

The impact of a nutrition teaching course on dietary practices among Yerevan State Medical University students

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According to the study conducted by the United Nations World Food Program, a large number of households in Armenia have not been observed to eat a diverse diet and inadequate education has been identified as one of the major causes of poor nutrition [1]. Recently, there has been an increasing concern among health professionals regarding the rise of morbidity of diseases, such as diabetes, hypertension, coronary artery disease, and other functional disabilities due to harmful eating habits developed early in college years [2,3]. Furthermore, the analyses of morbidity data regarding blood circulation diseases and neoplasms show increasing trends from 1997 to 2002 in Armenia [4].

The nutritional issues of Armenian adolescents and young adults, who mainly acquire their knowledge while studying at higher educational institutions, have rarely been investigated. Even of greater importance is the need for assessment of medical students' dietary habits and concerns as indicators of appropriate alteration of dietary patterns due to nutritional knowledge they obtain during medical course. It is expected that healthy practices adopted early in their life do not only improve their health and physical fitness at younger age, but also enhance psychological readiness to participate in creation of environment of healthy behavior in their future practice of medical workers [5].

Classroom tests measure nutrition knowledge, but the practical application of nutrition knowledge is not as measurable. Ideally, increased nutrition knowledge allows students to apply information and to make healthful dietary alterations [3]. In this study a pretest/posttest procedure was used to examine changes in dietary practices of students after a term of studying basic nutrition classes, the latter integrated in general hygiene course offered at a Yerevan state medical university (YSMU).

Materials and Methods

Given the objectives of the study, also time, human and financial resources limitation this study utilized a

nonequivalent control group design [6]. The prescribed full course of nutrition is offered (as a part of general hygiene course) during the second term of study to the third year general medicine students. Based on this, the inclusion criterion for the intervention group was defined: general medicine students studying during the second term of third year at YSMU. Furthermore, to provide greater comparability in terms of medical curricula a comparison group was chosen to be general medicine students studying during the second term of the second year at YSMU. A pretest, which aimed to assess the dietary habits of medical students, was conducted in both groups before the beginning of the full basic nutrition course. The pretest was conducted during the first week of March 2003. The posttest was conducted six months after the start of the program during the second and third weeks of September. The number of participants using Fisher's Z transformation of correlation coefficients for $\alpha = 0.05$ and $1-\beta = 0.80$ is approximately 112 in each group [7]. Since the method of data collection of the study required completion of a self-administered questionnaire during the class time, the attendance rate and dropout rate on the posttest were taken into consideration. A dropout rate of 15 % was hypothesized [8].

The students both in intervention and comparison groups are clustered in classroom units in which their small group classes are held at YSMU. These classroom units include 10-15 students. The list of distinguishing numbers of classroom units has formed the sampling frame of the study. Twelve classroom units from intervention and 13 classroom units from comparison group have been chosen using simple random sampling. The appropriate procedures were performed using the Statistical Package for the Social Sciences version 11.0 (SPSS 11.0) for Windows. From the selected classroom units 140 intervention-group students and 139 comparison-group students participated at the pretest. On average 91 % of the eligible general medicine students participated at the pretest. The response rate was similar in both groups. The reasons for non-response were: unable to contact/absent (8% on average) and refused to participate for whatever

reason (1% on average). Of the completed 279 questionnaires three were excluded (one from intervention group and two from comparison group) because more than 25% of values were missing. Of the 279 participants initially enrolled at the pretest 228 (82 %) participated at the posttest six months later. On average coverage rates were enrolled at the pretest 228 (82 %) participated at the posttest six months later. On average coverage rates were similar in both groups. On the posttest the participants were difficult to contact, because shifts in composition of classroom units had occurred. These shifts are common when moving from one academic year to another. Moreover, non-response at posttest was also attributable to usual absentee status. No single student who was involved at pretest refused to participate in posttest when contacted. Furthermore, students who were lost to follow up were not statistically different from the initial cohort on all variables.

The pre- and post-surveys were conducted using a self-administered questionnaire which included semi-quantitative food frequency questionnaire (FFQ) adapted from 1980 Nurses' Health Study Dietary Questionnaire [7] and Blocks FFQ [9]. The questionnaire was translated into Armenian, revised by an independent translator. Pilot testing of the questionnaires was conducted in the beginning of February 2003. The adapted FFQ had two main components: (a) a list of food and (b) a set of frequency-of-use response categories. The list of food contained food products more specific for Armenian population and was focused on groups of food. Groups of food included several food items: dairy food – 10 items, fruit – 14 items, vegetables – 13 items, meat group – 9 items, sweets – 6 items, baked goods and cereals – 5 items, miscellaneous – 9 items. Food groups and serving sizes were set to Food Guide Pyramid (FGP) definitions for each food category [10].

Evidence suggests that socioeconomic factors such as educational level, involvement in food preparation and socioeconomic status may be related to the dietary patterns [3]. Therefore, the questionnaire included questions on academic excellence, extent of involvement in food preparation and socioeconomic status. Demographics related questions obtained information on age of the participant, self-reported body weight and height, gender, and residency status.

The categorical data were coded before the entry: numerical codes were assigned to each of the answer categories. Data editing by range checking was performed to verify that only valid ranges of numbers are used in coding [11].

For the continuous data missing values (9 missing values at pretest) were replaced with the mean score of all other participants for that variable [12]. Data were entered using the SPSS, version 11.0. All the frequency-of-use categories for the food items were converted to a daily basis with 6 and more times daily = 6; 4-6 times daily = 5; 2-3 times daily = 2.5; once a day = 1; 5-6 times weekly =

0.8; 2-4 times weekly = 0.4; once a week 0.1; 1-3 times a month = 0.07 and almost never = 0. These daily frequencies were multiplied by the FGP serving sizes to provide total number of servings in each food category [13]. At pre- and posttests, the statistical significance of difference between groups for all study variables was assessed by independent sample *t* test for continuous variables, and Chi-square tests were performed for categorical variables [14].

The servings of food groups and separate food items treated in a continuous scale became the dependant variables for each study participant. For within-group comparisons, statistical significance was determined by paired samples *t* test on the posttest pretest difference [14]. All analyses were based on 114 participants in intervention and 114 participants in comparison groups, for whom complete data at pre and posttests are available. The questionnaire posed a little respondent burden, requiring on average 35 minutes to complete it. Questionnaires were completed during usual class time. The questionnaire did not include questions on sensitive aspects of students' behavior (smoking, alcohol drinking, drug abuse, etc). The objectives of the study and the voluntary nature of participation were explained to each participant and an oral informed consent was established each time. This study was approved by the departmental Institutional Review Board committee within the College of Health Sciences of the American University of Armenia in February 2003.

Results and their Discussion

The mean age of participants in intervention group was about 20.3 and 19.5 in comparison group, the difference being statistically significant. About 34% of comparison group and 43% of intervention group were male, but gender was independent of the group status. Furthermore, mean difference in body mass index (21.1 in comparison and 21.6 in intervention groups at pretest) between groups was not significantly different at pre- and posttests ($p > 0.97$). Furthermore, there was no difference between groups on following characteristics: residency in Yerevan, place of living (dormitory, home, rented home), academic achievement and measures of socioeconomic status (owning a car, having adequate money to buy food), as well as involvement in food preparation (Table 1).

The between-group comparisons of servings of FGP food groups performed using independent sampled *t* test revealed that mean servings of milk, vegetable, fruit group, bread, fats and sweets category did not vary significantly between intervention and comparison groups at pretest. However, statistically significant differences in mean servings for fruit group ($p < 0.033$), bread group ($p < 0.025$) and borderline significance for fats, sweets group ($p < 0.093$) were observed between intervention and

Socio-demographic, anthropometrical characteristics and food preparation habits of study participants by groups at the pretest

Variable	Comparison % (n)	Intervention % (n)
Age, mean (n)*	19.51 (114)	20.37 (114)
Body weight, kg (n)	60.4 (114)	62.5 (114)
Body height, cm (n)	168.6 (114)	169.3 (114)
BMI (weight/height ²)	21.1 (114)	21.6 (114)
Male	34.2 (39)	43 (49)
Female	65.8 (75)	57 (65)
City of permanent living:		
Yerevan	50.9 (58)	55.3 (63)
Other	49.1 (56)	44.7 (51)
Place of living:		
Dormitory	6.1 (7)	0.9 (1)
Home (rented)	17.5 (20)	15.8 (18)
Home	75.4 (86)	79.8 (91)
Other	0.9 (1)	3.5 (4)
Overall university performance:		
Excellent	15.8 (18)	22.8 (26)
Good	69.3 (79)	62.3 (71)
Poor	14.9 (17)	14.9 (17)
Family owns a car or uses it regularly	71.1 (81)	75.4 (86)
Have adequate money to buy food	86 (98)	92.1 (105)
Food preparation on their own:		
Always	13.2% (15)	5.3 (6)
Usually	19.3 (22)	17.5 (20)
Sometimes	32.5 (37)	35.1 (40)
Rarely	23.7 (27)	26.3 (30)
Never	11.4 (13)	15.8 (18)

P < 0.001 at pretest between intervention and control groups

control groups at posttest.

For within-group comparisons, statistical significance was determined and food group servings were analyzed by paired samples t test on the posttest pretest difference (Table 2). The results showed a statistically significant increase in consumption of vegetable group over six-month period in both intervention (3.5 servings) and comparison (4.2 servings) groups.

Moreover, a statistically significant increase in consumption of fruit group over six-month period in both intervention (1.4 servings) and comparison (2.8 servings) groups was reported. Furthermore, a borderline significance was recorded in increase of milk group servings in intervention (0.5 servings) and comparison (0.6 servings) groups. A decrease in consumption of meat group was recorded, although that was not statistically significant. Statistically significant decrease in consumption of bread group was reported in comparison group (0.7 servings). Most important, a statistically significant decrease was recorded in consumption of fats and sweets in intervention group (2.5 servings). A decrease in consumption of fats and sweets was recorded in comparison group (0.8 serv-

ings), though this was not statistically significant. Paired t tests were further performed on food items in this category to reveal items that constituted decrease in total fats and sweets group (Table 2). The results showed a statistically significant decrease in consumption of chocolate (0.9 servings), candy (0.4 servings), cake (0.3 servings) and butter (0.3 servings) in intervention group over six-month period. Furthermore, a statistically significant decrease in consumption of sugar was reported in intervention (0.7 servings) and comparison (0.9 servings) groups. This decrease in consumption of sugar in both groups correlated with the statistically significant decrease in consumption of tea ($p < 0.001$).

The results of this study indicate that the dietary habits of general medicine students changed significantly over the six-month period. The mean reported servings for the milk, fruit, vegetable and meat groups were fairly well compared to the FGP Recommendations. Mean reported intake of bread group servings, which are good sources of vitamin B [10] fell short of the FGP Recommendations in both study groups at pre- and posttests. Changes that were common for both groups were the increase in consumption of vegetable, fruit and milk groups. The research suggests that the seasonal variations in terms of available food items may account for this change [15]. Moreover, this study show a significant decrease in consumption of sugar in both study groups. This decrease correlates with the decrease in tea consumption, which might be explained by a transition to hotter season. Significant dietary alterations, unique for the intervention group were: decrease in consumption of butter, chocolate, candy and cake over the six-month period. In fact, these changes might be one of the easier changes for the medical student population. The obtained data show that the study participants consume less bread group servings than what the FGP Recommendations are. Furthermore, the comparison group lowers its bread group servings over the six-month period. This might be explained by the fact that the increased energy intake from added milk group, fruit and vegetable group servings should be compensated by the decrease in consumption of bread group to finally balance the energy expenditures [16]. This assumption was approved by the results of the study that showed no significant change in BMI over the six-month period. However, this compensation is not healthful for an individual, since the bread group servings fell short of the FGP Recommendations early at the pretest. In contrary, compensatory decrease in energy intake is constituted by more healthful alterations (decrease in consumption of sugars and fats) in intervention group.

This study has several limitations. In particular, the study participants were chosen from only general medicine students which might not be representative of the whole medical student population at YSMU. Given time, financial and human resources limitations this

Consumption of food groups and food items by sample groups

Food groups and food items	Comparison Group FGP Servings Mean \pm SE m (N = 114)		Intervention Group FGP Servings Mean \pm SE m (N = 114)	
	Pretest	Posttest	Pretest	Posttest
Milk, yogurt and cheese group*	3.82 \pm 0.27	4.42 \pm 0.27	3.56 \pm 0.25	4.08 \pm 0.25
Vegetable group †	3.87 \pm 0.38	8.09 \pm 0.53	3.71 \pm 0.34	7.22 \pm 0.47
Fruit group ‡	8.08 \pm 0.72	10.87 \pm 0.89	7.22 \pm 0.66	8.58 \pm 0.56
Meat, poultry, fish, dry beans, eggs and nuts group	3.99 \pm 0.35	3.80 \pm 0.31	3.96 \pm 0.37	3.32 \pm 0.29
Bread, cereal, rice and pasta group §	4.61 \pm 0.28	3.89 \pm 0.28	4.92 \pm 0.27	4.8 \pm 0.29
Fats, oils and sweets group	7.91 \pm 0.57	7.10 \pm 0.56	8.46 \pm 0.51	5.97 \pm 0.34
Butter ¶	0.84 \pm 0.12	0.67 \pm 0.09	0.89 \pm 0.12	0.63 \pm 0.09
Chocolate ¶	1.89 \pm 0.19	1.69 \pm 0.18	1.99 \pm 0.18	1.09 \pm 0.13
Candy ¶	1.11 \pm 0.16	1.32 \pm 0.17	1.07 \pm 0.14	0.72 \pm 0.09
Cake ¶	0.87 \pm 0.11	0.74 \pm 0.11	0.75 \pm 0.11	0.44 \pm 0.05
Sugar †	2.70 \pm 0.19	1.79 \pm 0.17	3.02 \pm 0.21	2.32 \pm 0.19

Borderline statistical significance in both groups between pretest and posttest

† P < 0.0001 in both groups between pretest and posttest

‡ P < 0.05 in both groups between pretest and posttest

§ P < 0.05 in comparison group between pretest and posttest

|| P < 0.0001 in intervention group between pretest and posttest

¶ P < 0.05 in intervention group between pretest and posttest

study utilized non-equivalent control group design, which has several threats to internal and external validity [6]. In particular, pre-and posttest difference in intervention group might be explained by interaction of specific events occurring between pre and posttests, processes within the study participants taking place naturally and specific selection differences that distinguish selected groups [6]. However, questionnaires were administered during usual classes, which decreased the possibility of interaction of selection and testing effect. The nutrition course has been taught by means of general lectures and small group classes. Therefore, the results of the study should be cautiously interpreted, considering the possibility of bias resulting from different exposure to knowledge in small group classes. The choice of an appropriate control from medical students though desired to provide comparable controls in terms of common basic disciplines, but the access to medical literature/knowledge may account for the large part of observed differences in pre and posttests in comparison group. However, the effectiveness of the control group and its similarity to intervention group was well approved by the baseline characteristics. Due to scarce financial, time and human resources it was not possible to obtain a bigger sample size, resulting in non-significant associations. Issues of validity and reliability

of instruments are important concerns in any study. Though the adapted questionnaire was pilot tested but its initial validity and reliability are not assured. Moreover, only forward translation was performed so the equivalences to the original English may not have been met.

The coverage rate on posttest was within the range of accepted values. Moreover, intervention and control group coverage rates were well comparable, which means that comparison of groups was not influenced by losses to follow up.

The nutritional course can be made more effective based on dietary practices of general medicine students. Appropriate healthful food choices for student cafeterias can be planned based on the revealed drawbacks. Planning for other types of university education can utilize responses from the nutrition course to approximate general student dietary practices. More research is needed to observe the environmental and behavioral factors that will further enhance health promotion efforts.

It is recommended that the donor agencies and NGOs coordinate their efforts to implement a countrywide educational campaign with broad involvement of mass media that targets mostly the youth and aims to improve their knowledge about the role of diet.

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Մենդային դասընթացի ազդեցությունը Երեւանի պետական բժշկական համալսարանի ուսանողների սնման սովորությունների վրա

Ա.Վ. Արեւյան

Հետազոտության նպատակն է եղել գնահատել Երեւանի պետական բժշկական համալսարանի ուսանողներին դասավանդվող սննդային դասընթացի ազդեցությունը նրանց սնման սովորությունների վրա:

Հետազոտությունը կատարվեց ոչ համարժեք ստուգիչ խմբի մոդելով: Որոշվեց ընտրանքի չափը՝ երկու խմբերի միջև տարբերությունների գնահատման բանաձևի օգնությամբ: Մասնակցի կողմից լրացվող հարցաթերթիկը պարունակում էր տվյալներ նրա սնման սովորությունների և սոցիալ-ժողովրդագրական ցուցանիշների վերաբերյալ: Պոստ-թեստը անցկացվեց պրե-թեստից 6 ամիս անց: Ընդհանուր առմամբ 114 ուսանող միջամտության ու նույնքան էլ ստուգիչ խմբից մասնակցեցին պրե- և պոստ-թեստերին: Անկախ t և Chi-քառակուսային թեստերը օգտագործվեցին միջխմբային, իսկ զույգ t թեստը՝

ներխմբային տարբերությունների վերլուծման համար:

Քաղցրավենիքների ու կարագի օգտագործման քանակի վիճակագրորեն հավաստի նվազում արձանագրվեց միայն միջամտության խմբում: Երկու խմբերում էլ մրգերի և բանջարեղենների խմբի օգտագործման քանակության աճ արձանագրվեց:

Ճարպերի և ածխաջրատների օգտագործման նվազումը միջամտության խմբում թույլ է տալիս ենթադրել, որ դա այս պոպուլյացիայի առավել հեշտ փոփոխության ենթարկվող սնման սովորություններից է:

Ամերիկեցիները և անցկացնել սնման սովորությունների փոփոխության պատճառագիտության մեջ ներգրավված միջավայրային ու վարքագծային գործոնների հետազոտությունը հետազոտություն՝ նպատակ ունենալով բարձրացնել դասավանդման արդյունավետությունը:

Влияние курса обучения питания на привычки питания студентов Ереванского государственного медицинского университета

А.В. Абеян

Целью исследования явилось изучение воздействия курса обучения питания на привычки питания студентов Ереванского государственного медицинского университета.

В исследовании использовалась модель неэквивалентной группы контроля. Был рассчитан размер выборки, используя формулу для вычисления разницы между двумя группами. Группы были выбраны методом случайной выборки. Исследование проводилось анкетно-опросным методом по специально разработанной для этой цели индивидуально заполняемой опросной анкете, отражающей набор потребляемых пищевых продуктов и социально-демографические показатели. Студенты из группы исследования и контрольной группы заполнили анкету во время пред- и пост-тестов. Пост-тест проводился спустя шесть месяцев после пред-теста. Независимые t тест и Chi-квадрат использовались

для определения межгрупповых различий, а t тест парных образцов – для определения различий внутри исследуемых групп.

Было выявлено статистически достоверное уменьшение в потреблении шоколада, леденцов, пирогов и масла у студентов в исследуемой группе. В обеих группах было зарегистрировано статистически достоверное увеличение потребления фруктов и овощей (согласно определениям Пирамиды Принципов Питания).

Результаты исследования показали, что курс обучения питания может корректировать привычки питания. Предлагается проводить исследования по дальнейшей оценке поведенческих факторов и факторов окружающей среды, влияющих на привычки питания, с целью повышения эффективности обучения.

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