Research Article

The effect of behavioral intervention and nutrition education program on serum lipid profile, body weight and blood pressure in Iranian individuals with spinal cord injury: A randomized clinical trial

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Objective: The efficacy of nutrition education on body weight and serum lipids has not yet been described in patients with spinal cord injury (SCI). In the present study, we examined the effect of a 7-month nutrition education program on lipid profile and body weight in individuals with SCI.

Design: Randomized clinical trial.

Setting: A tertiary rehabilitation center.

Participants: Patients with SCI who were referred to Brain and Spinal Cord Injury Research Center.

Intervention: The nutrition education program consisted of 5 education sessions during a period of 7 months.

Outcome measures: Body weight and serum concentrations of total cholesterol (TC), triglyceride (TG), high-density lipoprotein cholesterol (HDL-C) and low-density lipoprotein cholesterol (LDL-C) were measure at the beginning of the trial and after 7 months. Two-way repeated measure analysis of variance (ANOVA) was used.

Results: Total of 57 patients (27 in control group and 30 in education group) participated. Nutrition education program showed no significant effect on the levels of TC, TG, LDL-C and HDL-C (P : 0.224, 0.172, 0.107 and 0.081, respectively). No significant changes in weight and waist circumflex have been observed as well (P : 0.970 and 0.361, respectively).

Conclusion: Our findings do not support a significant influence of nutrition education program on weight and lipid profile. It seems that the nutrition education program alone is not adequately effective to have beneficial influence on weight and lipid profile.

Clinical trial registration No.: IRCT201406215968N3

Keywords: Spinal Cord Injury, Triglyceride, Cholesterol, Blood pressure, Clinical trial

Introduction

Healthy nutritional intake has become a major part of life style modification in order to attain a good health status. Maintaining a healthy diet is recommended by many physicians, however, the exact efficacy of nutrition education programs on lipid profile and body weight has poorly been investigated in people with disability.

Unfavorable lipid profile is associated with increased risk of cardiovascular diseases.^{1,2} In this regard, de Dios Sanz *et al.*³ demonstrated that a nutrition education program was effective in reducing low-density lipoprotein cholesterol (LDL-C) in a working adult population. On the other hand, Muchiri *et al.*⁴ showed that the efficacy of nutrition education is limited and insignificant in improvement of HbA1c in patients with type 2 diabetes mellitus. In this regard, there are numerous investigations supporting the beneficial

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effects of dietary behavior modifications on anthropometric measurements and inflammatory markers.⁵ It has been shown that dietary patterns can predict the risk of cardiovascular diseases (CVD).^{6,7} This literature^{3,5-7} supports the favorable effects of nutrition education on health. However, the exact impact of nutrition education on serum lipid profiles in patients with spinal cord injury (SCI) has been poorly described. Previously, Lieberman *et al.*⁸ suggested that patients with SCI receive nutrition education since their study showed that people with SCI consume fewer daily servings of fruit, dairy, and whole grain foods than proposed by the 2010 Dietary Guideline recommendations. Moreover Kim *et al.*⁹ emphasized development of intensive weight control programs for patients with SCI which indicates the necessity of nutrition education programs during rehabilitation. Tomey *et al.*¹⁰ evaluated the nutritional status in patients with paraplegia and demonstrated that the intake of several key nutrients does not meet the guidelines and BMI of many patients are out of the recommended ranges. The study of Tomey *et al.*¹⁰ emphasizes the necessity of increased nutrition knowledge in people with SCI. In the present study, we assessed the effect of nutrition education on serum lipid profile in a group of Iranian patients with SCI in a randomized clinical trial.

People with SCI have a restricted ability in performance of daily routine tasks which leads to decreased physical activity and results in a sedentary life style. This sedentary life can cause increased body fat. In this regard, Jones *et al.*¹¹ showed that people with SCI have greater body fat mass for any given body mass index (BMI) compared to healthy individuals. By considering the increased risk of CVD in patients with SCI,¹² it is clinically essential to modify dietary behaviors to attain a more favorable life style which may have beneficial influences in reducing CVD risks among vulnerable individuals. Furthermore, Burri and Neidlinger¹³ hypothesized that people with disability are at risk for poor antioxidant nutrient intakes and status, because of their typically low energy expenditures. The study of Burri and Neidlinger¹³ suggested that the health status of patients with disability can be improved by monitoring their status of antioxidant nutrients. This literature emphasizes the fact that proper nutritional intake may have a noticeable impact on health in people with physical disability and therefore suitable nutrition education programs should be considered during rehabilitation. Up to now, no study has evaluated the effect of nutrition education programs on serum lipids in Iranian people with SCI and it has not yet been clarified if the nutrition education can be

considered as an effective therapeutic intervention to attain a more favorable lipid profile in order to decrease CVD risk. To the best of our knowledge, this is the first study investigating the influence of nutrition education on lipid profile and body weight in people with SCI in Iran.

Patients and Methods

Participants

Patients with SCI who were referred to the Brain and Spinal Cord Injury Research Center were invited to participate in our investigation. Inclusion criteria were: age above 18 years old, time since injury longer than 2 years, traumatic SCI, BMI higher than 22. Both men and women were recruited. Informed written consent was obtained from each individual after providing adequate information about the trial to each patient. Participants were assured about the confidentiality of their information and participation in the study was voluntary. Participants were then divided into two groups of intervention and control by random allocation method.

Study design

This study is a randomized clinical trial with registration No. IRCT201406215968N3. Eligible subjects according to inclusion criteria were divided into two groups by random allocation method. Block Randomization method was used to divide participants equally in two groups of intervention and control. Both groups contained 30 participants. However, three patients in control group did not show up for the blood tests after 7 months and therefore, the analysis included 30 patients in intervention group and 27 patients in control group. The block randomization method is designed to randomize subjects into groups that results in equal sample sizes. Blocks are small and balanced which keeps the numbers of subjects in each group similar.^{14,15} In this study, a random numbers table was used for randomization process. Both groups received the standard nutrition brochures. These brochures contain general recommendations about consuming healthy diets and emphasize maintaining normal weight. The intervention group participated in monthly educational sessions. After three months, the time interval between education sessions increased to two months. The overall nutrition education program consisted of 5 education sessions held over a 7-month period. Furthermore, patients in intervention group received specific diets which were designed for each individual based on anthropometric characteristics. These designed diets contained the required amount of calorie and the recommended foods with details. Diets

were designed to have a total energy intake between 1200 and 1800 kcal based on patients' anthropometric data. About 20% of total energy intake was derived from fat intake in each diet. The patients in the intervention group received 5 sessions of education to understand the amount of calories of different food groups and to recognize which foods with which amounts are essential to be included in a healthy diet. The designed diets were given to each patient based on their anthropometric measurements as a pattern so that each individual could understand how diets are designed. These diets were examples which helped each patient to better understand diets and individuals were free to modify the designed diet based on their preferences as long as they maintained the total amount of calories (for example foods could be replaced with foods from similar food groups with the same caloric intake). All patients in the intervention group attended all five sessions. In the intervention group, all participants were followed by regular weekly phone calls and were encouraged to stay on the designed diets and amend the received education. Overall, participants received 28 phone calls during 7 months. No hospitalization during the trial occurred. This study uses a pre- and post-intervention measurement approach and we did perform multiple assessments during the 7 months of intervention. One reason that we did not use multiple measurements is that the effect of nutritional modifications on weight and lipid profile is slow and requires time so that a significant change in weight or other variables could be detected.

Nutrition education program

Five sessions of education during 7 months were planned. During the first three months, sessions were held monthly. The fourth session was held during the fifth month and the last session was held in the seventh month, at the beginning of month. The measurements of lipid profile and weight were performed at the end of the seventh month (30 days after the last education session). The sessions included face to face consults and viewing educational movies and slides. Instructions on how to follow healthy dietary patterns were given to each individual. Furthermore, participants were provided with educational brochures which presented the different food groups, types of different fats and required proportions of each food group for each age group. Instructions to reduce the fat intake by proper food cooking methods were also given to each participant in brochures and hand-outs. Different healthy food menus were also introduced in the brochures. To increase the efficacy of each education

session, the meaning and concept of terminology which were related to nutrition education were explained to each participant in the intervention group. The nutrition education program included instructions which emphasized lower intake of high-fat intake foods and dairy products, lower intake of fried foods, desserts and fast foods. These instructions also insisted on higher intake of vegetables and fruits and having fiber-rich diets.

Anthropometric and clinical measurements

Anthropometric measurements included measurement of body weight, height and waist circumference. Weight was measured by wheelchair scales designed for patients with SCI with accuracy of 100 gr (SECA digital scale; Seca, Hamburg, Germany). Participants wore minimal clothes and no shoes when measuring the weight. The height of each patient was measured in standard lying supine position while wearing no shoes (with accuracy of 0.5 cm). Body mass index (BMI) was calculated as body weight (in kilograms) divided by height (in meters squared). The smallest circumference between the lowest rib and iliac spine was considered as the waist circumference. Waist circumferences were measured by flexible meter scales with accuracy of 0.1 cm. Injury level was determined by clinical examination by an expert neurosurgeon and was confirmed by magnetic resonance imaging (MRI).

Assessment of serum lipid profile

Serum lipid profile and fasting plasma glucose (FPG) were measured at beginning of the trial and then in the seventh months of trial. Anticubital venous blood samples were taken from each patient and were centrifuged at 3000 rpm for 10 minutes at 4°C. Plasma concentration of triglyceride (TG), total cholesterol (TC), high-density lipoprotein cholesterol (HDL-C), low-density lipoprotein cholesterol (LDL-C) and FPG were measured using specific kit manufactured by Pars Azmon Company after 14 hours of fasting.

Estimation of physical activity

Physical activity was estimated according to the following three defined categories:

Physical activity with mild intensity: activities which require trivial movements. These activities require minimum energy and one can continue doing these activities for a long time without fatigue. Heart and respiratory rates are not increased. Patients may experience relaxation or trivial increased body temperature. Patients do not experience any perspiration by mild physical activity.

Physical activity with moderate intensity: activities which require moderate physical movement and can be performed for a while without feeling of fatigue. Heart and respiratory rates are moderately increased and patients experience increased body temperature with minimal sweating.

Physical activity with severe intensity: activities which require maximum energy and cannot be performed for a long time without fatigue. Heart and respiratory rates are noticeably increased. Patients experience pressure with severe increased body temperature and severe sweating. These activities cause fatigue rapidly.

The minutes in each physical activity intensity level was estimated by patients' recall during the past 7 days. Since it has been shown that physical activity may affect lipid profile,^{12,16} duration of physical activity in each intensity level was considered as a confounder. Therefore, the effect of nutrition education program on lipid profile was statistically assessed with adjustment for physical activity.

Statistical analysis

All statistical analysis was performed using SPSS ver. 21 software (IBM Corp., Armonk, NY, USA). The χ^2 test (Fisher's exact test) was used to compare categorical

variables in univariate analysis. Categorical data are reported using percentages and continuous quantitative values are reported by mean $\pm$ standard deviation (SD). Two-way repeated measure analysis of variance (ANOVA) was used to assess the efficacy of nutrition education program on lipid profile, weight and waist circumference. $P < 0.05$ was considered as statistically significant.

Results

A total of 57 patients (27 in control group and 30 in education group) participated in this investigation. The majority of participants were men (78.9%, n: 45). In both groups, most patients were married (59.3% and 73.3% in control and intervention group, respectively). Table 1 demonstrates the baseline characteristics of participants in education and control groups. There was no significant difference in baseline variables including sex, marital status, employment and anthropometric measures between the two groups (Table 1). Most patients in the control group were unemployed (51.9%, n: 14) but the majority of participants in intervention group mentioned having employment (53.3%, n: 16). However, the χ^2 test showed no significant difference regarding employment between the two groups (P :

Table 1 Baseline characteristic of the participants in the intervention and control groups.

Variable	Subgroup	Education group		Control Group		P-value
		Mean (SD)	Frequency (Percentage)	Mean (SD)	Frequency (Percentage)	
Sex	Men	-	25 (83.3)	-	20 (74.1)	0.30*
	Women	-	5 (16.7)	-	7 (25.9)	
Marital Status	Single	-	7 (23.3)	-	8 (29.6)	0.41*
	Married	-	22 (73.3)	-	16 (59.3)	
	Divorced	-	1 (3.3)	-	1 (3.7)	
	Widow	-	0 (0.0)	-	2 (7.4)	
Employment	Employed	-	16 (53.3)	-	11 (40.7)	0.63*
	Unemployed	-	12 (40.0)	-	14 (51.9)	
	Retired	-	2 (6.7)	-	2 (7.4)	
Physiotherapy session	None	-	23 (76.7)	-	22 (81.5)	0.75*
	Once per month	-	1 (3.3)	-	0 (0.0)	
	Once per week	-	2 (6.7)	-	1 (3.7)	
	≥ 2 per week	-	4 (13.3)	-	4 (14.8)	
Weight (kg)	-	82.41 (16.90)	-	80.44 (14.99)	-	0.64**
Height (Cm)	-	173.52 (8.79)	-	169.04 (10.37)	-	0.10**
Waist Circumflex (Cm)	-	104.73 (13.98)	-	104.38 (13.48)	-	0.92**
Body mass Index (kg/m ²)	-	27.39 (4.88)	-	28.05 (5.44)	-	0.71**
Injury Level	Cervical	-	3 (10.0)	-	6 (22.2)	0.33*
	Thoracic	-	24 (80.0)	-	17 (63.0)	
	Lumbar	-	3 (10.0)	-	4 (14.8)	
Physical activity (minutes per day)	Mild	101.67(100.22)	-	138.15 (130.89)	-	0.27*
	Moderate	57.67 (56.09)	-	22.78 (20.36)	-	0.30*
	Severe	3.19 (3.08)	-	11.12 (10.90)	-	0.47*

*P-values stand for χ^2 test.

**P-values stand for comparison of means with One-way Analysis of Variance (ANOVA).

Table 2 The lipid profile of the participants at the baseline and after 7 months of the trial in education and control groups.

Variable	Baseline		After 7 months		Mean Difference	
	Education group	Control group	Education group	Control group	Education group	Control group
TC (mg/dl)	186.01 (36.48)	179.69 (38.37)	195.24 (41.88)	178.68 (39.54)	6.88	-0.18
TG (mg/dl)	179.60 (107.67)	151.96 (74.80)	189.12 (96.90)	153.40 (80.65)	0.32	-2.28
LDL-C (mg/dl)	118.20 (31.86)	110.59 (33.52)	127.24 (35.88)	111.31 (31.84)	8.28	2.09
HDL-C (mg/dl)	32.67 (6.55)	36.95 (11.95)	34.04 (6.61)	40.27 (13.12)	1.48	4.01
VLDL-C (mg/dl)	34.46 (18.34)	30.81 (17.66)	35.16 (14.49)	30.00 (16.23)	5.54	1.80
LDL-C/HDL-C ratio	3.68 (0.96)	3.08 (0.86)	3.85 (1.61)	3.90 (0.83)	0.12	0.08
Weight (kg)	82.41 (16.90)	80.44 (14.99)	79.68 (16.09)	81.08 (14.46)	-0.68	0.08
Waist Circumflex (cm)	104.73 (13.98)	104.38 (13.48)	102.08 (11.21)	105.95 (13.54)	-1.33	0.95
Body Mass Index (kg/m ²)	27.39 (4.88)	28.05 (5.44)	26.56 (4.36)	28.22 (5.41)	-0.34	0.07

HDL-C, High-density lipoprotein cholesterol; LDL-C, Low density lipoprotein cholesterol; TC, Total cholesterol; TG, Triglyceride; VLDL-C, Very low density lipoprotein cholesterol.

0.63). The most common injury level in the control group was injury at thoracic sections (63.0%, n: 17). Similarly, the majority of participants in the intervention group were injured at thoracic levels (80.0%, n: 24). The mean weight was not significantly different between intervention and control groups (82.41 ± 16.90 and 80.44 ± 14.99 kg in the intervention and control groups, respectively; $P: 0.64$). Other anthropometric measures including height and waist circumflex were not also different between the two groups (0.13 and 0.91, respectively). Most patients in the control group were not receiving any physiotherapy sessions (81.5%, n: 22). Similarly, 76.7% of participants in the intervention group were not receiving any physiotherapy sessions.

Since physical activity can affect lipid profile,^{12,16} we estimated the performed physical activities by each individual in three intensity levels of mild, moderate and severe. Physical activity was not significantly different between intervention and control groups at the baseline in all three intensity levels ($P: 0.27, 0.30$ and 0.47 for mild, moderate and severe activities, respectively).

Values of lipid profile at the baseline and at the end of the trial have been shown in Table 2. Two way repeated measure ANOVA showed that the intervention had no significant effect on the values of TG, TC, HDL and LDL. The results of two-way repeated measure ANOVA has been shown in table 3. Test of within subjects contrast showed no influence of education on the level of LDL ($F(1,18): 2.156, P: 0.159$), TC ($F(1, 18): 1.585, P: 0.224$), TG ($F(1, 17): 2.036, P: 0.172$) and HDL ($F(1, 18): 2.84, P: 0.081$). Weight was also not significantly affected by nutrition education program ($F(1, 19): 0.001, P: 0.970$). Total cholesterol levels were 186.01 ± 36.48 mg/dl and 195.24 ± 41.88 mg/dl in the education group at the beginning of the trial and after 7 months, respectively. In the control group, TC levels were 179.69 ± 38.37 mg/dl and 178.68 ± 39.54 mg/dl at the beginning and end of the trial,

respectively. Our analysis showed that the changes in total cholesterol level were not statistically different between intervention and control groups ($P: 0.224$). Similarly, nutrition education program showed no significant effect on the levels of TG, LDL-C and HDL-C ($P: 0.172, 107$ and 0.081 , respectively).

There was no significant difference in the anthropometric measurements including weight, height, waist circumflex and BMI between education and control groups at the beginning of the trial ($P: 0.64, 0.10, 0.92$ and 0.71 , respectively). After 7 months of nutrition education program, no significant changes in weight and waist circumflex have been observed in the education group compared to control ($P: 0.970$ and 0.361 , respectively).

Discussion

The role of nutrition and diets in determining the body composition has been shown in numerous investigations.¹⁷⁻¹⁹ It has been demonstrated by Holmes and Kwiterovich that low-fat diets contribute to attain low levels of cholesterol and triglyceride in plasma which subsequently decrease cardiovascular risk.²⁰ A known method to prescribe low-fat diets is by nutrition education programs. However, the outcomes of education programs are dependent to patients' adherence to the prescribed diets. Differences in adherence to maintain a specific diet between various study populations may result in discrepancies between research studies. Here, we examined the effect of a seven-month nutrition education program on serum lipid profile in patients with SCI. Our outcome does not support any significant effect of nutrition education program on serum concentrations of TC, TG, LDL-C, HDL-C and VLDL-C. Previously, Liusuwan *et al.*²¹ investigated the effect of nutrition education and behavioral intervention on body composition and serum lipid in individuals with immobility due to spinal cord dysfunction. Outcomes of Liusuwan *et al.* study²¹ demonstrated insignificant

Table 3 The results of two-way repeated measure ANOVA in assessment of efficacy of education on lipid profile and weight in people with spinal cord injury.

Test		TG	TC	LDL-C	HDL-C	Weight	Waist circumference
Tests of within subject effects	Sphericity Assumed	P: 0.172	P: 0.224	P: 0.107	P: 0.081	P: .970	0.361
	Greenhaus-Geisser	P: 0.172	P: 0.224	P: 0.107	P: 0.081	P: .970	0.361
	Huynh-Feldt	P: 0.172	P: 0.224	P: 0.107	P: 0.081	P: .970	0.361
	Lower-Bound	P: 0.172	P: 0.224	P: 0.107	P: 0.081	P: .970	0.361
Tests of within subjects contrast	Education	F(1, 17): 2.036	F(1, 18): 1.585	F(1, 18): 2.156	F(1, 18): 2.84	F(1, 19): 0.001	F(1, 14): 0.893
	Time	P: 0.172	P: 0.224	P: 0.159	P: 0.081	P: .970	P: 0.361
		F(1, 17): 1.33	F(1, 18): 0.107	F(1, 18): 0.573	F(1, 18): 1.252	F(1, 19): 0.001	F(1, 14): 0.133
	Education*Time	P: 0.172	P: .747	P: 0.459	P: 0.278	P: 0.971	P: 0.721
		F(1, 17): 0.015	F(1, 18): 0.018	F(1, 18): 0.062	F(1, 18): 1.195	F(1, 19): 1.116	F(1, 14): 0.076
		P: 0.903	P: 0.894	P: 0.807	P: 0.664	P: 0.304	P: 0.786

HDL-C, High-density lipoprotein cholesterol; LDL-C, Low density lipoprotein cholesterol; TC, Total cholesterol; TG, Triglyceride.

influences of nutrition educations on body weight, BMI, serum LDL-C, HDL-C, TC and TG which is in line with our findings. Our study emphasize the fact that nutrition education can hardly affect body composition and serum lipids itself and therefore, more intensive programs which also include regular observations to maximize adherence to the diets should be considered when improvement of lipid profile is the clinical goal. Although a nutrition consult is the first step to shift life style toward favorable healthy styles to attain suitable anthropometric measures and serum lipid concentration, our study shows that nutrition education sessions have an insignificant effect on serum lipid profile and body weight in patients with SCI. The inadequate effect of nutrition education on weight reduction has been demonstrated in several studies so far. For instance, Rogerson *et al.*²² reported that undergraduate UK nutrition education may not effectively contribute to weight management. Consistent with Rogerson *et al.* study, our investigation also supports the idea that nutrition education alone may not be effective in reducing weight. It is recommended that nutrition education be applied in combination with other strategies including increasing physical activity and administration of proper medications to reduce body weight and also to attain the favorable lipid profile.

Previously, Carnie *et al.*²³ assessed the effect of adding nutrition education to an 'exercise at work' program on weight loss and showed that nutrition education has the potential to help to reduce weight during the first month three months but this beneficial effect is lost by 6 months. The findings of Carnie *et al.*²³ described the importance of special emphasis on increasing adherence to the program. Here, we compared the effect nutrition education program after 7 months of intervention. Although the education sessions were held monthly and participants in the education group were encouraged to follow the nutritional instruction in each session, still it seems that short-term assessments with shorter time intervals are required. On the other hand, there are also numerous investigations which support the beneficial effects of nutrition education on weight management. For instance, Silveira *et al.*²⁴ demonstrated in a systematic review that school-based nutrition education intervention reduces excessive weight gain in children and adolescents. One reason for the discrepancy between our findings and Silveira *et al.* study is the differences in study population. Silveira *et al.*²⁴ assessed the healthy population whereas we investigated subjects with SCI who are known to be immobile and have restricted physical activity. Furthermore, daily dealing with immobility

can cause some extent of frustration which itself may lead to decreased adherence in following diets in patients with SCI. As mentioned above, the adherence of patients to the diets plays the most important role in success of a nutrition education program. Differences of the adherence level between different population studies may cause such discrepancies. Weight control is an essential component of rehabilitation in patients with immobility. People with SCI are more susceptible to obesity and increased waist circumference²⁵ which increases the risk of cardiovascular diseases in these patients.²⁶ It has been recommended by Kim *et al.*⁹ that patients with SCI require specific and intensive weight control programs. Our study was unable to show a significant effect of nutrition education program on lipid profile and weight in people with SCI. It seems that combination interventions which also contain motivational programs to increase program adherence along with short time interval assessments are required. Further investigations are required to test the influence of combined interventions of nutrition educational and motivational programs on lipid profile and anthropometric measures in SCI.

Study limitations

The small sample size of the study is a major limitation which restricts the power of this clinical trial. It is still recommended that future studies with recruitment of larger sample size be performed to confirm the findings of this study. Moreover, the factors that affect complying with the nutrition programs are numerous. Many of patients with SCI have limited hand function that limits meal preparation. Furthermore, persons with SCI are substantially limited in mobility which may restrict the ability to shop to implement a nutritional plan. Moreover, many people with SCI are dependent to their caregivers for intake of daily meals. The role of the caregiver should also be considered when designing a nutritional plan. Due to existence of various factors precluding people with SCI complying with nutritional programs, it is recommended that future studies with consideration of these factors be designed to attain a more reliable outcomes on the effect of nutrition programs on weight and lipid profile. Another limitation for this study is that the physical activity was not assessed by standard instruments since none of the relevant questionnaires to measure physical activity in SCI have been validated in the Farsi language. Further investigations are required to validate these questionnaires to be used in Iranian population with SCI.

Conclusion

In this clinical trial, the effects of a 7-month nutrition education program on body weight, serum lipid profile and blood pressure in patients with SCI have been investigated. Our findings do not support a significant influence of nutrition education program on anthropometric measurements, lipid profile and blood pressure. It seems that the nutrition education program alone is not adequately effective to have beneficial influence on weight and lipid profile. Therefore, it is recommended that combination interventions which also contain physical exercises, proper medications and motivational programs to increase program adherence along with short time interval assessments be administered.

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Contributors None.

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Conflicts of interest None.

Ethics approval None.

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