



Internet and Social Isolation: A Comparative Study of the Effect of Internet Use on Social Isolation Between Young and Middle-Aged Individuals

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Received 2021 March 14; Revised 2021 July 29; Accepted 2021 August 31.

Abstract

Background: One of the symptoms of mental health disorders is social isolation which refers to unfavorable social relationships with other people. Today, Internet use is an important predictor of social isolation.

Objectives: The present study aimed to investigate the relationship between Internet use and social isolation (objective-subjective) in young and middle-aged individuals in the city of Shiraz.

Methods: This cross-sectional study was conducted on 600 young and middle-aged (15 - 65 years old) individuals in Shiraz, Iran. Data were collected using three questionnaires (objective isolation with four subscales, subjective isolation with two subscales, and the amount of Internet use). Regression analyses were used to analyze the data.

Results: Regression analysis showed that in objective isolation, Internet use increased just two subscales, including network diversity ($P < 0.001$) and the level of social participation ($P < 0.001$). It can be argued that the Internet has partly reduced social isolation in the objective dimension. In the subjective dimension, Internet use has increased the received social support ($P < 0.001$). Thus, Internet use would reduce the level of social isolation in the subjective dimension ($P < 0.001$). Although the significance level of the relationship between Internet use and social isolation is almost the same in both generations, the intensity of middle-aged relationships is higher than that in young people.

Conclusions: Internet use has reduced social isolation; however, considering the low intensity of the reduction of isolation, it is argued that Internet use does not isolate people but just does not upgrade them much.

1. Background

Social isolation is an important disorder that falls under the category of mental and social health. One of the early points in the study of social isolation can be found in McPherson et al.'s (2006) study. This study, referring to the diminution of the size of the core discussion network (CDN) between 1985 and 2004, has pointed to an increase in the level of social isolation in the United States (1).

There is no consensus among scholars on the definition of social isolation. Social isolation is the quantity and quality of unfavorable social relationships with other people in the CDN. Meeuwesen considered the common characteristic of all definitions of social isolation to be the lack of meaningful social networks in which the "meaningful" term refers to realizing the social needs of individuals (2). In fact, in the present era, persons with fewer social contacts do not necessarily feel lonely or isolated, while having many social contacts does not preclude a sense of isolation

(3).

Social isolation is equal to having a personal network of a reduced scope; as the personal network becomes smaller, closer, or more homogeneous, or in the absence of supportive relationships, chances of social isolation increase (4).

Some researchers distinguish between objective isolation and subjective isolation in the social isolation argument (3, 5). Objective isolation regards the structural characteristics of the social network of individuals, such as the size of the network and the frequency of interactions in the network; on the other hand, subjective isolation deals with the functional characteristics of the social network such as perceived support and loneliness. Loneliness is a subjective negative feeling associated with a perceived lack of a wider social network (social loneliness) or absence of a specific desired companion (emotional loneliness) (6).

Social isolation creates some problems. For example, it increases psychological distress risk (7). Also, a high

level of social isolation is associated with a higher incidence of depression (8). In addition, social isolation significantly increases aggression in both males and females (9) by contributing to upregulation in neuroinflammatory responses (10). Also, it has been found that social isolation steadily increases with age and almost is consistently and strongly associated with poor health conditions and unfavorable behaviors across all ages (11).

Studies have pointed to several factors as predictors of social isolation. These factors include poverty (12-14), illness, inadequate physical health (15, 16), and one of the most important factors named internet use (5, 17-19).

However, there are different views on how the Internet affects social isolation. On the one hand, evidence from some studies suggests that the Internet strengthens the communication of everyday life of individuals by complementing other forms of communication with those with whom non-Internet communications are also established (20-23). Research in Iran has shown that the Internet not only affects the level of communication among individuals but also reduces individually perceived loneliness (19). Therefore, the use of the Internet is associated with lower levels of social isolation (4, 24, 25).

On the contrary, there is limited evidence to show that the Internet limits the social network of users and may even turn into a complete substitute for face-to-face relationships (26-28).

However, the Internet has an important role in changing the level of social isolation in contemporary societies. According to statistics, there are currently 5.098 billion Internet users worldwide (29) and Internet penetration in the middle east (70%) is higher than its penetration in the world (63.2%) (30). Iran is one of the top 20 countries with the highest number of Internet users, and its Internet penetration rate is 80.5% (31).

2. Objectives

Since Internet use is an important determinant of network size, interaction and diversity of ties in the network, and even the level of social support and loneliness (subjective isolation), present study aimed to apparently, it can be an important predictor of social isolation. The investigate the relationship between Internet use and social isolation (objective-subjective) in young and middle-aged individuals in Shiraz.

3. Methods

3.1. Study Design and Sampling

This cross-sectional study was conducted in the city of Shiraz. Following Lin study study (32) with 95% confi-

dence, 600 individuals aged 15 - 65 years residing in Shiraz were selected as the sample size through stratified multi-stage random sampling. Primarily, some city blocks were selected randomly out of the 10 districts in Shiraz; within each district, a sample of private households was chosen at random. At the start of the interview, the interviewer determined the household composition and selected the respondent from among all those 15 - 65-year-old individuals. In households with more than one adult, one person was selected at random. If the person selected was unavailable or declined to be interviewed, it was recorded as non-response. The inclusion criteria of participants were (1) residence in Shiraz city and (2) have 15 - 65 years old. The exclusion criteria of participants were (1) temporary residence in Shiraz city and (2) have less than 15 and more than 65 years old. Individuals aged 15 - 30 years were considered young ($n = 300$) and those aged 30 - 65 years were considered middle-aged ($n = 300$). They were selected almost equally from the young and middle-aged generations. Data were analyzed using descriptive (mean and standard deviation) and inferential (independent sample t-test, univariate analysis, and regression analysis) statistical methods in SPSS version 19.

3.2. Instruments

The data collection instrument was a questionnaire comprising two parts; Social Isolation (objective and subjective) and Internet Use questions. To determine the validity of the questionnaire, some individuals aged 15-65 years in Shiraz were interviewed face-to-face to assess face validity including difficulty level, relevancy, and ambiguity of the scale. Moreover, content validity was evaluated qualitatively by a panel of experts who assessed the items of the instrument and its indices in terms of use of proper vocabulary, necessity, significance, placement of the items, and necessary time to complete the questionnaire. Finally, the instrument was confirmed as a comprehensive tool considering all necessary aspects so that it could assess social isolation properly.

3.2.1. Objective Isolation Measurement

The objective isolation was assessed using these indices: CDN size, frequency of interaction with CDN, network diversity, and participation in social activities.

CDN Size: It was measured through the network size framework developed by Wellman et al. (2006) (33). The respondents specified the number of the individuals with whom they were in frequent contact, from whom they received support, and with whom they talked about important matters. This index does not have a specified range because the size of CDN can be different for each person.

Frequency of Interaction with CDN: It was assessed by measuring the amount of contact with the first 10 people mentioned in the responses to the CDN size questions. Respondents had to select one of 5 responses from 5 (every day) to 1 (once a year) about the amount of contact with those 10 people. The total score ranged from 0 to 50.

Network Diversity: The respondents categorized the individuals they numbered in the CDN size into nine groups: Household members, immediate family members, other relatives, friends, neighbors, workmates/schoolmates, online friends, people from organizations/institutions, and others. "Online friends" in this study referred to individuals who were introduced to the participants in virtual space. The total score ranged from 0 to 9.

Participation in Social Activities: Participation in social activities was grouped based on the answers to seven questions about the membership of individuals in social groups, such as non-governmental organizations (NGOs), neighborhood groups, associations, and trade councils; participants had to select from 0 (I was not a member) to 4 (too much). The total score ranged from 0 to 28. In this sample, the Cronbach's alpha of the scale was 0.68, indicating good internal consistency and desirable validity and reliability.

3.2.2. Subjective Isolation Measurement

Subjective isolation was measured using the variables of perceived loneliness and received social support.

Perceived Loneliness: This variable was measured using the Perceived Loneliness Scale (PLS) (34) with 11 items. Respondents responded to a 5-point Likert scale from 0 (strongly disagree) to 4 (strongly agree). The total score ranged from 0 to 44. In this sample, the Cronbach's alpha of the scale was 0.70, indicating good internal consistency and desirable validity and reliability.

Received Social Support: A method similar to that of Wellman et al. (2006) was used to measure received social support (34). The respondents determined whether they received six types of social support from each of the nine groups in their CDN or not. Generally, they responded to 54 yes (=1)/no (=0) questions. The total score ranged from 0 to 54.

3.2.3. Social Isolation

Social isolation is calculated by converting the scores of respondents in each dimension of isolation (objective and subjective) to the score "Z" and then aggregating them. The objective isolation was assessed using these indices: CDN size, frequency of interaction with CDN, network diversity, and participation in social activities and Subjective isolation was measured using the variables of perceived loneliness and received social support. Some of

the previous studies considered social network size and frequency of interaction (5, 35), social support (36), social participation (5), and loneliness (37) for assessing social isolation, and some of them considered all indices (3, 19). In this study, an attempt was made to consider all necessary content dimensions of all indices (objective and subjective) to approve the content validity of the instrument.

3.2.4. The Amount of Internet Use

Internet use was evaluated by 10 items, including various types of Internet use such as "sending and receiving emails" and "dealing with online conversations". This scale was measured using a 5-point Likert scale from 0 (not at all) to 4 (very high). The total score ranged from 0 to 40. In this sample, the Cronbach's alpha of the scale was about 0.80, indicating good internal consistency and desirable validity and reliability.

3.3. Ethical Considerations

Informed consent was obtained from all participants to participate in the study. They were also assured of the confidentiality of their information and also the fact that the results would be published without mentioning the participants' names.

4. Results

4.1. Participant Characteristics

Female respondents were more than male respondents (female = 59.8%; male = 40.2%) and the majority of respondents (58%) were married. Most respondents under 30 years old were single (67%), while most of those over the age of 30 were married (84%). A small percentage of respondents were illiterate. Literate respondents were divided into two groups of those with university education (39.8%) and those without university education (58.2%).

4.2. Descriptive Statistics of Dependent Variables

Internet use was significantly higher in young people (mean \pm SD, 12.63 \pm 4.79). The respondent's CDN size ranged from 0 to 23. On average, individuals are contacted twice a week with their CDN, and the diversity of the members of this network reaches seven groups. Social participation is significantly higher in young people (mean \pm SD, 2.47 \pm 3.17).

Findings showed that a level of loneliness ranged from 10 to 48, which is significantly higher in middle-aged individuals (mean \pm SD, 27.69 \pm 6.46). On average, respondents reported lower social support than the average, which is significantly higher in young individuals (mean \pm SD, 8.53 \pm 3.98).

Subjective isolation is significantly higher in middle-aged individuals (mean \pm SD, 6.23 ± 1.14). On average, the level of social isolation in both generations was significantly higher than the average (Table 1).

Table 1. Characteristics of the Study Participants and Comparative Mean Differences

Variables/ Generation	Mean \pm SD	t Statistics	P Value
The amount of Internet use		13.243	0
Young	12.63 \pm 4.79		
Middle-aged	4.34 \pm 6.71		
Objective isolation			
Core network size		-0.367	0.714
Young	7.41 \pm 4.20		
Middle-aged	7.54 \pm 4.25		
Frequency of interactions		-0.109	0.913
Young	3.59 \pm 1.12		
Middle-aged	3.60 \pm 1.23		
Network diversity		1.786	0.075
Young	2.91 \pm 1.13		
Middle-aged	2.74 \pm 1.12		
Social participation		2.208	0.028
Young	2.47 \pm 3.17		
Middle-aged	1.93 \pm 2.75		
Objective isolation		-0.764	0.445
Young	14.90 \pm 3.09		
Middle-aged	15.090 \pm 3.14		
Subjective isolation			
Loneliness		-2.750	0.006
Young	26.22 \pm 6.59		
Middle-aged	27.69 \pm 6.46		
Social support		3.903	0.001
Young	8.53 \pm 3.98		
Middle-aged	7.50 \pm 3.28		
Subjective isolation		-4.39	0.001
Young	5.73 \pm 1/51		
Middle-aged	6.26 \pm 1.14		
Social isolation		-2.306	0.021
Young	20.64 \pm 3.81		
Middle-aged	21.36 \pm 3.83		

4.3. Internet Use and Social Isolation

Univariate analysis showed that the social isolation of Internet users is different regarding the amount of use (Table 2). Several regression models were set up. Internet use

had a negative relationship with objective isolation, subjective isolation, and ultimately social isolation (Table 3). Therefore, as young and middle-aged individuals' Internet use increases, objective and subjective isolation and, indeed, social isolation decrease. Moreover, the intensity of the effect of Internet use on social isolation is higher in middle-aged individuals.

5. Discussion

The results show that young people use the Internet more than middle-aged people. In line with some other studies (5, 26, 27), Internet use reduces social isolation and its dimension in both young and middle-aged people. In summary, the results of this study showed that Internet use does not have any effect on the reduction or increase in the number of members of each individual's CDN. This indicates that people are contacting new people through the Internet, but they do not add new people to their CDN and do not change the number of members in the CDN. So, the number of members of the CDN is determined in a process independent of the Internet.

The results also indicated that with the increase in Internet use, the diversity of members within the CDN increases. This is not necessarily related to strong ties with high interactions. It becomes clearer if you pay attention to this result that Internet use does not increase the frequency of interactions; it means that people do not have strong ties with individuals and groups that diversify their network or do not convert these ties to strong ties. In explaining this matter, it may be argued that Internet users have formed strong ties within the CDN in actual space. As Nowland et al. (38) in their study depicted that lonely people employ Internet use in a way that enhances existing friendships and/or to forge new ones. That is why the results showed that as Internet use increases, the level of social isolation decreases in the objective dimension.

Concerning the subjective dimension, we see that by increasing Internet use, loneliness does not increase or decrease. On the contrary, some other studies, especially earlier articles, show that Internet use reduces loneliness (39, 40). People seem to use the Internet to gain more social support; this kind of support, as mentioned above, can be received from members of the CDN and in different fields of job, care, information, and emotion. Hence, the subjective dimension of social isolation is also reduced by Internet use.

However, we should keep in mind that the intensity of the reduction of isolation is not high, and the results indicated that the effect of Internet use on the reduction of social isolation was slightly higher than the low level. In other words, Internet use does not isolate people but just

Table 2. Comparative Mean differences of Social isolation by Internet Use

Isolation and Internet Use	Young			Middle Aged		
	Mean \pm SD	F Statistics	P Value	Mean \pm SD	F Statistics	P Value
Objective isolation						
Core network size		0.256	0.774		0.899	0.408
Low	7.19 \pm 3.9			7.37 \pm 4.18		
Average	7.52 \pm 4.19			8.19 \pm 4.71		
High	7.65 \pm 5.10			8.10 \pm 3.10		
Frequency of interactions		0.463	0.63		0.936	0.393
Low	3.60 \pm 1.05			3.55 \pm 1.27		
Average	3.63 \pm 1.11			3.81 \pm 1.14		
High	3.42 \pm 1.38			3.70 \pm 0.92		
Network diversity		0.659	0.518		2.484	0.85
Low	2.81 \pm 1.04			2.68 \pm 1.07		
Average	2.97 \pm 1.14			2.98 \pm 1.33		
High	3 \pm 1.37			3.21 \pm 1.03		
Social participation		7.071	0.001		18.78	0.001
Low	1.16 \pm 2.51			1.50 \pm 2.32		
Average	3.05 \pm 3.50			3.15 \pm 3.35		
High	2.68 \pm 3.17			5.53 \pm 4.03		
Objective isolation		2.47	0.056		6.37	0.002
Low	15.38 \pm 2.69			15.42 \pm 3.07		
Average	14.53 \pm 3.14			14.05 \pm 3.21		
High	14.98 \pm 3.09			13.14 \pm 2.90		
Subjective isolation						
Loneliness		2.6	0.076		0.419	0.65
Low	26.72 \pm 6.94			27.71 \pm 6.47		
Average	25.47 \pm 6.03			27.92 \pm 6.71		
High	28 \pm 7.49			25.90 \pm 5.08		
Social support		1.981	0.14		5.889	0.003
Low	8.08 \pm 3.44			7.14 \pm 3.05		
Average	9.06 \pm 4.17			8.53 \pm 3.96		
High	8.58 \pm 4.45			9.50 \pm 4.70		
Subjective isolation		4.067	0.018		3.394	0.035
Low	5.97 \pm 1.25			6.35 \pm 1.36		
Average	5.50 \pm 1.60			5.99 \pm 1.54		
High	3.05 \pm 1.75			5.40 \pm 1.67		
Social isolation		4.17	0.016		7.576	0.001
Low	21.35 \pm 3.26			21.78 \pm 3.74		
Average	20.03 \pm 3.89			20.05 \pm 3.86		
High	21.02 \pm 3.81			18.55 \pm 3.47		

Table 3. Predicting Effects of Internet Use on Social Isolation in Young and Middle-Aged

Social Isolation Dimensions and Generations	Internet Use			
	B	B	t	P Value
Objective Isolation				
Core network size				
Young	0.037	0.65	1.13	0.258
Middle-aged	0.065	0.11	1.87	0.063
Frequency of Interactions				
Young	-0.007	-0.05	-0.83	0.404
Middle-aged	0.015	0.085	1.48	0.141
Network diversity				
Young	0.017	0.11	1.96	0.051
Middle-aged	0.032	0.2	3.56	0
Social participation				
Young	0.08	0.19	0.09	0.001
Middle-aged	0.148	0.38	7.034	0.001
Objective isolation				
Young	-0.045	-0.11	-0.19	0.062
Middle-aged	-0.117	-0.26	-4.69	0.001
Subjective isolation				
Loneliness				
Young	0.005	0.005	0.09	0.93
Middle-aged	-0.034	-0.04	-0.65	0.518
Social support				
Young	0.059	0.11	1.92	0.056
Middle-aged	0.113	0.24	4.23	0.001
Subjective isolation				
Young	-0.015	-0.08	-1.13	0.001
Middle-aged	-0.039	0.19	-3.38	0.001
Social isolation				
Young	-0.06	-0.12	-2.04	0.42
Middle-aged	-0.156	-0.29	-5.14	0.001

does not upgrade them much. It might be the reason for different results in previous studies. Some of these results, which are in line with the results of this study, showed that the use of Internet media was associated with lower levels of social isolation (4, 41). On the contrary, limited studies show opposite results (26, 42).

Although the significance level of the relationship of Internet use to social isolation and its dimensions are almost the same in both generations, the intensity of middle-aged relationships is higher than young people. This result is due to different types of internet use between

young and middle-aged people, which reduces the social isolation of young people less than that of middle-aged individuals.

This study had several limitations. The main limitation of the research was that studying the CDN needed information about respondent's interactions and that with whom they interact. This not only led to the use of interviews but also the need to attract the trust of the respondents was necessary. It made the process of completing the questionnaires extremely difficult.

Based on the results of this study, it seems appropri-

ate that future studies investigate the relationship of using mobile apps and social networking sites (SNS) to social isolation.

To measure the objective isolation in the present study, the CDN of young and middle-aged individuals was measured using questions that assessed close relationships among individuals, and the lack of questions about more distant relationships was evident. It is recommended that future studies measure the whole individuals' social network.

5.1. Conclusion

According to this study, Internet use decreases the level of objective isolation, subjective isolation, and total social isolation in young and middle-aged people, but the intensity of the effects of the Internet is higher in the middle-aged group. Therefore, due to the increasing rate of middle-aged groups in Iran and changing new and changing effects of this new technology, researchers must observe and monitor the trend of changes to suggest ways for using the Internet as an opportunity to reduce the isolation and loneliness of middle-aged individuals, and in this way, they help increase their physical and mental health.

Footnotes

Authors' Contribution: Research design: Mohammad Taghi Abbasi Shavazi and Maryam Hashempour-Sadeghian; Supervision: Mohammad Taghi Abbasi Shavazi; Collect the data: Maryam Hashempour-Sadeghian. Data analysis and Writing the manuscript: Mohammad Taghi Abbasi Shavazi and Maryam Hashempour-Sadeghian.

Conflict of Interests: No conflict of interest is reported by the authors.

Data Reproducibility: The data presented in this study are openly available in one of the repositories or will be available on request from the corresponding author by this journal representative at any time during submission or after publication. Otherwise, all consequences of possible withdrawal or future retraction will be with the corresponding author.

Ethical Approval: IR.SUMS.REC.1400.707.

Funding/Support: The authors received no financial support for the research, authorship, and publication of this article.

Informed Consent: Informed consent was obtained from all participants to participate in the study.

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