The Effect of Social Networks and Internet Emotional Relationships on Mental Health and Quality of Life in Students: a Path Analysis Model

Fatemeh Aliverdi

Alborz University of Medical Sciences

Zahra Mehdizadeh Tourzani

Alborz University of Medical Sciences

Leili Salehi

Alborz University of Medical Sciences

Mostafa Qorbani

Alborz University of Medical Sciences

Zohreh Mahmoodi (✉ zohrehmahmoodi2011@gmail.com)

social determinants of health research center, Alborz University of medical sciences, Karaj, IRAN

<https://orcid.org/0000-0002-7868-6941>

Research

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Abstract

Background: Social networks and relationships create a sense of belonging and social identity and therefore have a major effect on mental health and quality of life, especially in young people. The present study was conducted to determine the effect of social networks and Internet emotional relationships on mental health and quality of life in students.

Materials and Methods: The present descriptive analytical study was conducted in 2021 on 350 students at Alborz University of Medical Sciences selected by convenience sampling. Data were collected using five questionnaires: Socioeconomic Status, Social Networks, Internet Emotional Relationships Mental Health, Quality of Life and a checklist of demographic details. Data were analyzed in SPSS-25, PLS-3, and Lisrel-8.8.

Results: According to the path analysis results, mental health had the most significant positive causal relationship with Internet emotional relationships in the direct path ($B=0.22$) and the most negative relationship with socioeconomic status ($B=-0.09$). Mental health was assessed using DASS-21, in which higher scores mean higher mental disorder. Quality of life had the highest negative causal relationship with DASS-21 score in the direct path ($B=-0.26$) and the highest positive relationship with socioeconomic status in the indirect path ($B=0.023$). The mean duration of using social networks ($B=-0.067$) and Internet emotional relationships ($B=-0.089$) had the highest negative relationship with quality of life.

Conclusion: The use of the internet and virtual networks, Internet emotional relationships and unfavorable socioeconomic status were associated with mental disorders and reduced quality of life in the students. Since students are the future of any country, it is necessary for policymakers to further address this group and their concerns.

Background:

The 21st century is a century of rapid spread of social networks on the internet, and in contrast to traditional media in which users are passive recipients, social media enable people to create and share content and have become a very popular means of social interactions [1], and this popularity has led to dramatic changes in people's lifestyles [2].

According to reports, 521 million new users have joined social networks by April 2021 [3], and the majority of the users of social networks are young people [2]. Despite people's increased use of and access to the internet, the social consequences of its long-term use and associated crises have been neglected [4]. Because of their many similarities to the human society, social networks allow people to retain their existing relationships, find new friends, and discover information about people they know offline, which can have both positive and negative consequences [5].

Some researchers believe that by creating a sense of belonging and public social identity, social relationships significantly affect mental and psychological health and improve the quality of life [6]. As a matter of fact, people with greater social interactions have more favorable physical and mental health [7]. On the one hand, social research and criticisms often emphasize the negative impact of using the internet [8]. For example, in a study conducted on 1573 youth, Kim et al. found that internet addiction and using virtual networks is associated with high rates of depression and suicidal ideations [9]. Moreover, some studies observed that the excessive use of

virtual networks and the internet is associated with stress, personality disorder, and sleep disorder [10, 11]. In other studies, some researchers reported the negative impact of using the internet and virtual networks on the quality of life [12]. On the other hand, researchers such as Khalaila et al. (2018) and Schmidt et al. (2021) reported that using the internet has a positive effect on older adults' quality of life [13, 14].

The youth and children are more inclined to use virtual networks due to being alone and not having adequate social connections and support [15, 16]. Cawachi et al. (2001) found that being involved in social networks and private relationships facilitates access to various forms of support that play a protective role against psychological problems including stress (Fig. 1) [17]. Grino et al. (2017) also found that loneliness affects both mental and physical quality of life by way of two paths. Mediated by mental health and resilience, loneliness has a relationship with mental and physical quality of life (Fig. 2) [18].

Given these issues and also due to the contradictions existing in relation to the effect of social networks on mental health and social support, the importance of mental health and quality of life among the youth, who make the future of any country, and the lack of studies assessing all these elements together in one model, the present study was conducted to determine the effect of social networks and Internet emotional relationships on quality of life and mental health in students using the path analysis model.

We aimed to answer these questions:

- 1– What is the effect of social network and internet emotional relationships(direct/indirect) on mental health of college student?
- 2- What is the effect of social network and internet emotional relationships(direct/indirect) on quality of life of college student?
- 3- What is the effect of mental health (direct/indirect) on quality of life of college student?
- 4- What is the effect of demographic factors (age, education,) on mental health and quality of life of college student?

Materials And Methods:

Study design:

The present cross-sectional (descriptive-analytical) study was conducted in 2021 on students at Alborz University of Medical Sciences. This university is located in Alborz Province, neighboring Tehran Province (where the Capital of Iran is located), and has six schools: Medicine, dentistry, pharmacy, health, nursing, and para-medicine.

Study population

Based on a study conducted by Ziggi et al. [19] and considering ***correlation=0.15, $\beta=0.2$, $\alpha=0.05$*** , the sample size was determined as 345 using the following formula, but it was then increased to 350 to take account of a potential withdrawal of 10%. A weight was assigned to each school based on the number of students in it, and then, based on the weight assigned to each school, the eligible students were selected from each school until the required sample size was reached.

$$n=\{(Z_{\alpha}+Z_{\beta})/C\}^2+3$$

$$C=0.5\ln[(1+r)/(1-r)]$$

Inclusion criteria

Male and female Iranian students aged 18 to 29 years who had passed one academic semester, did not use psychotropic and narcotic drugs, did not take antidepressants, had physical and mental health according to their educational records and self-report, and had a cellphone that enabled them to use virtual networks were included in the study.

Exclusion criteria

The students who withdrew from the study for whatever reason or who quit studying, experienced adverse events during the study such as death of parents, and returned incomplete questionnaires were excluded.

Data collection

The Depression, Anxiety and Stress Scale - 21 Items (DASS-21) was used to assess the students' mental health, and the 36-item short-form health survey (SF-36) was administered to assess their quality of life. Data were collected using five questionnaires and a checklist, as follows:

Checklist of demographic details

This checklist inquired about participants' personal details, including age, gender, nationality, marital status, education, field of study, academic semester, occupation, use of virtual networks on their cellphone, being a virtual network user, type of virtual network used, and the mean duration of using social networks per day (in hours).

Socioeconomic status scale

The socioeconomic status questionnaire comprising five main items and six demographic items developed by Ghodrathnama in 2013 was used to evaluate four dimensions of the socioeconomic status, i.e. income level, economic class, education and housing status. The items were scored on a five-point scale ranging from 1: very low 5: very high. Eslami et al. confirmed the face and content validity of this questionnaire in Iran. They also confirmed its reliability by calculating a Cronbach's alpha of 0.83 (2013) [20]

Internet Emotional Relationships questionnaire

The valid and reliable questionnaire developed by Barghi-Irani et al. [21] was used to assess online emotional relationships. This 28-item questionnaire has five components, including trust, honesty, enjoyment, sexual desire and preferring virtual relationships, and is scored based on a five-point Likert scale (from totally disagree to totally agree). The validity and reliability of the questionnaire were confirmed with Cronbach's alpha coefficients of 0.73 for trust, 0.70 for honesty, 0.71 for enjoyment, 0.79 for sexual desire, 0.84 for preferring virtual communication, and 0.90 for the whole scale [21]. In the present study, the overall reliability of this tool was confirmed with Cronbach's alpha of 0.85.

Stress, Anxiety, Depression Scale (DASS21), Lovibond (1995) [22]

The standard DASS-21 has 21 items in the three dimensions of stress, anxiety, and depression, each with seven items, and the final score of each subscale and the total score are found by summing up the scores of the items in that subscale. Each item is given a score between zero (did not apply to me at all) to three (applied to me very much). Since DASS-21 is the short form of the original scale with 42 items, the final score of each subscale has to be doubled. The validity and reliability of this scale were confirmed in Iran by Sahebi et al. within a range of 0.77 to 0.79 [23]. The lower is the score in this scale, the better is the respondent's mental health.

36-Item Short-Form Health Survey (SF-36):

This questionnaire was designed in the US by Ware and Sherbourne (1992) and its validity and reliability were assessed in different groups of patients [24]. The survey contains 36 items in eight dimensions, including physical functioning, role limitations due to physical problems, role limitations due to emotional problems, energy/fatigue, emotional well-being, social functioning, pain and general health. Moreover, two general subscales called physical health and mental health are obtained by combining these subscales. A lower total score in this questionnaire indicates lower quality of life and vice versa. In Iran, Montazeri et al. (2005) confirmed the validity of this questionnaire as 0.58 to 0.95 and its reliability as 0.77 to 0.90 [25].

Social Networks Questionnaire

The social network and media use were assessed using Jahanbani's (2018) standard 19-item questionnaire containing three dimensions, including degree of use, type of use, and users' trust in networks. Scoring is based on a five-point Likert scale from very little to very much. Jahanbani (2018) confirmed the reliability of this questionnaire with Spearman's correlation coefficient of 0.90. The internal consistency of this questionnaire was also confirmed with Cronbach's alpha coefficient of 0.85 [26].

Procedure:

The study began after obtaining the necessary permissions from the university and a code of ethics from the university ethics committee. Due to the Covid-19 situation and the impossibility of physical presence of the students, a consent form for participation in the study was first sent to the students through related online networks, such as the Student Deputy, the Student Research Committee and student groups. Eligible students willing to take part were selected by convenience sampling. Then, the online questionnaires were forwarded to the students through these networks and they were asked to complete them in the specified timeframe (minimum two weeks). The researcher's phone number was given to the students to contact for responding to any possible ambiguities.

The students were assured of the confidentiality of all their data and that they had no obligation to take part in the study or continue their cooperation and that they would not face any problems or restrictions if they decided not to participate in the study.

Statistical analysis:

This study assessed the fit of a conceptual model for examining the concurrent effect of social networks and Internet emotional relationships on mental health and quality of life in students. First, the normal distribution of the quantitative variables was assessed using the Kolmogorov-Smirnov test. The path analysis method is an extension of the usual regression that shows the direct effects as well as indirect effects and impact of each

variable on the dependent variables, and the results of this model can provide a rational interpretation of the relationships and correlations observed. Data were analyzed in SPSS-25 [27], PLS3 [28] and Lisrel-8.8 [29]. The correlation results were presented as Pearson's correlation coefficient, and the path analysis results as beta with a significance level of $T\text{-value} > 1.96$.

Path analysis is considered a causal modeling technique; it can be performed with either cross-sectional or longitudinal data [30].

Results:

The data from 350 students at Alborz University of Medical Sciences were assessed in this study. Participants' mean age was 22.42 ± 2.8 years and their mean duration of education was 14.99 ± 1.4 years. The mean score of quality of life was 2237.5 ± 539.4 , mental health 41.31 ± 14.15 , Internet emotional relationships 61.42 ± 17.50 , and social networks 49.87 ± 9.3 .

According to Pearson's correlation test results, the use of social networks ($r = -0.155$) and mental health (DASS-21) ($r = -0.260$) had a negative and significant correlation with quality of life, with DASS-21 having the highest negative and significant correlation. In other words, the higher was the DASS-21 score, i.e., the higher was mental disorder, including stress, anxiety, and depression, the lower is the score of quality of life ($r = -0.260$).

Mental health had a positive and significant correlation with the mean duration of using social networks ($r = 0.137$) and Internet emotional relationships ($r = 0.222$). Among these two variables, Internet emotional relationships had the highest positive and significant correlation with the mental health score (DASS-21 ($r = 0.222$)) (Table 1).

Table 1

The correlation matrix between social networks and online emotional relationship with mental health and quality of life in students 1400(n = 350)

	1	2	3	4	5	6	7	8
1 Age	1							
2 Education	0.508**	1						
3 Average time of use of the Internet	-0.108*	-0.088	1					
4 Internet Emotional Relationships	-0.120*	-0.134*	0.097	1				
5 Mental disorder (DASS)	-0.014	0.072	0.137*	0.222*	1			
6 Socioeconomic status	-0.153**	0.070	-0.156**	0.027	-0.093	1		
7 Social Network Score	-0.085	-0.014	0.497**	0.265**	0.161**	-0.041	1	
8 Quality of Life (SF36)	0.018	-0.012	-0.056	-0.074	0.260**	-0.032	-0.155**	1
** = P < 0/01 * = P < 0/05								

In order to test the model, the above questionnaires were first assessed in the model. The factor loadings of the items of each questionnaire and the validity and reliability of the tools used in the model were assessed in PLS. According to the results, the factor loading of all the questionnaires items was higher than 0.4 and all the items were retained after the final testing of the model. To determine the convergent and divergent validity, indices including composite reliability (CR), average variance extracted (AVE), maximum shared variance (MSV), and average shared variance (ASV) were used. According to the results, $CR > AVE$ and $AVE > 0.5$; therefore, the subscales of this tool have convergent validity, and since $MSV < AVE$ and $ASV < AVE$, the divergent validity is also desirable (Table 2). Table 3 presents the Heterotrait-heteromethod ratio of correlations (HTMT), which is used to assess the divergent validity of two variables. Divergent validity is acceptable when this ratio is less than 0.9 [31].

Table 2

The results of the confirmatory factor analysis and the combination of CR) and the mean of variance extracted (AVE) quality of life questionnaire, mental disorders, social networks and Internet emotional relationships in the test model

Questionnaires	Composite reliability	Average variance extracted	Rho-A	MSV	ASV	Alpha Cronbach
DASS	0.937	0.832	0.904	0.551	0.484	0.899
Internet emotional relationship	0.925	0.712	0.901	0.562	0.389	0.898
Quality of Life (SF36)	0.961	0.74	0.938	0.501	0.435	0.878
Social networks	0.887	0.75	0.869	0.340	0.367	0.865

Table 3

Heterotrait-heteromethod ratio of correlations (HTMT) Matrix Quality of Life, Mental Disorders, Social Networks and Internet emotional relationships in the Test Model

	1	2	3	4
1 Mental health				
2 Internet emotional Relationships	0.252			
3 Quality of Life	0.750	0.205		
4 Social Networks	0.209	0.331	0.252	

According to the path analysis results, in the direct path, mental health had the most positive significant causal relationship with Internet emotional relationships ($B = 0.22$) and the most negative relationship with socioeconomic status ($B = -0.09$). In this study, mental health was assessed using DASS-21, in which higher scores mean unfavorable mental health or higher mental disorders (stress, anxiety, and depression). Thus, with a one-unit increase in the score of online emotional relationships, mental disorders (DASS-21) increase by 0.22 units, and with a one-unit increase in socioeconomic score, mental disorders reduce by -0.09 units.

Among the variables related to quality of life, in the direct path, quality of life had the highest negative causal relationship with the mental health or DASS-21 score ($B = -0.26$); in other words, with a one-unit increase in the score of mental disorders, quality of life reduced by 0.26 units. Among the variables with a significant causal relationship with quality of life in the indirect path, socioeconomic status had the highest positive relationship with quality of life ($B = 0.023$), while the mean duration of using social networks ($B = -0.067$) and Internet emotional relationships ($B = -0.089$) had the highest negative relationship with this index. In other words, a one-unit increase in socioeconomic score increased the quality of life score by 0.023 units, and one-unit increases in the score of Internet emotional relationships and the mean duration of using social networks reduced the quality of life score by 0.089 and 0.067 units, respectively. An increase in the quality of life score meant a more favorable quality of life and vice versa (Table 4).

Table 4
Direct and indirect effects of social networks with mental health and quality of life

mental health (DASS21)		Direct effects	Indirect effects	Effectively
	education	0.12*	0.36	0.12*
	Average time of use of the Internet over a day (to hours)	0.08	0.288	0.11
	Socioeconomic status	-0.09*	0.0012	-0.09*
	Internet emotional relationships	0.22*	0.013	0.22*
	Social networks	0.06	-	0.06
Quality of life(SF-36)	education	0.04	-0.03*	-0.03*
	Average time of use of the Internet over a day (to hours)	0.04	-0.067*	-0.067*
	Socioeconomic status	-0.06	0.0234*	0.0234*
	Internet emotional relationships	0.02	-0.089*	-0.089*
	Social networks	-0.14*	-	-0.14
	Mental health	-0.26*	-	-0.26*
*=significant				

The model fit indices showed that the model has a good fit and is highly compatible and the adjusted relationships of the variables based on the conceptual model are rational. Accordingly, there is no significant difference between the fitted model and the conceptual model (Table 5).

Table 5
model Fitting Indicators

RMSEA (Root mean error of estimation)	NFI (Soft Growth)	GFI (Good fit)	CFI (adjusted fitness)	χ^2/df	df	χ^2
0000	0/99	1	1	1/06	3	3/18

Discussion:

In the course of their education, students experience a unique transition from high school to adulthood [32], which marks the beginning of a major period of psychological and social development that can have different impacts on students' health and life [33].

According to the results obtained, among the variables with a significant causal relationship with mental health in the students, socioeconomic status had the highest direct negative relationship. In other words, the more unfavorable is a student's socioeconomic status, the greater is his risk of mental disorders such as stress, depression and anxiety. This finding agrees with the results obtained by Silva et al., who found in their review study of 2004 to 2014 that there is an independent relationship between mental health and socioeconomic status

[34]. In a cohort study conducted on adolescents, Reiss et al. (2020) found that socioeconomic status is an independent predictor of mental health problems. Adolescents and youth with unfavorable socio-economic conditions experience various stressful situations in their life, thus exposing them to mental problems or their exacerbation [35]. The results of many studies indicate that there are more stressful situations in the life of families with a lower socioeconomic status, such as parents' mental illness or accidents, severe financial crisis, job loss, academic problems, etc. compared to other groups, which can contribute to the development of mental disorders [34–36].

In the present study, Internet emotional relationships had a positive causal relationship with mental health in the direct path. In other words, students' mental disorders increased as their score of Internet emotional relationships scored. The consequences of introducing new communication technologies include the changes in the type and method of communication between the two sexes, mutual emotional interactions and different patterns of intimacy [37]. Today, a new type of relationship has formed in the context of the internet, especially virtual networks, that is very different from its traditional form. Researchers have found conflicting results in relation to these forms of friendship. On the one hand, online friendships are defined as fragile relationships with less attachment, commitment and self-disclosure that deter people from pursuing social activities and impair their development of social relationships. On the other hand, online friendships are regarded as an alternative to positive experiences and beneficial and stable relationships [38]. Researchers have found that feeling left out of the family and society and the absence of a strong social network persuade people to pursue online relationships and make up for their emotional deficiencies and can cause different levels of internet addiction [39]. In a study conducted on university students, Seyyed Salman Alavi et al. found that there is a significant relationship between mental disorders including depression and internet dependencies, which agrees with the present findings [40], but disagrees with the results of the study by Hachebi (2001), who argued that social media provide a good opportunity for people and can affect their mental health [41]. These contradictions can be caused by the method and level of use of social networks and the level of emotional-social dependence due to cultural-social limitations. The rise in these contradictions is alarming not only for policy-makers and civil community groups, but also for the citizens [42].

Another investigated variable was students' quality of life. Poor mental health has a direct, negative, causal effect on quality of life, such that an increase in mental problems reduces students' quality of life. The present findings agree with the results of many studies, including a qualitative systematic review study by Connell et al. (2012) which found that a good quality of life is correlated with a good sense of control, a positive self-image, and hope and optimism, and conversely, a low quality of life is correlated with mental disorders, anxiety and poor self-esteem [43]. In another study conducted on university students, Jenkins et al. (2020) confirmed the effect of mental problems on quality of life and argued that students with anxiety, depression or other mental problems had a poorer quality of life [44].

Other factors with a significant causal relationship with quality of life included the average time spent on the internet and online emotional relationships, which had the greatest negative relationship with quality of life. Some researchers have found that internet use is significantly associated with reduced communication with friends and social networks, which causes further loneliness and a decrease in some aspects of quality of life [45]. In a study conducted on nursing students, Ragheb et al. (2018) found that inappropriate use of the internet adversely affects the students' quality of life. They believed that excessive use of the internet was a way for the students to run away from the pressures of real life or parental conflicts (46), which agrees with the present findings. Nonetheless,

a study conducted on older adults by Khalaila et al. (2017) showed that using the internet and social networks has a positive role in the quality of life in this age group [14]. Such contradictions can be due to the differences in age groups examined, study type and data collection instruments.

Conclusion:

According to the results, using the internet and virtual networks, online emotional relationships, and unfavorable socioeconomic status are associated with mental disorders and reduced quality of life in students. Since students make the future of every country, it is essential for policymakers to further address this group and their concerns. The researchers recommend further training of the public on proper internet use and virtual networks and their role in improving the quality of life.

Abbreviations:

EDU= Education

TUS= Average time of use of the Internet

INT= Internet Emotional Relationships

SOM= Social Network Score

DASS= Depression, Anxiety and Stress Scale

SES= Socioeconomic Status

SF36= 36-Item Short-Form Health Survey

Declarations:

Ethics approval and consent to participate:

Informed consent was obtained from all the participants entering the study. Relevant guidelines and regulations were observed for all methods. All experimental protocols were approved by the Ethics Committee of Alborz University of Medical Sciences (Abzums.Rec.1399.234). All methods were carried out in accordance with relevant guidelines and regulations.

Consent for publication:

Not applicable

Availability of data and materials:

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Competing interests:

The authors declare that they have no competing interests.

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Authors' contributions:

F, A. designed and collected the data, performed the statistical analysis and wrote the manuscript. Z, M. supervised the study, contributed to the study design and conducted the analysis, and also helped write the manuscript. M, Q. analyzed the data and helped write the manuscript. L, S. served as the study's scientific advisor, designed and helped write the manuscript. Z, M T. helped collect the data and write the manuscript.

All author(s) have read and approved the final manuscript.

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Figures

Figure 1

Relationship between social networks, social impacts and psychological accuracy (17)

Figure 2

Relationship between loneliness and resilience, mental health and physical and psychological life quality (18)

Figure 3

A conceptual model of communication between social networks and Internet emotional relationships on mental health and quality of life

Figure 4

Full Empirical Model (Empirical Path Model between EDU =Education., TUS= Average time of use of the Internet, INT= Internet Emotional Relationships SOM= Social Network Score, DASS= Depression, Anxiety and Stress Scale, SES= Socioeconomic Status SF36=36-Item Short-Form Health Survey