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Review Article

Designing a Mediterranean-like Diet Plan to be Used for a Randomized Controlled Clinical Trial

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ABSTRACT

Objectives: To design a Mediterranean diet (MD) that can be utilized as an intervention in a randomized controlled trial. Methods: Dietary components were proposed for a Mediterranean menu and typical Pakistani diet. Three-day menu cycles were arranged utilizing the laid-out dietary components. Recipes were created and adjusted to meet the menu objectives at the 2000 calorie level. Using this basic meal plan of 2000, we further developed menu plans for other multiple menus to give a total of 2500, 3000, and 3500 kcal/day. Results: our results show that 100% of the grains in the Mediterranean meal plan are provided, while the typical Pakistan meal plan provided 10% of whole grain. Nutrient-empty and energy-dense desserts and cakes were included for the typical Pakistani meal plan on a daily basis, while these were represented at the least by a MD meal plan. To compare the overall health promotion characteristic, the mean HEI score for the three-day menu cycle was 92.5 and 30.4 for the MD and the typical Pakistani meal plans, respectively, showing the MD diet is more superior in terms of overall health-promotion compared to the other diet plan. Results from the 10 pilot subjects show good compliance of eating their diet in accordance to MD dietary regimen. Mean HEI determined for genuine member consumption (n = 10, 6 days each) was: 92.5% and 30.4%, respectively, for the MD and typical Pakistani diet regimen.

Key words: Dietary, Mediterranean Dietary, Macronutrients, Food, Vegetables.

Introduction

The Mediterranean dietary (MD) plan is an essentially plant-based eating plan. MD plan incorporates every-day intake of whole-grains and olive oil. Other natural products and vegetables are also essential part of an MD plan. In addition, beans, nuts, spices, and flavors make up an MD meal plan. Albeit the pyramid shape recommends the extent of food varieties to eat (e.g., eat more products of the soil and less dairy food varieties). It really depends on the person to choose precisely how much food to eat at every feast, as this will differ by active work and body size.[1]

Individual food sources and parts of the MedDiet (for example extra-virgin olive oil and nuts) have proven and factual medical advantages.[2] However as of late exceptional consideration has been given to the general blend of food varieties, communicated as a dietary example, that might be most unequivocally connected with wellbeing because of the added substance or synergistic impacts of the parts. Varieties of Mediterranean dietary examples have existed around the Mediterranean area with plant food varieties at the focal point of the plate and olive oil as the essential fat being steady parts. For instance, couscous, vegetables and green-leafy vegetables have been significant in North Africa; furthermore, pasta, polenta, rice or potatoes alongside vegetables have been unmistakable in southern Europe, among others. A central point of interest is whether the advantages of the MedDiet example can be summed up to populaces

outside the Mediterranean locale. In these populaces, the utilization of olive oil has as a rule been low, so this piece of the definition has normally been widened to incorporate other generally unsaturated plant oils, and the eating regimens have frequently called 'Mediterranean-type' dietary examples.

As a developing nation, Pakistan suffers from a variety of malnutrition issues, [3,4] particularly the university students.[5] Of particular interest, the growing population of university students suffer from malnutrition as well as academic stress and dietary inflammatory issues. Stress and dietary inflammatory issues in the university students if left unaddressed will give birth to multiple health problems in the practical life of these individuals. This is the best stage of life for any nutritional intervention as after finishing the university education, these individuals will start their professional life. Any improvement this brought about in this stage of life will be transformed in the practical life of a community as a whole.

Methods

The present study was an observational study design, and part of a longitudinal randomized-clinical trial (registration No. UMIN000052163. https://center6.umin.ac.jp: UMIN 2023. Effects of Nutritional Counselling on the Academic Stress, Inflammatory Biomarkers and Quality of Life in University Students: A Single Blinded Open Randomized Trail. https://center6.umin.ac.jp/cgi-open-bin/ctr_e/ctr_view.cgi?recptno=R000059533). The details of the clinical trial found online (UMIN, 2023), and also are provided in a separate paper of this journal. The main purpose of this study was to design a Mediterranean dietary plan (MD plan) that to be used as an intervention in our ongoing randomized clinical trial study.

Three-day menu cycles were planned using the established components. We put forth up dietary objectives to accomplish from the MD plan. The objectives depended on the U.S. 2010 healthy people. The particular dietary objectives are displayed in Table 1. The fat objective was given in grams each day, in light of pattern energy admission, and subjects identified grams of fat in the food varieties that they ate on the tracker. Diminishing fat intake brought about a little decline in complete fat intake by concentrate on members, and members consequently had the option to decrease all fat intake to under 30% of calories without extra guiding for keeping up with all fat intake to beneath 30% of calories. A food rundown of high salt

food varieties, that members ought to keep away from was given, however subjects were not approached to follow sodium consumption. The quantity of objectives was more prominent in the Mediterranean arm (Table 1). The 'fat' objective was to keep up with 30% of calories from fat while lessening PUFA and SFA intake by around half and 30%, individually, and expanding MUFA consumption by around half. Subjects in this gathering were approached to devour food varieties high in omega 3 unsaturated fats no less than two times every week. The 'entire grain' objective was equivalent to in the Smart dieting treatment arm. ' Leafy foods' objectives were for utilization of no less than 7-9 FDA servings each day, contingent upon energy consumption, and to incorporate culinary spices and allium vegetables, as displayed in Table 1. In view of these objectives, a MD would outfit the supplements objectives as displayed in Table 2.

Recipes were created and adjusted to meet menu objectives at the 2000 calorie level and corresponding additions of menus at the 2000 kcal level were utilized to lay out 2500, 3000, and 3500 kcal/day to take into consideration differing energy necessities of members. Meal plans were analyzed for their macro- and micro-nutrients composition using our lab-built nutrition composition database as extensively reported in our previous works [6-9] and others.[10] The two dietary plans were compared for differences in menu goals including macronutrients (% Calories), Omega 6: Omega 3, % Kcal saturated fat, Grains (servings/day), Fruit & Vegetables (servings/day), Nuts (servings/day), Fish (servings per week), Legumes (servings/day), Poultry (servings/day), Red & processed meats (servings/day), Sweets, pastries (servings/day), Sugar sweetened beverages (servings/day).

Results

Table 1 shows a comparison of the menu goals between the two diet plans. Table 2 shows a three-day menu cycle of the two dietary plans. Figure 1 shows the macronutrients composition of the two dietary plans. The average food group composition compared to goals is depicted in Figure 2. In general, the results of this pilot study show that 100% of whole grain foods are included in the Mediterranean diet, while none in the typical Pakistani diet. Sweets and pastries were included in the typical Pakistani diet daily but not the Mediterranean diet. Percent mean HEI score for the three-day menu cycle was 92.5 and 30.4 for the Mediterranean and typical Pakistani diet, respectively. Preliminary results from three participants fed both diets for 6 days.

Table 1: Menu Goals

Diet Components	Mediterranean	Pakistan
Macronutrients (% Calories)	45% CHO, 37%Fat, 18% Protein	60% CHO, 30%Fat, 10% Protein
Omega 6: Omega 3	4:1	13:1
% Kcal saturated fat	<8%	>20%
Grains (servings/day)	>1 (whole grain)	>1 (refined)
Fruit & Vegetables (servings/day)	3-4 veg 4 fruits	<2 veg <2 fruits
Nuts (servings/day)	1	0
Fish (servings per week)	3/6 days	0
Legumes (servings/day)	1	0
Poultry (servings/day)	Unlimited	unlimited
Red& processed meats (servings/day)	0	daily
Sweets, pastries (servings/day)	1/6	daily
Sugar sweetened beverages (servings/day)	0	daily

CHO=carbohydrates, Pro=Protein, kcal= Kcalories

Table 2: A 3-day Menu Cycle

		Day1	Day2	Day3
Mediterranean Dietary Plan	**B**	-Maize bread with olive oil -Green/Black Tea	-Whole wheat bread with olive oil -Green/Black Tea	Wheat and Maize mixed bread with olive oil - Milk -egg omelet
	L	-Bread from whole wheat grain -vegetables curry -green leafy salad -pickle of olive fruit -lassi -apple	-Vegetable Rice -Beans Curry -meat (mutton) -lassi -pear	-Cheese -legumes -poultry -lassi -onion/tomato/podina mixed salad
	D	-Rice -Fish grilled -tomato chitini -pear	-mixed vegetables curry -Whole grain wheat bread -yogurt -light Pudding with nuts -apple	-vegetables Biryani -Daal Haleem -yogurt -tomato Chitni -carrot
	S	-badam -apple -green tea	-pistacho -pear -green tea	-roasted black gram -green tean with lemon -bana
Typical Pakistani Dietary Plan	B	- Halwa poori -Black tea with milk	-Parata (fried with ghee) -Egg fried in ghee -Black tea with milk -Roghni Naan	-ghee Fried bread -Choly spicy saalan -Black tea with milk
	L	- Ground Beef Kebabs -Kabali Pulao -Achar -Wheat Bread -halwa meeta	- Chicken Karahi. - Chapli Kabab -Wheat Bread -Custard	-Chicken handi -Wheat Bread -achar -custard
	D	- Chicken Malai Tikka & Chicken Malai Boti. -wheat bread -Zarda	- Seekh kabab -Spicy Biryani -wheat bread	- Beef Korma -wheat bread -Kabali pulao
	S	-parata laden with ghee -black tea	-black tea -samosa	-black tea -pakora

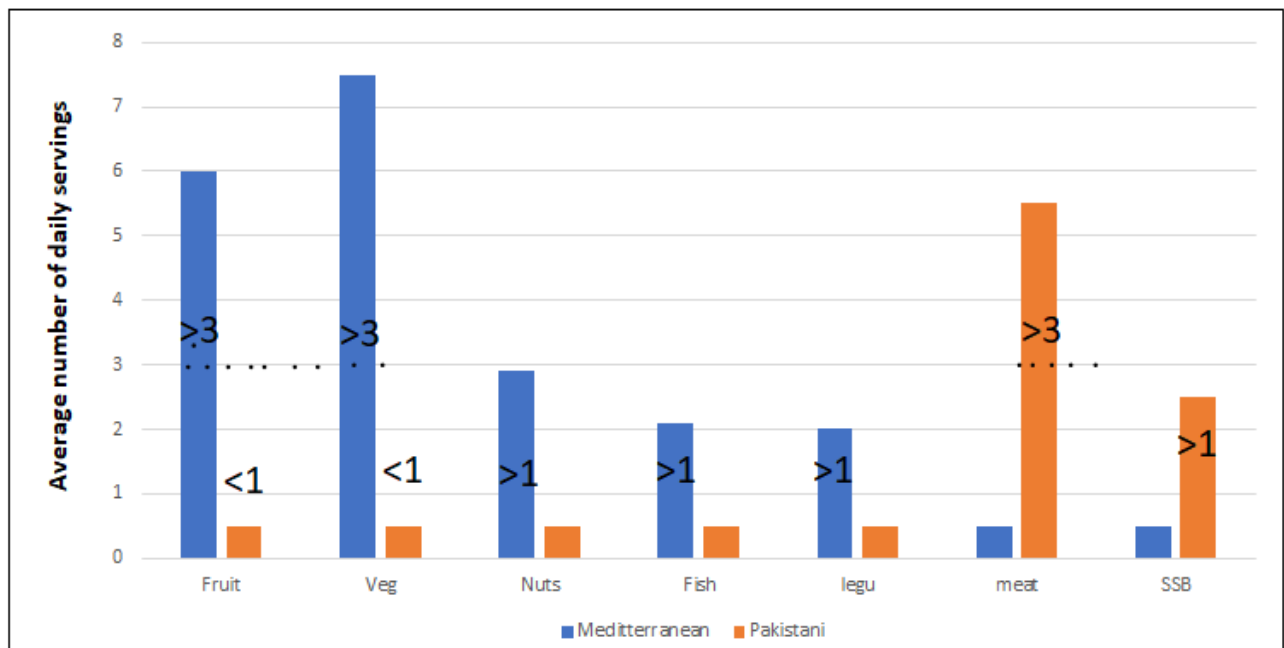**Fig. 1:** Macronutrients Composition of the two Dietary Plans

Fig. 2: The Average Food Group Composition Compared to Goals (adapted from Schweitzer et al., 2019): Diet component: Veg=vegetables; SSB=sugar-sweetened beverages; daily component servings=1/4 cup dry or 1/2 cup fruit; 1 cup leafy, ½ cup vegetables; ½ ounce nuts, 1 ounce fish, ½ cup legumes, 1 ounce of red or processed meat, 8 fluid ounces of sugar-sweetened-beverages

Discussion

Pakistan is a non-industrial nation and malnutrition is a general medical problem of central concern. [6,9,11] We have recently reported the ailing health and its related issues in our studies.[5,6,9] In the current pilot study, we planned a dietary pattern for our ongoing study on university students. The dietary pattern depends on the Mediterranean dietary (MD) routine, which all around the world is viewed as a sound eating regimen plan. Our principal objective was to plan a MD plan for our subjects and to contrast this MD plan with a regular Pakistani dietary intend to see the distinctions regarding wellbeing and prosperity utilizing

laid out boundaries. In the current review, the MD had a 10-overlap higher proportion of omega-6: omega-3 fat than normal Pakistani eating routine. This proportion is significant from various medical problems additionally including anxiety and stress.[12] A three-day menu cycle was arranged and met objectives for a calming taking care of concentrate as detailed beforehand.[13] Agreeableness of food varieties in the Mediterranean eating regimen might influence diet consistence in the people who regularly eat commonplace Pakistani eating routine. Every one of the 10 members consumed inside 5% of the arranged eating regimen except for two members, who, during the Mediterranean eating routine cycle, consumed 75%. Mean HEI determined

for real member consumption (n=10, 6 days each) was: 92.5 MD plan and 30.4 regular Pakistani eating regimen. These findings are in close concurrence with discoveries as revealed beforehand.[13] The future studies need more innovative techniques to adopt for better management of nutrition problems in Pakistan.[14]

Conclusion

The Md plan designed in the present study was healthier as compared to a typical Pakistani dietary plan and proved to be feasible for adaptation as shown by high compliance by the study subjects.

Declaration

There is no conflict of Interest/Competing Interests among authors.

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Supplementary Table 1: Dietary Goals for an MD plan

Nutrient	Target	Minimum	Maximum
Energy (Kcal)	2000	-	-
Carbohydrates (Total) (g)	268.3	130	317.1
Dietary Fiber (g)	24.39	-	-
Fat (Total) (g)	56.82	45.45	79.55
N-6, Linoleic Acid (g)	4.545	4.545	22.73
N-3, Total (Incl. ALA) (g)	1.976	0.909	4.545
N-3, (EPA & DHA) (g)	1.976	0.25	4.545
Protein (g)	97.56	48.78	170.7
Histidine (g)	1.756	0.878	-
Isoleucine (g)	2.439	1.22	-
Leucine (g)	5.366	2.683	-
Lysine (g)	4.976	2.488	-
Methionine & Cysteine (g)	2.439	1.22	-
Phenylalanine & Tyrosine (g)	4.585	2.293	-
Threonine (g)	2.634	1.317	-
Tryptophan (g)	0.683	0.341	-
Valine (g)	3.122	1.561	-

Nutrient	Target	Minimum	Maximum
Vitamin A(μg)	-	700	3000
Thiamin (B1)	-	1.1	-
Riboflavin (B2)	-	1.1	-
Niacin (B3)	-	14	35
Pantothenic acid (B5)	-	5	-
Vitamin B6	-	1.3	100
Biotin (B7) (μg)	-	30	-
Folate (B9) (μg)	-	400	1000
Cyanocobalamin	-	2.4	-
Choline(mg)	-	425	3500
Vitamin C(mg)	-	75	2000
Vitamin D(IU)	-	600	4000
Vitamin E(mg)	-	15	1000
Vitamin K(μg)	-	90	-

Nutrient	Target	Minimum	Maximum
Calcium(mg)	-	1000	2500
Chromium(mg)	-	25	-
Copper(mg)	-	0.9	10
Fluoride(μg)	-	3000	10000
Iodine(μg)	-	150	1100
Iron(mg)	-	18	45
Magnesium(mg)	-	320	-
Manganese(mg)	-	1.8	11
Molybdenum(μg)	-	45	2000
Phosphorus(mg)	-	700	4000
Selenium(μg)	-	55	400
Zinc(mg)	-	8	40
Potassium(mg)	-	4700	-
Sodium(mg)	-	1500	2300

Supplementary Table 2: Nutrients Goals for an MD plan

1	Food high in MUFA	7 to10 exchanges/day (5 g/exchange)
2	Vegetables/Allum	use liberally at least once a day
3	Dark green culinary herbs	one serving/day, 1 TB fresh or 1 tsp. dried
4	Vegetable/Dark Green	one to two servings/day
5	Fruit	one serving/day Vitamin C Fruit and one serving/day Other Fruit
6	Foods high in omega-3 food	twice a week, 3 ounce serving size (with limits on fish with higher mercury)
7	Orange and yellow vegetable	one to two servings/day
8	Other vegetable	one to two servings/day
9	Red vegetable	one to two servings/day
10	Whole grains, at least 3 servings/d	at least three servings/day