Research Paper: Association Between Virtual Social Networks and Health-Promoting Lifestyles in Medical University Students

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ABSTRACT

Background: Medical students make extensive use of virtual social networks, especially in the era of the coronavirus pandemic, so that their health-promoting behaviors may be adversely affected.

Objectives: This study aimed to determine the relationship between the use of virtual social networks and a health-promoting lifestyle among postgraduate medical students.

Materials & Methods: This cross-sectional study was conducted among post-graduate students studying at Tehran University of Medical Sciences in 2020. A total of 240 students were included using quota sampling method. Data were collected via valid and reliable questionnaires consisting of socio-demographic information, health-promoting lifestyle Profile-II, and virtual social networks utilization. The spearman test was employed to evaluate the association between virtual social networks and lifestyle.

Results: The mean age of participants was 32.21±7.45 and 75.4% were female. The mean score of lifestyle was 138.28±21.18, while the mean score of virtual social networks utilization was (64.55±11.40). There was a statistically significant correlation between utilization of virtual social networks and total score of lifestyle (r=-0.189, P=0.003), as well as physical activity (r=-0.232, P=0.001), nutrition (r=-0.179, P=0.005), and self-actualization (r=-0.154 , P=0.017) of health promoting lifestyle. Linear regression model showed that utilization of internet and social networks (B=-0.37, P=0.02), utilization in the time between 12 pm and 8 am (B=-14.3, P=0.011) were independently associated with Health Promoting Lifestyle score.

Conclusion: This study showed that more than half of students had a healthy lifestyle (55%). The average score of virtual social networks used by students was high. Utilization of internet and the time of utilization were independent predictors of Health Promoting Lifestyle score.

Keywords: Online Social Networking, Health-Related Behaviors, Healthy Lifestyle, Universities, Students
1. Introduction

Virtual social networks was defined as places where people may identify themselves, show off their features, build personal public profiles, meet actual friends and other people based on similar interests [1]. These networks have the capability to change interpersonal and social relationships, as well as influence lifestyles [2].

According to some previous research in Iran, the interaction of people, especially students, on social networks has noticeably increased in recent years [3]. Social networks have become an integral part of the lives of many students [4, 5]. Based on the results of the national survey of the Iranian Students Polling Agency (ISPA) in July 2019, 42.8% of students were using WhatsApp social networks, 42.4% (Telegram), 39.5% (Instagram), and 2.3% (Facebook), while 30.24% had not used any social networks [4]. These studies have revealed that the main motivations for most students to join social networks were entertainment and communication with past and present friends [3].

Virtual social networks might have different effects on learners in the educational system, including students, who constitute a substantial part of Internet users, due to the multiple benefits they gain such as knowledge acquisition and information exchange, interaction, quick feedback, fun, and entertainment [4]. Researchers found that social networking through Internet tools enhances critical thinking, team-centered projects, problem-solving, and contributes to the production of new knowledge [4]. Social networks have desirable effects on optimizing educational and therapeutic processes [6, 7]. On the other hand, an overview of the latest research shows different and, in some cases, contradictory findings. According to an Iranian article, the most negative effect of virtual social networks is the time spent on use, which could adversely influence students’ academic performance [8].

In addition, it has shown that risk perception, adoption of new habits, and illness prevention are all influenced by virtual social networks [9]. Reduced self-esteem, nutritional issues, increased aggression, ridiculous sentiments, and decreased attention to activities are some of the negative elements of virtual social networks [10]. In certain situations, because of disseminating false information and initiatives, it can influence relationships between people and the health system, leading to a loss of public faith in healthcare workers and, consequently, people may be directed to unapproved and unscientific actions [11]. According to a previous study in Iran, the length of time spent on Facebook has had an impact on eating habits in adolescents in Isfahan [12]. The results of previous research at Qazvin University of Medical Sciences, Iran, showed that students of medical science, prior to the corona pandemic, widely used virtual social networks which correlated with some aspects of their healthy lifestyle [13]. A health-promoting lifestyle includes disease prevention and can complement some healthy lifestyle features [7]. A healthy lifestyle depends on many factors, such as genetics and environmental factors. However, some habits have remarkable effects on health [14]. A health-promoting lifestyle combines six domains: self-actualization, health responsibility, exercise, nutrition, interpersonal support, and stress management [15].

According to an Iranian study, after the COVID-19 outbreak, use of virtual social networks soared by 40% [11]. Long periods of time spent at home, as well as a lack of face-to-face interactions, lead to an increase in the use of virtual social networks [11]. Accordingly, the question here is about the impact of virtual social networks on the lifestyles of postgraduate students who do most of their academic activities online, especially in Corona condition, and who will play an important role as health professionals in the health promotion of people.

So, this study aimed to investigate the relationship between lifestyle and virtual social networks used among postgraduate students at Tehran University of Medical Sciences (TUMS) to tap into the results for identifying threats and converting them into opportunities for improving students’ health.

2. Materials and Methods

Study type and study population

This analytical cross-sectional study was conducted among postgraduate students at TUMS between August and November 2020. Students who were studying for a master or doctorate degree and were using at least one of the common virtual social networks (Telegram, WhatsApp, and/or Instagram) at the time of conducting the study were included. Non-Iranian students, students who were not fluent in Persian, those who were in the first semester or who had transferred from other universities were excluded from the study. The sample size was calculated based on similar Iranian studies [16]. A total of 200 samples were calculated considering a correlation coefficient of -0.197, type 1 error = 0.05, and study power of 80%.
The sample was selected using quota sampling method. The sampling frame was the list of all students studying at TUMS available from the vice-chancellor of education. There are 10 faculties in TUMS that were considered as strata in this study. The student proportion for each degree and faculty was computed according to the number of students in each faculty to the overall number of students (3040 students). The questionnaire was uploaded on the Porsline website and the link of questionnaire was sent to the mobile numbers of the representative’s students that were selected through purposive sampling method. The students were asked to send the link to other mobile numbers and email or share it in virtual groups (Telegram and WhatsApp). The study’s objectives and the consent form were provided to the participating students on the first page of the online questionnaire. It was mentioned that participation is voluntary, and pressing the “start button” means that the informed consent form has already been signed.

**Study instrument**

The first section of the study instrument was the sociodemographic information encompassing age, gender, educational level, school of study, income status, marital status, residency, Internet connection method, name of the social network in use, duration, goal, and history of social network utilization. The second section was the 52-item Health Promoting Lifestyle Profile-II (HPLP-II) questionnaire, and the third section included 20 items on virtual social networks. HPLP-II is a refinement of Walker et al. HPLP [15]. The questionnaire consists of 6 domains with 52 items; health responsibility (9 items), physical activity (8 items), nutrition (9 items), self-actualization (9 items), interpersonal support (9 items), and stress management (8 items). This questionnaire was measured on a 4-point Likert scale (never= 1, sometimes= 2, often= 3, always= 4). High scores indicate a better and more desirable lifestyle. The mean score of all 52 HPLP items ranges from 52 to 208 was used to calculate the total score of the HPLP II. The total HPLP II score was divided into four levels: poor (52–90), moderate (91–129), good (130–168), and excellent (169–208) [17]. Internal consistency and test-retest reliability have been demonstrated in the English version of the HPLP-II [15]. The reliability and validity of the Persian version of HPLP-II was verified in the Iranian study by Mohammadi Zaidi and colleagues [19]. In the current study, the Cronbach’s alpha coefficient for the overall scale was 0.936, and for the six subscales, it ranged from 0.69 to 0.86.

Virtual social networks questionnaire was developed by Pouresmaeil et al. in 2020 to examine the utilization of virtual social networks. It is composed of 20 items on a five-point Likert scale (strongly disagree= 1, disagree= 2, neutral= 3, agree= 4, strongly agree= 5). To obtain the total score of the questionnaire, the scores of items were summed together; thereby, the overall score of the questionnaire ranged between 20 and 100, divided into four categories; 0-25 indicates low utilization of social networks, 26-50 as medium utilization, 51-75 and 76-100 as high and very high utilization, respectively. Pouresmaeil et al. have verified its validity based on the opinions of health and information technology experts, and its reliability was also verified through internal consistency by Cronbach’s alpha coefficient of 0.79 [13]. In this study, the Cronbach’s alpha coefficient was 0.874.

**Statistical analysis**

Data were described using mean and Standard Deviation (SD) and frequency and percent, as appropriate. Kolmogorov-Smirnov test was used to assess normal distribution of continuous variables. The spearman correlation was used to examine the correlation between the age, total score of lifestyles and virtual social networks. The Mann–Whitney U test, Kruskal-Wallis and linear regression model were employed to examine the use of virtual social networks based on demographic variables. An independent sample t-test was applied to examine the relationship between the mean scores of health-promoting lifestyle and dichotomous variables (gender, level of education, and income-generating activity). The one-way Analysis of Variance test (ANOVA) was used to evaluate the relationship between the mean scores of health-promoting lifestyle and multilevel demographic variables. The independent association of predictors with health-promoting lifestyle was explored using linear regression model. The data was analyzed using SPSS software version 26.

3. Results

Two hundred and forty students participated in this study. The mean age of the students was 32.21±7.45 and 181 (75.4%) were female. Half of the participants were master students, and the other half were studying for a doctorate. Of total, 131 (54.6%) had an income, 145 students (60.4%) were single, and 138 (57.5%) were living with family. Nearly 25% were from the School of Public Health, while less than 4% were from the School of Dentistry (Table 1).

Regarding Internet connection, (42.1%) of the participating students were using the home Internet. Most students (74.6%) used the Internet between 4 p.m. and 12
p.m. Of total, 181 (75.4%) participants stated that their goal of using virtual social networks was to communicate with others, 179 (74.6%) aimed at searching for scientific content, and 168 (70%) to check the news. Other goals of using virtual networks were entertainment 164 (68.3%), professional activities 142 (59.2%), using health-related content 105 (43.8%), online shopping 101 (42.1%) and research 100 (41.7%), respectively. The majority of the participants (91.7%) were using WhatsApp, followed by Telegram (70%), Instagram (69.2%), and LinkedIn 50 (20.8%). Participants used other social networks including YouTube 36 (15%), Facebook 17 (17.5%), Twitter 16 (6.7%), and Imo 8 (3.3%).

Table 1 showed the mean score of virtual social network utilization and health promoting lifestyle in terms of study variables. Health promoting lifestyle was significantly associated with the time of using the internet in a day. Overnight habit of internet utilization (from 12 p.m to 8 a.m) was significantly associated with the lowest score of health promoting lifestyle compared to daily users of internet (from 8 am to 4 p.m).

The average score of health-promoting lifestyles was 138.3±21.2. The highest mean score was related to the domain of self-actualization (26.93±5.01, 66% of total score), followed by interpersonal relation (26.3±4.15, 64% of total score), while the lowest mean score was related to the domain of physical activity (16.92±5.17, 37% of total score), followed by stress management (19.9±4.09, 49% of total score). According to the classification of HPLP, 88 students (36.7%) had moderate, 132 students (55%) had good, 18 students (7.5%) had excellent, and only 2 students (0.8%) had poor health promoting lifestyle. The mean total score of the use of virtual social networks among students was 64.55±11.40, which indicates a high utilisation rate. Only one student was in the low range, 24 students (10%) were in the medium range, 174 (72.5%) were in the high range, and 41 (17.1%) were in the very high range. There was a statistically significant inverse correlation between the total score of lifestyle and the use of virtual social networks (P=0.003). Concerning lifestyle domains, physical activity, nutrition, and self-actualization domains displayed a significant inverse correlation with the use of virtual social networks (P=0.05). The direction of the relationship between the total score of lifestyle, also its dimensions and use of virtual social networks was negative indicating that students with higher use of virtual social networks have a worse lifestyle (Table 2).

Table 3 shows the percentage of agreement response to the items of virtual social network utilization. More than half of the students considered virtual social networks part of their daily lives and programs, and they also used them in their workplaces. They agreed with the use of virtual social networks by family members and considered them useful for raising awareness.

The results of the regression model showed that utilization of internet and social networks (B=-0.37, P=0.02), and the time between 12 pm and 8 am (B=-14.3, P=0.011) has a statistically significant effect on reducing the Health Promoting Lifestyle score.

4. Discussion

This study revealed a high rate of virtual social network utilization among postgraduate students and health-promoting lifestyle was significantly associated with the use of social media between 12 o’clock and 8 a.m. Nightly use of the Internet negatively can affect some aspects of the lifestyle. In most studies, the amount of Internet use has been emphasized, not the time of utilization. Some studies in adolescents have shown that using the Internet and social media is associated with insufficient sleep, irregular sleep patterns, periods of sleep disturbance and a disturbed sleep schedule on weekends [19-21].

Also, there was a significant inverse correlation between utilization of virtual social networks and physical activity, nutrition and self-actualization domains of health promoting life style. This finding is in agree with previous study by Eydi Zade et al.who showed that WhatsApp and Telegram had an inverse and significant relationship with lifestyle and its dimensions such as exercise, weight control and nutrition [16]. However, Pouroeima et al. found a positive relationship between lifestyle and virtual social networking, as well as health responsibility, nutrition, and interpersonal relationships domains [13].

The relationship between virtual social networks utilization and physical activity has been showed in a number of studies, but different results have been observed. Based on the findings of the Kulandairaj study in 2014, virtual networks impact working out and doing sports among students [22]. In the findings of Centola’s, there was a positive effect of social media on improving health behaviors, including exercise [23]. Al-Eisa et al. also revealed that the use of Instagram was a motivating factor in strengthening adherence and in maintaining the appropriate level of physical activity [24] while according to a study conducted by Maher et al. in 2015, a physical activity intervention using a social network with a pedometer has led to a significant difference in physical
Table 1. Score of health promoting life style profile and utilization of virtual social network according to the study variables

| Variable                  | Levels                        | No. (%) | Virtual Social Networks Utilization | P     | Health Promoting Lifestyle | P     |
|---------------------------|-------------------------------|---------|-----------------------------------|-------|-----------------------------|-------|
| Gender                    | Female                        | 181(75.4) | 64.51±10.37                      | 0.748 | 138.77±20.67               | 0.530 |
|                           | Male                          | 59(24.6)  | 64.64±11.74                      |       | 136.77±22.79              |       |
| Educational level         | Master                        | 120(50.0) | 64.70±11.51                      | 0.570 | 138.65±20.20               | 0.787 |
|                           | PhD                           | 120(50.0) | 64.39±11.34                      |       | 137.91±22.18              |       |
| Income-generating activity| Yes                           | 131(54.6) | 64.03±12.19                      | 0.723 | 139.66±22.61               | 0.271 |
|                           | No                            | 109(45.4) | 65.17±10.39                      |       | 136.63±19.28              |       |
| Marital status            | Single                        | 145(60.4) | 62.43±10.43                      |       | 137.48±20.68               |       |
|                           | Married                       | 92(38.3)  | 62.97±12.73                      | 0.252 | 140.06±21.46               | 0.280 |
|                           | Divorce & widow               | 3(1.3)    | 70.0±10.44                       |       | 122.33±35.85              |       |
| Residence                 | Dormitory                     | 76(31.7)  | 64.78±11.62                      |       | 139.56±22.03               |       |
|                           | Family                        | 138(57.5) | 63.94±11.78                      |       | 139.62±21.08              |       |
|                           | Private houses                | 17(7.1)   | 68.52±8.53                       | 0.357 | 127.52±16.95               | 0.105 |
|                           | With friends                  | 3(1.3)    | 69.0±10.81                       |       | 127.33±11.93              |       |
|                           | Others                        | 6(2.5)    | 61.83±4.26                       |       | 127.33±17.72              |       |
| School                    | Nutritional sciences and dietetics | 16(6.7) | 66.0±11.67                      |       | 144.56±20.34               |       |
|                           | Virtual school                | 12(5.0)   | 68.0±9.14                       |       | 134.75±20.77              |       |
|                           | Medicine                      | 39(16.3)  | 65.0±8.10                       |       | 133.51±19.98              |       |
|                           | Public Health                 | 59(24.6)  | 65.74±12.74                      |       | 137.57±22.00              |       |
|                           | Nursing and Midwifery         | 28(11.7)  | 61.53±11.34                      |       | 133.00±18.90              |       |
|                           | Allied medical sciences       | 19(7.9%)  | 61.84±12.71                      | 0.627 | 147.52±19.24               | 0.225 |
|                           | Advanced technologies in medicine | 15(6.3) | 68.86±10.80                      |       | 141.00±21.56              |       |
|                           | Dentistry                     | 8(3.3)    | 64.12±9.31                       |       | 142.37±30.58              |       |
|                           | Pharmacy                      | 15(6.3)   | 64.2±12.51                       |       | 144.93±25.03              |       |
|                           | Traditional medicine          | 7(2.9)    | 61.57±12.92                      |       | 126.42±26.81              |       |
|                           | Rehabilitation                | 14(5.8)   | 64.12±9.29                       |       | 143.00±16.95              |       |
|                           | International                 | 8(3.2)    | 58.62±16.80                      |       | 136.62±18.26              |       |
| Internet connection       | Mobile phone                  | 94(39.2)  | 65.95±9.91                       | 0.505 | 137.60±18.41              | 0.579 |
|                           | Home Internet                 | 101(42.1) | 63.73±12.64                      |       | 138.76±21.57              |       |
|                           | University and Dormitory      | 41(17.0)  | 63.97±10.27                      |       | 139.97±25.98              |       |
|                           | Others                        | 4(1.7)    | 58.0±20.63                       |       | 125.00±20.24              |       |
| Time of using Internet in a day | 8am-4 pm                   | 41(17.1)  | 56.97±15.73                      |       | 141.58±22.31              |       |
|                           | 4pm-12 pm                     | 179(74.6) | 54.81±10.30                      | 0.312 | 138.72±20.88              | 0.046 |
|                           | 12pm-8 am                     | 20(8.3)   | 57.05±10.24                      |       | 127.65±19.09              |       |
activity in the short run [25]. In 2015, Zhang and colleagues mentioned that the social impact of anonymous online counterparts seems to be more successful than advertising messages in improving physical activity [26]. Our study showed that people who used more virtual social networks had less physical activity. Postgraduate students do not have a physical education course and they complete the majority of their academic work via the Internet. In addition, as the university closed in the time of Corona pandemic, students increasingly used virtual social networks to communicate with one another and professors. Staying in the residence and the closure of public sports clubs and university sports facilities to avoid viral transmission also limited physical activity opportunities. It seems that physical activity programs of the university, need to be revised to encourage more students to participate in physical activity. It should be noted that having multiple platforms to hold live sports sessions, share sports training videos and animations, send educational or motivational messages, and establish a virtual fitness consultation service can be helpful in these situations.

In our study, there was a weak negative significant relationship between virtual social networks use and self-actualization that agree with previous views. According to Walker’s definition, spiritual growth, also known as self-actualization, is the process of transcending, connecting, and developing one’s inner resources. Transcending connects us to our most balanced selves, brings us inner peace, and allows us to explore new possibilities for becoming something more by going beyond who and what we are. Harmony, wholeness, and connection with the universe are all feelings associated with connecting. Development entails searching for meaning, finding a sense of purpose, and working toward life goals in order to maximize human potential for wellness [15]. According to Esfijani et al., issues such as a sense of isolation, a bad learning experience, communication barriers, and so on may have an impact on student achievement at virtual schools. Virtual universities have a higher dropout rate than traditional institutions, implying that learning achievement and student contentment are unacceptably low in this setting. Based on data from the literature, students in virtual learning environments are unable to satisfy their social and self-actualization needs [29].

In the study by Forghani and Mohajeri, there was a relationship between lifestyle components such as diet changes and the use of mobile social networks. As the time spent for using mobile social networks increased, so did each component of the lifestyle [27]. But in a systematic review comparing different social media interventions for diet and exercise behaviors, Williams, et al. found no significant difference in promoting healthy diets and behaviors between social media treatments and control groups [28]. Our findings, as well as those of a study conducted in Isfahan, showed that increasing the use of virtual social networks has an impact on eating habits [12]. The regular consumption of meals during corona pandemic has changed as a result of the closure of public restaurants and catering facilities in universities, as well as the limited activities of grocery stores. Although, one of the reasons for which could be spending time on networks. Some people who lost access to fresh food bought food or raw materials online, and others used social media to learn how to make new fast foods and sweets.

Table 2. Relationships between the use of virtual social networks and health-promoting lifestyle and related domains

| Health-Promoting Lifestyle Domains       | Use of Virtual Social Networks |     |     |
|-----------------------------------------|--------------------------------|-----|-----|
|                                         | Mean±SD                        | Spearman Coefficient | P    |
| Health Responsibility                   | 23.0±4.7                       | -0.116 | 0.07 |
| Physical Activity                       | 16.9±5.2                       | -0.232 | 0.001|
| Nutrition                               | 25.1±4.1                       | -0.179 | 0.005|
| Self-actualization                      | 26.9±5.1                       | -0.154 | 0.02 |
| Interpersonal Relationship              | 26.3±4.1                       | -0.07  | 0.28 |
| Stress management                       | 19.9±4.1                       | -0.095 | 0.14 |
| Total score of lifestyle                | 138.3±21.2                     | -0.189 | 0.003|

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5. Conclusion

According to this study, the average score of virtual social networks utilization among students was high. We also found significant inverse correlation between utilization of virtual social networks and physical activity, nutrition and self-actualization domains of health-promoting lifestyle.

Regarding the limitations of this study, access to all students was limited because of the partial closure of universities, which adversely affected data collection due to corona conditions. So the online questionnaire link was informally sent to virtual networks, and also with the assistance of the virtual information groups of medical schools. Another limitation was that we only included postgraduate students in the study; hence, it is advised that research be undertaken with students from other degrees, universities, and non-medical majors as well. Furthermore, no students from other nations were included in the research, so comparison between Iranian and international students on this subject appears to be relevant for future study. In addition, since people who do not use virtual social networks did not participate in this study, it is suggested to compare the lifestyle of this group with those who use virtual social networks too.

Table 3. Utilization of virtual social network among students

| No | Item                                                                 | Agreement, No. (%) |
|----|----------------------------------------------------------------------|--------------------|
| 1  | Spending a lot of time on virtual social networks daily              | 83 (34.6)          |
| 2  | Spending time on virtual social networks instead of having fun outside | 28 (11.7)          |
| 3  | Joining to social network as soon as becoming familiar with that network | 8 (3.3)           |
| 4  | Making virtual social networks as a part of everyday life            | 133 (55.4)         |
| 5  | Finding friends through virtual social networks                      | 29 (12.1)          |
| 6  | Getting instant access to virtual social networks when have free time | 116 (48.3)         |
| 7  | Visiting virtual social networks as the biggest fun                   | 48 (20.0)          |
| 8  | Using virtual social networks as a lucrative business                 | 42 (17.5)          |
| 9  | Using virtual social networks at least once a day                     | 94 (39.2)          |
| 10 | Feeling bad if you do not use virtual social networks daily          | 70 (29.2)          |
| 11 | Using virtual social networks as part of a life plan                  | 127 (52.9)         |
| 12 | Informing personal and business appointments through virtual social networks | 115 (47.9) |
| 13 | Joining to the most of virtual social networks                       | 60 (25.0)          |
| 14 | Usefulness of using virtual social networks to increase awareness    | 134 (55.8)         |
| 15 | Being Agree with family members to use virtual social networks       | 122 (50.8)         |
| 16 | Feeling bored when not having access virtual social networks         | 90 (37.5)          |
| 17 | Receiving messages from friends through virtual social networks daily | 95 (39.6)          |
| 18 | Learning a lot from virtual social networks daily                    | 106 (44.2)         |
| 19 | Sharing problems with friends through virtual social networks        | 115 (47.9)         |
| 20 | Checking virtual social networks at work                              | 143 (59.6)         |
Ethical Considerations

Compliance with ethical guidelines

The ethical approval for this study was granted by the School of Medicine at Tehran University of Medical Sciences. (Approval ID: IR.TUMS.MEDICINE.REC.1399.208, approval date:2020-07-04)

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Authors’ contributions

Conceptualization, research design, and Material preparation: Fatemeh Rahimi and Mahnaz Pouresmaeiel; Data collection: Fatemeh Rahimi, Zahra Hazzati- Meimaneh, Farahnaz Sabeti, Najmolmolook Amini; Statistical analyses: Fatemeh Rafiei; Supervision: Somaieh Borjalilu; Writing the manuscript’s first draft: Fatemeh Rahimi; Manuscript Editing: All authors.

Conflict of interest

The authors declared no conflict of interest.

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