

The Effect of Empowerment-Based E-Learning on Health-Promoting Behaviors in Female Adolescents

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Abstract

Background: *Paying particular attention* to the health of adolescents, especially girls, is one of the millennium development goals, the improvement of HPB in female adolescents is necessary. Therefore, this *study* aimed to determine the effect of the empowerment-based e-learning program on HPB in female adolescents. The present study was of quasi-experimental type (educational intervention) in which 80 middle school and high school female students participated. Data collection tools included the Questionnaire of Demographic Characteristics and the HPB Questionnaire (the Health Promoting Lifestyle Profile II (HPLP II)). First, the pretest was performed using the research tool in both intervention and control groups. After performing the pretest, the empowerment model was performed according to the needs, wants of the research samples, and based on the triple steps (perception of threat, problem-solving, and assessment) for the intervention group. Eight weeks after the intervention, the questionnaire was completed again in both groups.

Results: The implementation of the educational program led to increased mean scores in the dimensions of HPB, including health responsibility, physical activity, nutrition, and interpersonal relationships in the intervention group, but spiritual growth and stress management had no significant change ($p > 0.001$). However, in the control group, no statistically significant change was observed in any of the dimensions of health-promoting behaviors.

Conclusion: The results of this study showed that empowerment-based e-learning can be effective in changing the behavior of female adolescents towards healthy behaviors. Therefore, this method is recommended as an effective educational approach to improve adolescent health-promoting behaviors.

Background

Adolescence is an important and critical period of human life and is one of the best and most valuable years of each individual's life (1). Adolescents (10–19 years old) constitute more than one-fifth of the world's population (2). Adolescence is accompanied by many physical, mental, emotional, and developmental changes. Because of these changes, adolescents face many high-risk behaviors that threaten their health in adulthood as well (3). On the other hand, numerous factors, including precocious puberty, increased age of marriage, the epidemiological transition of diseases, technology development, access to global media, and changes in cultural values, all expose adolescents to conditions affecting their health (4). One of the health determinants is health-promoting behaviors, which are the main indicators of health and are considered fundamental factors in disease prevention (5). These behaviors involve six areas, including physical activity, nutrition, spiritual health, interpersonal relationships, health responsibility, and stress management (6). Therefore, by improving the status of HPB in adolescence, many problems can be prevented in adolescents (7).

Empowerment is an internal growth process leading to the full realization of natural talents (8). Notification, communication, and health education are located at the core of empowerment (8). Using

empowerment strategies, healthcare providers can develop the skills of problem-solving, critical thinking, negotiation, and information search in adolescents and increase their level of health (9). The results of empowerment include positive self-confidence, the ability to achieve the goal, a feeling of control over life, change activities, and having hope for the future (10).

Nowadays, adolescent empowerment, given its fundamental value in adolescent health and its overall positive impact on the family, is viewed as an important and necessary public policy goal, (11). The implementation of an empowerment program aiming to increase awareness, knowledge, motivation, self-esteem, and self-efficacy leads to self-control and preventive behaviors, being essential to promote health and quality of life (12).

The goal of empowerment in health promotion is to empower individuals and communities to decide on selecting the best health option by emphasizing the role and importance of recognizing health determinants that have objective manifestations in the physical and social environment. Therefore, it can be said that empowerment plays an important role in the health promotion issue (13).

Given that adolescents have problems such as immobility, poor nutrition, and not pursuing health problems, they are considered as vulnerable groups in the community, and paying attention to health, and HPB in this age group are necessary. Thus, this study was performed aiming to determine the effect of implementing the empowerment-based e-learning program on HPB in adolescents.

Despite the importance of health promotion, especially in adolescents, the educational program is not yet provided as a comprehensive and organized program or based on a specific educational pattern and model, and most adolescents do not achieve the ability to perceive the received information during the educational program. Therefore, it seems very necessary to establish a comprehensive health-promoting program based on an educational pattern. This study was performed aiming to determine the effect of the empowerment-based e-learning program on HPB among female adolescents.

Method

The present study was of quasi-experimental type (educational intervention). The sampling method was of multi-stage cluster random sampling type; so that districts 1, 2, 3, and 4 of the city of Rasht were considered as the main clusters. Then, using the list of public and non-public schools in these 4 districts, 4 schools from each district were selected as the systematic random method. In each district, two public schools (one, 1st grade and another, 2nd grade) and two non-public schools (one, 1st grade and another, 2nd grade) were selected. Overall, 16 schools were selected from these 4 districts. The total number of samples was 40 individuals in each intervention and control group. Data collection tools involved the Questionnaire of Demographic Characteristics and HPLP II. The Health Promoting Behaviors Questionnaire designed by Walker, measures self-initiated health behaviors. This tool has 54 items with 6 subscales, including spiritual growth (9 items), health responsibility (9 items), physical activity (8 items), nutrition (9 items), interpersonal relationships (9 items), and stress management (8 items). The scoring method is based on a 4-point Likert rating scale (never = 1 point, sometimes = 2 points, usually = 3 points,

and always = 4 points). The total score range of the Health Promoting Behaviors Questionnaire is between 52 and 208, and a higher score means better health status. Participants who obtained a score of 97% and above (201.78–208) were placed in the “good” group, those with a score of 75–97% (150.7–201) were placed in the “acceptable” group, and participants with a lower score were placed in the “weak” group.

Walker et al. measured the validity and reliability of the original version of this scale, and its total test-retest reliability was reported to be 0.93(14). Overall, this scale had a high internal consistency, and its Cronbach’s alpha coefficient was between 0.92 and 0.94. Mohammadi et al performed the validity and reliability of the translated version of this scale in Iran. The internal consistency with Cronbach’s alpha coefficient for the total scale was 0.95, and its external stability, which was measured by the test-retest method after 3 weeks, was reported to be 0.93 (15).

First, the pretest was performed using the research tool in both intervention and control groups. After performing the pretest, the empowerment model was performed according to the needs, wants of the research samples, and based on the triple steps (perception of threat, problem solving, and assessment) for the intervention group (Fig. 1).

The educational intervention was performed in the form of providing educational content (Table 1) through the empowerment-based e-learning model during 6 one-hour sessions weekly. The educational content was presented by a faculty member researcher, was recorded using Camtasia software, and then was emailed to the participants of the intervention group. The educational content was collected using valid sources and approved by eight faculty members of Guilan University of Medical Sciences.

Exclusion criteria included unwillingness to participate in the study and not attending the class for two consecutive sessions. The participants completed the research tool 8 weeks after the end of the education. During these 8 weeks, the researcher answered the questions of the intervention group by phone (at least twice a week). Statistical analysis was performed using descriptive statistics, frequency, mean, and standard deviation. To evaluate the normality of the data and the homogeneity of variances, the Kolmogorov-Smirnov test was used. Also, in the inferential findings section, to compare the intervention and control groups before and after the educational intervention, the t-test, paired t-test, or their nonparametric equivalents, including Mann-Whitney and Wilcoxon tests and Chi-square tests, were performed using SPSS software version 16.

Results

In this study, the data of 80 female students (40 in the intervention group and 40 in the control group) were statistically analyzed. The mean age of the intervention group was 15.8 ± 2.7 (age range = 12–19 years), and that of the control group was 16.1 ± 1.3 (age range = 12–19 years). The mean age of the participants’ fathers was 43.1 ± 4.1 years, and the mean age of their mothers was 39.8 ± 2.6 . The demographic characteristics of the participants are shown in Table 2.

The result of the t-test showed that the mean score of the health-promoting behaviors in two groups (intervention and control groups) before the intervention were 146.86 ± 26.28 and 151.41 ± 21.26 respectively, but after the intervention, the mean score of health-promoting behaviors increased to 164.3 ± 24.13 in the intervention group (Table 3).

This difference was statistically significant ($P < 0.001$) (Table 4).

There was a significant relationship between income, educational level, and HPB ($P < 0.05$) (Table 5).

The research results regarding demographic variables using Chi-square, Mann-Whitney, and t-tests showed that there was no statistically significant difference between the intervention and control groups. The findings also showed that there was no significant difference between the two groups of intervention and control before the educational intervention concerning HPB in different dimensions. There was a statistically significant difference between the two intervention and control groups concerning the dimensions of responsibility, physical activity, nutrition, and interpersonal relationships after the educational intervention, but no significant differences were observed in the dimensions of stress management spiritual, and growth.

Discussion

The implementation of the empowerment-based e-learning program led to improving the area of health responsibility in the intervention group. These results are consistent with the results of Ahmadizade et al.'s study. The results of Ahmadizade et al.'s study indicated that educating and providing adequate information to adolescents resulted in increasing their responsibility and improving their performance in self-care and promoting health-related behaviors (16). The results of Kahtari et al.'s study also support these findings (17). Based on the results of the Iranian studies, a very limited number of adolescents had enough information in the field of how to do proper self-care (18, 19). Adolescents' low mean age and lack of awareness of their role in improving HPB led to their low health responsibility (20). The implementation of the educational intervention led to increasing HPB in the dimension of physical activity. Today's facilities and lifestyle, particularly in urban regions (due to devices such as computers, televisions, etc.), have caused adolescents and the youth to show less desire for physical activity. One of the most effective ways to encourage the youth to do more physical activity (as the most important element of a healthy lifestyle) is by implementing educational programs (21). The findings of Kang studies also supported these results (22), but these results were inconsistent with those of Solhi et al.'s study, showing that the interventions could not significantly change and improve health-promoting behaviors, including physical activity (23). The reason may be that the interventions have not been implemented systematically and based on the pre-intervention educational needs assessment. In the present study, the mean of the proper nutrition dimension in the intervention group after education had a noticeable increase compared to the control group, which may indicate the positive effect of the educational program on this group. These findings are consistent with the results of Vrdoljak et al.'s (24).study showing that education affected the improvement of adolescents' nutritional status, but they

are not consistent with the findings of Hazavehei's (25) research indicated the ineffectiveness of the educations provided in university students in health variables, especially the nutrition dimension. The implementation of the desired educational intervention program did not affect the students' spiritual growth and did not lead to increasing or decreasing the tendency to this dimension. Whenever spiritual growth is applied to humans, it includes all his/her existential aspects, and many factors affect this growth (26). The results of Chiou et al.'s (27). study entitled "The effect of the educational intervention using an interactive approach on behavior change" confirm these findings. However, this result was not consistent with the results of Behere et al.'s (28). study concluding that various aspects of mental health affected individuals' religious attitudes and they were able to increase mental and spiritual health through educational interventions. The findings of current study showed that the implementation of the desired educational intervention program did not have any effect on stress management, but the results of Imani et al.'s (27) study are not in line with these findings because the results of the mentioned study showed that holding counseling classes could be effective in promoting mental health, including youth stress control. Perhaps the reason for the ineffectiveness of the educational intervention on student stress management in this study can be attributed to the issue of the approximate co-occurrence of filling out the second stage questionnaire with students' exam days and the distortion of results by this issue. The findings of this study showed that the implementation of the desired educational intervention program directly affected students' interpersonal relationships. This result was consistent with the study of Thulaseedharan et al., (29) showing that the intervention had a positive effect on the mentioned variable and led to improved relationships and reduced depression.

Conclusion

The study results showed that the empowerment-based e-learning program was effective in the areas of health responsibility, physical activity, nutrition, and healthy interpersonal relationships. Comparing the scores of the dimensions of HPB in the intervention group showed that the most changes were related to the dimensions of responsibility, physical activity, nutrition, and interpersonal relationships, and the least changes were related to the area of stress management and spiritual growth, respectively. Given the effect of this educational approach, it is suggested that decision-makers and service providers in the field of healthcare use the results of the present study regarding adolescent health-promoting programs.

Declarations

-Ethical Approval and Consent to participate

This study was approved by the University Ethics Committee with the number "IR.GUMS.REC.1399.657".

-Consent for publication

Not applicable.

-Availability of supporting data

yes

-Competing interests

There is no conflict of interest for all authors.

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-Authors' contributions

Z.B. and M.P participated in the Conceptualization, design, and implementation of the intervention, analysis of the findings, and drafting of the manuscript. M.R. participated in the design of the study and writing—review and editing of the manuscript. All authors read and approved the final manuscript.

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Tables

Table 1
Educational sessions

| Educational Sessions | Educational Program |
|-----------------------------|---|
| First session | Responsibility and providing solutions to increase individuals' responsibility for health |
| Second session | Principles of proper nutrition |
| Third session | The necessity of doing physical activity and exercise |
| Fourth session | Interpersonal relationships, the required skills for adaptive interpersonal communication |
| Fifth session | Stress management and control, and ways to deal with it |
| Sixth session | The definition of spiritual growth and health, the necessity of the existence of spirituality |

Table 2
Characteristics of participants in two groups

| Variables | | Intervention | | Control | |
|-----------------------------|-----------------------|----------------------|-------------|----------------------|-------------|
| | | Number (individuals) | Percent (%) | Number (individuals) | Percent (%) |
| Education center | Public | 21 | 52.5 | 20 | 50 |
| | Private | 19 | 47.5 | 20 | 50 |
| Grade | Primary high school | 18 | 45 | 19 | 47.5 |
| | Secondary high school | 22 | 55 | 21 | 52.5 |
| Study field | Math | 9 | 22.5 | 10 | 25 |
| | Experimental | 11 | 27.5 | 13 | 32.5 |
| | Humanities | 10 | 25 | 8 | |
| | Vocational | 10 | 25 | 9 | 22.5 |
| Area or residence | City | 36 | 90 | 38 | 95 |
| | Suburbs | 4 | 10 | 2 | 5 |
| Father's level of education | Illiterate | 2 | 5 | 1 | 2.5 |
| | Primary | 1 | 2.5 | 3 | 7.5 |
| | Middle school degree | 3 | 7.5 | 1 | 2.5 |
| | Diploma | 25 | 62.5 | 18 | 45 |
| | University educated | 9 | 22.5 | 17 | 42.5 |
| Father's job | Unemployed | 1 | 2.5 | 0 | 0 |
| | Worker | 8 | 20 | 12 | 30 |
| | Farmer | 3 | 7.5 | 1 | 2.5 |
| | Clerk | 6 | 15 | 9 | 22.5 |
| | Self-employed | 22 | 55 | 18 | 45 |
| Mother's level of education | Illiterate | 0 | 0 | 0 | 0 |
| | Primary | 4 | 10 | 1 | 2.5 |
| | Middle school degree | 2 | 5 | 3 | 7.5 |

| | | | | | |
|---------------------|---------------------|----|------|----|------|
| | Diploma | 10 | 25 | 13 | 32.5 |
| | University educated | 24 | 60 | 23 | 57.5 |
| Mother's job | Housewife | 18 | 45 | 24 | 60 |
| | Worker and farmer | 1 | 2.5 | 2 | 5 |
| | Clerk | 17 | 42.5 | 14 | 35 |
| | Self-employed | 4 | 10 | 0 | 0 |
| Income | Equal | 16 | 40 | 11 | 27.5 |
| | Outcome > income | 24 | 60 | 29 | 72.5 |
| | Income > outcome | 0 | 0 | 0 | 0 |
| Living with parents | Yes | 38 | 95 | 29 | 97.5 |
| | No | 2 | 5 | 1 | 2.5 |

Table 3

Comparison of the mean score (standard deviation) of HPLP II and subscales before and after intervention in two groups

| HPLP II and subscales | Before intervention | | P value* | After intervention | | P value** |
|--|---------------------|----------------|----------|--------------------|---------------|-----------|
| | Mean ± SD | | | Mean ± SD | | |
| | Intervention group | Control group | | Intervention group | Control group | |
| Health responsibility | 27.14 ± 5.12 | 29.12 ± 4.38 | 0.12 | 26.34 ± 4.03 | 21.82 ± 4.67 | 0.001 |
| Physical activity | 17.26 ± 4.31 | 19.11 ± 5.02 | 0.1 | 23.03 ± 4.11 | 15.97 ± 4.14 | 0.001 |
| Stress management | 21.12 ± 4.03 | 22.36 ± 4.23 | 0.1 | 24.03 ± 4.18 | 23.76 ± 5.35 | 0.1 |
| Spirituality growth | 26.12 ± 5.47 | 25.58 ± 6.03 | 0.32 | 27.39 ± 4.12 | 26.45 ± 5.14 | 0.2 |
| Interpersonal relationships | 25.03 ± 5.02 | 26.74 ± 5.25 | 0.25 | 28.25 ± 3.04 | 22.11 ± 4.49 | 0.002 |
| Nutrition | 22.31 ± 4.04 | 25.37 ± 5.113 | 0.01 | 27.86 ± 4.17 | 24.51 ± 4.68 | 0.001 |
| Total HPLL | 146.86 ± 26.28 | 151.41 ± 21.26 | 0.11 | 164.3 ± 24.13 | 149.7 ± 33.31 | 0.002 |
| HPLP II: Health-Promoting Lifestyle Profile II; SD: standard deviation | | | | | | |
| *Independent t-test | | | | | | |
| **ANCOVA | | | | | | |

Table 4
Comparison of the mean differences of HPLP II and subscales before and after intervention in in two groups

| HPLP II and subscales | Group | Mean Difference | SD | P value* |
|-----------------------------|--------------|-----------------|----------|----------|
| Nutrition | Intervention | -29.600124 | 5.44238 | < 0.01 |
| | Control | -2.76826 | 2.43146 | 0.32 |
| Physical activity | Intervention | 39.42683 | 2.28948 | < 0.01 |
| | Control | 25.68332 | 6.12223 | < 0.26 |
| Stress management | Intervention | -24.13580 | 10.79512 | < 0.09 |
| | Control | -1.92731 | 3.29816 | 0.12 |
| Spirituality growth | Intervention | 4.91944 | 8.76727 | < 0.001 |
| | Control | 0.45093 | 3.17567 | 0.35 |
| Interpersonal relationships | Intervention | -27.93266 | 11.62759 | < 0.001 |
| | Control | -24.27257 | 7.62852 | < 0.03 |
| Health responsibility | Intervention | -19.53623 | 7.17442 | < 0.001 |
| | Control | 0.47346 | 5.23717 | 0.23 |
| Total HPLL | Intervention | -28.21862 | 4.71653 | < 0.001 |
| | Control | 0.57946 | 4.52731 | 0.41 |
| * Standard Deviation | | | | |
| **Paired t test | | | | |

Table 5
The correlation of HPB dimensions with demographic characteristics in in two groups

| Demographic variables | HPB in the intervention group | | HPB in the control group | |
|-----------------------|----------------------------------|----------|----------------------------------|----------|
| | Spearman Correlation coefficient | P value* | Spearman Correlation coefficient | P value* |
| Age | -0.018 | 0.11 | 0.212 | 0.01 |
| Education Level | -0.611 | 0.01 | -0.017 | 0.04 |
| Income | 0.315 | 0.03 | 0.133 | 0.13 |
| *P < 0.05 | | | | |

Figures

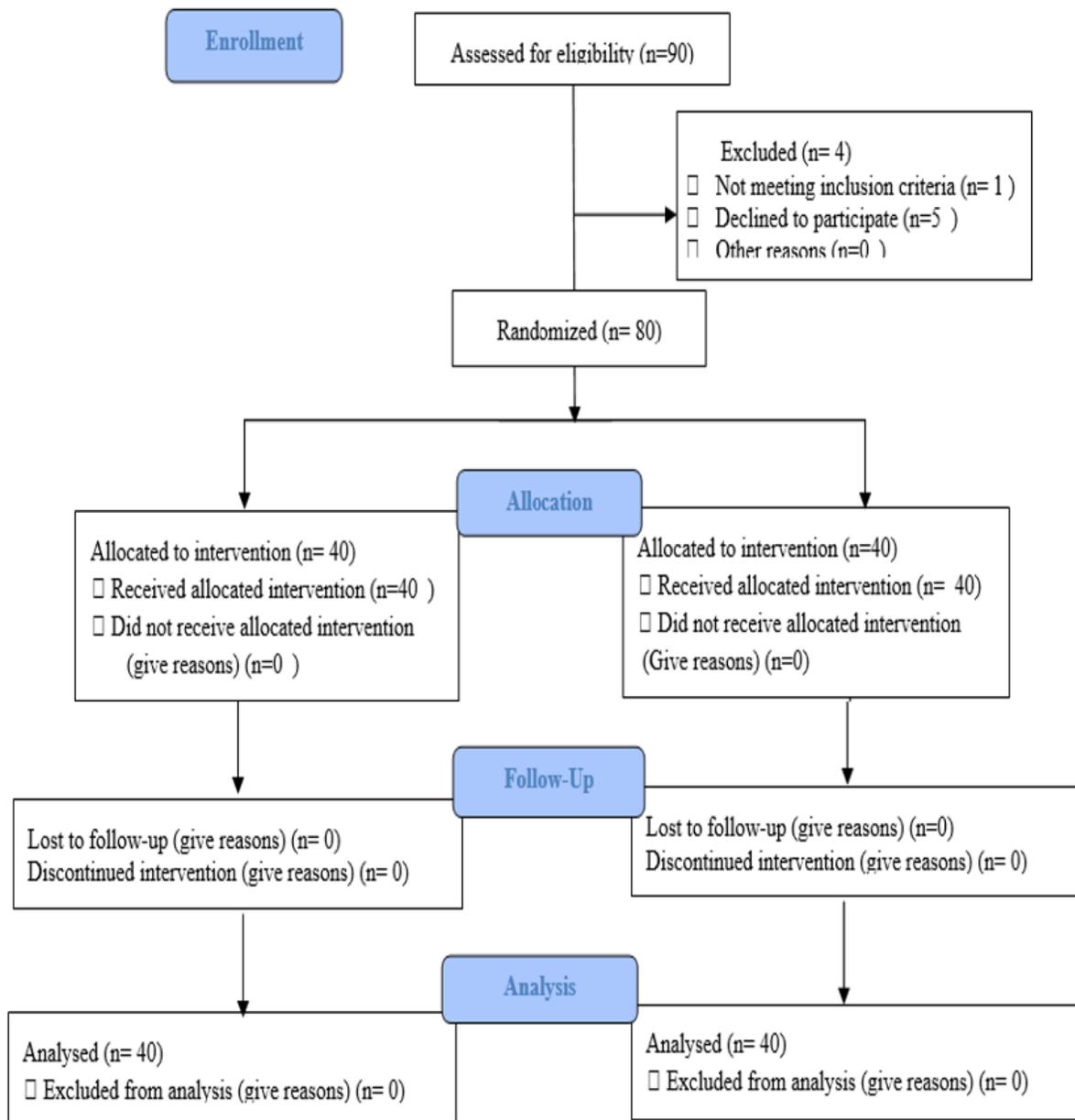


Figure 1

Consort flow diagram