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The effect of educational intervention on health-promoting lifestyle: Intervention mapping approach

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Abstract:

BACKGROUND: The health-promoting lifestyle by empowering individuals will increase control over their health, improve quality of life, and prevent diseases. The purpose of the present study was to determine the effect of the educational intervention based on the intervention mapping approach on health-promoting lifestyle in Iranian college students.

METHODS: This study is a quasi-experimental control study that was conducted in two groups of 65 students of Iran University of Medical Sciences in 2018–2019. The data were collected using the Health-Promoting Lifestyle Standard Profile II questionnaire and a researcher-made questionnaire based on the mapping approach, whose validity and reliability were confirmed. The educational intervention was designed according to the pretest results, including five training sessions and performed for the intervention group. The two groups were evaluated with the same questionnaires 1 month and 3 months later, and the data were analyzed using independent *t*-test, Spearman, ANCOVA, ANOVA test, and covariance.

Results: Before the intervention, no significant difference was observed between the mean scores of health-promoting behaviors in the two groups, but after the intervention, the mean scores of attitude, subjective norms, enabling factors, and perceived self-efficacy and mean scores of health-promoting lifestyle and its dimensions increased significantly in the intervention group ($P < 0.001$) compared to the control group.

Conclusion: The educational intervention is effective in improving behaviors related to health-promoting lifestyle and its dimensions. Therefore, performing educational interventions are suggested to adopt and adhere to behaviors related to health-promoting lifestyle by utilizing and reinforcing perceived self-efficacy, subjective norms, enabling factors, and attitudinal change.

Keywords:

Health, healthy lifestyle, intervention, students

Introduction

Health is an important achievement in today's human life that individuals seek to improve their quality of life and avoid chronic diseases and premature death.^[1] The individuals' lifestyles and choices are essential to be healthy and enhance life.^[2,3] The reason for the importance of lifestyle in health is the change in the nature of diseases from

contagious to noncontagious and chronic. With the changes in individuals' lifestyle and culture, infectious diseases reduced and replaced chronic diseases. The chronic diseases, especially cardiovascular diseases, cancers, diabetes, obesity, and etc. are often caused by unhealthy living conditions, and hence, the origin of these diseases, i.e., the lifestyle and behavior of humans is the main focus.^[4] According to the World Health Organization statistics, 60% of deaths in developing countries are

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due to unhealthy lifestyles, and by 2030, it is expected to reach 75% of global mortality.^[5]

However, many preventable chronic diseases are associated with lifestyle^[6,7] and if they are timely identified and changed, their dangerous consequences for health are prevented. In this regard, hypertension, tobacco, diabetes, physical activity deficiency, and obesity are the five leading causes of death in the world that can be reduced and controlled with lifestyle changes.^[6] Therefore, by changing individuals' lifestyle and replacing unhealthy lifestyles with healthy lifestyles, one can reduce the incidence and prevalence of many chronic diseases, resulting in death from these diseases.^[8]

An increase in costs of healthcare along with the fact that therapies are not always effective has led health professionals to support the concept of health promotion. Health promotion is defined as empowering individuals to identify the factors that affect individual-social health and making the right decisions in choosing healthy behaviors and thus observing healthy lifestyle.^[9] Health promoting lifestyle is a process that is consciously carried out by the individual for the purpose of promoting health and involves continuous behaviors that require daily activities.^[10] This lifestyle encompasses behaviors that empower individuals to increase control over their health and finally, the health of the individual and community.^[11] Health-promoting lifestyle reduces stressors, improves the quality of life, and has a significant effect on reducing health costs and increasing life expectancy.^[12] Health-promoting lifestyle has various dimensions, including interpersonal relationships, responsibility for health, spiritual growth and self-actualization, stress management, nutrition, and physical activity.^[13,14] The importance of these health-promoting behaviors and lifestyles is largely due to their effect on the quality of life and disease prevention^[15] and that promoting community health is one of the most important principles of community development.^[14]

One of the life periods that highlights the importance of lifestyle is student life. During this period, students experience many challenges, including changes in lifestyle, social environment, development of new social networks, autonomy, and behavioral independence that can affect individuals' physical and mental health.^[16,17] In other words, young individuals are more prone to high-risk behaviors such as drug abuse, high-risk sexual behaviors, inactivity, stress, unhealthy eating habits, etc.^[18] Such unhealthy and inappropriate health behaviors will lead to many chronic diseases such as lung cancer, cardiovascular diseases, gastric ulcer disease, etc.^[9,19] Studies conducted on the health-promoting lifestyle of students in Iran and the world show that they are not under a good condition^[9,14,16,20,21] and experience

a range of inappropriate health behaviors, including unhealthy eating habits, physical inactivity, irregular sleep, unhealthy sexual behaviors, cigarette smoking, alcohol abuse, and etc.^[9,15,19]

Given that one of the objectives set by the World Health Organization by 2020 is to promote a healthy lifestyle^[5] and one of the key strategies for promoting health is to adopt a healthy lifestyle, design interventions to change the unhealthy lifestyle and promote the dimensions and behaviors associated with a health-promoting lifestyle are important. One of the approaches available for educational interventions in health promotion is the intervention mapping approach. This approach evaluated and intervenes on health-related problems with problem solving and ecological perspective.^[22] Students are a large part of the community and the social capital of that community. Studying the promotion of students' lifestyles, on the one hand, is effective in designing promotional interventions to promote healthy behaviors of these individuals. On the other hand, students with healthy lifestyles can become a role model for other people in society. The innovation of the present study is the use of a mapping approach in designing a lifestyle promotion intervention for the students under study, an approach that has not been used in research. Therefore, the present study. Therefore, the present study was conducted aimed to determine the effect of educational intervention based on the intervention mapping approach on health-promoting lifestyle in Iranian college students.

Methods

This study was a quasi-experimental interventional controlled study with a pretest-posttest design. The statistical population of the study consisted of students of Iran University of Medical Sciences during the academic years 2018–2019.

The sample size formula was used to determine the sample size based on comparing the means in the two independent groups with 95% confidence interval and 0.5% error. The sample size for each group was $n = 58.4$ and with about 12% for the sample drop, and the total number of samples in each group was $n = 65$. In this study, we used multistage random sampling method. First, a list of all faculties of Iran University was prepared, and two health schools were selected as the intervention group and the nursing school as the control group. The samples were randomly selected as the intervention and control groups are not from a dormitory.

The study inclusion criteria were no physical and mental disease based on the student's health record, nonfinal semester, and no transfer during the study. The study exclusion criteria included students from

another university visiting Iran University of Medical Sciences, physical and mental diseases, lack of consent to continue participation in the study, and incomplete questionnaires.

Data collection tools included Health-Promoting Lifestyle Profile II questionnaire by Walker *et al.* (1987) and a researcher-made questionnaire: Standard Health-Promoting Lifestyle Questionnaire has 6 dimensions of spiritual growth (11 items), health responsibility (13 items), interpersonal relationships (7 items), stress management (6 items), physical activity (8 items), and nutrition (7 items). The validity and reliability of this tool have been confirmed by various studies.^[3,23]

The second questionnaire was designed based on a cross-sectional study and a need assessment based on the intervention mapping approach. The questionnaire had four dimensions of self-efficacy (27 items), attitude (25 items), subjective norms (30 items), and enabling factors (15 items). Each question had five options: Always (Score 5), Most times (Score 4), Sometimes (Score 3), Low (Score 2), and Not at all (Score 1). The content validity of the questionnaire was confirmed by a 12-member panel of health education and health promotion professionals with content validity ratio >0.56, and content validity index >0.79. The construct validity also had suitable fit indices for exploratory factor analysis (Comparative fit index (CFI) and Index Fit-Normed (NFI) >0.9 and Root mean square error of approximation (RMSEA) <0.07). Cronbach's alpha test and test-retest were used to determine the reliability of the questionnaire. So, the questionnaire was administered to a group of 15 students at two stages, 10 days apart. The results of the two tests were analyzed and the correlation coefficient obtained from the re-test for the researcher-made questionnaire for self-efficacy construct was 0.95, 0.92 for attitude construct, 0.97 for enabling factors construct, 0.97 for subjective norms construct and 0.94 for all questions. Cronbach's alpha was 0.70 for self-efficacy construct, 0.80 for attitude construct, 0.74 for subjective norms construct, 0.80 for enabling factor construct, and 0.76 for total questions. Furthermore, we considered demographic questions (age, gender, marital status, field of study, degree, residence status, employment status, type of employment, and economic status).

The samples were selected and entered the two intervention and control groups with the approval of the Ethics Committee of Iran University of Medical Sciences (IR.IUMS.REC.1395.9321108002) and coordination with the University authorities. After justifying the samples on how to carry out the project, the confidentiality of the information, the purpose of the project, and the written consent, the study was started. The demographic information were collected, and questionnaires

were completed and collected in both groups. Then, according to the initial results of the data analysis of the questionnaires, a training program was designed and implemented for the intervention group. All interventions related to lifestyle dimensions included enabling factors, self-efficacy, attitude, and subjective norms. The program consists of five training sessions for 45 min in $n = 25$ groups using methods of short lecture, group discussion, question and answer, role-playing and using training materials including instructional booklet, poster, pamphlet, progressive muscle relaxation training audio and software of a record of physical activity and nutrition. The questionnaires were again completed in two groups 1 month and 3 months later and the data obtained after the intervention were analyzed using the IBM SPSS version 22 (International Business Machines Corporation (IBM), New York, United States) using descriptive statistics and analytical statistical tests.

Results

A total of 130 students (two groups of $n = 65$) participated in this study. The intervention and control groups were homogeneous in terms of variables, as shown in Table 1, no statistically significant difference was found between the two groups.

The results of independent *t*-test showed that no significant difference was found between the two

Table 1: Comparison of demographic information of two intervention and control groups before the educational intervention

Variable	Intervention group, n (%)	Control group, n (%)	P ^a
Sex			
Male	33 (50.8)	31 (47.7)	0.73
Female	32 (49.2)	34 (52.3)	
Marital status			
Single	46 (52.3)	44 (67.7)	0.70
Married	19 (29.2)	21 (32.3)	
Educational level			
Bachelor	34 (52.3)	33 (50.8)	0.91
Master	17 (26.2)	16 (24.6)	
Ph.D	14 (21.5)	16 (24.6)	
Residency status			
Dormitory	35 (53.8)	34 (52.3)	0.86
Nondormitory	30 (46.2)	31 (47.7)	
Job status			
Employed	15 (23.1)	17 (26.2)	0.68
Unemployed	50 (76.9)	48 (73.8)	
Financial status			
Good	7 (10.8)	8 (12.3)	0.85
Average	45 (69.2)	42 (64.6)	
Bad	13 (20)	15 (23.1)	
Age, mean±SD	24.84±4.25	25.27±4.71	0.58 ^b

^aChi-Squared test, ^bIndependent *t*-test. P value significant at $P < 0.05$. SD=Standard deviation

groups in terms of mean scores of constructs of attitude, subjective norms, enabling factors, and perceived self-efficacy before the educational intervention, while the results of the analysis of covariance showed that by controlling the effect of pretest results, these differences were significant between the two groups 1 month and 3 months after the educational intervention [Table 2].

The results of the sphericity test showed that the assumption was not established for all constructs ($P < 0.05$), so Greenhouse test and the results of this test were used. Considering the insignificance of Greenhouse-Geisser test ($P < 0.05$), for constructs of attitude, subjective norms, enabling factors, and perceived self-efficacy, it can be concluded that in terms of mean scores of the above constructs before intervention, 1 month after the intervention, and 3 months after the intervention no statistically significant difference was found in the control group [Table 2].

In order to compare mean scores of attitude, subjective norms, enabling factors, and perceived self-efficacy before educational intervention, 1 month after the educational intervention, and 3 months after the educational intervention in the intervention group, due to lack of sphericity assumption and high Epsilon coefficient in all constructs (>0.75), the results of Huynh-Feldt test were used. Considering the significance of Huynh-Feldt test ($P < 0.05$), it can be concluded that in terms of the mean score of attitude, subjective norms, enabling factors, and perceived self-efficacy before, 1 month, and 3 months after the educational intervention, a statistically significant difference was found in the intervention group [Table 2].

The results of the independent *t*-test showed that no significant difference was found between the two control and intervention groups before the educational intervention ($P < 0.05$). While the results of the analysis of covariance showed that by controlling for the effect of pretest results, these differences were significant between the two groups 1 month and 3 months after the educational intervention [Table 3].

The results of the Spearman test showed that sphericity was not established for all constructs ($P < 0.05$). Furthermore, given that the Epsilon coefficient estimation for the Greenhouse–Geisser test in all constructs was less than 0.75, the results of this test were used. Regarding the nonsignificance of Greenhouse–Geyser test ($P < 0.05$), for the score of health-promoting lifestyle and its dimensions in the control group, it can be concluded that in terms of the mean score of health-promoting lifestyle and its dimensions before, 1 month, and 3 months after the intervention, no statistically significant difference was found in the control group [Table 3].

While, considering the significance of Greenhouse–Geisser test ($P < 0.05$), for the score of health-promoting lifestyle and its dimensions in the intervention group, it can be concluded that in terms of the mean score of health-promoting lifestyle and dimensions a statistically significant difference was found in the intervention group before, 1 month, and 3 months after the intervention [Table 3].

Discussion

Healthy lifestyle is one of the valuable resources to reduce the incidence of diseases and their complications.^[24] The present study was conducted aimed to determine

Table 2: Mean and standard deviation of the studied constructs in the control and intervention groups before, 1 month, and 3 months after the educational intervention

Variables	Stages	Mean±SD		P
		Intervention group	Control group	
Attitude	Before intervention	78.07±15.15	77.16±14.54	0.072 ^a
	1 month after intervention	86.10±11.62	77.87±15.16	0.001 ^b
	3 months after intervention	82.96±13.02	77.87±15.02	0.001 ^b
	P	0.001 ^c	0.11 ^c	-
Subjective norms	Before intervention	81.33±18.45	82.15±17.74	0.79 ^a
	1 month after intervention	88±12.48	82.13±17.76	0.001
	3 months after intervention	87.80±12.91	82.24±17.64	0.001
	P	0.001 ^c	0.53 ^c	
Enabling factors	Before intervention	41.35±8.34	40.98±9.85	0.81 ^a
	1 month after intervention	49.67±5.98	40.93±9.85	0.001 ^b
	3 months after intervention	47.83±8.33	41.64±8.36	0.001 ^b
	P	0.001 ^c	0.19 ^c	
Perceived self-efficacy	Before intervention	82.93±15.65	83.47±15.09	0.84 ^a
	1 month after intervention	89.60±12.29	83.46±15.07	0.001 ^b
	3 months after intervention	87.27±13.13	83.40±14.95	0.001 ^b
	P	0.001 ^c	0.92 ^c	

^aIndependent *t*-test, ^bANCOVA test, ^cRepeated measurements ANOVA test. P value significant at $P < 0.05$. ANCOVA=Analysis of covariance, SD=Standard deviation

Table 3: Mean and standard deviation of health promoting lifestyle and its dimensions in the control and intervention groups before, 1 month and 3 months after educational intervention

Variables	Stages	Mean±SD		P
		Intervention group	Control group	
Health responsibility	Before intervention	21.09±4.24	20.63±3.89	0.052 ^a
	1 month after intervention	27.04±3.79	20.63±3.88	0.001 ^b
	3 months after intervention	26.04±4.09	20.63±3.89	0.001 ^b
	P	0.001 ^c	0.32 ^c	-
Physical activity	Before intervention	14.23±5.46	15.41±4.87	0.19 ^a
	1 month after intervention	18.61±4	15.40±4.81	0.001 ^b
	3 months after intervention	17.49±4.20	15.41±4.87	0.001 ^b
	P	0.001 ^c	0.57 ^c	-
Nutrition	Before intervention	23.44±4.31	22.89±4.30	0.46 ^a
	1 month after intervention	28.07±4.07	22.89±4.30	0.001 ^b
	3 months after intervention	26.96±4.21	22.89±4.30	0.001 ^b
	P	-	-	-
Spiritual growth	Before intervention	23.46±4.25	23.32±4.77	0.19 ^a
	1 month after intervention	28.26±4.14	23.29±4.79	0.001 ^b
	3 months after intervention	27.26±4.14	23.32±4.77	0.001 ^b
	P	0.001 ^c	0.32 ^c	-
Interpersonal relations	Before intervention	23.15±4.12	23.13±3.96	0.98 ^a
	1 month after intervention	26.95±4.51	23.16±4.01	0.001 ^b
	3 months after intervention	25.15±4.51	23.13±3.96	0.001 ^b
	P	0.001 ^c	0.32 ^c	-
Stress management	Before intervention	16.70±3.87	17.32±2.73	0.29 ^a
	1 month after intervention	19.04±4.74	17.35±2.68	0.001 ^b
	3 months after intervention	18.01±4.78	17.32±2.73	0.001 ^b
	P	0.001 ^c	0.16 ^c	-
Total	Before intervention	122.27±18.90	122.72±16.13	0.88 ^a
	1 month after intervention	148.28±18.03	122.75±16.11	0.001 ^b
	3 months after intervention	141.73±19.39	122.72±16.13	0.001 ^b
	P	0.001 ^c	0.48 ^c	-

^aIndependent t-test, ^bANCOVA test, ^cRepeated measurements ANOVA test. P value significant at P<0.05. ANCOVA=Analysis of covariance, SD=Standard deviation

the effect of the educational intervention based on the intervention mapping approach on the health-promoting lifestyle of students in Iran as semi-experimental.

The study results showed that the mean score of health-promoting lifestyle and its dimensions 1 month and 3 months after the intervention had a significant increase in the intervention group compared to the beginning of the intervention, but in the control group, no significant difference was observed regarding the lifestyle and its dimensions. In a study by Amiri *et al.*, also the educational intervention on the healthy lifestyle of taxi drivers in Langrood increased lifestyle score in the intervention group.^[25] In another study conducted by Jahani Eftekhari *et al.* on women, the mean score of female health volunteers' performance in health-promoting behaviors immediately and 3 months after the intervention was significantly higher compared to the intervention group.^[24] This finding is also consistent with the study results of Altun; Chaeye and Yullmusi; who found that health promotion interventions lead to improved attitudes toward health-related behaviors, enhancing skills, and performing healthy behaviors.^[26,27]

For health-promoting lifestyle regarding responsibility, Rahimi Foroushani *et al.* consistent with the results of the present study, showed that educational interventions promoted health responsibility in the intervention group. In the field of physical activity, although the study results were consistent with those of Mahdipour *et al.*, Rahimi Foroushani *et al.*, and Hassani *et al.*,^[28,30] but inconsistent with the study results of Zareiean *et al.* who found that educational interventions were not able to modify and improve health-promoting behaviors including physical activity over a period.^[31] For nutrition, consistent with the results of the present study, Rahimi Foroushani *et al.* and Vrdoljak *et al.* showed that the mean of proper nutrition in the intervention group increased after training compared to the control group.^[28,32] Regarding the spiritual growth, consistent with the results of the present study, Rahimi Foroushani *et al.*, Mahdipour *et al.* increased mental and spiritual health by conducting educational interventions.^[28,30] Concerning the interpersonal relationships, the results of the present study were consistent with the study results of Rahimi Foroushani *et al.* and Mahdipour

et al. who showed that implementation of educational intervention program had a direct effect on interpersonal relationships.^[28,30] Concerning stress management, consistent with the results of the present study, Rahimi Foroushani *et al.* and Jahani Eftekhari *et al.* showed that educational intervention had a positive effect on reducing mood anxiety, trait anxiety, and perceived stress.^[24,28]

According to the purpose of this study, to determine the effect of the educational intervention on health-promoting behaviors, the results showed that the mean score of constructs of attitude, subjective norms, enabling factors, and perceived self-efficacy in the intervention group increased significantly compared to before the intervention. Consistent with these results, in a study by Peyman *et al.* which aimed to determine the effect of self-efficacy-based education on promoting nutritional behaviors in Hamadan, the results showed that self-efficacy perceived led to maintain and promote behavior and education. It can affect the self-efficacy of eating behaviors.^[33] In a study by Sabzmakan *et al.*, also attitude, efficacy, and subjective norms related to healthy food consumption changed significantly after the intervention.^[34] In a study by Hamilton *et al.* who examined the intervention effect on promoting physical activity and healthy nutrition among the elderly in 2010, subjective norms of physical activity in the intervention group increased significantly after the intervention compared to the control group.^[35] Furthermore, in a study by Wall *et al.* who examined the effect of educational nutrition intervention on improving vegetable consumption in Pennsylvania, after the educational intervention, a significant difference was reported in students' knowledge, attitude, and self-efficacy toward vegetable consumption.^[36]

For the effect of the educational intervention on health-related behaviors, it can be argued that interventions based on behavioral change theories by improving self-efficacy and developing and reinforcing enabling factors as well as reinforcing and changing beliefs, values, perceptions, patterns of behavior, and norms will enhance the quality of lifestyle and determinants of health state and consequently, promote health-related behaviors. Given that health promotion interventions based on behavioral approaches seek to change individuals' behavior and encourage them to adopt a healthier lifestyle, so it can be concluded that the educational intervention related to health promotion by affecting health-related decision-making can change attitudes and behaviors related to health.

Limitations

The limitations of this study include the lack of full researcher control over the subjects and the discussion

of follow-up of samples regarding health-promoting behaviors. In addition, the individual differences and personal characteristics of the respondents when answering the questionnaires, the degree of interest in the program, and other educational activities outside the control of the researcher were also some of the limitations that should be considered in interpreting the results. It is recommended to investigate health-promoting behaviors in the larger community in addition to medical students, among other students with longer follow-up periods. Using other models and theories of health education and health promotion and qualitative studies can also be helpful in examining health-promoting lifestyles.

Conclusion

According to the results of the present study, the educational intervention in health promotion is effective in improving and promoting health-related behaviors and lifestyle and its dimensions. Therefore, health education, lifestyle modification, behavior change, environmental modification, and nutritional intervention improve the health behaviors of the study population. According to the study results, if educational interventions are implemented to adopt and adhere to healthy lifestyle behaviors by utilizing constructs self-efficacy, changing attitudes and enhancing enabling factors, and promoting health literacy strategies, they will be highly effective and promote a healthy lifestyle.

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Conflicts of interest

There are no conflicts of interest.

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