

Impact of Health-Promoting Educational Intervention on Lifestyle (Nutrition Behaviors, Physical Activity and Mental Health) Related to Vaginal Health Among Reproductive-Aged Women With Vaginitis

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Abstract

Background: Vaginitis is one of the most common diseases in reproductive-aged women (15 - 49 years of age). Side effects of vaginitis can affect other aspects of health, which could be prevented by promoting a healthy lifestyle related to vaginal health.

Objectives: This study aimed at determining the impact of health-promoting educational intervention on lifestyle (nutrition behaviors, physical activities, and mental health) related to vaginal health among reproductive-aged women with vaginitis.

Methods: The data set was collected as part of an experimental study conducted on 350 reproductive-aged women with vaginitis. Participants were selected through a stratified two-stage clustered sampling and simple randomization from 10 attending health centers affiliated with Kermanshah University of Medical Sciences in five regions (North, South, East, West, and Center) of Kermanshah (a city in western Iran) in 2015. Two clinics in each region were selected; patients from the first center were chosen as the intervention group and patients from the second center made up the control group. To collect data, a questionnaire including socio-demographic and lifestyle questions was used. The questionnaire was designed and validated via the psychometric process. Educational intervention was performed over twenty sessions of 25 to 35 minutes. The intervention group was followed up with face-to-face education, a pamphlet, phone contact, and by social media. The control group continued the routine treatment without contacting the intervention group. Data were collected from both groups before the intervention and six months after the intervention. Data were analyzed using the SPSS-20 package, using the independent t-test, paired t-test, chi-square test, and analysis of covariance (ANCOVA) test. The confidence interval was 95% and $P < 0.05$ was considered statistically significant.

Results: ANCOVA showed that after adjusting for effects of pretest scores, the difference between mean scores on the scale of lifestyle related to vaginal health in the intervention group (28.48 ± 0.38) and control group (23.65 ± 1.23) was significant ($P < 0.001$). Intervention has a positive significant effect on increasing the mean scores of lifestyle in the intervention group ($P < 0.001$). Comparing mean differences between the two groups indicated significant difference between them ($P < 0.001$). Results of the paired t-test in the control group did not show significant changes in lifestyle scores after 6 months ($P > 0.05$). The independent t-test did not show significant statistical differences between the two groups in terms of demographic characteristics ($P > 0.05$).

Conclusions: According to the findings, educational intervention is beneficial in promoting three aspects of women's lifestyle related to vaginal health. Therefore, a health-promoting lifestyle seems essential for having a healthy vagina and for preventing vaginitis.

Keywords: Vaginitis, Health Promotion, Lifestyle

1. Background

Most women have vaginitis at some point in their lives (1). Vaginitis is the most prevalent infection of the genital tract and the most commonly recognized infection among women in primary care and gynecology clinics. It has been

estimated that vaginal infections alone account for > 10% of outpatient visits to providers of women's health (2). Vaginitis is a general term that refers to inflammation of the vaginal wall, generally caused by one of three disorders: yeast infections, bacterial vaginosis, or trichomoniasis (3, 4). Vaginitis affects women of all ages but is most

common during the reproductive years (the American college of obstetricians and gynecologists, August 2011). It occurs in 1% - 14% of all women of reproductive age. The highest incidence is noted among young, sexually active women. In the USA, the reported rate at general gynecologic clinics is 5% - 15%, while for STD clinics, reported rates range from 32% to as high as 64%. European rates are uncertain but are likely similar to those in the United States. A subpopulation of women (less than 10%) suffers from recurrent, often intractable episodes (5). About 30% of women of childbearing age have bacterial vaginosis and 3% have trichomoniasis. Nearly 75% of all adult women have had at least one yeast infection in their lifetime and 40% to 45% will have two or more such infections. About 3% of women of childbearing age (6-8). About 40% to 50% of women who experience a first episode are likely to experience a recurrence and 5% may present a form of "recurring" vaginitis characterized by at least three or more episodes of infection per year (9). Vaginitis is a global health problem that affects men, women, families, and communities and may have severe consequences such as infertility, ectopic pregnancy, chronic pelvic pain, spontaneous abortion, and an increased risk of HIV transmission. Therefore, proper prevention and treatment of these diseases are of great importance (10-14). Vaginal infection is also associated with several adverse health outcomes, such as preterm birth or delivery of a low-birth weight infant (8, 15). Although there are many studies on factors associated with vaginitis, evidence of the relationship between vaginitis and lifestyle factors is limited. This study aims to investigate such important relationships, which will contribute to the existing literature.

Yeast vaginitis is frequently described in women who have taken broad-spectrum antibiotics, or systemic steroids, have diabetes or glycosuria, or are obese or immunocompromised (stress-induced yeast vaginitis). Dietary factors have also been postulated as a cause of recurrent yeast vaginitis (16). Psychosexual problems and depression can present with recurrent episodes of vaginal discharge (17). Some predisposing factors for vaginitis include obesity; physical activity deficiency; high intake of sugar, carbohydrates, cola, and alcohol; low intake of dairy products; low vitamin C; stress; sleep disorders; and antibiotics. Therefore, reducing simple carbohydrates, refined foods, and alcohol helps to reduce frequent or persistent yeast infections (4).

Protein-energy malnutrition and intake of several nutrients such as vitamins A and C, iron, and zinc have been reported to affect the immune system, particularly local immunity. It is therefore plausible that intake of certain nutrients may be associated with vaginitis. This may be caused by a limited variety in dietary intake; for example,

among women in this study, dietary fiber was uniformly low, suggesting limited consumption of health-protective foods such as fruits and vegetables. Yogurt should contain live bacterial acidophilus cultures, so it is necessary to read the packaging contents before buying yogurt (18). Chronic stress affects the hypothalamus-pituitary-adrenal axis, which influences immune function. Recurrent candida vulvovaginitis is increasing. Increased psychosocial stress is associated with greater prevalence and incidence of bacterial vaginosis independent of other risk factors (7, 19). Consumption of excess sugar is also found to be bad for vaginal health and can increase the likelihood of yeast infections (15, 20). Fresh fruits and vegetables are a part of a balanced diet that also supports your vaginal health. Certain vitamins and minerals found in fresh vegetables and fruits are particularly good. Vitamin C is a well-known immune system booster. They help with circulation and prevention. Therefore, a strict low-carb diet is recommended. Generally a balanced diet, avoiding processed and sugar-rich foods and including plenty of fresh vegetables and fruits supports vaginal health (21, 22).

These studies show that lifestyle is associated with vaginitis. Food habits, obesity, and related factors such as physical activity, stress and stress management, adequate sleep, and mental health are important factors influencing vaginitis. The term "lifestyle" is often used to refer to the way people live (23). Lifestyle includes behaviors such as food habits, sleeping and resting, physical activity and exercising, weight controlling, smoking and alcohol consumption, immunization against disease, coping with stress, and ability to use family and society support systems (21). World Health Organization (WHO) defines health promotion in the Ottawa Charter: "Health promotion is the process of enabling people to increase control over, and to improve, their health" (WHO 1986). (Stephen Abbott, The meaning of 'health improvement', Health education journal). The term 'health-promoting behaviors' refers to individual actions taken to attain positive health outcomes (Pender, Murdaugh, and Parsons, 2011). Therefore, health-promoting behaviors could include individual actions to modify risk factors such as smoking cessation, exercising regularly, eating a healthy diet, or controlling weight (24). Pender classified health-promoting lifestyle actions into six categories, including nutrition, physical activity, stress management, interpersonal relationships, spiritual growth, and health responsibility (25, 26). Maintaining health requires improvement in health-promoting lifestyle actions (27). For health public policy, one of these action areas was supporting the health of women. Women are the primary promoters of health all over the world. For their effective participation in health promotion, women require access to information, networks, and funds (28).

Women's health is a fundamental component of development and improvement in the developing world (29). Regarding the increase in prevalence of gynecological tract infections in various communities, the world health organization (WHO) often emphasizes their prevention and control. The necessity for consultation and education to promote efficient preventative healthy behaviors is an important topic in the field of sexual and reproductive health. It is necessary to educate women of reproductive age about infection prevention, how to use health services, and about self-care methods aimed at reducing disease transmission and increasing rates of treatment (10, 30).

In this study, we tried to empower women's health based on the strategies recommended by the world health organization. This intervention concentrates on three main lifestyle dimensions: nutrition behaviors, physical activity, and mental health. We provided an educational intervention based on health-promoting lifestyle, provided pamphlets and face-to-face education, interacted via social media, text message, and phone contacts and followed up with study participants to improve their knowledge and skills to improve their vaginal health and prevent of vaginitis.

2. Objectives

The current research aimed to study the effectiveness of health-promoting educational intervention on three dimension of lifestyle (nutrition behaviors, physical activity, and mental health) associated with vaginal health among reproductive-aged women with vaginitis.

3. Methods

Approval was gained from the ethics committee of Tehran University of Medical Sciences (ethical code: 9021108004-133603). After the required arrangements were made, the experimental study was conducted over nine months on women with vaginitis who visited attending health centers affiliated with Kermanshah University of Medical Sciences to diagnose and treat their vaginitis in 2015.

3.1. Participants and Setting

Participants were selected from 10 health centers using stratified two-stage clustered sampling. The control group continued routine clinical treatment individually, without contact with the intervention group. Criteria for inclusion in the study were as follows: married women 15

- 49 years of age with clinically diagnosed vaginitis, fertile, non-pregnant, without special disorders such as cancer, immune deficiency, or diabetes, and with intent to participate in the study.

3.2. Sampling and Data Collection

The data set was collected as part of an experimental (interventional) study. This study was conducted for different objects. Therefore, sample size was determined two ways (the first section, which was based on standard deviation and mean that related to another part of the original study was removed from this paper). Sample size for the intervention (this experimental study) was based on OR and P (probability) of prevalence of vaginitis according to the references. Data show that the prevalence is 29% (4). Probability of type I and type II were considered using a sample calculation ($\alpha = 0.05$ and $\beta = 0.2$). The aforementioned estimated sample size was multiplied by the research design effect using a coefficient of 1.2 and assuming probability of loss to follow up as 15%. The final sample size was calculated as 175 participants in each group.

The study used stratified two-stage clustered sampling with simple randomization. This means that health centers in Kermanshah (a total of 24 centers) are considered as clusters. Then, the health centers were divided into five geographic areas (North, South, East, West, and Center) of the city. In the next phase, two health centers from each region were randomly selected. Among all health centers, therefore, 10 health centers were selected and their names were written on 10 cards. These cards were scrambled together and then cards were drawn, as each card was picked out, it was assigned as an intervention center; the next card naming a health center in the same region was considered a control center. In this way, based on the list of five administrative districts in Kermanshah, two health centers, one for the intervention group and the other for the control group, were randomly selected from each district. Then, appropriate participants from each health center who met the inclusion criteria were randomly selected. In total, 400 women with vaginitis who were referred to 10 health centers in Kermanshah were examined based on inclusive and exclusive criteria. Then, according to the criteria, 23 patients in the control centers and 27 patients in the intervention centers were excluded from the study. Finally, 350 patients met the criteria and were randomized into the intervention group and the control group. There were 175 women in each group.

After that, the researcher randomly selected the necessary number of women who were diagnosed with vaginitis disease in the health centers. The intervention group and control group had no contact with each other. To avoid

bias, Kermanshah health centers were requested not to allow any other similar intervention to be conducted during the time this research was carried out. However, after completing the study, all control groups also received similar education. The two groups were not significantly different in the baseline.

3.3. Sample Size

The sample size with a 95% confidence level and power of 80% was calculated by the Equations 1 and 2:

$$d = \frac{1 + (1 + l^2) e^{5l^{\frac{2}{4}}}}{1 + e^{-l^{\frac{2}{4}}}} = \frac{1 + (1 + 0.53^2) e^5}{1 + e^{-l^{\frac{2}{4}}}} = 1.46 \quad (1)$$

$$n = \frac{\left(z_1 - \frac{\alpha}{2} + z_1 - \beta e^{-\frac{l}{4}}\right)^2 \times (1 + 2pd)}{pl^2} = 137.5 \quad (2)$$

OR = 1.7; P = 0.45 (relapse of vaginitis according to epidemiology of vaginitis); L = Ln(1.7) = 0.53

3.4. Data Collection

Data was collected using a questionnaire that included questions about socio-demographic characteristics and lifestyle. Although there are some questionnaires such as walker health promoting lifestyle profile, there are no questionnaires about lifestyle as it relates to vaginal health. Consequently, a questionnaire to measure lifestyle related to vaginal health was designed and validated via a psychometric process.

The first part of questionnaire included socio-demographic questions (age, literacy, job, husband's job, husband's literacy, economic status, shelter, body mass index, history of vaginitis, family size). The second part of the questionnaire included questions about lifestyle over three dimensions (nutrition behaviors, physical activity, and mental health) with multiple Likert-type scale choices (always, sometimes, and never). Higher scores show more health-promoting behaviors. The research team set down items into pools according to the review literature, an expert panel, observation, and the experiences of the researcher. Face validity and content (quantitative - qualitative) validity were assessed. Among the questions, 11 were in the nutrition dimension, 8 were in the physical activity dimension, and 20 were in the mental health dimension. Then, the validity and reliability of the questionnaire were examined by qualified professors and their comments were applied to the questionnaire. The questionnaire's validity was approved after correcting some problems and ambiguities. Moreover, to assure the feasibility of the study in this group of people (reproductive-age women), a

pilot study was performed by giving the questionnaire to 11 women.

Face validity was assessed by an expert panel (5 members) in two stages: qualitative and quantitative. The quantitative section was assessed by impact score. All questions were more than 1.5 and were therefore accepted in this phase. To standardize and validate the questionnaire, qualitative assessment was done using an expert panel (11 members) and quantitative assessment was done using the content validity ratio (CVR) and content validity index (CVI). After validity assessment, questions with CVI and CVR less than the limit were corrected and modified. The validation process was repeated until the desired CVR (0.59) and CVI (> 0.79) were obtained. Assessment of reliability was done by a test-retest method and the use of Cronbach's alpha. The reliability was confirmed with a Cronbach's alpha value greater than 0.7. Cronbach's alpha for the nutrition questions was $\alpha = 0.768$, for the physical activity questions was $\alpha = 0.773$, and for the mental health questions was $\alpha = 0.89$. Cronbach's alpha for all questions in the questionnaire was ($\alpha = 0.92$), more than the required 0.6, and reliability of the questionnaire was coefficient obtained for lifestyle questions, respectively. Finally the number of lifestyle questions was decreases to 22 (nutrition behaviors: 5; physical activity: 6; mental health: 11).

Following this psychometric process, the questionnaire was used to collect data. This questionnaire was given to both groups in two separate times: before the intervention and six months after intervention.

3.5. Intervention Methods

After randomly selecting and dividing the clinics into intervention and control groups, the control group received the usual treatment and the intervention group received the health-promoting lifestyle intervention emphasizing healthy lifestyle in the three dimensions of nutrition behaviors, physical activity, and mental health. Follow-up with participants included perceived feedback, reactions, and discussions. The content of the intervention was adapted to women's needs for the three aspects of lifestyle associated with vaginal health and prevention of vaginitis. The intervention was performed over twenty sessions, each lasting 20 to 30 minutes. The intervention group received face-to-face education, a pamphlet, phone contacts, text messages, and social internet networks and social media messages. The main objective of this program was to enable women to improve their lifestyle skills (through decreasing levels of unhealthy nutrition behaviors, more physical activity, and better mental health). They received education about weight control, strict intake of sweets, increasing intake of vegetables and fruits, increasing intake of dairy products, having a continuously

balanced diet, walking and performing other exercise at least three times a week, doing physical activities even in bad condition such as bad weather or occupied situation, regular sleep program, good relationship with others (particularly husband), self-responsibility and locus control of health, stress management, relaxation methods such as deep breathing and walking to manage stressful situations, and going to mental health centers and counseling units to solve problems and improve mental health.

3.6. Statistical Analysis

To approach the aims and to test the hypotheses of the research, data were analyzed using the SPSS-20 statistical software package. Tests included independent t-test, paired t-test, chi-squared test, and analysis of covariance (ANCOVA). $P < 0.05$ was considered statistically significant.

3.5. Ethical Considerations: The participants in were familiarized with details of the study, asked to read and sign a consent form, and assured of confidentiality. Participation was voluntary; women were given the opportunity to leave during the course of the study if they became uncomfortable. They were invited to ask any questions about the process of the study and the objectives of the study were explained to them. The control group was given the opportunity to participate in the health-promoting educational program after the study was completed. In total, 350 participants were included and were assured their information would remain private.

4. Results

The mean age of women in this study was 30.5 ± 7.66 years. Most of our study population (93.1%) was housewives. The financial status of participants was moderate (88.9%). Mean number of years of schooling in women was 8.89 ± 3.65 and for their husbands was 9.95 ± 3.54 . Of the participants, 78% experienced vaginitis at least one time in the six months before the pretest, 37.1% in the intervention group and 41.1% in the control group. There was no significant statistical difference between the two groups (intervention and control) in terms of demographic characteristics ($P > 0.05$). At the start of the study, both groups also had a similar distribution in relapse of vaginitis. Other characteristics of women participating in the study divided by intervention group and control group are shown in [Table 1](#).

The results of the paired t-test for comparing the lifestyle scores of the intervention group showed that the difference in the mean scores for the total healthy lifestyle index and its three dimensions, including nutrition behaviors, physical activity, and mental health, is significant.

Mean scores for the total nutrition behaviors index and its five dimensions, including sweet intake, fruit intake, vegetable intake, dairy intake, and 6 months diet planning, were also significant ($P < 0.001$), and the mean scores for total nutrition behaviors increased significantly. Physical activity also included six dimensions: habitual routine activities, going to the gym 3 - 5 times per week, walking 3 - 5 times per week for at least 30 minutes, physical activities even due occupied situation, physical activity in bad weather at home, and continuing physical activity. The mean scores for total physical activities also increased significantly. The third dimension of lifestyle was mental health, which included 11 dimensions: adequate sleep (7 - 8 hours), relaxation techniques (deep breathing, walking), solving problems in a mental counseling center, interpersonal relationships, discussion with husband about problems, good relation with husband, gratitude, truth to others, self-efficacy, responsibility, and acceptance of mental health education. The mean score for total mental health also changed significantly ($P < 0.001$). Data about these results are shown in [Table 2](#).

Comparison of the lifestyle means scores in the three dimensions after 6 months in the control group was determined using a paired t-test ($P > 0.05$) and was not statistically significant ([Table 3](#)).

We compared the mean differences of the overall health-promoting lifestyle scores between the two groups ([Table 4](#)). The mean difference of the overall health-promoting lifestyle scores was calculated from the mean total health-promoting lifestyle scores at pre-intervention and post-intervention, which was significantly greater in the intervention group than in the control group. An independent samples t-test showed that there were significant differences in the means of the overall health-promoting lifestyle scores between the two groups ($P < 0.001$). The mean difference score for all dimensions of lifestyle in the intervention group were higher than the scores in the control group.

[Table 5](#) shows that there is a significant difference ($P < 0.001$) in all three dimensions of lifestyle between the two groups after intervention.

To study the effects of intervention on the mean of lifestyle index after controlling for some variables which were significant before intervention, we used ANCOVA. Results of ANCOVA showed that by adjusting for the effect of pre-test scores, the differences between the mean post-test scores of healthy lifestyle and its three dimensions in the control and intervention groups were statistically significant ($P < 0.001$). Therefore, the intervention had a significant effect on score after controlling for the pretest score before intervention. In other words, the health-promoting educational intervention was effective in promoting di-

Table 1. Characteristics of Reproductive-Aged Women With Vaginitis (n = 350)^a

Characteristics	Groups		P Value ^b
	Intervention (n = 175)	Control (n = 175)	
Age	30.08 ± 7.61	30.99 ± 7.70	0.26
Literacy	9.11 ± 3.60	8.67 ± 3.70	0.25
Husband's literacy	10.05 ± 3.50	9.84 ± 3.59	0.57
Area per person, m ² /p	31.24 ± 11.75	32.10 ± 13.04	0.51
Weight	69.39 ± 10.95	69.65 ± 10.70	0.82
Height	160.91 ± 5.33	160.61 ± 5.44	0.59
BMI	26.72 ± 3.51	26.97 ± 3.71	0.52
Employment			0.89
Housewife	162 (93.6)	160 (92.5)	
Employed	8 (4.6)	9 (5.2)	
Student	3 (1.7)	4 (2.3)	
Husband's Employment			0.98
Unemployed	6 (3.5)	7 (4)	
Employed	156 (90.7)	158 (90.3)	
Retired	6 (3.5)	5 (2.9)	
Student	4 (2.3)	5 (2.9)	
Socioeconomic status			0.09
Good	12 (6.9)	10 (5.7)	
Moderate	155 (88.6)	156 (89.2)	
Poor	8 (4.6)	9 (5.1)	
Family size			0.13
Two	9 (5.3)	10 (5.8)	
Three	56 (32.2)	65 (37.6)	
Four	69 (39.7)	47 (27.2)	
Five	22 (12.6)	33 (19.1)	
Six and more	18 (10.3)	18 (10.3)	
Vaginitis recurrence history			0.27
No	17 (9.7)	25 (14.3)	
Once	65 (37.1)	72 (41.1)	
Two times	72 (41.1)	56 (32.6)	
Three times and more	21 (12)	22 (12.57)	

^aValues are expressed as mean ± SD or No. (%).

^bDerived from t-test for continuous data and chi-square tests for categorical information.

mensions and total scores of healthy lifestyle indexes in the intervention group.

5. Discussion

The intervention in this study was conducted according to the lifestyle needs of women, as described by Campbell (31).

Some surveys have been conducted in Kermanshah about vaginitis and the need for implementation of an educational intervention (32). Thus, the design of the intervention was adjusted based on our understanding of the problem and the context. The results of the present study showed that women of reproductive age with vaginitis need education on genital tract infections (GTIs) and re-

lated self-care processes. Our findings prove that women's needs and interests in education about self-care concerning sexual relationships was more significant than their needs and interests in other educational domains. Enhancement of information, motivation, and behavioral skills is necessary to change the related behaviors and to achieve correct self-care behaviors (33). While there are many factors associated with vaginal health and vaginitis, we had to concentrate on factors that could be improved. A review of the literature about vaginitis showed that lifestyle is associated with vaginitis, i.e., nutrition behaviors such as intake of sugar, dairy, vegetables, and fruits; physical activity such as weight control, normal BMI, and stress management which are related to vaginitis; and mental health, such as good relationships with oth-

Table 2. Results Obtained for Women's Lifestyle (Nutrition Behaviors, Physical Activities, and Mental Health) Score Before and After Intervention in the Intervention Group^a

Variables	Before Intervention	After Intervention	P Value ^b
Nutrition behaviors			
Sweet intake	1.77 ± 0.82	1.93 ± 0.77	< 0.001
Fruit intake	2.44 ± 0.71	2.69 ± 0.51	< 0.001
Vegetable intake	1.70 ± 0.74	2.67 ± 0.53	< 0.001
Dairy intake	1.48 ± 0.66	2.70 ± 0.53	< 0.001
Diet planning for 6 months	1.25 ± 0.50	2.66 ± 0.64	< 0.001
Physical activities			
Habitual routine activities	1.88 ± 0.9	2.68 ± 0.61	< 0.001
Going to gym 3 - 5 times per week	1.01 ± 0.7	1.52 ± 0.82	< 0.001
Walking 3 - 5 times per week at least 30 minutes	1.26 ± 0.62	2.32 ± 0.81	< 0.001
Physical activities even due occupied situation	1.74 ± 0.75	2.81 ± 0.47	< 0.001
Physical activity in bad weather at home	1.22 ± 0.46	2.59 ± 0.71	< 0.001
Continuing physical activity	1.25 ± 0.03	2.66 ± 0.04	< 0.001
Mental health			
Sleep (7 - 8 hours)	2.10 ± 0.81	2.85 ± 0.43	< 0.001
Relaxation (deep breathing, walking)	1.04 ± 0.27	2.20 ± 0.76	< 0.001
Solving problems in mental counseling center	1.03 ± 0.16	1.29 ± 0.53	< 0.001
Relationships	1.31 ± 0.66	1.99 ± 0.80	< 0.001
Discussion with husband about problems	2.35 ± 0.66	2.94 ± 0.27	< 0.001
Good relationship with husband	2.46 ± 0.74	2.95 ± 0.25	< 0.001
Gratitude	1.59 ± 0.78	2.76 ± 0.54	< 0.001
Truth to others	2.26 ± 0.86	2.82 ± 0.47	< 0.001
Selfefficacy	2.76 ± 0.53	2.96 ± 0.22	< 0.001
Responsibility	2.71 ± 0.54	2.95 ± 0.33	< 0.001
Acceptance of mental health education	1.65 ± 0.71	2.86 ± 0.36	< 0.001

^aValues are expressed as mean ± SD.^bDerived from paired t-test.

ers, solving problems, perception of counseling, control of stress, and acceptance of responsibility about health. Therefore, these three aspects of lifestyle, nutrition behaviors, physical activity, and mental health, were the most important subjects in our intervention.

The hypothesis of this study was that health-promoting intervention would lead to improvement of the mean scores of health-promoting lifestyle behaviors associated with vaginal health and prevention of vaginitis. Results of the statistical tests showed a significant difference in the total mean scores of lifestyle and all the dimensions studied between the intervention group and the control group after intervention. No changes were observed in the control group (except for intake of sweets in the control group, which showed a negative significant difference because of a return to use of sweets after Ramadan fasting). Because women in the control group were not aware of good diet in this situation. This indicates the positive effect of health-promoting interventions on the health of reproductive-age women and is in accordance with the results of the study conducted by

Rahimi Froushani et al. (34).

According to the findings, women who received intervention showed increases in scores for nutrition behaviors, physical activities, and mental health. Consequently, their quality of life improved. This indicates that intervention is necessary for women, as Barot has said: "Investments in sexual and reproductive health are necessary to reach global health" (35).

This study aimed to improve women's health and prevent vaginitis and its side effects. To achieve these goals, the educational intervention focused on health-promoting lifestyle behaviors. Health-promoting lifestyle behaviors are a valuable way to reduce the incidence and impact of health problems, reduce health care costs, and improve quality of life (36, 37). Other studies showed that treatment and behavioral intervention programs are both effective methods of treatment, but the behavioral intervention program is superior in terms of cost-effectiveness and lower side effects (38).

Lifestyle factors are related to many diseases that could be prevented through exercise, good nutrition, avoidance

Table 3. Results Obtained for Women's Lifestyle (Nutrition Behaviors, Physical Activities, and Mental Health) Score Before and After Intervention in the Control Group^a

Variables	Before Intervention	After Intervention	P Value ^b
Nutrition behaviors			
Sweet intake	1.87 ± 0.78	1.35 ± 0.52	< 0.001
Fruit intake	2.45 ± 0.76	2.45 ± 0.77	0.86
Vegetable intake	2.13 ± 0.85	2.18 ± 0.84	0.12
Dairy intake	1.89 ± 0.79	1.93 ± 0.83	0.26
Diet planning for 6 months	1.91 ± 0.77	1.95 ± 0.77	0.12
Physical activities			
Habitual routine activities	2.30 ± 0.87	2.29 ± 0.90	0.76
Going to gym 3 - 5 times per week	1.21 ± 0.48	1.20 ± 0.46	0.59
Walking 3 - 5 times per week at least 30 minutes	2.04 ± 0.83	1.97 ± 0.84	0.05
Physical activities even due occupied situation	2.47 ± 0.67	2.45 ± 0.74	0.46
Physical activity in bad weather at home	2.16 ± 0.83	2.19 ± 0.87	0.24
Continuing physical activity	1.91 ± 0.05	1.95 ± 0.05	0.12
Mental health			
Sleep (7 - 8 hours)	2.51 ± 0.66	2.56 ± 0.69	0.07
Relaxation (deep breathing, walking)	1.25 ± 0.55	1.26 ± 0.56	0.31
Solving problems in mental counseling center	1.17 ± 0.41	1.17 ± 0.43	0.76
Relationships	1.58 ± 0.80	1.58 ± 0.80	1.00
Discussion with husband about problems	2.49 ± 0.72	2.46 ± 0.76	0.19
Good relationship with husband	2.53 ± 0.68	2.52 ± 0.71	0.81
Gratitude	2.04 ± 0.94	2.03 ± 0.94	0.65
Truth to others	2.09 ± 0.92	2.08 ± 0.93	0.70
Self-efficacy	2.59 ± 0.64	2.61 ± 0.64	0.31
Responsibility	2.65 ± 0.58	2.59 ± 0.71	0.07
Acceptance of mental health education	2.40 ± 0.79	2.43 ± 0.79	0.13

^a Values are expressed as mean ± SD.^b Derived from paired t-test.

of tobacco and alcohol, psychological well-being, healthy interpersonal relationships, relaxation, stress management, suitable sleeping, spiritual involvement, spending time in nature, and service to others according to Dr. Roger Walsh of the University of California, Irvine's College of Medicine, and Michael O'Donnell (39). The present intervention concentrated on health-promoting lifestyle behaviors to prevent vaginitis and improve vaginal health.

Routine intake of dairy and fresh vegetables and fruits reduces the likelihood of vaginitis, whereas intake of sweets increases the probability of vaginitis (40).

In a study by Watson and Calabretto, vaginal inflammation in a group that consumed yogurt was decreased up to three times. Our study likewise showed that dairy intake in the intervention group increased significantly, and with regular yogurt intake, inflammation of the vagina was almost completely eliminated. Also, women learned in the educational session and via pamphlets that the routine consumption of fruits and vegetables helps to prevent disease, especially vaginitis. Maintaining a balanced diet and awareness of nutritional considerations are vital

for women. In addition, inadequate physical activity leads to obesity, which is a factor for susceptibility to vaginitis. Women perceived that 30 minutes of simple exercises and walking 3 to 5 times per week enabled them to achieve normal BMI and prevent obesity. In a study conducted by Mirghafourvand et al. on women of reproductive age in Tehran, given the fact that physical activity makes positive changes to health. Their studies have reported a relationship between self-efficacy and the sub-domains of health-related lifestyles such as nutrition, physical activity, health responsibility, and other sub-domains. In our study we also tried to raise women's self-efficacy in a simple way. Participants learned to maintain their exercise routine even in a bad situation. For example, dusty and warm weather should not be barriers for exercise. Women also did some simple physical activities at home (41). In a mental health setting, we could improve women's scores. We believe an important aspect of lifestyle related to vaginal health, as described by Fiocco, is stress management, which is essential for maintaining and promoting long-term healthy behavior patterns. Also by Mirghafourvand et al. In a study

Table 4. Comparison of the Mean Difference of Lifestyle (Nutrition Behaviors, Physical Activities, and Mental Health) Scores Between the Intervention and Control Groups^a

Variables	Intervention group	Control group	P Value ^b
Nutrition behaviors	3.98 ± 1.63	-0.38 ± 1.41	< 0.001
Sweet intake	0.137 ± 0.36	-0.52 ± 0.61	< 0.001
Fruit intake	0.24 ± 0.61	0.005 ± 0.43	< 0.001
Vegetable intake	0.97 ± 0.71	0.05 ± 0.44	< 0.001
Dairy intake	1.21 ± 0.65	0.04 ± 0.47	< 0.001
Diet planning for 6 months	1.41 ± 0.71	0.04 ± 0.34	< 0.001
Physical activities	7.33 ± 2.58	-0.08 ± 1.18	< 0.001
Habitual routine activities	0.8 ± 0.85	-0.01 ± 0.51	< 0.001
Going to gym 3 - 5 times per week	0.51 ± 0.82	-0.01 ± 0.28	< 0.001
Walking 3 - 5 times per week at least 30 minutes	1.05 ± 0.9	-0.07 ± 0.5	< 0.001
Physical activities even due occupied situation	1.06 ± 0.75	-0.01 ± 0.31	< 0.001
Physical activity in bad weather at home	1.37 ± 0.75	0.03 ± 0.38	< 0.001
Continuing physical activity	1.61 ± 0.71	0.04 ± 0.34	< 0.001
Mental health	7.33 ± 2.58	0.00 ± 0.88	< 0.001
Sleep (7 - 8 hours)	0.74 ± 0.71	0.04 ± 0.33	< 0.001
Relaxation (deep breathing, walking)	1.16 ± 0.77	0.01 ± 0.15	< 0.001
Solving problems in mental counseling center	0.26 ± 0.49	0.005 ± 0.25	< 0.001
Relationships	0.68 ± 0.65	0.00 ± 0.20	< 0.001
Discussion with husband about problems	0.58 ± 0.68	-0.002 ± 0.3	< 0.001
Good relationship with husband	0.49 ± 0.66	-0.005 ± 0.33	< 0.001
Gratitude	1.17 ± 0.80	-0.005 ± 0.16	< 0.001
Truth to others	0.56 ± 0.73	-0.005 ± 0.22	< 0.001
Self-efficacy	0.20 ± 0.50	0.01 ± 0.22	< 0.001
Responsibility	0.24 ± 0.47	-0.06 ± 0.45	< 0.001
Acceptance of mental health education	1.21 ± 0.7	0.02 ± 0.24	< 0.001

^aValues are expressed as mean ± SD.^bDerived from independent two-sample t-test.

of health-promoting behaviors and their predictors in Iranian women of reproductive age. Jiang et al. (2007) have similar findings in their intervention (42). Women learned how to overcome stress. Pursing relaxing activities such as meditation, breathing slowly and deeply, doing regular exercises, listening to music, maintaining communications with others, especially relatives, and reflective journaling are different ways to manage stress. We used these stress management techniques in the current study. This was in line with the results of Dale et al. Adequate sleep is also a major component of women's health. Determining regular hours for sleeping, having a daily program for walking, eating light meals, and drinking warm milk can promote the quality and quantity of sleeping, and these elements were taught to women. Also, these interventions keep women engaged and increase their self-confidence and responsibility about their health (43). Abedi et al. made similar findings in their study (44).

Currently, considering the importance of self-care in the promotion of health, lifestyle modification, disease prevention, evaluation of symptoms, health protection,

treatment and rehabilitation as a complement to specialized health care, the methods for establishing self-care behaviors are emphasized in disease management (45-47).

Women's health services, particularly sexual and reproductive health services, sometimes are not provided at a level of quality. Quality of care is a multidimensional concept that is affected by stakeholders' priorities; context-based attributes of quality of care include access to care, effectiveness of care, safety, equitability, communication, acceptability, efficiency, and privacy and confidentiality. Quality of care must therefore go side by side with increasing access to information and services. The findings of this study may be used for planning health-promoting interventions among women. We used social media with internet access, pamphlets, phone contact, text messages, face-to-face conversations, and group discussions to educate women with different situations. For example, some women were satisfied with social media because of access to internet and some enjoyed group discussion, while others were interested in phone contacts or pamphlets. Women should be able to choose these methods for them-

Table 5. Comparison of Lifestyle Scores in Control and Intervention Groups After Intervention^a

Variables	Intervention group	Control group	P Value ^b
Nutrition behaviors			
Sweet intake	1.93 ± 0.77	1.35 ± 0.52	0.005
Fruit intake	2.69 ± 0.51	2.45 ± 0.77	0.001
Vegetable intake	2.67 ± 0.53	2.18 ± 0.84	< 0.001
Dairy intake	2.70 ± 0.53	1.93 ± 0.83	< 0.001
Diet planning for 6 months	2.66 ± 0.64	1.95 ± 0.77	< 0.001
Physical activities			
Habitual routine activities	2.68 ± 0.61	2.29 ± 0.90	< 0.001
Going to gym 3 - 5 times per week	1.52 ± 0.82	1.20 ± 0.46	< 0.001
Walking 3 - 5 times per week at least 30 minutes	2.32 ± 0.81	1.97 ± 0.84	< 0.001
Physical activities even due occupied situation	2.81 ± 0.47	2.45 ± 0.74	< 0.001
Physical activity in bad weather at home	2.59 ± 0.71	2.19 ± 0.87	< 0.001
Continuing physical activity	2.66 ± 0.04	1.95 ± 0.05	< 0.001
Mental health			
Sleep (7 - 8 hours)	2.85 ± 0.43	2.56 ± 0.69	< 0.001
Relaxation (deep breathing, walking)	2.20 ± 0.76	1.26 ± 0.56	< 0.001
Solving problems in mental counseling center	1.29 ± 0.53	1.17 ± 0.43	0.002
Relationships	1.99 ± 0.80	1.58 ± 0.80	< 0.001
Discussion with husband about problems	2.94 ± 0.27	2.46 ± 0.76	< 0.001
Good relationship with husband	2.95 ± 0.25	2.52 ± 0.71	< 0.001
Gratitude	2.76 ± 0.54	2.03 ± 0.94	< 0.001
Truth to others	2.82 ± 0.47	2.08 ± 0.93	< 0.001
Self-efficacy	2.96 ± 0.22	2.61 ± 0.64	< 0.001
Responsibility	2.95 ± 0.33	2.59 ± 0.71	< 0.001
Acceptance of mental health education	2.86 ± 0.36	2.43 ± 0.79	< 0.001

^a Values are expressed as mean ± SD.^b Derived from independent t-test.

selves. Because the health of women and adolescent girls, particularly sexual and reproductive health and rights, at its center, as described by Ebrahimi-Tavani et al. (47). We used these strategies to improve knowledge, awareness, attitudes, skills, professional practice, and patient outcomes. The results showed that the health-promoting educational intervention largely reduces the number of relapses of vaginitis in women and promoted a healthier lifestyle. This intervention helped women to learn and adopt health-promoting lifestyle behaviors related to vaginal health and prevention of vaginitis.

Our recommendations for future action include implementing other surveys about reproductive health, especially vaginitis, and about behavioral factors such as sexual behaviors. According to our findings, a trial run of the intervention revealed that the intervention could be delivered with fidelity and was acceptable to patients (33). There is no doubt that such intervention will be beneficial, in which case it should be implemented. Finally, the effects of the intervention are sufficiently promising. In that case, the researcher who understands the underlying problem,

has developed a credible intervention, and has considered the key points in evaluation will be in a strong position to conduct a worthwhile, rigorous, and achievable definitive trial, as suggested by Campbell et al. (31).

5.1. Limitations

Some providers in health care clinics were not satisfied with the presence of researchers in their services field.

5.2. Strengths

Good communication between the researcher and participants led to more instances of contact about health-promoting issues such as reproductive health, mental health, and other health subjects.

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Footnotes

Authors' Contribution: Abbas Rahimiforushani is the corresponding author of this manuscript; he participated in design of the study, the statistical analysis and editing. Roxana Parsapur and Fereshteh Majlessi implemented the data collection and carried out the intervention, biostatistical analysis and final revision of the manuscript. Ali Montazeri, Gholamreza Garmarudi and Roya Sadeghi supervised the study. All authors have studied and approved the content of the present manuscript.

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References

- Workowski KA, Berman S, Centers for Disease C. Sexually transmitted diseases treatment guidelines, 2010. *MMWR Recomm Rep*. 2010;**59**(RR-12):1-110. [PubMed: 21160459].
- Karaer A, Boylu M, Avsar AF. Vaginitis in Turkish women: symptoms, epidemiologic - microbiologic association. *Eur J Obstet Gynecol Reprod Biol*. 2005;**121**(2):211-5. doi: 10.1016/j.ejogrb.2004.11.030. [PubMed: 16054964].
- Karasz A, Anderson M. The vaginitis monologues: women's experiences of vaginal complaints in a primary care setting. *Soc Sci Med*. 2003;**56**(5):1013-21. [PubMed: 12593874].
- Medscape . General Gynecology New York: Medscape; 2016. Available from: http://emedicine.medscape.com/obstetrics_gynecology.
- Tempera G. Vaginal infections: epidemiology and risk factors. *Riv Ostet Ginecol Prat Med Perinat*. 2005;**27**(7-8):280-3.
- Koumans EH, Sternberg M, Bruce C, McQuillan G, Kendrick J, Sutton M, et al. The prevalence of bacterial vaginosis in the United States, 2001-2004; associations with symptoms, sexual behaviors, and reproductive health. *Sex Transm Dis*. 2007;**34**(11):864-9. doi: 10.1097/OLQ.0b013e318074e565. [PubMed: 17621244].
- Al-Aali KY. Prevalence of Vaginal Candidiasis among Pregnant Women Attending Al-Hada Military Hospital, Western Region, Taif, Saudi Arabia. *Int J Sci Res*. 2015;**4**(5):1736-43.
- Sutton M, Sternberg M, Koumans EH, McQuillan G, Berman S, Markowitz L. The prevalence of Trichomonas vaginalis infection among reproductive-age women in the United States, 2001-2004. *Clin Infect Dis*. 2007;**45**(10):1319-26. doi: 10.1086/522532. [PubMed: 17968828].
- Mulu W, Yimer M, Zenebe Y, Abera B. Common causes of vaginal infections and antibiotic susceptibility of aerobic bacterial isolates in women of reproductive age attending at Felegehiwot Referral Hospital, Ethiopia: a cross sectional study. *BMC Womens Health*. 2015;**15**:42. doi: 10.1186/s12905-015-0197-y. [PubMed: 25968607].
- WHO . Sexually transmitted and other reproductive tract infections: a guide to essential practice. Geneva: World Health Organization; 2005.
- UNDP, WHO, World Bank. . Sexually transmitted infections (STIs): the importance of a renewed commitment to STI prevention and control in achieving global sexual and reproductive health. Geneva: WHO; 2013.
- Hafner LM, Pelzer ES. Tubal damage, infertility and tubal ectopic pregnancy: Chlamydia trachomatis and other microbial aetiologies. *Zagreb: InTech*; 2011.
- Xia DY, Liao SS, He QY, Choi KH, Mandel JS. Self-reported symptoms of reproductive tract infections among rural women in Hainan, China: prevalence rates and risk factors. *Sex Transm Dis*. 2004;**31**(11):643-9. [PubMed: 15502670].
- Msuya SE, Mbizvo E, Stray-Pedersen B, Sundby J, Sam NE, Hussain A. Reproductive tract infections and the risk of HIV among women in Moshi, Tanzania. *Acta Obstet Gynecol Scand*. 2002;**81**(9):886-93. [PubMed: 12225308].
- Hillier SL, Nugent RP, Eschenbach DA, Krohn MA, Gibbs RS, Martin DH, et al. Association between bacterial vaginosis and preterm delivery of a low-birth-weight infant. The Vaginal Infections and Prematurity Study Group. *N Engl J Med*. 1995;**333**(26):1737-42. doi: 10.1056/NEJM199512283332604. [PubMed: 7491137].
- Carr PL, Felsenstein D, Friedman RH. Evaluation and management of vaginitis. *J Gen Intern Med*. 1998;**13**(5):335-46. [PubMed: 9613891].
- Sherrard J, Donders G, White D, Jensen JS, European I. European (IUSTI/WHO) guideline on the management of vaginal discharge, 2011. *Int J STD AIDS*. 2011;**22**(8):421-9. doi: 10.1258/ijjsa.2011.011012. [PubMed: 21795415].
- Neggers YH, Nansel TR, Andrews WW, Schwebke JR, Yu KF, Goldenberg RL, et al. Dietary intake of selected nutrients affects bacterial vaginosis in women. *J Nutr*. 2007;**137**(9):2128-33. [PubMed: 17709453].
- Ehrstrom SM, Kornfeld D, Thuresson J, Rylander E. Signs of chronic stress in women with recurrent candida vulvovaginitis. *Am J Obstet Gynecol*. 2005;**193**(4):1376-81. doi: 10.1016/j.ajog.2005.03.068. [PubMed: 16202729].
- Chapple A, Hassell K, Nicolson M, Cantrill J. 'You don't really feel you can function normally': Women's perceptions and personal management of vaginal thrush. *J Reprod Infant Psychol*. 2000;**18**(4):309-19. doi: 10.1080/713683045.
- Pirzadeh A, Sharifirad G, Kamran A. Healthy lifestyle in teachers. *J Educ Health Promot*. 2012;**1**:46. doi: 10.4103/2277-9531.104816. [PubMed: 23555149].
- Sharma R, Biedenharn KR, Fedor JM, Agarwal A. Lifestyle factors and reproductive health: taking control of your fertility. *Reprod Biol Endocrinol*. 2013;**11**:66. doi: 10.1186/1477-7827-11-66. [PubMed: 23870423].
- Feldman LP, Hornik J. The Use of Time: An Integrated Conceptual Model. *J Consum Res*. 1981;**7**(4):407-19. doi: 10.1086/208831.
- Chiou AF, Hsu SP, Hung HF. Predictors of health-promoting behaviors in Taiwanese patients with coronary artery disease. *Appl Nurs Res*. 2016;**30**:1-6. doi: 10.1016/j.apnr.2015.08.008. [PubMed: 27091244].
- Enjebab B, Farajzadegan Z, Taleghani F, Aflatoonian A, Morowatisharifabad MA. Health Promoting Behaviors in a Population-based Sample of Middle-aged Women and its Relevant Factors in Yazd, Iran. *Int J Prev Med*. 2012;**3**(Suppl 1):S191-8. [PubMed: 22826765].
- Motlagh Z, Mazloomi-Mahmoodabad S, Momayyezi M. Study of Health-promotion behaviors among university of medical science students. *Zahedan J Res Med Sci*. 2011;**13**(4):29-34.
- Tol A, Tavassoli E, Shariferad GR, Shojaezadeh D. Health-promoting lifestyle and quality of life among undergraduate students at school of health, Isfahan university of medical sciences. *J Educ Health Promot*. 2013;**2**:11. doi: 10.4103/2277-9531.108006. [PubMed: 24083261].
- Watt RG. Strategies and approaches in oral disease prevention and health promotion. *Bull World Health Organ*. 2005;**83**(9):711-8. [PubMed: 16211164].

29. Chamberlain J, Watt S, Mohide P, Muggah H, Trim K, Bantebya Kyomuhendo G. Women's perception of self-worth and access to health care. *Int J Gynaecol Obstet.* 2007;**98**(1):75-9. doi: [10.1016/j.ijgo.2007.03.019](https://doi.org/10.1016/j.ijgo.2007.03.019). [PubMed: [17459386](https://pubmed.ncbi.nlm.nih.gov/17459386/)].
30. Ray K, Muralidhar S, Bala M, Kumari M, Salhan S, Gupta SM, et al. Comparative study of syndromic and etiological diagnosis of reproductive tract infections/sexually transmitted infections in women in Delhi. *Int J Infect Dis.* 2009;**13**(6):352-9. doi: [10.1016/j.ijid.2008.11.021](https://doi.org/10.1016/j.ijid.2008.11.021). [PubMed: [19237304](https://pubmed.ncbi.nlm.nih.gov/19237304/)].
31. Campbell NC, Murray E, Darbyshire J, Emery J, Farmer A, Griffiths F, et al. Designing and evaluating complex interventions to improve health care. *BMJ.* 2007;**334**(7591):455-9. doi: [10.1136/bmj.39108.379965.BE](https://doi.org/10.1136/bmj.39108.379965.BE). [PubMed: [17332585](https://pubmed.ncbi.nlm.nih.gov/17332585/)].
32. Yarmohammadi S, Taheri G, Mousavi SS, Sheikhepour M, Paykoub MH, Hashemian AH. The Effect of Education on Knowledge, Attitude and Practice of Patients with Vaginitis. *Adv Biol Res.* 2015;**9**(3):196-200.
33. Ebrahimi-Tavani M, Ghofranipour F, Hajizadeh E, Abedini M. Assessment of educational needs among women of reproductive age with common genital tract infections (vaginitis): The first step for developing a self-care educational package. *Int J Women's Health Reprod Sci.* 2015;**3**(4):201-7.
34. Rahimi Foroushani A, Estebsari F, Mostafaei D, Eftekhar Ardebili H, Shojaeizadeh D, Dastoorpour M, et al. The effect of health promoting intervention on healthy lifestyle and social support in elders: a clinical trial study. *Iran Red Crescent Med J.* 2014;**16**(8):18399. doi: [10.5812/ircmj.18399](https://doi.org/10.5812/ircmj.18399). [PubMed: [25389486](https://pubmed.ncbi.nlm.nih.gov/25389486/)].
35. Barot S. Sexual and reproductive health and rights are key to global development: The case for ramping up investment. *Guttmacher Pol Rev.* 2015;**18**(1):1-7.
36. Ahmadi A, Rosta F. Health promoting life style among women of reproductive age. *Woman Dev Pol.* 2014;**11**(4):543-58.
37. Pettaway L, Frank D. Health promoting behaviors of urban African American female heads of household. *ABNF J.* 1999;**10**(1):14-9. [PubMed: [10335137](https://pubmed.ncbi.nlm.nih.gov/10335137/)].
38. Golmakani N, Khadem N, Arabipour A, Kerigh BF, Esmaily H. Behavioral Intervention Program versus Vaginal Cones on Stress Urinary Incontinence and Related Quality of Life: A Randomized Clinical Trial. *Oman Med J.* 2014;**29**(1):32-8. doi: [10.5001/omj.2014.08](https://doi.org/10.5001/omj.2014.08). [PubMed: [24498480](https://pubmed.ncbi.nlm.nih.gov/24498480/)].
39. WHO. Milestones in health promotion: Statements from global conferences. Geneva: World Health Organization; 2009.
40. Al-Ghazzei FH, Tester RF. Biotherapeutic agents and vaginal health. *J Appl Microbiol.* 2016;**121**(1):18-27. doi: [10.1111/jam.13054](https://doi.org/10.1111/jam.13054). [PubMed: [26757173](https://pubmed.ncbi.nlm.nih.gov/26757173/)].
41. Mirghafourvand M, Mohammad-Alizadeh-Charandabi S, Tavanezhad N, Karkhaneh M. Health-promoting lifestyle and its predictors among Iranian adolescent girls, 2013. *Int J Adolesc Med Health.* 2014;**26**(4):495-502. doi: [10.1515/ijamh-2013-0324](https://doi.org/10.1515/ijamh-2013-0324). [PubMed: [24262646](https://pubmed.ncbi.nlm.nih.gov/24262646/)].
42. Jiang ZM, Li YY, Wu JQ, Li WY, Wen ZY, Gao ES, et al. An Intervention Study of Reproductive Tract Infections among Married Women of Reproductive Age in Shanghai. *J Reprod Contraception.* 2007;**19**(1):1-26. doi: [10.1016/s1001-7844\(07\)60014-5](https://doi.org/10.1016/s1001-7844(07)60014-5).
43. Dale H, Brassington L, King K. The impact of healthy lifestyle interventions on mental health and wellbeing: a systematic review. *Mental Health Rev J.* 2014;**19**(1):1-26.
44. Abedi P, Jorfi M, Afshari P. Evaluation of the Health Promotion Lifestyle and its Related Factors in Reproductive Aged Women in Ahvaz, Iran. *Community Health J.* 2015;**9**(1):68-74.
45. Fiocco AJ, Scarcello S, Marzolini S, Chan A, Oh P, Proulx G, et al. The effects of an exercise and lifestyle intervention program on cardiovascular, metabolic factors and cognitive performance in middle-aged adults with type II diabetes: a pilot study. *Can J Diabetes.* 2013;**37**(4):214-9. doi: [10.1016/j.jcjd.2013.03.369](https://doi.org/10.1016/j.jcjd.2013.03.369). [PubMed: [24070883](https://pubmed.ncbi.nlm.nih.gov/24070883/)].
46. Mirghafourvand M, Baheiraei A, Nedjat S, Mohammadi E, Charandabi SM, Majdzadeh R. A population-based study of health-promoting behaviors and their predictors in Iranian women of reproductive age. *Health Promot Int.* 2015;**30**(3):586-94. doi: [10.1093/heapro/dat086](https://doi.org/10.1093/heapro/dat086). [PubMed: [24395956](https://pubmed.ncbi.nlm.nih.gov/24395956/)].
47. Ebrahimi-Tavani M, Ghofranipour F, Hajizadeh E, Abedini M. Assessment of Educational Needs Among Women of Reproductive Age With Common Genital Tract Infections (Vaginitis): The First Step for Developing a Self-care Educational Package. *Int J Women's Health Reprod Sci.* 2015;**3**(4):201-7.