



Original Article

Higher emotional investment in social media is related to anxiety and depression in university students

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المخلص

أهداف البحث: معظم الدراسات عن الآثار الضارة على الصحة النفسية الناجمة من الاستخدام المفرط لوسائل التواصل الاجتماعي قد تم إجراؤها على المراهقين، واستخدمت تلك الدراسات التكرار والمدة كمؤشر وحيد لاستخدام وسائل التواصل الاجتماعي. هدفت الدراسة الحالية إلى ربط استخدام وسائل التواصل الاجتماعي (التكرار، والمدة، والتركيز الانفعالي) مع القلق والاكتئاب وتقدير الذات لدى طلاب الجامعات.

طرق البحث: شملت هذه الدراسة المقطعية أخذ عينات غير احتمالية لعدد 893 طالباً جامعياً (23.91 ± 2.17 عاماً) من خلال تحميل استبيانات عبر برنامج نماذج قوئل ومشاركة الرابط من خلال مجموعات وسائل التواصل الاجتماعي، وكانت أدوات الدراسة المستخدمة مقياس القلق والاكتئاب في المستشفى، ومقياس روزنبرغ لتقدير الذات، ومقياس التكامل الاجتماعي والارتباط العاطفي مع وسائل التواصل الاجتماعي. وشملت المتغيرات المسجلة كلا من استخدام وسائل التواصل الاجتماعي بشكل عام (الحجم والتكرار)، واستخدام وسائل التواصل الاجتماعي ليلاً، والتركيز الانفعالي في وسائل التواصل الاجتماعي، كما تم تقييم مستويات القلق والاكتئاب وتقدير الذات. استناداً على النتائج المحققة فقد تم تقسيم نتائج المشاركين إلى شرائح ربعية.

النتائج: أظهرت الدراسة علاقة إيجابية ذات دلالة إحصائية للتركيز الانفعالي في وسائل التواصل الاجتماعي مع القلق والاكتئاب، كما أظهر اختبار التباين أحادي الاتجاه (أنوفا) زيادة ملحوظة في درجات القلق والاكتئاب، وكانت معدلات الإصابة بالقلق والاكتئاب ظاهرة إحصائياً لدى المشاركين الذين لديهم تركيز انفعالي أكبر في استخدام وسائل التواصل الاجتماعي، واحتمالية الإصابة بالقلق والاكتئاب زادت بمعدل 1.76 و 1.18 على التوالي مع كل وحدة زيادة في التركيز الانفعالي في وسائل التواصل الاجتماعي.

الاستنتاجات: زيادة التركيز الانفعالي في استخدام وسائل التواصل الاجتماعي يرتبط بالقلق والاكتئاب لدى طلاب الجامعات، وكذلك فإن احتمالية الإصابة بالقلق والاكتئاب تتزايد مع كل وحدة زيادة في التركيز الانفعالي في وسائل التواصل الاجتماعي.

الكلمات المفتاحية: طلاب الجامعة؛ وسائل التواصل الاجتماعي؛ القلق؛ الاكتئاب؛ الصحة النفسية

Abstract

Objectives: Most studies that have reported the adverse effects of social media (SM) usage on mental health have been conducted on adolescents. Additionally, such studies have used frequency or duration as the only indicator of SM usage. The present study aims to relate SM usage (frequency, duration, and emotional investment) with anxiety, depression, and self-esteem in university students.

Methods: In this cross-sectional study, we adapted a non-probability convenience sampling technique. The data from 893 university students was collected through questionnaires, which were developed in Google forms and their links were shared in social media groups. The study tools used were Hospital Anxiety and Depression Scale, Rosenberg self-esteem scale, Social Integration and Emotional Connection subscale of the Social Media Use Integration Scale. We recorded variables for overall SM use (volume and frequency), night-time specific SM usage, emotional investment in SM, anxiety, depression, and self-esteem levels. Based on the scores achieved in SM variables, participants' data were classified into different quartiles.

Results: We found a significant positive correlation of emotional investment in SM with anxiety ($r = 0.71$; p -value < 0.001) and depression ($r = 0.72$; p -value 0.003). The results of the one-way ANOVA revealed significantly

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increased anxiety and depression scores (p -value 0.03 and 0.02, respectively) in quartile four versus quartile one. The probability or likelihood of being anxious and depressed significantly increased by factors of 1.76 and 1.48, respectively with per unit increase in emotional investment in SM.

Conclusion: Higher Emotional Investment in Social Media is related to Anxiety and Depression in University Students. The probability of being anxious and depressed significantly increases with per unit increase in emotional investment in SM.

Keywords: Anxiety; Depression; Mental health; Social media; University students

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Introduction

Due to the excessive use of social media (SM), some researchers have warned about its potential harmful effects on human health. Greater usage of SM predicts depressive symptoms¹ and has been found to be positively associated with depression and anxiety.^{2,3} Morin-Major et al.⁴ found diurnal cortisol production as directly proportional to the number of Facebook friends. The underlying cause of depression/anxiety being related to SM could be negative comparisons. Through SM, young people are projecting the best image to their peers by uploading pictures of themselves enjoying at parties and on holidays. This creates comparisons and the perception that other people are more fortunate and blessed.⁵ In addition, peer feedback becomes more frequent and swifter through SM than without it. Such negative comparison and peer feedback could underlie possible associations between SM and anxiety and depression⁶ as reported by Seabrook et al. (2016)⁷ and Appel et al. (2016).⁸

In comparison to extensive studies exploring the effects of SM use on mental health in children and adolescents, very few studies have been conducted to date on the effects of SM use in adults.^{9,10} The following two studies have presented mixed results. Farahani et al.⁹ concluded that the use of Facebook has a significant positive relation with anxiety and stress whereas Stronge et al.¹⁰ reported a very weak relationship. Moreover, most studies examining the relationship between SM and mental well-being have focused only on the quantity of SM—i.e., the frequency and duration as indicators of SM use. Very few studies have focused on the emotional attachment of social interactions.¹¹ Considering the emotional attachment that today's youth have towards SM, and the way in which the youth incorporate social media into their typical routines, frequency and duration may not be enough proof of SM usage. To measure SM usage beyond frequency and duration, the Social Media Use Integration Scale (SMUIS) was developed by Jenkins-

Guarnieri et al.¹² The 6-items Social Integration and Emotional Connection (SIEC) subscale of SMUIS measures the emotional attachment to social media use, and how well integrated social media is into the social habits of users.¹² The current study aims to explore the relationship between SM use and anxiety, depression, self-esteem in University students.

Materials and Methods

The research was approved by the institutional review board of our university (IRB 2019-01-403) and conducted from September 2019–March 2020. The study design was cross sectional. Our potential participants were Saudi students registered in any university within KSA. The study was advertised in classrooms and social media groups. The survey was uploaded in Google forms, and the link was shared with all potential participants. Students who took the survey were requested to voluntarily forward the survey's link to their friends. All survey questions were in Arabic (the native language of the study participants). All participants gave written consent by clicking an on-screen tick box at the start of the survey. No identifying information was collected during the surveys to keep the participants anonymous. Participants were not compensated for taking the survey.

Measures/variables

Our dependent variables were anxiety, depression, self-esteem; whereas SM use was considered as an independent variable.

To assess the levels of SM usage, three measures were adopted:

- a) exposure or time spent in SM (overall SM usage)
- b) night-time specific SM usage
- c) emotional investment in SM (i.e., importance of SM to a person)

Overall social media usage

We assessed the participants' overall social media usage in two complementary ways: volume and frequency of social media use.¹³ First, the participants estimated the volume or total time per day on social media for personal use (excluding any time spent on social media for work) out of four response choices: 0–30 min; 31–60 min; 61–120 min; 121 min and above. These response choices were coded from 0 to 3. Second, the participants were asked to report the frequency of their use of each of the six widely used social media platforms in KSA, including WhatsApp, Snapchat, YouTube, Twitter, Instagram, and Facebook.¹⁴ Seven response choices ranging from “I do not use this platform, once a month, 1–2 days/week, 3–6 days/week, once a day, 2–4 times/day, 5 or more times/day” were coded as 0 to 6. Overall social media scores were obtained by summing up the coded scores of the volume and frequency of SM usage, ranging from 0 to 39 (SM volume score range 0–3; SM frequency score range 0–36) where higher scores indicated higher levels of overall social media usage. Based on the mean scores, the participants' data

were collapsed into quartiles for analyses (Q1 = 0–19; Q2 = 20–24; Q3 = 25–28; Q4 = 29–39).

Night-time specific social media usage

The night-time specific social media usage was assessed with a questionnaire developed by Woods & Scott¹¹ and consisted of seven questions related to the following: the frequency and duration of social media usage shortly before bed and in bed; perceived sleep delays due to social media; and the frequency and duration of sleep disturbances from social media alerts. All frequency questions were answered with a 4-point scale (0–3; never, sometimes, often, always/daily) and duration questions with a 8-point scale (0–7; 0 min, 1–5 min, 6–10 min, 11–15 min, 16–20 min, 21–25 min, 26–30 min, 31 min and more). An overall score of 0–33 was attained in the end where the higher scores indicated higher levels of night-time social media usage. Based on mean scores, participants' data were collapsed into quartiles for analyses (Q1 = 0–13; Q2 = 14–18; Q3 = 19–22; Q4 = 23–33).

Emotional investment in SM

To assess the emotional investment in social media, the Social Integration and Emotional Connection subscale of the Social Media Use Integration Scale (SMUIS)¹² was used. This scale consisted of six items rated on a 5-point Likert scale (1–5) from “strongly disagree” to “strongly agree”, resulting in a score ranging from 6 to 30 such that a higher overall score indicated a greater level of emotional investment. Reverse scoring was done for the last item only. Based on the mean scores, the participants' data were collapsed into quartiles for analyses (Q1 = 6–15.75; Q2 = 16–18; Q3 = 19–21; Q4 = 22–30).

To translate these questionnaires, first, the English versions were translated into Arabic by a translator and then a blind back translation (into English) was done by another translator. Next, investigators compared the back translated version with the original version. Finally, a field trial of the Arabic questionnaire was conducted, and feedback was obtained from the participants regarding the quality of the instrument, including its clarity, comprehensibility, and acceptability. Reliability and internal consistency of these questionnaires were confirmed by the test-retest technique and Cronbach's alpha respectively (Cronbach's alpha: overall social media use (0.68), night-time specific SM use (0.75), emotional investment in SM (0.79). “Face validity” of these questionnaires were confirmed by the Social sciences experts in our university.

Anxiety and depression

Anxiety and Depression levels were assessed with the Hospital Anxiety and Depression Scale (HADS) developed by Zigmond and Snaith.¹⁵ The HADS is a 14-item scale, 7 items each to assess anxiety and depression.

Self-esteem

Self-esteem was assessed with the Rosenberg self-esteem scale.¹⁶ It is a 10-item scale that measures self-worth by

measuring both positive and negative feelings about the self. Each item is answered on a 4-point Likert scale. An overall score of 0–30 was attained in the end, where higher scores indicated higher levels of self-esteem.

To minimize recall bias, students were asked to answer each question keeping in view their behaviour “during the past month only”. We also used high quality questionnaires that have been validated and found to be reliable in the Arab population. We included students from all courses and did not limit our research to a particular course or year. Because certain courses (such as medicine) are considered more demanding and tough it may make students more susceptible to anxiety and depression.

Statistical analysis

Descriptive statistics were used to find out coded scores of independent variables (SM usage; overall, night-time specific, emotional investment) and dependent variables (anxiety, depression, and self-esteem), as reported by the study participants. Correlations between any of the dependent and independent variables were explored through Pearson correlation. Data related to SM use (overall SM use, night-time specific SM use, emotional investment in SM) were not symmetrically distributed, therefore, based on each SM variable's mean score, participants were categorized into four quartiles [quartile 1 (Q1 or 25th percentile); quartile 2 (Q2 or 50th percentile); quartile 3 (Q3 or 75th percentile); quartile 4 (Q4 or 100th percentile). Mean scores across these quartiles were compared by one-way ANOVA. A Binary Logistic Regression test was used to determine the probability/likelihood of developing anxiety, depression, and low self-esteem with SM use and to find out the odd ratios. Statistical analyses were performed with SPSS Version 20., and p values < 0.05 were significant.

Results

Responses were received from 893 university students (51.1% females and 48.9% males). The mean age of the study participants was 23.91 ± 2.17 years. There was no “missing data” in the study as all the questions in the Google Forms survey were marked as “required”. Study variables' mean

Table 1: Study variables weighted scores (Means and Standard Deviations).

Variables	Means \pm Standard Deviations	Minimum score	Maximum score
1. Overall social media use	23.28 \pm 6.63	0	39
2. Night-time specific social media use	17.44 \pm 6.29	0	33
3. Emotional investment in social media	17.99 \pm 3.68	8	28
4. Anxiety	7.93 \pm 4.5	0	21
5. Depression	6.65 \pm 3.68	0	21
6. Self-esteem	18.48 \pm 5.17	8	30

Table 2: Correlation of social media use with anxiety, depression, and self-esteem.

Overall social media use (1)	Night-time specific social media use (2)	Emotional investment in social media (3)	Anxiety (4)	Depression (5)	Self-esteem (6)
1.	0.46***	0.04	0.04	0.04	0.0
2.		0.05	0.04	0.01	0.02
3.			0.71***	0.72**	0.08
4.				0.48***	-0.39***
5.					-0.53***

**p value < 0.01.

***p value < 0.001.

Table 3: Weighted Whole Sample Characteristics.

Independent Variables	Anxiety scores		Depression scores		Self-esteem scores	
	Mean ± SD	95% CI for Mean	Mean ± SD	95% CI for Mean	Mean ± SD	95% CI for Mean
Overall social media use						
Q1 (0–19)	7.63 ± 4.09	7.01–8.25	6.41 ± 3.55	5.87–6.94	18.48 ± 5.05	17.71–19.24
Q2 (20–24)	7.98 ± 4.69	7.25–8.71	6.83 ± 3.93	6.21–7.44	18.29 ± 5.40	17.45–19.14
Q3 (25–28)	8.38 ± 4.79	7.67–9.09	6.68 ± 3.94	6.10–7.26	18.27 ± 5.39	17.47–19.06
Q4 (29–39)	7.66 ± 4.41	6.93–8.38	6.69 ± 3.23	6.16–7.22	18.95 ± 4.77	18.17–19.73
P value#	0.38		0.77		0.63	
Night-time specific social media use						
Q1 (0–13)	7.58 ± 4.54	6.89–8.27	6.52 ± 3.68	5.96–7.08	18.27 ± 5.03	17.51–19.04
Q2 (14–18)	8.01 ± 4.56	7.31–8.71	6.72 ± 3.90	6.67–7.85	18.30 ± 5.67	17.43–19.17
Q3 (19–22)	7.89 ± 4.36	7.28–8.49	6.33 ± 3.67	5.82–6.84	18.79 ± 4.93	18.10–19.48
Q4 (23–33)	8.36 ± 4.65	7.53–9.20	6.52 ± 3.38	5.91–7.13	18.50 ± 5.06	17.59–19.41
P value#	0.53		0.09		0.76	
Emotional investment in social media						
Q1 (6–15.75)	7.58 ± 4.56	6.88–8.29	6.58 ± 3.72	6.06–7.10	18.17 ± 5.34	17.34–18.99
Q2 (16–18)	7.82 ± 4.29	7.22–8.42	6.66 ± 3.94	5.90–7.43	18.21 ± 5.18	17.48–18.93
Q3 (19–21)	7.67 ± 4.45	7.03–8.30	6.65 ± 3.32	5.86–7.35	18.70 ± 4.81	18.01–19.39
Q4 (22–30)	9.13 ± 4.81*	8.20–10.07	7.25 ± 3.87**	5.12–8.16	19.09 ± 5.50	18.02–20.15
P value#	0.03		0.02		0.40	

Abbreviations: SD = Standard Deviation, CI = Confidence Interval, Q1 = First Quartile, Q2 = Second Quartile, Q3 = Third Quartile, Q4, Fourth Quartile.

#P value by one-way ANOVA.

*post-hoc Tukey test significantly difference from Q1 (P value 0.03).

**post-hoc Tukey test significantly difference from Q1 (P value 0.02).

have been presented in Table 1. In correlation results, we found a significant positive correlation between emotional investment in SM and anxiety or depression; as indicated in

Table 2. Comparing the mean scores in the four quartiles by One-way ANOVA revealed significantly increased anxiety and depression scores in quartile 4 versus quartile 1

Table 4: Binary Logistic Regression between Social media uses and anxiety, depression, and low self-esteem.

Study variables	P value	Odds Ratios	95% Confidence Interval		
			Lower	Upper	
Overall SM use					
Independent	Dependent				
Overall SM use	Anxiety	0.39	1.01	0.98	1.05
	Depression	0.28	1.03	0.98	1.07
	Self-esteem	0.54	1.07	0.99	1.14
Night-time specific SM use	Anxiety	0.37	1.02	0.98	1.05
	Depression	0.61	0.99	0.95	1.03
	Self-esteem	0.43	1.05	0.97	1.01
Emotional Investment in SM	Anxiety	0.03	1.76	1.01	1.11
	Depression	0.04	1.48	0.91	1.04
	Self-esteem	0.73	0.99	1.02	1.15

Abbreviations: SM = Social Media use.

Cut-off points: Anxiety-scores above 7; Depression-scores above 7; Low self-esteem: scores below 15.

(Table 3). In the binary regression model, we found that the probability/likelihood of being anxious and depressed increased significantly by factors of 1.76 and 1.48 respectively with per unit increase in emotional investment in SM (Table 4). However, per unit increase in emotional investment in SM did not affect the probability of having low self-esteem. On the other hand, per unit increase in overall and night-time specific SM usage had no significant effect on the probability/likelihood of developing anxiety, depression, or low self-esteem.

Discussion

Our study examined three aspects of SM usage (overall, night-time specific, emotional investment) among young adults and explored their relationship with anxiety, depression, and self-esteem. We found that the frequency of SM uses (daytime and night-time) is not associated with anxiety, depression, and self-esteem. However, higher emotional investment in SM uses was associated with anxiety and depression. Our results are in accordance with Davila et al.¹⁷ who concluded that poorer quality interactions, rather than the time spent, was associated with depressive symptoms. A recent large-scale study by Stronge et al.¹⁰ also favours our results in which they concluded that the time spent on social media usage is typically not a serious risk factor for psychological distress.

Our results are contrary to those studies that indicated a strong relationship between the time spent in SM and anxiety and depression. All those studies gathered data from adolescents. Adolescence is characterized by changes in every aspect of physical and mental development¹⁸ and this phase of life is susceptible to the development of depression and anxiety.¹⁹ On the other hand, our study participants were adults and adults have the cognitive capacities necessary for developing a stable cognitive schema, and they are capable of coping with the real-life stressors in a way much better than adolescents. The association of SM with negative mental health observed in adolescents may not hold true in the case of young adults.

Our study did not find any relation between SM and self-esteem. These results are contrary to a recent meta analytic review that analysed the results of 121 studies and reported a significant negative relation between SM and self-esteem, though weak in magnitude.²⁰

Our study results reveal that SM users might have adverse effects on mental health from SM usage as a function of their style of usage (i.e., emotional vs non-emotional). This phenomenon can be explained based on “The dualistic model of passion”.²¹ According to this model, people experiencing harmonious passion can freely choose any pursuit, and they can pursue or leave any activity on their will. This sense of choice supports well-being. On the other hand, people experiencing obsessive passion have an uncontrollable urge, and they cannot disengage from their passion. This sense of compulsion produces a negative effect on well-being. The dualistic model of passion has been successfully applied to modern day activities, such as internet use²² and video games^{23,24} and thus it provides a means for assessing “want to” vs “have to”.

Unlike previous studies, we examined the association between SM usage and psychological distress in adults, as adults are increasingly using social media, yet remain an under-researched population. Moreover, in addition to the frequency and duration of SM usage, we explored the emotional investment in SM as well.

Our results reveal that how much and how often an individual uses SM during the daytime or night-time (i.e., overall and night-time specific SM use) may not predict anxiety, depression, and self-esteem. However, one’s emotional investment in SM i.e. their behaviour, attitude, or emotions towards social media may predict anxiety or depression. In other words, emotions seem to be more crucial than mere exposure or time spent. Instead of linking anxiety and depression to the volume/frequency of SM usage, one should pay attention to the emotional behaviour of the user. A well-structured program is desperately needed to provide guidelines to the youth on SM use. Psychological support centres within universities may help in developing such programs. In collaboration with departments of Information and Communication Technology, universities may also consider blocking the use of social media for general purposes and allowing the educational use of SM only inside university campus. This will not only reduce stress and depression among university students but can also help them in their learning process.

Our study has certain limitations. Cross sectional studies provide no real insight into the direction of cause here. Do depression and anxiety lead to more SM emotional investment or does more SM emotional investment lead to depression and anxiety, or does something else influence both at the same time? Factors such as the intimate aspects of the students, family relationships, consumption of any substance, nature of the course and year of study etc., which can influence stress and anxiety levels, were not considered. Certain demographic characteristics that may have a direct impact on the usage of SM such as income, family status etc. were not considered. Our subjects were apparently healthy young university students, limiting the generalizability of our results to older adults, children, and clinically diagnosed anxious or depressed patients. This study used convenience sampling, so the results might not be generalized to the whole population. We did not explore the nature of the SM usage such as type of the content shared, its quality etc. Last but not the least, we did not gather objective data on the actual usage of SM sites, and we relied merely on self-reported usage. This approach may involve recall errors or bias. This can be overcome in future studies by sharing screenshots of battery usage displaying the duration of active application usage.

Conclusion

Our results reveal that higher emotional investment in SM is significantly related to anxiety and depression in university students. The probability/likelihood of being anxious and depressed increases significantly by factors of 1.76 and 1.48 respectively with per unit increase in emotional investment in SM. The frequency and time spent on SM is not related to anxiety, depression, and self-esteem.

Recommendations

Future studies should be conducted to explore the direction of this relationship and the underlying mechanism. Since anxiety and depression among university students may adversely affect their academic performance, we need to identify the personality factors/traits/behaviours that lead to an increased degree of emotional investment in SM and take measures to lessen this emotional investment.

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Conflict of interest

The authors have no conflict of interest to declare.

Ethical approval

The ethical approval of this research was obtained from the Institutional Review Board of Imam Abdulrahman Bin Faisal University through letter number IRB-2019-01-403 dated on 22.12.2019.

Authors' contributions

AAA conceived and designed the study and collected data. RL analysed and interpreted the data, wrote the initial and final draft of the article. All authors have critically reviewed and approved the final draft and are responsible for the content and similarity index of the manuscript.

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References

1. Pujazon-Zazik M, Park MJ. To tweet, or not to tweet: gender differences and potential positive and negative health outcomes of adolescents' social internet use. *Am J Men's Health* 2010; 4: 77–85.
2. Tsitsika AK, Tzavela E, Janikian M, Ólafsson K, Iordache A, Schoenmakers T, et al. Online social networking in adolescence: patterns of use in six European countries and links with psychosocial functioning. *J Adolesc Health* 2014; 55: 141–147.
3. Yan H, Zhang R, Oniffrey TM, Chen G, Wang Y, Wu Y, et al. Associations among screen time and unhealthy behaviors, academic performance, and well-being in Chinese adolescents. *Int J Environ Res Publ Health* 2017; 14: 596.
4. Morin-Major JK, Marin MF, Durand N, Wan N, Juster RP, Lupien SJ. Facebook behaviors associated with diurnal cortisol in adolescents: Is befriending stressful? *Psychoneuroendocrinology* 2016; 63: 238–246.
5. Chou H-TG, Edge N. 'They are happier and having better lives than I am': the impact of using Facebook on perceptions of others' lives. *Cyberpsychol Behav Soc Netw* 2012; 15: 117–121.

6. Tsai CC, Yang YK, Cheng CH. The effect of social comparison with peers on self-evaluation. *Psychol Rep* 2014; 115(2): 526–536.
7. Seabrook EM, Kern ML, Rickard NS. Social networking sites, depression, and anxiety: a systematic review. *JMIR Mental Health* 2016; 3(4): e50.
8. Appel H, Gerlach AL, Crusius J. The interplay between Facebook use, social comparison, envy, and depression. *Curr Opin Psychol* 2016; 9: 44–49.
9. Farahani HA, Kazemi Z, Aghamohamadi S, Bakhtiarv F, Ansari M. Examining mental health indices in students using Facebook in Iran. *Procedia Soc Behav Sci* 2011; 28: 811–814.
10. Stronge S, Mok T, Ejova A, Lee C, Zubielevitch E, Yogeewaran K, et al. Social media use is (weakly) related to psychological distress. *Cyberpsychol Behav Soc Netw* 2019; 22: 604–609.
11. Woods HC, Scott H. #Sleepyteens: social media use in adolescence is associated with poor sleep quality, anxiety, depression and low self-esteem. *J Adolesc* 2016; 51: 41–49.
12. Jenkins-Guarnieri MA, Wright SL, Johnson B. Development and validation of a social media use integration scale. *Psychol Pop Media Cult* 2013; 2: 38–50.
13. Lin LY, Sidani JE, Shensa A, Radovic A, Miller E, Colditz JB, et al. Association between social media use and depression among US young adults. *Depress Anxiety* 2016; 33: 323–331.
14. Alhaddad MS. The use of social media among Saudi residents for medicines related information. *Saudi Pharmaceut J* 2018; 26: 1106–1111.
15. Zigmund AS, Snaith RP. The hospital anxiety and depression scale. *Acta Psychiatr Scand* 1983; 67: 361–370.
16. Rosenberg M. *Society and the adolescent self-image*. Princeton, NJ: Princeton University Press; 1965.
17. Davila J, Hershberg R, Feinstein B, Gorman K, Bhatia V, Starr L. Frequency and quality of social networking among young adults: associations with depressive symptoms, rumination, and corumination. *Psychol Pop Media Cult* 2012; 1: 72–86.
18. Peterson AC, Kennedy RE, Sullivan P. Coping with adolescence. In: Colten ME, Gore S, editors. *Adolescent stress: causes and consequences*. New York: Aldine de Gruyter; 1991.
19. McLaughlin KA, King K. Developmental trajectories of anxiety and depression in early adolescence. *J Abnorm Child Psychol* 2015; 43: 311–323.
20. Saiphoo AN, Halevi LD, Vahedi Z. Social networking site use and self-esteem: a meta-analytic review. *Pers Individ Differ* 2020; 153: 109639.
21. Vallerand RJ. On passion for life activities: the Dualistic Model of Passion. In: Zanna MP, editor. *Advances in experimental social psychology*. New York, NY: Academic Press; 2010. pp. 97–193.
22. Seguin-Levesque C, Laliberte ML, Pelletier LG, Blanchard C, Vallerand RJ. Harmonious and obsessive passion for the internet: their associations with couple's relationships. *J Appl Soc Psychol* 2003; 33: 197–221.
23. Wang CK, Khoo A, Liu WC, Divaharan S. Passion and intrinsic motivation in digital gaming. *Cyberpsychol Behav* 2008; 11: 39–45.
24. Przybylski AK, Rigby CS, Ryan RM. A motivational model of video game engagement. *Rev Gen Psychol* 2010; 14: 154–166.

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