



## Original Article

**Effect of lifestyle education based on Pender model on health-promoting behaviors in HIV positive individuals: A randomized clinical trial study**Farah Khani<sup>1</sup>, Shahzad Pashaeypoor<sup>1\*</sup>, Nasrin Nikpeyma<sup>1</sup>, Anoshirvan Kazemnejad<sup>2</sup><sup>1</sup> Department of Community Health and Geriatric Nursing, School of Nursing and Midwifery, Tehran University of Medical Sciences, Tehran, Iran<sup>2</sup> Department of Biostatistics, Faculty of Medical Sciences, Tarbiat Modares University, Tehran, Iran

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## ABSTRACT

**Background & Aim:** Human Immunodeficiency Virus (HIV) prevalence is increasing, and this disease has become a crisis for the modern world. Today, the survival of patients has been increased, such that HIV is considered a chronic disease. So, Paying attention to health-promoting intervention is necessary. Thus, the current study aims to determine the effect of educating lifestyle based on the Pender model on health-promoting behaviors in HIV patients.

**Methods & Materials:** In this randomized clinical trial study, 70 HIV patients who had inclusion criteria were selected and then divided into intervention and control groups randomly. The intervention group received 6 one-hour education sessions weekly based on Pender lifestyle (nutrition, physical activity, stress management, spiritual growth, interpersonal relationships, and health responsibility). A demographic questionnaire and HPLP2 were used, which were completed by both groups before the intervention and 8 weeks after the intervention. Chi-Square, Fisher, Independent t, and ANCOVA statistical tests and SPSS 16 software were used to analyze data.

**Results:** results showed that there was no significant difference in various dimensions of health-promoting lifestyle between two groups before intervention. However, intervention group scores for nutrition ( $28.08 \pm 6.23$  vs.  $23.58 \pm 6.04$ ), physical activity ( $22.26 \pm 6.46$  vs.  $16.39 \pm 6.09$ ), stress management ( $25.03 \pm 5.14$  vs.  $19.96 \pm 6.41$ ), spiritual growth ( $29.49 \pm 6.11$  vs.  $25.45 \pm 8.54$ ), interpersonal relationships ( $29.17 \pm 6.14$  vs.  $23.11 \pm 7.45$ ) and health responsibility ( $28.36 \pm 6.06$  vs.  $23.89 \pm 5.74$ ) were significantly higher than control group 8 weeks after intervention. Moreover, the total score of health-promoting behaviors had a significant difference in the intervention group compared to the control group ( $166.7 \pm 28.43$  vs.  $134.5 \pm 35.68$ ,  $p < 0.001$ ).

**Conclusion:** Based on the findings, it can be said that educating lifestyle based on the Pender model causes HIV patients to use health-promoting behaviors, which are recommended as a useful theory-based program for managers and providers of health services.

## Introduction

Human Immunodeficiency Virus (HIV) is the cause of AIDS which its prevalence depends on age, gender, and geography. It is increasing worldwide (1), such that it is among the essential concerns of societies, especially in developing countries (2). Based on the report published in 2015, 16000 patients are added to HIV patients daily (3). Moreover, the World Health Organization report in 2016 reveals that 36.7 million

people have AIDS (4), which has increased compared to 29.8 million cases in 2001 (5). Iranian Ministry of Health reported that 36571 cases of AIDS have recorded in Iran until 2017 (6), which shows increased cases of this disease compared to 30183 patients in 2015. It should be mentioned that 85% of patients are men, and 15% are women, and 53% of cases are in the 21-35 age group (7). Today, this disease is considered as a chronic disease. Thus, patients can be empowered to take responsibility for their health and have a healthy lifestyle (8). In this regard, health-promoting behaviors improve their mental and physical health and increase their life quality (9).

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In other words, health-promoting behaviors are strategies for keeping healthy, and health-promoting lifestyle keeps and improves the quality of life, ability, and self-transcendence. Health-promoting behaviors are one of the significant criteria of health which should be educated to people (10).

There are various models for educating health-promoting behaviors in which the Pender model is one of them (11). Pender's health promotion model is a multi-dimensional model that reveals World Health Organization's principles on promoting health and combines constructs from social cognitive theory like self-efficacy and perceived barriers and benefits from Health Belief Model (12). This model describes that when a person believes that his/her behavior will have desired outcomes, he/she is more willing to do it. According to this model, behaviors are affected by social, mental, and environmental factors. Therefore, perceived barriers and benefits, interpersonal factors, and self-efficacy are important constructs for changing behavior and promoting health. In the Pender model, health-promoting behaviors are desired outcomes and the final goal of healthcare interventions (13). Pender model reveals that health-promoting lifestyle includes 6 dimensions (nutrition, regular physical activity, stress management, spiritual growth, health responsibility, and interpersonal relationships), which can increase the quality of life and health and decrease healthcare costs (14).

Various studies have been done with emphasizing health-promoting behaviors and using the Pender model as a theoretical framework on different groups such as adolescents (15) and adults (16), on chronic diseases like diabetes (17), and hypertension and heart diseases (18). Results show that lifestyle education has an essential role in the changing lifestyle of patients with chronic disease and decreases risk factors, and interventions based on the given model improve health-promoting behaviors. However, the required evidence on the effect of the Pender model on different aspects of HIV patients was not found. About

increasing HIV prevalence and the importance of a healthy lifestyle in these individuals, it is necessary to design intervention programs based on this model and evaluate their efficiency. Thus, the current study aims to determine the effect of educating lifestyle based on the Pender model on health-promoting behaviors in HIV patients.

## **Methods**

The current study is a randomized clinical trial. The research population is HIV patients who covered by the Controlling Behavioral Disease Center in the South of Tehran. This center provides services for HIV patients, and all health centers of Southern Tehran send individuals diagnosed with HIV to this center. 70 patients were selected based on research criteria. Inclusion criteria were age higher than 18, literacy, not receiving education program simultaneously, and at least 6 months passed from diagnosis. Exclusion criteria were non-participation in 2 consecutive sessions and withdrawal from the study.

The sample size determined at 95% confidence level, 80% statistical power, and by considering that the effect of educating lifestyle based on the Pender model on health-promoting behaviors in HIV patients is at least  $d = 9$  compared to the control group so that the effect of education program becomes significant. Moreover, the standard deviation of health-promoting behaviors was determined 17.6 and 9.7 for the intervention and control group based on Mohamadipour et al. study (20). On this basis, the sample size was considered 30 for each group, which 35 was predicted by considering 15% drop. Then, 70 patients were selected based on inclusion criteria and their names were written on papers with the same color and were placed in dark pockets in a container. Then, one of the personnel was asked to draw 35 pockets. These pockets were considered as intervention group and other pockets were considered as control group.

A demographic questionnaire and health-promoting behaviors questionnaire were used in this study. Demographic information and disease history questionnaire include 20 questions on age, education, income, diagnosis time, disease period, and using antivirus drugs. Health Promoting Lifestyle Profile (HPLP<sub>2</sub>) was used to examine health-promoting behaviors. This questionnaire has 6 subscales and 52 items which 9 items evaluate the spiritual growth (question 1-9), 9 items evaluate health responsibility (question 12-21), 8 items evaluate physical activity, (question 36-43), 9 items evaluate nutrition (question 44-52), 9 items evaluate interpersonal relationships (question 22-27), and 8 items evaluate stress management (question 10, 38, 30-35). Answer to these items is based on 5-point Likert scale from very low (score 1) to very high (score 5). Score 1 shows the lowest, and score 5 shows the highest. A higher score shows having more health-promoting behaviors, and lower score shows weak health behaviors. In current research, Cronbach's alpha, and ICC were used to assess reliability which was  $\alpha = 0.93$  and  $ICC=0.98$ , respectively.

A pretest was done for both groups after confirmation by the Ethical Committee of Tehran University of Medical Sciences (IR.TUMS.FNM.REC.1395.1296). This trial was registered with the Iranian Registry of Clinical Trials by code IRCT20170121032095N1. Then, healthy lifestyle program was designed based on Pender model by collecting information on Pender model constructs (perceived benefits, perceived barriers, self-efficacy, interpersonal influencers, positional influencers) and Pender lifestyle dimensions (nutrition, physical activity, spiritual growth, stress management, interpersonal relationships, health responsibility) from the most current resources and guidelines.

7 experts confirmed the validity of education program contents, and the package was given to patients in the form of 6 one-hour sessions of lecture, question, and answer, and group discussion. Education sessions were managed based on Pender model constructs. In order to emphasize

perceived barriers and perceived benefits, information related to the subject, its importance, and desired results of doing health behavior were given, and discussion on problems and difficulties of not doing health behaviors and potential solutions was done. Self-efficacy of patients was improved by question and answer and saying their experiences and emphasizing self-efficacy and taking health responsibility. Interpersonal influencers such as being in environments like workshops or conferences that provide the chance of facing similar persons and change the view of these patients on others' behavior were improved by intervention and encouraging patients to continuous presence in sessions. Positional influencers were improved by giving information on the disease, increasing awareness of educational and medical needs, giving information on the importance of actions or choices related to health behaviors, and emphasizing their abilities and skills.

The control group did not receive any education and only provided with routine services, and the education manual was given to them at the end of the study.

Posttest was done 8 weeks after the end of education for both groups for self-report. Data obtained from questionnaires were collected, and descriptive and inferential statistics and SPSS 16 software were used to compare the effect of educating the health-promoting lifestyle before and after the intervention. Mean and standard deviation were used to describe quantitative variables like age, duration of disease, and health-promoting lifestyle. Frequency and percent were used to describe qualitative variables like gender, education, income, disease period, and using retrovirus drug. In order to compare demographic variables, the Chi-Square test and Fisher test were used. Independent t-test and ANCOVA were used to compare dimensions of health-promoting behaviors within and between groups. The significance level was set at  $p<0.05$ .

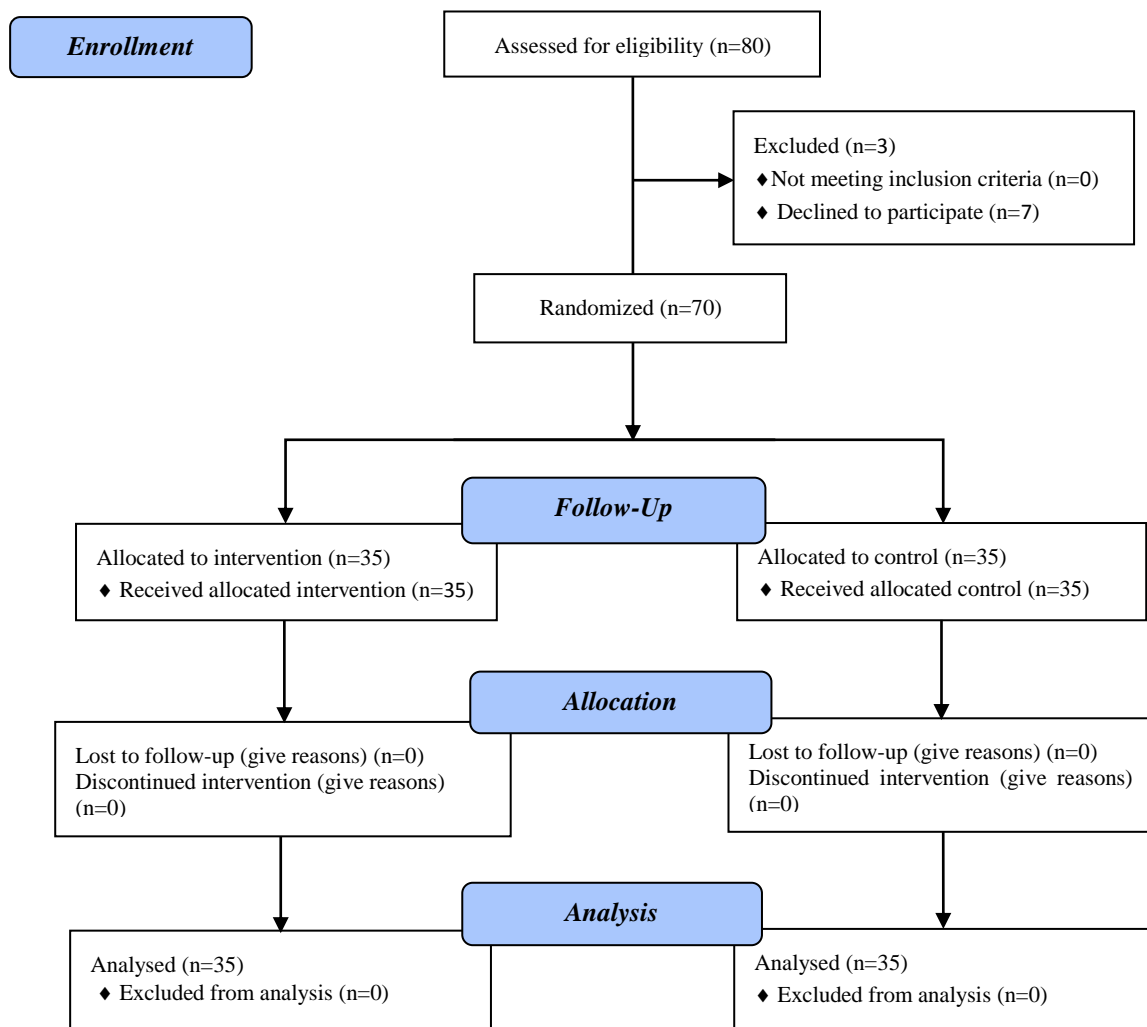
## Results

***Lifestyle education in HIV positive individuals***

70 patients participated in the current study and were present until the end of the research (figure 1). Most of them were women, and their education level was under diploma. The majority did not have good income. Results showed that there is no significant difference between the two groups before the intervention in terms of demographic characteristics. Table 1 shows the details.

Results showed that there is no significant difference between the two groups before the intervention in terms of different dimensions of a health-promoting lifestyle. However, intervention group scores for nutrition (28.08±6.23 vs 23.58±6.04), physical activity (22.26±6.46 vs

16.39±6.09), stress management (25.03±5.14 vs 19.96±6.41), spiritual growth (29.49±6.11 vs 25.45±8.54), interpersonal relationships (29.17±6.14 vs 23.11±7.45) and health responsibility (28.36±6.06 vs 23.89±5.74) were significantly higher than control group. Moreover, total score of health-promoting behaviors was significantly higher in intervention group compared to control group (166.7±28.43 vs 134.5±35.68, p<0.001). The effect of scores before intervention was controlled by ANCOVA analysis at all dimensions of a health-promoting lifestyle. Table 2 presents more details.



**Figure1.** Consort flow diagram of the study

**Table 1.** Comparison of demographic variables in the intervention and control groups

Variable	Level	Control (N=35)	Intervention (N=35)	P value
		N (%)	N (%)	
Gender	Female	10 (28.6)	12 (34.3)	P= 0.60*
	Male	25 (71.4)	32 (65.7)	
Education Level	Under Diploma	26 (74.3)	24 (68.6)	P= 0.62**
	Diploma	8 (22.9)	11 (31.4)	
	Upper Diploma	1 (2.9)	0	
Income adequacy	Yes	1 (2.9)	3 (8.6)	P= 0.38**
	No	23 (65.7)	18 (51.4)	
	Somewhat	11 (31.4)	14 (40)	
Stage of disease	Without symptoms	10 (28.6)	16 (45.7)	P= 0.21*
	With symptoms	25 (71.4)	19 (54.3)	
Status about anti retrovirus HIV	Yes	31 (88.6)	33 (94.3)	P= 0.67**
	No	4 (11.4)	2 (5.7)	
Duration of disease (yr)	Mean (SD)	4.977±4.40	5.94±3.03	P= 0.29***
Age (yr)	Mean (SD)	34.91±7.93	41.54±9.79	P= 0.4***

\*Chi-square, \*\*Fisher's exact test, \*\*\* Independent t-test

**Table 2.** Comparison of the mean±sd scores of health promotion behavior dimensions before and after intervention between two groups

	Before intervention		P value*	2 months after intervention		P value**
	Intervention	Control		Intervention	Control	
Nutrition	23.37±6.088	27.20±6.78	0.015	28.08±6.23	23.85±6.04	0.003
Physical activity	16.97±6.26	18.77±7.06	0.2	22.26±6.46	16.39±6.09	0.001
Stress management	20.91±6.00	22.23±6.30	0.37	25.03±5.14	19.96±6.41	0.001
Spirituality growth	27.23±7.36	26.69±8.12	0.77	29.49±6.11	25.45±8.54	0.004
Interpersonal relationships	26.09±7.07	27.60±6.58	0.35	29.17±6.14	23.11±7.45	0.001
Health responsibility	28.83±7.93	30.23±6.49	0.42	28.36±6.06	23.89±5.74	0.002
Health promotion behaviors	144.26±29.78	152.83±31.91	0.24	166.7±28.43	134.5±35.68	0.001

\* Independent t-test, \*\* ANCOVA

## Discussion

Current research examines the effect of educating lifestyle based on the Pender model on health-promoting behaviors of HIV<sup>+</sup> patients. Results showed that lifestyle education programs based on Pender model could affect health-promoting behaviors in HIV patients. Various studies have shown the efficiency of educational intervention based on health-promoting model on lifestyle and related factors such as self-efficacy, perceived barriers, and benefits, and other constructs of Pender health-promoting model which describe the success of using Pender model as a suitable strategy for intervention and behavior prediction (15, 18).

Findings showed that education programs based on the Pender model could affect the nutrition of patients and improve nutrition behaviors. Smith et al. (2015) studied nutritional weakness, nutritional insecurity, and nutritional status of AIDS patients and showed that HIV patients have some weaknesses and deficiencies compared to other patients or persons (21).

Wanke and Saghayam (2015) showed that nutritional education as an intervention improves nutritional knowledge and behavior (22). Khodaveisi et al. (2016) examined the effect of the Pender model on nutritional behaviors and showed that there is a direct relationship between education based on the Pender model and nutritional behaviors.

Moreover, educational intervention changes perceived barriers, causes commitment to action, and as a result, changes nutritional behavior, which is consistent with current study (23). In HIV<sup>+</sup> patients, significant nutritional insecurities occur concerning possibility of high-risk behaviors, which increases the role of caregivers in educating healthy nutritional behavior.

Moreover, results showed that education based on the Pender model causes regular physical activity in HIV patients. Results of Noorzi et al. (2010) study showed that a higher percent of experimental group was in readiness, action, and continued steps 3 and 6 months after educational intervention based on Pender model compared to control group. They concluded that presenting educational intervention based on health-promoting model affects step of physical activity in addition to increasing physical activity (24). The main difference of current research with previous studies is that research samples are from vulnerable groups of society, and although they were at the emergence of clinical symptoms level, intervention based on Pender model could make a significant difference in intervention group. In this regard, we can refer to Somarriba et al. (2010) study, which examined the effect of age, gender, nutrition, and physical activity in HIV patients. They found that regular physical activity affects spiritual and emotional health of HIV patients. Moreover, increased number of CD<sub>4</sub> cells is one of the most critical outcomes of doing physical activity by HIV patients, which was reported in this study (25). Therefore, implementing interventions that increase patients' motivation for doing physical activity is important.

The results of the current study showed that education programs based on Pender model could improve stress management in HIV patients. Since studies show that stress management can have an essential role in rebuilding the immunity system in HIV patients (26, 27), Pender model can improve controlling disease progress. The results of the current study showed the efficiency of

Pender model on spiritual growth of HIV patients. Spirituality is one of the most essential resources in decreasing the sense of pain in patients, which can help accepting disease better and increasing self-confidence (28).

The interpersonal relationship was also increased after educational intervention based on the Pender model. Results showed that educating the ability to make interpersonal relationship can positively affect follow up treatment by HIV patients and causes commitment to treatment (29).

Non-controllable confounding variables like different psychological characteristics, different social and cultural backgrounds, the difference in interpersonal relationships, economic problems, and the difference in motivation and interests that can affect learning are among limitations of current research which the effect of these variables was modified by randomly assigning samples to intervention and control groups.

## **Conclusion**

The results of the current study showed improved health responsibility after the intervention in HIV patients, which is consistent with some other studies (20, 30).

It can be said that based on findings of current research, that designed intervention can affect the lifestyle of HIV patients. Moreover, concentrating on aspects of lifestyle and improving their quality can be a useful action to improve their health. Thus, it is recommended to present the given educational package to similar persons in healthcare centers.

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## **Conflict of Interest**

The authors of this study declare no conflicts of interest.

## References

1. Derman EW, Whitesman S, Dreyer M, Patel DN, Nossel C, Schwellnus MP. Healthy lifestyle interventions in general practice: Part 9: Lifestyle and HIV/AIDS. *South African Family Practice*. 2010 Jan 1;52(1):11-6.
2. Shamsipour M, Khajehkazemi R, Haghdoost AA, Setayesh H, KarimanMajd S, Mostafavi E. Knowledge, attitude, and practice of clerical students with respect to HIV/AIDS in Iran, 2011. *Journal of religion and health*. 2016 Feb 1;55(1):26-37.
3. A series of health reports in the Islamic Republic of Iran Report actions, achievements and challenges. Available at: <http://aids.behdasht.gov.ir/uploads/dastavardha.pdf>
4. Iran AIDS progress report. Available at: [http://www.who.int/hiv/data/epi\\_core\\_july2015.png](http://www.who.int/hiv/data/epi_core_july2015.png). Accessed July 21, 2015.
5. The epidemiology of AIDS in Iran. Available at: [http://www.who.int/gho/hiv/epidemic\\_status/cases\\_all\\_text/en/](http://www.who.int/gho/hiv/epidemic_status/cases_all_text/en/)
6. The latest HIV statistics in Iran. Available at: <http://behdasht.gov.ir/?siteid=1&pageid=1508&newsview=169553>
7. The latest statistics of AIDS. Available at: <http://behdasht.gov.ir/?siteid=1&pageid=1508&newsview=129360>
8. Zhang C, Li X, Liu Y, Zhou Y, Shen Z, Chen Y. Impacts of HIV stigma on psychosocial well-being and substance use behaviors among people living with HIV/AIDS in China: Across the life span. *AIDS Education and Prevention*. 2018 Apr;30(2):108-19.
9. Wiersema JJ, Santella AJ, Dansby A, Jordan AO. Adaptation of an Evidence-Based Intervention to Reduce HIV Risk in an Underserved Population: Young Minority Men in New York City Jails. *AIDS Education and Prevention*. 2019 Apr;31(2):163-78.
10. Walker LO, Avant KC. *Strategies for theory construction in nursing*. 4th Edition. USA: Pearson Prentice Hall; 2011
11. Nies MA, McEwen M. *Community/Public Health Nursing-E-Book: Promoting the Health of Populations*. Elsevier Health Sciences; 2014
12. Shaahmadi F, Shojaeizadeh D, Sadeghi R, Arefi Z. Factors Influencing Health Promoting Behaviours in Women of Reproductive Age in Iran: Based on Pender's Health Promotion Model. *Open access Macedonian journal of medical sciences*. 2019 Jul 30;7(14):2360.
13. Pender NJ, Murdaugh CL, Parsons MA. The health promotion model. *Health promotion in nursing practice*. 2002;4:59-79.
14. Bhandari P, Kim M. Predictors of the health-promoting behaviors of Nepalese migrant workers. *Journal of Nursing Research*. 2016 Sep 1;24(3):232-9.
15. Mohamadian H, Eftekhar H, Rahimi A, Mohamad HT, Shojaiezade D, Montazeri A. Predicting health-related quality of life by using a health promotion model among Iranian adolescent girls: A structural equation modeling approach. *Nursing & Health Sciences*. 2011 Jun;13(2):141-8.
16. Cho SH, Choi M, Lee J, Cho H. Relationship between Expectations Regarding Aging and Physical Activity among Middle Aged Adults in Urban Areas: Based on the Pender's Health Promotion Model. *Journal of Korean Academy of Nursing*. 2015 Feb 1;45(1).
17. Cho SH, Choi M, Lee J, Cho H. Relationship between Expectations Regarding Aging and Physical Activity among Middle Aged Adults in Urban Areas: Based on the Pender's Health Promotion Model. *Journal of Korean Academy of Nursing*. 2015 Feb 1;45(1).
18. Holcomb K. Hypertension: Enhancing Lifestyle Management through Patient Education and Pender's Health Promotion Model. *Doctor of Nursing Practice (DNP) Projects*. 98.2017; Retrieved from [https://scholarworks.umass.edu/nursing\\_dnp\\_caps\\_tone/98](https://scholarworks.umass.edu/nursing_dnp_caps_tone/98)
19. Mohammadi Zeidi I, Pakpour Hajiagha A, Mohammadi Zeidi B. Reliability and validity of Persian version of the health-promoting lifestyle profile. *Journal of Mazandaran University of Medical Sciences*. 2012 Mar 15;21(1):102-13.
20. Mohammadipour F, Izadi Tameh A, Sepahvand F, Naderifar M. The impact of an educational intervention based on Pender's health promotion model on the lifestyle of patients with type II diabetes. *Journal of Diabetes Nursing*. 2015 Jan 10;2(4):25-35.
21. Smit E, Wanke C, Dong K, Grotheer A, Hansen S, Skinner S, Tang AM. Frailty, food insecurity, and nutritional status in people living with HIV. *The Journal of frailty & aging*. 2015 Dec 1;4(4):191.
22. Saghayam S, Wanke C. The impact of nutritional status and nutrition supplementation on outcomes along the HIV treatment cascade in the resource-limited setting. *Current Opinion in HIV and AIDS*. 2015 Nov 1;10(6):472-6.

23. Khodaveisi M, Omid A, Farokhi S, Soltanian AR. The effect of Pender's health promotion model in improving the nutritional behavior of overweight and obese women. *International journal of community based nursing and midwifery*. 2017 Apr;5(2):165.
24. Noroozi A, Tahmasebi R, Ghofranipour F. Effect of health promotion model (HPM) based education on physical activity in diabetic women. *Iranian Journal of Endocrinology and Metabolism*. 2011 Nov 15;13(4):361-7.
25. Somarriba G, Neri D, Schaefer N, Miller TL. The effect of aging, nutrition, and exercise during HIV infection. *HIV/AIDS (Auckland, NZ)*. 2010;2:191.
26. Antoni MH, Cruess DG, Klimas N, Carrico AW, Maher K, Cruess S, Lechner SC, Kumar M, Lutgendorf S, Ironson G, Fletcher MA. Increases in a marker of immune system reconstitution are predated by decreases in 24-h urinary cortisol output and depressed mood during a 10-week stress management intervention in symptomatic HIV-infected men. *Journal of psychosomatic research*. 2005 Jan 1;58(1):3-13.
27. Sabet AH, Khalatbari J, Ghorbani MA, Haghghi M, Ahmadpanah M. Group training of stress management vs. group cognitive-behavioral therapy in reducing depression, anxiety and perceived stress among HIV-positive men. *Iranian journal of psychiatry and behavioral sciences*. 2013;7(1):4-8.
28. Kaya Y, Beji NK, Aydin Y, Hassa H. The effect of health-promoting lifestyle education on the treatment of unexplained female infertility. *European Journal of Obstetrics & Gynecology and Reproductive Biology*. 2016 Dec 1;207:109-14.
29. Mabuto T, Charalambous S, Hoffmann CJ. Effective interpersonal health communication for linkage to care after HIV diagnosis in South Africa. *Journal of acquired immune deficiency syndromes (1999)*. 2017 Jan 1;74(Suppl 1):S23.
30. Khosravan S, Alami A, Mansoorian MR, Kamali M. The Effect of Intervention Based on Pender's Model of Health-Promoting Self-Care Behaviors in Women who are the Head of their Household. *Nurs Midwifery Stud*. 2016;5(4):e37253.