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Comparison of social support and social network among people living with HIV and general population in Isfahan, Iran

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Abstract

Introduction: Social support is an important aspect of life of people living with human immunodeficiency virus (PLHIV), affecting their physical and mental health. Humans receive the most social support from their social networks, characterized as interpersonal social ties. This study aimed to compare social support and social network (its size) among PLHIV and healthy people in Isfahan.

Material and methods: A case-control study was conducted among 100 PLHIV recruited conveniently and matched with 200 healthy people by random sampling in Isfahan in 2022. Norbeck social support questionnaire and indirect social network size estimation questionnaire were employed. Linear regression in Stata software was used, and significance level of 5% was considered.

Results: The mean ± SD of social network size in PLHIV (119.98 ± 100.0) was significantly smaller than that of healthy people (161.6 ± 120.3) ($p < 0.05$). The mean ± SD score of social support in PLHIV (27.7 ± 14.7) was significantly lower than that of healthy people (63.3 ± 33.3) ($p < 0.05$). In both groups, there was a significant direct correlation between social network size and social support ($p < 0.05$).

Conclusions: The social network size and social support are smaller in PLHIV compared with healthy population. Stigma and discrimination related to HIV seem to be the main causes of these results. Programs aiming to reduce stigma and discrimination toward HIV in Iran are suggested.

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Key words: social support, social network, human immunodeficiency virus, HIV.

Introduction

One of the biggest health problems worldwide is human immunodeficiency virus (HIV) that impairs the human body's immune system and sets the stage for opportunistic infections [1]. An estimated 39.0 million people were living with HIV at the end of 2022 [2]. Needle sharing and using other contaminated injection tools as well as sexual contact, mother-to-child transmission, and infected blood and its products, are the ways of HIV spreading [3].

The global spread of this virus has caused harm in the health, social, economic, cultural, and political domains [4]. Aside from clinical changes, HIV causes significant social and psychological damage due to stigma and feelings of inferiority, leading to anxiety, loneliness, depression, death,

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lower self-esteem and self-confidence as well as social and sexual isolation [5]. The affected people may engage in social and sexual deviance while losing important sources of support, such as employment, family, and friends [6]. Although people living with HIV (PLHIV) are less likely to seek regular healthcare, they encounter societal hurdles, such as stigma. Social assistance may be quite beneficial in the process of caring for these individuals [7]. In general, social support refers to being cared for, respected, and accepted as well as being a member of a supportive social network [8]. Moreover, it refers to a social resource in the context of interpersonal interactions and social involvement [9]. Social support is divided into two categories: 1) objective support (financial support, presence of social networks, and community engagement), and 2) mental support (individual respect, understanding, and emotional fulfillment) [10]. It can come from a variety of sources, including family, friends, pets, neighbors, coworkers, etc. [11]. Social support offers many physical and psychological advantages to individuals who experience stressful social situations. It is also seen as a role in lowering psychological suffering [12], and may directly impact people's mental health regardless of external cause [13].

Poor social support can cause inadequate medication adherence, which in turn leads to immunosuppression and ultimately, to depression, Therefore, social support is effective in mental health [14].

Furthermore, social support has been demonstrated to minimize feelings of social isolation, avoid psychological injury, enhance adherence to therapy, and improve quality of life [15]. In some countries, there are still numerous stigmas associated with HIV, and topics, such as social support and mental health are barely recognized and under investigation. A research in India assessed the level of social support in PLHIV, with only 43.1% of participants receiving high level of social support [16]. In PLHIV, a lack of social support is connected with poor adherence, psychological suffering, and stigma [17].

Individuals obtain the most social support from those in their social network, since social support is strongly associated with its members [18]. Social networks are characterized as interpersonal social ties [19], which include a spouse or intimate partner, close friends and family, religious or political relationships, and social relationships, among others [20]. A study reported that there is a significant relationship between social networks and social support, and it was discovered that most support is related to kinship and family relationships [21]. A great amount of research has perceived the importance of social support networks in public health, and found a clear and substantial link between social networks and social support [22]. Positive social interactions in the form of a social network foster an atmosphere of mutual support and a sense of shared identity among group members, leading to a more positive sense of self. However, an imbalance in some characteristics, including gender identity or the presence of conditions, such as AIDS, interrupts a person's social conditions, which may result in disruption in this person's social relations, leading to lack of societal support [23].

According to literature, very few studies have been conducted on the relationship between the size of social network and social support in HIV-infected patients in Iran. Based on conducted surveys, it seems that in terms of measurement of social support, most of the studies have been done in certain groups of the society, such as students, elderly, pregnant mothers, or cancer patients. However, no study has compared the level of social support in HIV patients with general population.

Therefore, the aim of this study was to assess the association between social support and social network (its size) among PLHIV in comparison with the general population in Isfahan.

Material and methods

Study design and study population

This case-control study was conducted from April to June 2022 in Isfahan among HIV-positive individuals living in Isfahan and controls as the general population.

Sample size sampling

To estimate sample size, the following formula, considering 95% confidence coefficient, 80% power, and mean (SD) score of social support in PLHIV as 126.74 (76.97) was used [6]. In addition, the social support score difference between PLHIV and general population was assumed to be about 32 points (2.5%). Sample size of the case (PLHIV) group was estimated to be 100. With sampling ratio of 1 case to 2 controls, sample size of the control group (general population) was estimated to be 200. Considering that women account for only 30% of HIV patients in Iran, in the present study, only one-third of case and control samples were women. Selection method of HIV patients was based on the prevalence:

$n = (2\times (z_(1 - (\alpha)/2) + z_(1 - \beta))^2 \delta^2) / d^2 = (16 \times 77^2) /((159 -126.7)^2) = 100$

Cases were sampled conveniently from PLHIV cohort, and those aged at least 18 years and having a confirmed HIV-positive test were included in the study. PLHIV who declined to participate were excluded.

For each case, two paired-matched (age and gender) controls from the general population were selected by a multistage sampling method according to geographical distribution in Isfahan city, with all 14 municipal districts of Isfahan city considered as strata. In each municipal area, crowded and busy centers (streets, shopping centers, parks, etc.) were listed as clusters. Then, two clusters were randomly selected within each stratum. Inside the clusters, passers-by on the street were haphazardly selected and included in the study if they were eligible. In each stratum, 14 controls (5 women and 9 men) were selected. People with Iranian citizenship, being a resident of Isfahan city, and having

mental ability to answer questions were included in the study, whereas those unwilling to participate were excluded. Sampling was done as available in the group of HIV patients, and sampling from the general population was performed in a multistage non-random manner.

Data collection

Two questionnaires, i.e., Norbeck social support questionnaire (NSSQ) [24] and indirect social network questionnaire [25] were used as tools for data collection. NSSQ evaluates two main dimensions of social support, including structural and functional, each of which contains several sub-scales. Structural support has sub-scales, such as number of people in communication network, duration of communication, and frequency of communication, whereas functional scale includes emotional support and material support. Scoring of this tool was in the form of a five-point Likert's scale ("not at all", "little", "medium", "a lot", and "too much"). Total score was obtained from the sum of all points, and the higher the score, the better the social support. Reliability and validity of NSSQ were confirmed in other studies, with Cronbach's a between 0.90 and 0.96 and its validity between 0.92 and 0.94 [26].

Indirect social network questionnaire consists of 19 questions evaluating people's knowledge, with answers as "yes" or "no". If the answer is yes, the number of people who are measured by those characteristics will be asked inside or outside the province. The criterion for answering this questionnaire was that the person must have lived in the province where the question was asked for at least 5 years. Reliability and validity of this questionnaire were approved through previous research [25]. Internal and external ICC were estimated as 0.93 and 0.63, respectively [27]. In this study, 19 reference groups with known population size (from reliable sources) were selected (e). First, individuals (both cases and controls) were asked the number of people they know in their active networks, and who belonged to each reference group (m). The definition of "knowing" was as follows: "People whom you know and they know you, by appearance or name, with whom you can interact if necessary, and during the past two

Table 1. Demographic characteristics of the participants

Variable	People living with HIV (n = 100)	General population (n = 200)	p-value
Age in years, mean (SD)	42.4 (9.1)	42.4 (9.0)	1
Number of children, mean (SD)	1.3 (1.27)	2 (1)	0.7
Number of households, mean (SD)	3.1 (1.15)	3.4 (1.19)	0.01*
Gender, n (%)			
Female	30 (30)	60 (30)	1
Male	70 (70)	140 (70)	
Education level, n (%)			
No education	1 (1)	9 (4.5)	0.0001*
Elementary	7 (7)	23 (11.5)	
Diploma and sub-diploma	83 (83)	91 (45.5)	
Bachelor's degree and above	7 (7)	60 (30)	
MSc and above	2 (2)	17 (8.5)	
Marital status, n (%)			
Single	22 (22)	52 (26)	0.565
Married	57 (57)	118 (59)	
Divorced/separated	17 (17)	23 (11.5)	
Deceased wife	4 (4)	7 (3.5)	
State of residence, n (%)			
Own	45 (45)	117 (58.5)	0.03*
Rented	55 (55)	83 (41.5)	
Way of transmission, n (%)			
Unprotected sex	51 (51)	–	–
Joint injection	22 (22)	–	–
Blood and its products	11 (11)	–	–
Unknown	16 (16)	–	–

**p-value for χ^2 and t-tests of two independent samples was considered significant at the level of less than 0.05.*

years you have contacted them in person, by telephone, or electronically" (R). Than C was estimated as follows:

$$\hat{C}_i = (\Sigma_j m_{ij})/(\Sigma_j e_j),$$

where $\hat{C}_i$ is the estimated size of the respondent's network, t is the size of the total population, m_{ij} is the number of people that the respondent (i) knows from the reference group (j), and e_j is the actual size of the reference group (j). Final $\hat{C}$ was considered as the mean of $\hat{C}_i$.

Statistical analysis

To describe data, mean, standard deviation, and frequency were employed. Two independent sample t-tests and χ^2 for comparison of case and control groups were used. To evaluate the normality of social support score and the size of social network, Shapiro-Wilk test was applied. To investigate the correlation between social support score and the size of social network, Pearson's correlation coefficient was used. Finally, to assess the effect of variables on the relationship between social network size and the social support score, linear regression was employed. All analyses were performed with Stata Crop software, considering significance level of 5%.

Results

The total number of participants in the study was 300 (100 cases and 200 controls). The mean age of cases and controls was 42.4 (SD = 9.1). About 30% of the participants in both groups were females. Around 83% of the cases and 45.5% of controls reported a diploma/sub-diploma educational level. Similarly, 57% of the cases and 59% of controls were married. PLHIV and general population groups were comparable in terms of the number of households, education, and state of residence ($p < 0.05$). The most frequent mode of HIV transmission was unprotected sex (Table 1). The mean social support scores of the cases and controls were 27.7 (SD = 14.7) and 63.8 (SD = 33.3), respectively ($p < 0.0001$). Also, the mean social network size of the cases was 119.98 (SD = 100.35) and controls 161.62 (SD = 120.39) ($p = 0.003$). Although there was no significant difference in

Table 2. Social network size and social support score in people living with HIV (PLHIV) and general population in Isfahan city

Parameter	Social support score mean (SD)			Social network size mean (SD)		
	PLHIV	General population	*p*-value	PLHIV	General population	*p*-value
Total	27.7 (14.7)	63.8 (33.3)	< 0.0001	119.9 (100.3)	161.6 (120.3)	0.003
Gender, *n* (%)						
Female	24.7 (16.4)	66.4 (30.0)	0.81	86.5 (73.6)	208.4 (141.0)	0.04
Male	29.0 (13.9)	62.7 (34.6)		134.3 (107.1)	141.5 (112.0)	
Education level, *n* (%)						
No education	39.0 (0)	61.7 (27.2)	0.70	127.6 (0)	96.07 (56.2)	0.02
Elementary	30.1 (19.0)	58.4 (35.2)		103.3 (106.6)	128.8 (82.8)	
Diploma and sub-diploma	27.1 (14.2)	63.1 (32.7)		125.5 (100.7)	165.1 (130.0)	
Bachelor's degree	27.8 (19.6)	68.8 (33.5)		85 (107.0)	179.2 (125.0)	
MSc and above	38.5 (7.7)	59.5 (36.7)		63.8 (90.2)	162.3 (108.3)	
Marital status, *n* (%)						
Single	26.6 (12.8)	64.1 (33.0)	0.60	137.3 (138.9)	188.6 (126.5)	0.06
Married	28.4 (15.5)	65.7 (33.3)		112.7 (84.9)	162.3 (119.4)	
Divorced/ separated	26.5 (16.4)	60.5 (33.7)		127.6 (99.6)	121.4 (104.9)	
Deceased wife	30.2 (7.5)	40.7 (30.2)		95.7 (72.6)	80.7 (42.3)	
State of residence, *n* (%)						
Own	27.6 (14.5)	63.9 (33.1)	0.20	127.6 (109.6)	177.9 (117.5)	0.008
Rented	27.7 (15.2)	63.7 (33.7)		113.7 (92.6)	138.6 (121.1)	
Way of HIV transmission, *n* (%)						
Unprotected sex	26.7 (16.3)	–	–	100.9 (90.0)	–	–
Needle sharing	29.8 (10.2)	–		141.1 (84.4)	–	
Blood and its products	29.5 (15.3)	–		170.1 (158.0)	–	
Unknown	26.9 (15.4)	–		117 (95.1)	–	

the social support score between these two groups according to demographic characteristics, the size of social network was significantly different in both groups regarding gender, education level, residential status, and marital status ($p < 0.05$) (Table 2). The intensity of correlation between the social network size and social support of the cases and controls were 0.32 (0.0009) and 0.6 (< 0.0001), respectively. Among PLHIV, this correlation was significant for men and women, diploma and sub-diploma educational level, and married and divorced individuals. In addition, this correlation was significant for those who were infected through needle sharing and unprotected sexual contact. In the general population, this correlation was significant for men and women, diploma and higher education, and single, married, and divorced people (Table 3).

Considering the control for the effect of education, marital status, and residence status, HIV infection decreased the social support score by 33.6 and the size of social network by 36.4 people. In PLHIV, male gender increased the size of social network by 47.8 people ($p = 0.02$). Also, the size of social network among those infected through sexual contact was 73 people less than those who were infected through blood and its products ($p = 0.02$). In any case, after controlling the effect for other variables, these effects were not significant ($p > 0.05$) (Table 4). In the general population, the size of social network in men was 41 less than that of women ($p = 0.03$). The results showed that with the increase of one year of age, the social support score decreased by 0.9 points ($p = 0.01$) (Table 5).

Table 3. Correlation between social network size and social support score in people living with HIV (PLHIV) and general population by demographic variables

Parameter		*r* (*p*-value)*	
		PLHIV	General population
Total		0.32 (0.0009)	0.60 (< 0.0001)
Gender			
	Female	0.50 (0.004)	0.63 (0.0001)
	Male	0.25 (0.030)	0.61 (0.0001)
Education level			
	No education	–	0.16 (0.20)
	Elementary	0.5 (0.22)	0.29 (0.16)
	Diploma and sub-diploma	0.33 (0.0002)	0.61 (0.0001)
	Bachelor's degree	0.42 (0.34)	0.67 (0.0001)
	MSc and above	–1 (1.000)	0.80 (0.0001)
Marital status			
	Single	0.18 (0.41)	0.66 (0.0001)
	Married	0.36 (0.005)	0.57 (0.0001)
	Divorced/ separated	0.58 (0.01)	0.65 (0.0007)
	Deceased wife	0.01 (0.98)	0.49 (0.25)
State of residence			
	Own	0.31 (0.03)	0.60 (0.0001)
	Rented	0.34 (0.01)	0.63 (0.0001)
Way of HIV transmission			
	Unprotected sex	0.39 (0.003)	–
	Needle sharing	0.40 (0.05)	–
	Blood and its products	0.80 (0.08)	–
	Unknown	0.40 (0.1)	–

**p-value < 0.05 was significant for Pearson's correlation coefficient between social network size and social support.*

Discussion

The results of this study showed that the social network size and the average score of social support in PLHIV were lower than in healthy population. However, in both groups, there was a direct relationship between the social support score and the social network size, the larger the social network, the greater the social support. Certainly, the correlation between social support and social networks was stronger in general population than in PLHIV.

This study found that the social network size among PLHIV is smaller than that of healthy people, in line with studies conducted in Iran and other countries [1-4]. The smaller size of social network among PLHIV may be due to social factors, such as society culture and religious beliefs, which affect people's social relationships [2]. In addition, due to insufficient knowledge about HIV/AIDS, stigma and discrimination toward PLHIV are common, leading to social exclusion and eventually, reduced size of their social network [5]. Stigma is a negative element that limits a person's adaptation to the disease and also complicates HIV management and treatment [6]. Due to the negative cultural attitude towards HIV, PLHIV have to manage their disease by themselves and deal with the fear, discrimination, and rejection of others, resulting in decrease in self-efficacy, withdrawal from society, and the occurrence of mental disorders, such as depression [7].

Based on the current study results, gender affected the social network size. In PLHIV, the social network size of men was larger than that of women, but in the general population, it was larger in women. A study in Australia (2010) showed that in the non-affected population, women had a larger social network size than men [28]. Another study (2006) reported that in the affected population, older men had a lower social network size than others [29]. According to the results of the present study, studies in Namibia (2018) and Iran (2013) demonstrated that the social support that PLHIV receive is less than that of healthy people [2, 11]. Research confirmed that HIV status has a strong negative impact on people's social integration. Due to the negative attitude of society as well as discrimination and stigma related to HIV, especially in developing countries, HIV infection may affect mental and social conditions of patients in addition to physical health. In the fear of disclosing HIV and the way of infection, PLHIV may isolate themselves, which

Table 4. Factors affecting social support and social network in people living with HIV

Parameter	Beta (95% CI)			
	Social network size		Social support score	
	Adjusted	Crude	Adjusted	Crude
Gender				
Female	1	1	1	1
Male	40 (–22-1)	47.8 (5-90)	5.90 (–3.38-15.11)	4.35 (–2.02-10.72)
Age	–0.16 (–3-3)	0.89 (–1.3-3)	0.12 (–0.58-–0.33)	–0.05 (–0.38-0.27)
Education				
No education	1	1	1	1
Elementary	–64 (–286-158)	–24 (–239-190)	–9.03 (–42.17-24.07)	–8.85 (–40.56-22.84)
Diploma and sub-diploma	–53 (–262-156)	–2 (–205-201)	–14.19 (–45.35-16.97)	–11.81 (–41.65-18.01)
Bachelor's degree	–103 (–329-122)	–43 (–258-173)	–12.60 (–46.19-20.99)	–11.14 (–42.84-20.56)
MSc and above	–134 (–402-133)	63 (–311-183)	–3.61 (–43.49-36.26)	–0.50 (–36.82-35.82)
Marital status				
Single	1	1	1	1
Married	–29 (–92-34)	–24 (–75-25)	3.59 (–5.81-13.00)	1.78 (–5.67-9.24)
Divorced/ separated	2 (–76-79)	–9 (–74-55)	4.31 (–7.26-15.89)	–0.10 (–9.70-9.49)
Deceased wife	4 (–124-132)	–41 (–150-67)	6.03 (–13.13-25.19)	3.61 (–12.54-19.76)
State of residence				
Own	1	1	1	1
Rented	–8 (–54-37)	–13 (–54-26)	0.66 (–6.19-7.52)	–0.19 (–6.12-5.72)
Number of children	2 (–21-25)	–1.4 (–16-13)	–0.95 (–4.44-2.53)	0.13 (–2.11-2.38)
Number of household members	1 (–19-22)	–0.5 (–17-16)	2.51 (–0.63-5.66)	2.11 (–0.40-4.63)
Way of HIV transmission				
Unprotected sex	1	1	1	1
Needle sharing	–51 (–131-27)	–32 (–135-39)	–1.07 (–12.85-10.70)	–1.68 (–12.58-9.22)
Blood and its products	–61 (–135-12)	–73 (–139-–8)	–3.65 (–14.66-7.36)	–5.21 (–15.03-4.60)
Unknown	–58 (–143-25)	–57 (–133-19)	–5.48 (–18.01-7.03)	–4.60 (–16.17-6.96)

Beta was estimated using multiple linear regression. All variables were entered into the model to estimate the adjusted beta. A significance level of less than 0.05 was considered.

limits their social support. In addition, they may face political and social exclusions as well as suffer the loss of job, financial resources, and even family and friends as the main sources of support. This leads to reduced social support, especially support to fight against HIV [2, 5, 12, 13]. Studies emphasize the protective role of social support on negative effects of stressful life events, such as HIV infection, disease severity, and mortality [30].

Our study demonstrated that the social support for women with HIV is less than that of men, while it was the opposite in the general population, where social support was shown more for women than men. A study in Iran (2013) proved that women receive more social support than men [2]. The reason for the high level of social support for women is their desire for social participation, which makes them seek social support more than men [14]. However, it seems that the impact of HIV on the lives of women is more than that of men, so the affected women do not have the necessary support in terms of financial, medical, educational, and cultural aspects while facing gender inequality [5]. According to our results, among the healthy population, social support has a relationship with age, whereas no significant relationship was observed in PLHIV. A study in Germany (2018) presented that the level of social support in the general population was significantly different between diverse age groups: the higher the age, the lower the social support [15]. As stated in other research, our study revealed that in comparison with healthy people, the amount of support lost for PLHIV was higher as well as the loss of communication with spouses and family members was more among HIV-positive individuals [16]. The main reason for this reduction in social support is stigma and discrimination related to HIV, which is common in most societies [17].

The main result of the present study is that there is a positive correlation between network size and social support in both groups of people with and without HIV: the larger

Table 5. Factors affecting social support and social network in general population

Parameter	Beta (95% CI)			
	Social network size		Social support score	
	Adjusted	Crude	Adjusted	Crude
Gender				
Female	1	1	1	1
Male	–41* (–79 to –2.9)	–66* (–102 to –31)	2.06 (–9.01-13.14)	–3.67 (–13.81-6.47)
Age	–2.0 (–4.7 to –0.4)	–4*(–5 to –2)	–0.92*(–1.68 to –0.16)	–0.74* (–1.25 to –0.24)
Education				
No education	1	1	1	1
Elementary	30 (–59-118)	33 (–59-125)	–5.23 (–31.05-20.59)	–3.31 (–29.10-22.46)
Diploma and sub-diploma	30 (–56-116)	69 (–13-151)	–7.31 (–32.32-17.55)	1.34 (–21.70-24.39)
Bachelor's degree	20 (–72-111)	83 (–2-167)	–5.68 (–32.44-21.07)	7.03 (–16.56-30.64)
MSc and above	24 (–76-123)	66 (–31-163)	–11.54 (–40.64-17.55)	–2.18 (–29.38-25.00)
Marital status				
Single	1	1	1	1
Married	30 (–19-78)	–26 (–65-12)	12.70 (–1.53-26.95)	1.62 (–9.27-12.52)
Divorced/ separated	–31 (–91-28)	–67* (–125 to –9)	6.16 (–11.26-23.59)	–3.58 (–19.99-12.81)
Deceased wife	–43 (–144-57)	–107* (–202 to –13)	–5.59 (–34.82-23.62)	–23.43 (–49.81-2.93)
State of residence				
Own	1	1	1	1
Rented	–30 (–65-5)	–39* (–73 to –5)	–2.24 (–12.41-7.91)	–0.24 (–9.69-9.19)
Number of children	–9 (–27-9)	–16* (–27 to –4)	–0.66 (–6.08-4.76)	–1.28 (–4.54-1.96)
Number of household members	10 (–6.2-26)	20* (5-34)	2.35 (–2.39-7.09)	3.95 (–0.18-8.10)

Beta was estimated using multiple linear regression. All variables were entered into the model to estimate the adjusted beta. A significance level of less than 0.05 was considered.

the social network size, the greater the social support received. However, this correlation was stronger in healthy people comparing with PLHIV as well as in women than in men. A study in Iran (2014) presented a significant direct association between social networks and social support, and also a correlation between strong relationships and health dimensions with social support [18]. Although the stronger the network is, the more support people receive. Heterogeneity in some identity-based characteristics, such as gender identity and HIV status, creates different social conditions, which may cause deprivation of community support [19]. Since HIV infection causes disconnection and reduction of social relations with family, friends, colleagues, and society, and shrinking of social network, all these factors can reduce social support resources of PLHIV and their access to support [5].

One of the limitations of our study is that the HIV-infected participants were selected by convenience sampling method among PLHIV referred to the counseling center. This may cause selection bias that affects the generalizability of the results, because people who did not participate in the study may have a smaller social network size and consequently, receive less social support. However, we selected healthy people through random sampling from the general population, and it is almost free from selection bias. Another limitation of the present study is the possibility of reporting bias among PLHIV. In order to reduce this bias, a trained HIV consultant was participating in interviewing.

Conclusions

The social network size and social support are smaller in PLHIV than among healthy people, and some of the main reasons for that are HIV-related stigma and discrimination. Fundamental planning to reduce stigma and discrimination toward PLHIV in Iran seems necessary. PLHIV can adapt better to their disease and its consequences if proper social support is provided. Moreover, there is a direct relationship between the size of social network and social support; in order to improve the social support among PLHIV, support-educational programs should be planned and implemented for people in their social networks. Another limitation of the current study is that sampling from the general population was done in the same way as from HIV-infected patients, which lengthened the process of data collection.

Disclosures

1. Institutional review board statement: This study was reviewed in the Isfahan University of Medical Sciences, Iran, and approved by the ethical code of IR.MUI.RESEARCH.REC.1400.480. A research permit from the Ministry of Health and Medical Education was acquired. Verbal informed consent was obtained from the participants, and their confidentiality, anonymity, and independence of participation in the study were respected.
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References

1. Zhao M, Liu B, Zheng T, Xu J, Hao Y, Wang J, et al. Factors associated with hostility among people living with HIV/AIDS in Northeast China: a cross-sectional study. BMC Public Health 2019; 19: 1189. DOI: 10.1186/s12889-019-7526-2.
2. HIV data and statistics. 2024. Available at: https://www.who.int/teams/global-hiv-hepatitis-and-stis-programmes/hiv/strategic-information/hiv-data-and-statistics.
3. Aldila D, Aprilliani RR, Malik M. Understanding HIV spread with vertical transmission through mathematical model. In: AIP Conference Proceedings, AIP Publishing LLC; 2018.
4. AliAkbar H. Modelling of HIV/AIDS in Iran up to 2014. J AIDS HIV Res 2011; 3: 231-239.
5. de Souza Caliari J, Teles SA, Reis RK, Gir E. Factors related to the perceived stigmatization of people living with HIV. Rev Esc Enferm USP 2017; 51: e03248. DOI: 10.1590/S1980-220X2016046703248.
6. Forouzan AS, Shushtari ZJ, Sajjadi H, Salimi Y, Dejman M. Social support network among people living with HIV/AIDS in Iran. AIDS Res Treat 2013; 2013: 715381. DOI: 10.1155/2013/715381.
7. Berg RC, Page S, Øgård-Repål A. The effectiveness of peer-support for people living with HIV: a systematic review and meta-analysis. PloS One 2021; 16: e0252623. DOI: 10.1371/journal.pone.0252623.
8. Taylor SE. Social support: a review. In: The Oxford Handbook of Health Psychology. Friedman HS (ed.). Oxford: Oxford University Press; 2011, p. 189-214.
9. Kocalevent RD, Berg L, Beutel ME, Hinz A, Zenger M, Härter M, et al. Social support in the general population: standardization of the Oslo social support scale (OSSS-3). BMC Psychol 2018; 6: 31. DOI: 10.1186/s40359-018-0249-9.
10. Qi M, Zhou SJ, Guo ZC, Zhang LG, Min HJ, Li XM, et al. The effect of social support on mental health in Chinese adolescents during the outbreak of COVID-19. J Adolesc Health 2020; 67: 514-518.
11. Ghani NA, Chik WMJW, Abdullah B, Ghazalli FSM. Social support for the HIV/AIDS community: a case study of Komuniti Cakna Terengganu (KCT), Malaysia. Mediterr J Soc Sci 2015; 6: 232. DOI: 10.5901/mjss.2015.v6n1s1p232.
12. Harandi TF, Taghinasab MM, Nayeri TD. The correlation of social support with mental health: a meta-analysis. Electron Phys 2017; 9: 5212-5222.
13. Soulsby LK, Bennett KM. Marriage and psychological wellbeing: the role of social support. Psychology 2015; 6: 1349-1359.
14. Weldesenbet AB, Kebede SA, Tusa BS. The effect of poor social support on depression among HIV/AIDS patients in Ethiopia: a systematic review and meta-analysis. Depress Res Treat 2020; 2020: 6633686. DOI: https://doi.org/10.1155/2020/6633686
15. Zhang T, Cao W, Lv J, Wang N, Reilly KH, Zhu Q, et al. Size, composition, and strength of ties of personal social support networks among adult people living with HIV/AIDS in Henan and Beijing, China. AIDS Behav 2012; 16: 911-919.
16. Subramanian A, Mohan A, Nandi PK, Rajeshwari K. Perceived social support, depression and their impact on quality of life of people living with HIV in India. AIDS Care 2021; 33: 1329-1334.
17. Basha EA, Derseh BT, Wubetu AD, Engidaw NA, Gizachew KD. Factors affecting social support status of people living with HIV/AIDS at selected hospitals of North Shewa Zone, Amhara Region, Ethiopia. J Trop Med 2021: 2021: 6695298. DOI: 10.1155/2021/6695298.
18. Faridvand F, Mirghafourvand M, Malakouti J, Mohammad-Alizadeh S. Relationship between social support and breastfeeding self-efficacy among women in Tabriz, Iran. Br J Midwifery 2017; 25: 103-109.
19. Sacamano PL. The association of social network factors with healthcare use and outcomes among persons who inject drugs in Baltimore, Maryland. Baltimore; 2018. Available at: http://jhir.library.jhu.edu/handle/1774.2/60086.
20. Kroenke CH, Kwan ML, Neugut AI, Ergas IJ, Wright JD, Caan BJ, et al. Social networks, social support mechanisms, and quality of life after breast cancer diagnosis. Breast Cancer Res Treat 2013; 139: 515-527.
21. Litwin H, Landau R. Social network type and social support among the old-old. J Aging Stud 2000; 14: 213-228.
22. Hosseini SH, Bahraminejad Z. The role of social support networks in public health and health service utilization among the elderly. J Res Health 2014; 4: 955-961.
23. Young LE, Tang JL, Schneider JA. Demographic and HIV status diversities as mechanisms of social integration and segregation among Black sexual and gender minorities enrolled in a community-based social network intervention. Soc Networks 2023; 73: 51-61.
24. Norbeck J. Scoring instructions for the Norbeck social support questionnaire (NSSQ). San Francisco, California, USA: University of California; 1995.
25. Rastegari A, Haji-Maghsoudi S, Haghdoost A, Shatti M, Tarjoman T, Baneshi MR. The estimation of active social network size of the Iranian population. Glob J Health Sci 2013; 5: 217-227.
26. Norbeck JS. The Norbeck Social Support Questionnaire. Birth Defects Orig Artic Ser 1984; 20: 45-57.
27. Zamanian M, Zolala F, Haghdoost A, Baneshi MR. Effect of estimation method, definition of ratio, and the plausible range in estimating social network size. Soc Netw Anal Min 2018; 8. DOI: 10.1007/s13278-018-0513-2.
28. McLaughlin D, Vagenas D, Pachana NA, Begum N, Dobson A. Gender differences in social network size and satisfaction in adults in their 70s. J Health Psychol 2010; 15: 671-679.
29. Emlet CA. An examination of the social networks and social isolation in older and younger adults living with HIV/AIDS. Health Soc Work 2006; 31: 299-308.
30. Kamenov K, Cabello M, Caballero FF, Cieza A, Sabariego C, Raggi A, et al. Factors related to social support in neurological and mental disorders. PloS One 2016; 11: e0149356. DOI: https://doi.org/10.1371/journal.pone.0149356.