids sodium, omega-3 fatty acids, fiber, sugar, and folate) using *NutritionistPro* (AXXYA systems, LLC, Stafford, TX). All anthropometric measures were recorded in the nutrition counseling records. Lipid levels were accessed from the CVD-PCP database. Nutrient, anthropometric and lipid levels were evaluated at two time points: baseline and 6-months.

The dietary goals of the nutrition counseling sessions were to reduce total and saturated fat intake, sodium intake, cholesterol intake, and overall calorie intake (for weight management), and to increase omega-3 fatty acid and fiber intake, according to Therapeutic Lifestyle Change (TLC) guidelines¹¹. While trying to achieve these goals, the following patient-centered counseling methods were used: 1) goal-setting, 2) self-monitoring practices (use of food diaries), 3) motivational interviewing (MI), 4) tailored instruction based on stage of change, and 5) addressing patients' barriers to making and maintaining diet changes.

Statistical analysis

The primary analysis was to examine 6-month changes in nutrient intake, dietary habits, anthropometrics, and lipid levels in patients with SLE attending nutrition counseling. A secondary analysis was to compare changes in diet habits, anthropometrics, and clinical outcomes among patients with lupus attending nutrition counseling and those referred but who failed to attend. Nutrient intake was not compared for the secondary analysis since 24-hour recalls were not obtained for the 30 individuals that were referred but did not attend nutrition counseling. A one sample t-test was done on the difference in the means between baseline and 6-month changes in nutrient intake, lipid levels, and anthropometric measures within the patients in the nutrition counseling group. In addition, a one-sample t-test was done to compare baseline and 6-month changes between patients in the nutrition counseling and comparison group. A chi-squared analysis was conducted for categorical variables depicting dietary habits within patients in the nutrition counseling group and between both

groups. Statistical analysis was performed using SAS Version 9.3 (2011, SAS Institute, Inc., Cary, NC). Statistical significance was set at $p < 0.05$ for all analyses.

Results

A total of 90 patients participating in the CVD-PCP were referred to nutrition counseling between March 2009 and June 2011. Patients who were aPL-positive without SLE ($n=8$), were pregnant ($n=1$), had end stage renal disease ($n=1$), and who did not follow up with the CVD-PCP program after the initial screening were excluded from the analysis ($n=9$). Thus 71 patients were included in the study, 41 patients participated in nutrition counseling and 30 patients were referred to nutrition counseling but did not attend (reference group). All 41 patients remained in the nutrition counseling group throughout the 6-month period and attended an average of 3 nutrition counseling sessions (range 2-5). Baseline values of outcomes of interest were compared to 6-month values.

In our study population ($n = 71$), 89% were female, 72% African American/Hispanic, 56% had hypertension, 21 % had hyperlipidemia, and 38% were considered overweight or obese (BMI ≥ 25). The mean age was 39.7 years old (± 12.82) with a mean lupus disease duration of 11.49 years (± 8.02). There was no significant differences in age, ethnicity, SLE duration, and past medical history of participants who attended nutrition counseling compared to those who did not. The mean steroid dose of the nutrition counseling group did not significant change from baseline to the 6-month follow-up (data not shown).

Changes in nutrient intake from baseline to 6-months revealed that nutrition counseling had a significant effect in changing intake of percent calories from fat, and sodium (Table 1). There was a significant increase in patients in the nutrition counseling group who reported a diet rich in fruit and vegetable intake, diet high in fiber, fish, and a low cholesterol diet (Table 2). There was significant weight loss, resulting in a 1.64 kg decrease, and a 0.39 kg/m² reduction in BMI level (Table 3). The difference from baseline to 6-month changes in waist circumference and cholesterol profile) among patients in the nutrition counseling groups was not significant.

When comparing differences in reported diet habits between the nutrition counseling and comparison group, there was a higher percentage of patients in the nutrition counseling group that reported consuming a diet high in fiber, $\chi^2 (1, N = 65) = 4.86, p = .028$, consuming two or more servings of fish each week, $\chi^2 (1, N = 65) = 7.68, p = .006$, and consuming a low-cholesterol diet, $\chi^2 (1, N = 65) = 4.63, p = .032$. Comparing differences in anthropometric changes from baseline to 6-months between groups revealed a significant change in weight, $t(63) = 2.16, p = .035$. BMI and waist circumference did not differ significantly between groups, $t(33.88) = 1.75, p = .089$. and $t(57) = .62, p = .535$, respectively.

Baseline weight and BMI were higher in the nutrition counseling group compared to the comparison group. A GLM regression procedure was done to assess change in weight between groups controlling for baseline weight and baseline BMI. There was a marginally significant change in weight between groups when controlling for baseline weight $t(63) =$

$-1.87, p = .066$. Patients in the nutrition counseling group lost .06 kg more than patients in the comparison group. When controlling for baseline BMI level, there was no significant change between groups, $t(63) = -1.40, p = .167$. There was no significant difference between groups in change of lipid profile.

Although dietary and anthropometric improvements were observed among patients who attended nutrition counseling, the reference group did not show any improvements. In fact, patients in the reference group gained weight over the 6-month period (3 pound weight gain in 6 months) and reported less desirable dietary habits from baseline to 6-months.

Discussion

Our study showed that nutritional guidance using patient centered methods reduced total calorie, percent calories from total and saturated fat, and sodium intake in patients with SLE. Patients also reported significant increases in eating a diet rich in fruits and vegetables, a high-fiber diet, 2 servings of fish per week, and a low-cholesterol diet. Diet and nutrient modification was accompanied by reductions in weight and BMI, but there were no significant changes in blood glucose or lipids.

Few previous studies have shown some benefits of nutrition counseling on modifying CVD risk factors in SLE patients. Hearth-Holmes et al.¹² found that 6 months of dietary counseling using National Cholesterol Education Program (NCEP) guidelines in a group of 29 hyperlipidemic SLE patients significantly reduced cholesterol levels. Shah et al.¹³ used a 12 week culturally sensitive, behaviorally focused diet intervention to modify CVD risk factors in 17 Hispanic-American and African-American women with SLE and found significant reductions in total cholesterol, low density lipoprotein (LDL) levels, triglycerides, and weight. In a 6-week study, Davies et al.¹⁴ evaluated the use of a low glycemic index diet compared to a traditional low calorie diet on weight loss, cardiovascular risk, disease activity, and fatigue in 23 female SLE patients on prednisone. There were no changes in CVD biomarkers but the researchers found significant weight loss achieved by subjects in both groups ($p < 0.01$). In contrast to the previous studies, our study was the only one to use patient-centered methods and tailored the nutrition intervention to patients' stage of change and barriers. Thus, our study contributes to the research of the impact that patient-centered nutrition counseling may have on reducing CVD risk factors in SLE patients.

The absence of changes in lipid levels were surprising since existing literature indicates reductions in fat, particularly saturated fat, leads to reductions in blood lipid levels. In a hyperlipidemic population without SLE, a meta-analysis showed that for every 1% decrease in energy consumed as dietary saturated fat there was an LDL reduction of 0.05 mmol/l¹⁵. Although patients in this study reduced their saturated fat by almost 1%, no significant reductions in LDL or other lipid measures were found. This may indicate that patients with SLE require a longer duration of dietary counseling or a reduction in saturated fat intake $>1\%$ to observe lipid level improvements or other lupus-related factors exist that impede the clinical improvements. Although we did not see significant improvements in cholesterol profiles, we did not observe worsening levels in the 6-month period.

Refined carbohydrate and excess sugar intake has been recently recognized as being a significant contributor to heart disease risk¹⁶. Additionally, Elkan et al.¹⁷ reported that patients with SLE consume significantly more refined carbohydrates, less fiber, more and fewer omega-3 fatty acids than healthy controls. They also report that these dietary characteristics in SLE patients contributed to unfavorable disease activity and serum lipids. Although we did not assess carbohydrate intake in our study population, we did find suboptimal fiber, omega-3 fatty acid intake and a high sugar intake. Future studies that include comprehensive nutritional counseling for patients with SLE should focus on reducing refined carbohydrate intake, while promoting sources of fiber and omega-3 fatty acids.

Nutrition counseling sessions revealed that this sample of SLE patients was dealing with multiple issues, such as chronic fatigue, depression, changes in appetite due to corticosteroid side effects, and coping with an ongoing illness that required frequent medical attention. Our study adopted a patient-centered counseling approach as a means to address such issues and provide an individualized method for dietary change and compliance. We found that overall, nutrition counseling using patient-centered methods seemed feasible and well-liked by patients. Twenty-two of the 41 (53.7%) patients in the nutrition counseling group came for 3 or more nutrition visits during the 6-month period, and none of the patients who started nutrition counseling dropped out of the nutrition counseling. Although the nutrition counseling resulted in changes in nutrients, diet habits, and weight, this study was not designed to examine which components of patient-centered counseling were most effective. Future studies should evaluate how ongoing health issues compete with SLE patients' ability to make dietary, weight, and other lifestyle changes.

Limitations of our study is the small sample size, short-follow-up, and that we did not control for potential confounding factors that may impact weight and lipid levels, such as prednisone dose, inflammation, and physical activity levels. We also did not include an evaluation of refined carbohydrate within the dietary analysis. Additionally, changes in nutrient intake were based on a single 24-hour recall at only two time points (baseline and 6-months), and thus may not be reflective of usual intake. Lastly, the analysis of the CVD events (e.g., stroke, myocardial infarction) or additional CVD risk factors (e.g., hypertension) among CVD-PCP patients was not the purpose of this analysis, which will be analyzed separately when all patients complete the program.

In summary, a six month nutrition counseling using patient-centered methods appears to be an effective method for promoting changes in nutrient intake, diet habits and, possibly, anthropometric measures in SLE patients.

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Table 1

Changes in Nutrient Intake^a from Baseline to 6 Months in the Nutrition Counseling Group (N = 41)

	Baseline Mean (SD)	6-month ^b Mean (SD)	Mean difference (SD)	t	p-value
Calories (kcal)	1687.64 (SD = 515.59)	1522.91 (SD = 440.78)	-164.73 (SD = 568.71)	-1.85	.07
%Calories from fat	32.93 (SD = 8.71)	28.18 (SD = 8.24)	-4.13 (SD = 9.88)	-2.68	.01
%Calories from saturated fat	10.37 (SD = 4.19)	9.22 (SD = 3.32)	-1.15 (SD = 3.91)	-1.88	.06
Cholesterol (grams)	277.71 (SD = 204.23)	231.38 (SD = 149.74)	-46.34 (SD = 225.32)	-1.32	.19
Sodium (grams) ^c	2518.28 (SD = 883.53)	2009.94 (SD = 977.74)	-508.34 (SD = 1359.82)	-2.90	.01
Omega-6 Fatty Acids (grams)	9.02 (SD = 4.97)	8.53 (SD = 8.24)	-.49 (SD = 6.78)	-.46	.65
Omega-3 Fatty Acids (grams) ^d	0.33 (SD = .66)	.29 (SD = .43)	.04 (SD = .81)	-.33	.74
Fiber (grams) ^e	18.04 (SD = 8.62)	18.38 (SD = 9.33)	.34 (SD = 9.33)	.22	.82
Sugar (grams)	82.52 (SD = 53.17)	76.72 (SD = 38.93)	-5.80 (SD = 51.93)	-.71	.48
Folate (mg)	365.16 (SD = 193.66)	334.89 (SD = 211.13)	-30.27 (SD = 261.11)	-.74	.46

^a t-test for differences in means only.

^b Goal nutrient intakes include: < 25-35% from fat, < 7% from saturated fat, > 200 mg from cholesterol, < 2400 mg from sodium, 20 gms fiber, 400 mcg folate

^c sodium outlier removed, N = 40,

^d omega-3 fatty acid outlier removed, N = 40,

^e fiber outlier removed, N = 40

Table 2

Differences in Diet Habits from Baseline to 6 Months in Nutrition Counseling Group

Measure	Baseline		6-months		χ^2	p-value
	Yes n (%)	No n (%)	Yes n (%)	No n (%)		
Diet rich in fruit & vegetable	19 (46)	22 (54)	30 (73)	11 (27)	12.98	<.001
Diet high in fiber	17 (41)	24 (59)	30 (73)	11 (27)	6.49	.011
2 servings of fish/week	13(31)	28(68)	23 (56)	18 (44)	10.13	.002
1 drink/day	35 (85)	6 (14)	40 (98)	1 (2)	.18	.675
Low cholesterol diet	6 (15)	35 (85)	25 (61)	16 (39)	4.49	.034

Note: *df* = 1 for all chi-squares

Table 3

Changes in Anthropometric Measures in the Nutrition Counseling Group from Baseline to 6 Months

	Baseline Mean (SD)	6-month Mean (SD)	Mean difference	<i>T</i>	<i>p</i>-value
Weight (kg) (N=41)	85.98 (SD = 20.21)	84.34 (SD = 19.04)	-1.64 (SD = 4.51)	-2.33	.025
BMI (kg/m ²) (N=41)	31.29 (SD = 7.39)	30.90 (SD = 7.16)	-.39 (SD =1.34)	-1.86	.070
Waist Circumference (cm) (N=38)	101.26 (SD = 515.09)	102.26 (SD = 14.19)	1.00 (SD = 6.83)	2.31	.370