

Social capital and self-rated health in people living with HIV: a cross-sectional study

Sara Roosta Pisheh¹, Hoorvash Farajidana², Mina Ataei³, Maryam Hashemnejad³, Zohreh Mahmoodi⁴

¹Student Research Committee, Alborz University of Medical Sciences, Karaj, Iran

²Department of Forensic Medicine and Medical Ethics, Alborz University of Medical Sciences, Karaj, Iran

³Department of Obstetrics and Gynecology, School of Medicine, Alborz University of Medical Sciences, Karaj, Iran

⁴Social Determinants of Health Research Center, Alborz University of Medical Sciences, Karaj, Iran

Abstract

Introduction: Apart from physical conditions, health is considered a product of general policies forming social environment to which people are exposed. The present study aimed to determine the relationship between social capital and self-rated health (SRH), also known as self-assessed health or self-perceived health, in people living with human immunodeficiency virus (HIV).

Material and methods: The present descriptive-analytic study was conducted among 321 patients with immunodeficiency at the West Tehran Behavioral Diseases Center in 2020-2021. Data were collected using social capital questionnaire (SCQ), and personal information checklist involved SRH questions. SPSS Statistics version 25.0 software was employed for data analysis.

Results: Majority of participants with SRH status were between 31 and 40 years old (44.2%). Based on linear regression test, two social capital components, such as social agency, i.e., proactivity and initiation in social contexts ($B = 0.231, p = 0.028$), and value of life ($B = 0.163, p = 0.009$), were the most positive predictor variables. On the other hand, intentional non-adherence to treatment was the most negative predictor variable ($B = -0.320, p \leq 0.001$) in patients who self-rated their health status.

Discussion and conclusion: Social agency, such as proactivity and initiation in social contexts, and value of life, had a statistically significant relationship with SRH status of HIV patients. Other social support components were not statistically significant. However, statistically significant relationship between social agency and value of life with SRH status highlights the necessity of taking actions, including preventing social isolation, being attentive to this group of people, and the role of the mentioned factors in SRH status.

HIV AIDS Rev 2025; 24, 3: 242-248
DOI: <https://doi.org/10.5114/hivar/159108>

Key words: social capital, self-rated health, HIV, PLHIV.

Introduction

Human immunodeficiency virus (HIV), followed by acquired immuno-deficiency syndrome (AIDS) continues to be one of the world's most serious public health issues [1]. This

disease is a health-medical phenomenon, entangling social, cultural, and economic aspects. Even though HIV-infected patients are facing life-lasting stress, pain, uncertainty, hopeless future, and feeling of being at "death's door", the sufferers

Address for correspondence: Dr. Zohreh Mahmoodi, Social Determinants of Health Research Center, Alborz University of Medical Sciences, 0098, Karaj, Iran, e-mail: zohrehmahmoodi2011@gmail.com

Article history:
Received: 10.12.2022
Revised: 07.01.2023
Accepted: 09.01.2023
Available online: 15.07.2025



endure a sense of rejection, discrimination, humiliation, and other sorts of pressure and rejection from their societies [2]. In addition to its personal consequences, HIV leads to problems encountered in society, such as workforce shortages, decreased life expectancy, and downfall of social structures [3].

A human is a social being, and social interaction is one of the primary factors affecting individuals' quality of life (QoL). Many research studies have revealed that a supportive environment positively influences the physical and psychosocial aspects and life satisfaction of people living with AIDS [4]. Nowadays, social capital is described as the networks of beneficial relationships among individuals [5]. Pronyk *et al.* [6] highlighted the vital roles of social capital and community cohesion in successful implementation of HIV treatment. The authors' viewpoint was founded upon the capacity to fight HIV stigma through interaction between individuals and societies. One of the most ever-present concerns regarding social capital is its relationship with an individual's health status, especially in the last two decades [7].

Apart from physical conditions, health is considered a product of general policies forming social environment to which people are exposed [8]. In health research, this variable has the most significant value, and its estimation has always been one of the challenges health researchers encounter. Self-rated health (SRH) is a valid and practical indicator to determine health status [9], and personal perception of one's health status is a highly critical indicator of one's QoL [10]. Social capital is linked to an individual's health status through several factors, such as lifestyle and socio-economic variables [7]. A study conducted in Canada between 2013 and 2015 among two groups of HIV-infected and healthy women, revealed that social elements and structural inequality were directly related to SRH status [11]. Health is the most fundamental component of social welfare that relies mostly on socio-economic factors rather than medical interventions, and is one of the central concepts of sustainable development [12]. Therefore, due to the significance of the issue, we decided to conduct a study to determine the relationship between social capital and SRH in people living with HIV (PLHIV).

Material and methods

Design

This descriptive-analytic cross-sectional study was conducted among 321 participants (males and females), who have been referred to the West Tehran Behavioral Diseases Center in 2020-2021. This health center is a referral center for patients with immunodeficiency disorders in western regions of Tehran.

Study population

According to Shokoohi *et al.* study [13], an *a* value of 0.05, a *b* value of 0.1, and a correlation coefficient of 0.18 be-

tween social determinants and mental health were assumed, and the sample size was determined as 321 respondents, giving the following formula:

$$n = Z_a + Z_b/C^2 + 3$$

$$c = \ln(1+r)/\ln(1-r)$$

Inclusion and exclusion criteria

Inclusion criteria

Data on HIV infection derived from patients' medical records of the center, Iranian nationality, no mental disorders (according to patients or their files), no use of psychotropic medications, and basic literacy.

Exclusion criteria

Severe illness, COVID-19 infection, relocation during the study, making it impossible to complete the questionnaire, and inability to answer study's questions.

Data collection and definition of terms

Data were collected using social capital questionnaire (Onyx and Bullen, 2000), and personal information checklist involved SRH questions.

Social capital questionnaire

Onyx and Bullen [14] developed social capital questionnaire (SCQ) with eight sub-scales to measure the concept of social capital from an individual point of view. Sub-scales included community participation, sense of trust, neighborhood connections, family and friend connections, value of life, social proactivity, diversity tolerance, and workplace connections. SCQ contain 36 items, and scoring system was designed based on a 4-point Likert scale. The sum of all thirty-six questions provides total score, and the total score of eight health variables varies between 0 and 100. Higher scores indicate better social capital. Eftekhari *et al.* [15] ensured the questionnaire's validity and reliability in Iran. The intra-class correlation coefficient of sub-scale scores was over 0.70, while internal consistency (Cronbach's α coefficient of reliability) was 0.96 [15]. In the present study, Cronbach's α coefficient of 0.85 confirmed reliability.

Health status (SRH)

SRH is a notable and beneficial indicator in health research employed to predict health issues economically by including it in questionnaires. It is noteworthy that SRH measures health perceived by individuals [16] using one question: "How do you evaluate your current health status?". The five-point Likert's scale scored the variation on a continuum from "excellent" to "very poor". In Iran, Ms. Nedjat

[17] examined the validity and reliability of the Persian version of the World Health Organization's health status questionnaire, which was approved to evaluate the general health status in Iran.

Personal information checklist

A researcher-made checklist of demographic information comprised questions regarding current personal relationship status, number of children, illness duration, adherence to treatment, medication use duration, age, education level, alcohol consumption in the past six months, number of smoked cigarettes, drug injections in the past six months, and substance abuse in the past six months.

Procedure

After obtaining the required authorization and approval from the Ethics Committee of Alborz University of Medical Sciences, the study was started. Due to the COVID-19 pandemic restrictions and rigorous implementation of health protocols, there was a limited number of patients visiting the center. Therefore, measures to solve this issue and achieve maximum population diversity were undertaken. In order to identify eligible participants, the researcher went to the center and search through patients' case files. Then, potential candidates were phoned, and objectives of the study were explained. Willing patients were asked if they intended to participate in person or online. Those who decided to be visiting the center were given written consent forms. The rest received their forms through the center or via the Internet. After collecting consent forms, the social capital questionnaire and checklist of personal information with questions on health status were provided to individuals either in person or online with Pars tools. The researcher collected data by telephone interviews from participants who could not participate in the study in person or online. Patients were assured about confidentiality of their information, and that they had no obligation to participate in the study. Also, patients were informed that no one will prevent their access to health services if they will not participate in the study.

Data analysis

After obtaining questionnaires, data were entered into SPSS Statistics version 25.0 [18] software. Kolmogorov-Smirnov (K-S) test was applied to assess normality of quantitative variables. Data were analyzed using χ^2 , ANOVA, and linear regression statistical tests. Assumptions for linear regression, such as normality, homoscedasticity, and linear relationship, were verified.

Results

The present study analyzed data obtained from 321 patients (209 males and 112 females). According to the findings, the majority of patients were between 31 and 40 years

old (44.2%), had a high school diploma or lower degrees (76.6%), had one sexual partner (75.1%), and had been infected with HIV for not more than five years (52.9%). Among unhealthy behaviors, smoking and alcohol consumption were prevalent, with 32.1% and 21.8%, respectively (Table 1). The health status of most of the participants was good (64.2%), and the average score was 3.86 ± 0.79 . The average score of the total social capital among the participants was 76.32 (mean, 14.94), and the highest average among its variables was that of social agency, i.e., proactivity and initiation in social contexts (17.25 ± 3.638) (Table 2).

Linear regression approach was employed to determine the relationship between SRH status and social capital according to personal and social variables. Subcutaneous, oral, and nasal drug administration in the past six months, having one to five children, substance abuse for more than 21 years, adherence to treatment, and social agency, i.e., proactivity and initiation in social contexts and value of life as two components of social capital, had a significant relationship with health status. Social agency, i.e., proactivity and initiation in social contexts ($B = 0.231$) was the most positive predictor variable. On the other hand, intentional non-adherence to treatment was the most negative predictor variable ($B = -0.320$) in SRH status. In other words, if the score of this social capital variable raised by one point, the SRH status increased by 0.05. Furthermore, non-adherence to treatment reduced SRH status by 0.96, as compared with adherence to treatment (Table 3). Based on the results of the study, the predictor variables determined 33% of differences in the criterion variable (Table 4).

Discussion

Health is a fundamental requirement in any social function. Humans can perform fully (provided that they are healthy), feel healthy, and are considered healthy by their surrounding society. However, these three qualities may not always correspond with each other [19]. Social factors play a vital role in building, maintaining, and terminating these aspects. Not only do social situations enhance the possibility of disease or disability, they also support disease prevention and health maintenance [20].

In the present study, according to linear regression, assessing social capital components, social agency and value of life were the most positive predictors of SRH status in people living with immunodeficiency/HIV. The findings are consistent with Kim's *et al.* study [21], which confirmed the positive relationship between social capital and SRH status. In the current research, the social-capital total score showed no statistically significant relationship with the SRH status. Of all social components, social agency and value of life were statistically significant, and had the most positive relationship with SRH. This discrepancy could be due to the test type, variables, demographic diversity, age group, or use of different instruments to investigate social capital. Here, both sexes' data were collected. After testing, we found that sex was of no significance. However, many studies

Table 1. Socio-demographic characteristics of participants

Variables	n (%)
Gender	
Males	209 (65.1)
Females	112 (34.9)
Age (years)	
< 20	3 (0.9)
21-30	57 (17.8)
31-40	142 (44.2)
41-50	115 (35.8)
51-60	4 (1.2)
Education	
Diploma and below	217 (76.6)
Associate degree	33 (10.3)
BS	63 (19.6)
MS and above	8 (2.5)
Insurance	
Yes	171 (53.3)
No	150 (46.7)
Duration of the disease (years)	
< 5	173 (53.9)
6-10	77 (24.0)
11-15	26 (8.1)
16-20	5 (1.6)
> 20	3 (0.9)
Using drugs (years)	
< 5	210 (65.4)
6-10	77 (24.0)
11-15	26 (8.1)
16-20	5 (1.6)
> 20	3 (0.9)
Adherence to treatment	
Yes	207 (95.6)
No	14 (4.4)
Personal relationship status	
Temporary	12 (3.7)
Permanent	142 (44.2)
Single, with a sexual partner	88 (27.4)
Single, with no sexual partner	79 (24.6)
Alcohol consumption	
Yes	70 (21.8)
No	251 (78.2)
Drug use (inhalation/ oral) in the last 6 months	
Yes	27 (8.4)
No	294 (91.6)

Table 1. Cont.

Variables	n (%)
Drug injection in the last 6 months	
Yes	2 (0.6)
No	319 (99.4)
Smoking	
Yes	103 (32.1)
No	218 (67.9)
Family's economic status	
Very low	54 (16.8)
Low	86 (26.8)
Average	171 (53.3)
High	7 (2.2)
Very high	3 (0.9)
Number of children	
0	172 (53.6)
1	69 (21.5)
2	61 (19.0)
3	13 (4.0)
≥ 4	6 (4.6)

Table 2. Social capital and self-rated health in people with HIV or immunodeficiency referred to the Behavioral Diseases Clinic of West Tehran Health Center

Variable	Mean (SD)
Social capital	
Community participation	11.08 (4.783)
Social agency, proactivity, and initiation in social contexts	17.25 (3.638)
Sense of trust	11.08 (2.903)
Neighborhood connections	9.70 (2.720)
Family and friend connections	7.24 (1.849)
Neighborhood connections	
Value of life	4.73 (1.379)
Workplace connections	10.53 (3.029)
Diversity tolerance	4.71 (1.471)
Total, mean (SD)	76.32 (14.94)
Variable	n (%)
Self-rated health	
Very poor	7 (2.2)
Poor	13 (4.0)
Sometimes good	46 (14.3)
Good	206 (64.2)
Excellent	49 (15.3)
Total, mean (SD)	3.86 (0.79)

Table 3. Relationship between self-rated health and social capital in people with HIV and immunodeficiency referred to the Behavioral Diseases Clinic of West Tehran Health Center, in terms of demographic factors

Predictive variable	B	SE	Beta	t	p-value
Constant	4.256	1.064		4.001	< 0.001
Gender	-0.116	0.100	-0.069	-1.165	0.249
Age	-0.004	0.007	-0.036	-0.591	0.555
Multiple sexual partners	-0.038	0.111	-0.021	-0.343	0.732
Use a condom	-0.115	0.114	-0.062	-1.006	0.315
Having a sexual partner with HIV	0.030	0.054	0.030	0.599	0.577
Insurance statuses	0.024	0.084	0.016	0.286	0.775
Alcohol consumption in the last 6 months	0.097	0.105	0.050	0.929	0.354
Drug use (inhalation/ oral) in the last 6 months	0.530	0.154	0.185	3.444	< 0.001
Drug injection in the last 6 months	-1.011	0.500	-0.100	-2.022	0.044
Smoking	0.092	0.094	0.054	0.977	0.330
Adherence to treatment	-0.969	0.156	-0.320	-6.209	< 0.001
Having a job	0.094	0.092	0.063	1.032	0.303
Personal relationship status					
Temporary	-0.069	0.243	-0.017	-0.286	0.775
Single, with a sexual partner	-0.030	0.121	-0.019	-0.252	0.801
Single, with no sexual partner	-0.034	0.146	-0.018	-0.232	0.816
Duration of the disease (years)					
6-10	-0.105	0.135	-0.057	-0.781	0.436
11-15	-0.187	0.184	-0.079	-1.013	0.312
16-20	-0.244	0.235	-0.076	-1.036	0.301
> 20	0.386	0.587	0.060	0.657	0.512
Number of children					
1	0.236	0.114	0.122	2.071	0.039
2	0.245	0.126	0.121	1.949	0.052
3	0.291	0.206	0.072	1.411	0.159
4	0.340	0.347	0.053	0.980	0.328
5	0.236	0.114	0.122	2.071	0.039
Drugs using (years)					
6-10	-0.050	0.140	-0.027	-0.358	0.721
11-15	0.009	0.217	0.003	0.043	0.966
16-20	0.171	0.380	0.027	0.450	0.653
> 21	-1.786	0.705	-0.214	-2.507	0.013
Education					
Associate degree	-0.219	0.141	-0.084	-1.550	0.122
BS	-0.017	0.110	-0.009	-0.156	0.876
MS and above	-0.235	0.260	-0.046	-0.906	0.366
Social economic status	0.009	0.016	0.034	0.555	0.579
Social capital					
Social agency, proactivity, and initiation in social contexts	0.050	0.023	0.231	2.211	0.028
Sense of trust	0.009	0.022	0.033	0.415	0.678
Neighborhood connections	-0.005	0.024	-0.016	-0.189	0.850
Family and friend connections	-0.033	0.032	-0.077	-1.038	0.300
Value of life	0.094	0.036	0.163	2.613	0.009
Workplace connections	0.026	0.018	0.099	1.419	0.157
Diversity tolerance	0.011	0.032	0.021	0.351	0.726
Total number	0.001	0.012	0.019	0.088	0.930

Table 4. Summary of multiple linear regression model for predicting health status with social capital in people with HIV and immunodeficiency referred to the Behavioral Diseases Clinic of West Tehran Health Center

SE	Adj R ²	R ²	R
0.653	0.330	0.414	0.643

focused only on one group (either females or males), or a group other than people living with HIV [7, 21, 22]. The exceptional feature of the present study is the statistical significance of the two components, which are the most debated issues in this vulnerable group. The role of social agency and value of life are in line with the findings of Carr and Gramling [23]. Their study revealed that the primary obstacle in AIDS was social rejection and discrimination against patients, which was directly related to the health status of individuals.

The mechanism, by which social capital is related to health issues, has not been fully clarified yet, but there is ample evidence to prove it. People who isolate themselves from society for any reason are at risk of poor health conditions due to limited access to resources, such as awareness-spreading means and emotional support [21]. Another principal hypothesis in this regard is the relationship between social capital and its impact on health behaviors. The path analysis study conducted by Erin *et al.* [24] confirmed the indirect relationship and mediating role of social capital on health behaviors.

In the current study, majority of HIV-infected patients rated their health status as "good". The results are consistent with a study of Alguero *et al.* [25] who investigated the SRH status of HIV-infected people, and found that 67.5% PLHIV described their health status as "good" and "very good". This personal perception of health status can be attributed to various reasons, including having access to antiviral therapies, advanced healthcare, and increased survival rate [26]. On the other hand, non-adherence to treatment can be associated with several causes, such as stigma, social isolation, patient's perception of disease, lack of social support, and socio-economic factors [27]. In the present study, non-adherence to treatment was another variable showing the most negative predictive relationship with the self-health status. In other words, the SRH status of patients who did not adhere to treatment was unfavorable. Studies demonstrated that patients who abandon treatment have lower CD4+ counts, and are in worse health condition than patients who adhere to treatment [28].

The process of coping with a chronic illness is dynamic, and constantly affected by individual and environmental stimuli. In this process, the patient must face individual and environmental challenges to achieve satisfactory mental and physical health and function levels [29]. Therefore, it is highly critical to acknowledge the factors affecting the health of vulnerable populations.

Conclusions

Social agency, i.e., proactivity and initiation in social contexts, and value of life, had a statistically significant relationship with the SRH status of HIV-positive patients. Other social support components were not statistically significant. However, a statistically significant relationship between social agency and value of life with the SRH status, highlights the necessity of taking actions, including social isolation prevention, attention given to this group of people, and the role of the mentioned factors in the SRH status.

Study limitations

The present study was conducted during the COVID-19 pandemic. Therefore, in-person data collection and population diversity were not feasible. Additionally, using questionnaires and the self-report nature of the study were other limitations.

Disclosures

1. Institutional review board statement: Ethics approval was acquired from the Ethics Committee of Alborz University of Medical Sciences (approval number: IR.ABZUMS.REC.1398.211).
2. Assistance with the article: The present study is the product of a master's thesis in midwifery counseling, graciously supported by the Research Vice-Chancellor of Alborz University of Medical Sciences and the West Tehran Behavioral Diseases Health Center. The researchers sincerely and greatly thank these organizations as well as all the study's participants.
3. Financial support and sponsorship: None.
4. Conflicts of interest: None.

References

1. Jozani ZB, Mohraz M, Qorbani M, Babaheidari TB, Mahmoodi Z. The effects of an educational program based on the health belief model on information-motivation-skill-behavioral skills among women living with human immunodeficiency virus. *J Educ Health Promot* 2019; 8: 252. DOI: 10.4103/jehp.jehp_337_19.
2. Nabavi SH, Alipour F, Hejazi A, Rashedi V. Relationship between social support and mental health in older adults. *Medical Journal of Mashad University of Medical Sciences* 2014; 57: 841-846.
3. Allah yari t,Eslamian a.Factors affecting the social health of people living with HIV . AIDS with an emphasis on social support. *J Soc Work* 2016; 1: 99-130.
4. Abachi A, Behravan H. The analysis of stigma impact on quality of life in patients with HIV/AIDS: a phenomenological study. *J Qualitat Res Health Sci* 2013; 2: 158-172.
5. Shiani M, Mousavi MT, Zare H. The measurement of social capital in Tehran. *Iranian Economic Review* 2017; 21: 431-447.
6. Mukoswa GM, Charalambous S, Nelson G. The association between social capital and HIV treatment outcomes in South Africa. *PLoS One* 2017; 12: e0184140. DOI: 10.1371/journal.pone.0184140.
7. Gu J, Zhu R. Social capital and self-rated health: empirical evidence from China. *Int J Environ Res Public Health* 2020; 17: 9108. DOI: 10.3390/ijerph17239108.

8. Marmot M. Social determinants of health inequalities. *Lancet* 2005; 36: 1099-1104.
9. Kim J, Lee R, Shim J. Material hardship and self-rated health among low-income households in South Korea. *Asia Pac J Soc Work Develop* 2018; 28: 279-294.
10. Souza Junior PR, Szwarcwald CL, Castilho EA. Self-rated health by HIV-infected individuals undergoing antiretroviral therapy in Brazil. *Cad Saude Publica* 2011; 27: S56-S66. DOI: 10.1590/s0102-311x2011001300007.
11. Shokoohi M, Bauer GR, Kaida A, Lacombe-Duncan A, Kazemi M, Gagnier B, et al. Social determinants of health and self-rated health status: a comparison between women with HIV and women without HIV from the general population in Canada. *PLoS One* 2019; 14: e0213901. DOI: 10.1371/journal.pone.0213901.
12. Sayedan F, Abdolsamadi M. The relationship between social capital and mental health of women and men. *Social Welfare Quarterly* 2014; 11: 229-254.
13. Shokoohi M, Bauer GR, Kaida A, Lacombe-Duncan A, Kazemi M, Gagnier B, , et al. Social determinants of health and self-rated health status: a comparison between women with HIV and women without HIV from the general population in Canada. *PLoS One* 2019; 14: e0213901. DOI: 10.1371/journal.pone.0213901.
14. Onyx J, Bullen P. Measuring social capital in five communities. *J Appl Behav Sci* 2000; 36: 23-42.
15. Eftekharin R, Kaldi A, Sam S, Sahaf R, Vatan RF. Validity and reliability of Persian version of Onyx Social Capital Scale in elderly people. *Iran J Ageing* 2016; 11: 174-189.
16. Huisman M, Deeg DJ. A commentary on Marja Jylhä's "What is self-rated health and why does it predict mortality? Towards a unified conceptual model" (69: 3, 2009, 307-316). *Soc Sci Med* 2010; 70: 652-654.
17. Nedjat S. Is self-rated health a good indicator for assessment of population health? A review article. *Iranian J Epidemiol* 2015; 10: 89-96.
18. IBM Corporation. IBM SPSS statistics for Windows. Armonk (NY): IBM Corp.; 2012.
19. Heidari A, Mokhtari M, Dehghani H. Teachers health status and its relationship with social capital: a case study of school teachers in Bushehr (1393-94). *Social Development and Welfare Planning* 2017; 8: 169-201.
20. Sadat PF, Farzaneh Q. A sociology study of effective factors in public health. *Sociological Studies of Youth (Jame Shenasi Motaleate Javanian)* 2012; 2: 73-94.
21. Kim Y, Schneider T, Faß E, Lochbaum M. Personal social capital and self-rated health among middle-aged and older adults: a cross-sectional study exploring the roles of leisure-time physical activity and socioeconomic status. *BMC Public Health* 2021; 21: 48. DOI: 10.1186/s12889-020-10043-6.
22. Hung N, Lau LL. The relationship between social capital and self-rated health: a multilevel analysis based on a poverty alleviation program in the Philippines. *BMC Public Health* 2019; 19: 1641. DOI: 10.1186/s12889-019-8013-5.
23. Carr RL, Gramling LF. Stigma: a health barrier for women with HIV/AIDS. *J Assoc Nurses AIDS Care* 2004; 15: 30-39.
24. Ho EC, Hawkley L, Dale W, Waite L, Huisingsh-Scheetz M. Social capital predicts accelerometry-measured physical activity among older adults in the US: a cross-sectional study in the National Social Life, Health, and Aging Project. *BMC Public Health* 2018; 18: 804. DOI: 10.1186/s12889-018-5664-6.
25. Ruiz-Algueró M, Hernando V, Marcos H, Gutiérrez G, Pérez-Elías MJ, de Quirós JCLB, et al. Self-rated health among people living with HIV in Spain in 2019: a cross-sectional study. *BMC Infect Dis* 2021; 21: 129. DOI: 10.1186/s12879-021-05815-3.
26. Behmanesh M, Taeri K, Hosseini S, Boroumandfar Z. Association between quality of life and social support among women suffering from HIV/AIDS. *The Journal of Qazvin University of Medical Sciences* 2016; 20: 40-47.
27. Turan B, Hatcher AM, Weiser SD, Johnson MO, Rice WS, Turan JM. Framing mechanisms linking HIV-related stigma, adherence to treatment, and health outcomes. *Am J Public Health* 2017; 107: 863-869.
28. Emamzadeh-Fard S, Fard SE, SeyedAlinaghi S, Paydary K. Adherence to anti-retroviral therapy and its determinants in HIV/AIDS patients: a review. *Infect Disord Drug Targets* 2012; 12: 346-356.
29. Sadeghnezhad Forotaghe M, Vanaki Z, Memarian R. The effect of nursing care plan based on "Roy Adaptation model" on psychological adaptation in patients with diabetes type II. *Evidence Based Care* 2011; 1: 5-20.