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Social Media Overuse and Its Association with Depression and Academic Performance of Senior Medical Students at Taif University

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Abstract: **Recently, social media has become an essential part of life of people, particularly young population representing the main source of obtaining news and connecting them with others. Conflicting results have been reported on the association between the utilization of social media and depression in previous studies.**

Objectives: To investigate the social media use among medical students in Taif University, and exploring the impact of its overuse on depression and academic performance of the students.

Subjects and Methods: This cross-sectional analytic study was conducted in college of medicine, Taif University. All regular Saudi medical male and female students of the fifth and sixth were invited to participate in the study by filling in the study questionnaire during 2018. The questionnaire consists of the following parts;.Socio-demographic characteristics of the students, details regarding utilization of social media use, history of factors that could be associated with the development of depression and assessment of depression using a PHQ-9 instrument.

Results: Three hundred eighty eight students were included in the study. Their age ranged between 22 and 27 years with an arithmetic mean of 23.5 years and standard deviation "SD" of ±0.9 years. The most frequent programs were chatting programs (30.4%), snapshot (25.6%) and Twitter (21.6%). Concerning daily usage, more than one third of them (36.4%) used social media for three to six hours daily while 11.3% used them for more than 9 hours daily. The prevalence of depression was 62.4%; 36.3% was mild whereas 19.6% and 6.4% was moderate or severe, respectively. Multivariate logistic regression analysis revealed that Female, single students, those with study/academic problems, drug and/or alcohol users and students exposed to physical or psychological violence were more likely to develop depression than their counterparts. There was no significant association between social media use and depression. Academic performance of students was significantly affected by the duration of social media use, $p<0.001$.

Conclusion: Depression is highly prevalent among senior medical students at Taif University with no significant association between it and social media use However, academic performance of students was significantly affected by the duration of social media use.

Keywords: **social media, senior medical students, academic performance.**

List of abbreviations:

Abbreviation	**Description**
PROMIS	Patient-Reported Outcomes Measurement Information System
GPA	Grade Point Average
BDI-II	Back Depression Inventory - second edition
USA	United States of America
SPSS	Statistical Package for Social Sciences
χ^2	Chi-Square test

1. INTRODUCTION

Background:

Worldwide, by the year 2020, it has been estimated that depression will represent the second most common reason of disability.[1] The burden of depression from economic point of view is very apparent including reduced productivity of affected persons and increased medical costs.[2]

A relatively high prevalence of depression has been reported among the medical students in the Kingdom of Saudi Arabia, representing a considerable public health problem.[3, 4]

Medical education, particularly in the last clinical years is one of the most stressful and challenging and ones, [5] and many previous studies carried out in various parts of the world have documented that medical students experience a considerable level of stress during their education course. [4, 6, 7]

Several risk factors are usually associated with depression,[8] however, there is nowadays increasing interest in the possible link between over-use of social media, such as Twitter, what's app, Facebook, snapchat and Youtube from one side and depression from the other side. As usually depression begin in adolescence[9, 10] and recently, social media has become an essential part of life of people, particularly adolescents representing the main source of obtaining news and connecting them with others.[11, 12]

Facebook and Twitter users in the Kingdom of Saudi Arabia are approximately 11 million and 9 million, respectively constituting the main number of social media users.[13] In the Unites States, approximately ninety percent of young adults utilize social media, and the majority of those visit social media sites at least once a day.[14] In addition, social media use represent about twenty percent of time spent on personal computers and thirty percent of time online through smart phones.[15]

Conflicting results have been reported on the association between the utilization of social media and depression in previous studies.[16, 17] Some of them documented that social media use has a beneficial effect in reducing depression,[18] due to an improvement in perceived social support, and life satisfaction,[19, 20] whereas others reported that over utilization of social media may lead to isolation from the community and consequent development of depressive symptoms.[17, 21]

From Academic point of view, it has been documented that the overuse of social media has influenced students` study time, wrong spellings, poor grammar as well as deviating their attention from their studies.[22] Students often spend a lot of their study time on social media than in their academic tasks which eventually impacted their academic performance.[23]

Rationale:

-Social media has gained wider acceptability and usability and became the most important communication tools, particularly among university students.

-Up to the researcher knowledge, no study has yet been published regarding the impact of overuse of social media on medical student`s academic achievement in Taif.

-The relation between social media overuse and depression is an interested issue for the researcher to investigate it as the association is still unclear.

-The researcher`s personally notice psychological disturbance among colleagues who overusing social media, especially depression.

Aim:

This study aimed to investigate the social media use among medical students in Taif University, and exploring the impact of its overuse on depression and academic performance of the students.

Specific objectives:

- To describe the pattern of social media use among senior medical students (5^{th} and 6^{th} levels), Taif University.
- To determine the prevalence rate of depression among senior medical students (5^{th} and 6^{th} levels), Taif University
- To investigate the association between social media use and depression among senior medical students (5^{th} and 6^{th} levels), Taif University
- To explore the impact of social media use on the academic performance of senior medical students (5^{th} and 6^{th} levels), Taif University

2. LITERATURE REVIEW

It is worth mentioning that there are worldwide few studies assessing the association between social media overuse and depression and academic performance of university students, including medical students. This study will be one of the few studies discussing this topic in Saudi Arabia.

Social media use and depression:

Lin, et al carried out in 2016 a survey aimed to assess the association between social media use and depression in a representative sample of young adults aged between 19 and 32 years. Social media use was assessed by self-reported total time per day spent on social media, visits per week, and a global frequency score based on the Pew Internet Research Questionnaire. Depression was evaluated using the Patient-Reported Outcomes Measurement Information System (PROMIS) Depression Scale Short Form. They concluded that social media use was significantly associated with increased depression. [24]

Shields and Kane (2011) examined the association between frequency of Internet use (and types of use) and several psychological and social variables and academic achievement among students of University of Missouri-St. Louis, USA. They observed that depression was not related to the frequency of Internet use. They reported that starting the day on the Internet, visiting news sites, viewing videos reduced symptoms of depression. GPA was both positively and negatively associated with specific types of Internet use.[25]

Pantic et al (2012) studied the association between social networking and depression among a sample of high school students in Serbia using Beck Depression Inventory - second edition (BDI-II) and average daily time spent on social networking sites. They reported significant positive correlation ($p<0.05$) between BDI-II score and the time spent on social networking.[26]

In USA, Rosen and colleagues (2013).investigated whether the use of specific technologies or media could be related to psychological problems among adolescents, young adults and adults. The results showed that participants who spent more time online and those who performed more Facebook image management experienced more clinical symptoms of major depression.[27]

Lou LL,Yan Z, Nickerson A, McMorris R.(2012) carried out a study of American university students aimed to investigate the association between students' use of social network sites and their psychological well-being reported that more duration of Facebook use was significantly linked to increased loneliness among students.[28]

Also in USA, Kalpidou et al. (2011) observed that university students who reported having higher numbers of Facebook friends' evidenced lower emotional adjustment to college life and they also reported that university students who spent more time on Facebook reported having lower self-esteem than those who spent less time.[29]

Selfhout et al (2009) examined whether the quality of social media interactions was associated with mental wellness than general social media use among adolescents in Netherlands. They observed that adolescents who reported low friendship quality and high frequencies of social use of online media (talking, messaging) were less likely to be depressed whereas those with low friendship quality who used social media primarily for passive use were more likely to be depressed and socially anxious.[30]

Davila J, Hershenberg R, Feinstein BA, Gorman K, BhatiaV, Starr LR (2012) investigated the social networking behaviors of 334 undergraduate Boston (USA) university students. They reported that more negative and less positive interactions on social networking sites were associated with greater depressive symptoms.[31]

Also, Kraut et al. (1998) reported inverse relationship between Internet use and depression, indicating that more communicating and interacting forms of Internet use like chatting and gaming reduce the risk of depression.[32]

Social media use and students` academic performance:

Mensah and Nizam (2016) carried out a cross-sectional study to investigate the impact of social media use on students' academic performance in Malaysian tertiary institution. Variables related to social media use (Time duration, time appropriateness, friend-people connection, nature of usage, health addiction, and security/privacy problems) were collected. Regression analysis revealed that time appropriateness, people-friend connection, nature of usage and health addiction were significantly associated with academic performance.[33]

Al-Rahmi and Othman (2016) carried out a study explore the impact of social media use as a tool of collaborative learning on academic performance of students of the Universiti Teknologi Malaysia. The results show that collaborative learning positively and significantly impacted the students' academic performance.[34]

3. METHODOLOGY

Study area:

This study was conducted in college of medicine, Taif University, in Taif city, which is located at an elevation of 1700-2500 meters above sea level in the Makkah Province with an estimated population of 1,281,613 according to 2011 census.[35] InTaif, there is one university including faculty of medicine for males and females where the study was conducted.

Study population/sampling:

All regular Saudi medical male and female students in medical college in Taif University of the fifth (male n=125, female n=77) and sixth (male n=118 and female n=68), who collected from Deanship of Student Affairs, Taif University, were invited to participate in the study by filling in the study questionnaire during 2018.

Study design:

Cross sectional analytic study was applied.

Data collection tool:

A structured self administered questionnaire was used for data collection. It consists of three main parts;.Socio-demographic characteristics of the students (age, academic level, GPA and marital status). Details regarding utilization of social media use were inquired (usage, duration, daily time of usage, and preferred activities), using questions developed by the researcher, based on a previous study carried out in Malaysia[33] and validated by two consultants in family medicine and one community medicine consultant. History of factors that could be associated with the development of depression was requested (financial problems, family history of depression, family conflicts, physical or sexual abuse, drug intake, chronic diseases and academic problems). Depression was assessed using a PHQ-9 instrument, which contains nine items. For each item the participants were asked to assess how much they were bothered by the symptoms over the last two weeks. There are four answer options: not at all (0), several days (1), more than half of the days (2), and nearly every day (3). The total score (range 0 to 27) indicated the degree of depression, with scores of ≥5, ≥10, and ≥15 represented mild, moderate, and severe levels of depression whereas a score less than 5 indicated no depression.[36]

Dependent variables:

Depression and academic performance (assessed as Grade Point Average "GPA") among senior medical students of Taif University who utilize social media

Independent variables:

- Socio-demographic characteristics
- Social media use
- Family problems
- Financial problems
- Academic problems
- Family history of depression
- Psychiatric and organic problems
- Physical/sexual abuse
- Drug intake

Data collection technique:

Questionnaires were distributed to all students at their college by the researcher himself. They were given time to fill in them freely, and then recollected. The researcher was available throughout the data collection period to clarify any difficulties.

Data entry and analysis:

- Statistical Package for Social Sciences (SPSS) software version 22 was used for data entry and analysis.
- Descriptive statistics (e.g. number, percentage for qualitative variable and mean and standard deviation for quantitative variables) were applied.
- Analytic statistics using Chi Square tests (χ^2) to test for the association and/or the difference between two categorical variables was utilized.
- Multivariate logistic regression analysis was performed to identify predictors of depression after controlling for confounders.
- Statistical significance was considered at p-value ≤0.05 throughout the study.

Study limitations:

Time allowed completing the study and student`s compliance will be considered as limitation factors.

Ethical considerations:

- A permission letter from the dean of male Faculty of Medicine, Taif University was obtained before starting this research.
- An approval from the Regional Research Ethics committee was obtained.
- Verbal consent from participants in the research was obtained.
- Confidentiality and medical ethics were respected.

Budget:

Self funded

4. RESULTS

Three hundred eighty eight students were included in the study. Their age ranged between 22 and 27 years with an arithmetic mean of 23.5 years and standard deviation "SD" of ±0.9 years. Majority of them aged between 22 and 24 years (85.2%). Slightly more than half of them (52.1%) were recruited from the fifth years. About two-thirds of the students (62.6%) were males and majority of them (90.2%) were singles.

Table 1: Socio-demographic characteristics of the medical students, Taif University (n=388).

	Frequency	Percentage
Age in years		
22-24	348	89.7
>24	40	10.3
Academic level		
Fifth years	202	52.1
Sixth year	186	47.9
Gender		
Male	243	62.6
Female	145	37.4
Marital status		
Single	350	90.2
Married	38	9.8

-Academic performance

As illustrated in figure 1, about half of the students (49.5%) had very good in the last semester whereas 18% had excellent and 8.2% just passed the semester.

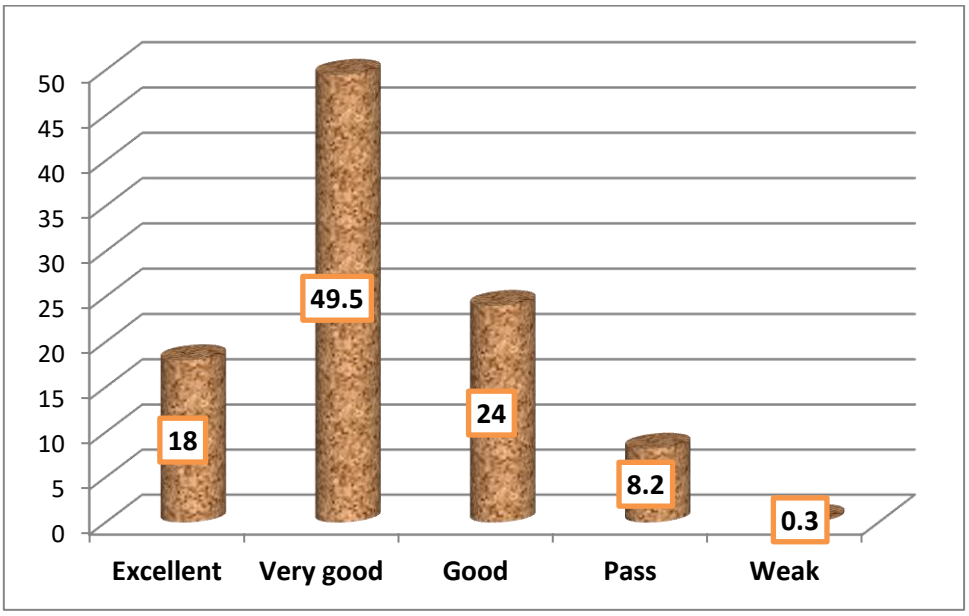

Figure 1: Last semester GPA among the participants (n=388).

-Utilization of social media:

Table 2 summarizes the utilization of social media among the participants. The most frequent programs were chatting programs (30.4%), snapshot (25.6%) and Twitter (21.6%). The duration of using social media exceeded 3 years among most of the students (78.6%) whereas it was less than one year among 4.9% of them. Concerning daily usage, more than one third of them (36.4%) used social media for three to six hours daily while 11.3% used them for more than 9 hours daily. Regarding the frequent activities followed on social media, recreation was the commonest one (35.6%), followed by sports (22.9%), arts (12.9%) and culture (12.4%).

Table 2: Description of social media utilization among senior medical students, Taif University

	Frequency	Percentage
Using social media		
Chatting programs	**118**	**30.4**
Twitter	**84**	**21.6**
Youtube	**47**	**12.1**
Snapshot	**99**	**25.6**
Instagram	**38**	**9.8**
Others	**2**	**0.5**
Duration of using social media (years)		
<1	**19**	**4.9**
1 -2	**16**	**4.1**
>2-3	**48**	**12.4**
>3	**305**	**78.6**
Daily duration of using social programs (hours)		
<1 (n=47	**6**	**1.5**
1-3 (n=87)	**133**	**34.3**
3-6 (n=71)	**141**	**36.4**
6-9 (n=34)	**64**	**16.5**
>9	**44**	**11.3**

Most frequent activity you follow on social media		
Religious		
Culture	**10**	**2.6**
Politics	**48**	**12.4**
Economy	**16**	**4.1**
Sports	**4**	**1.0**
Arts	**89**	**22.9**
News	**50**	**12.9**
Recreation	**26**	**6.7**
Others	**138**	**35.6**
	7	**1.8**

-Risk factors for depression

From table 3, it is seen that only 3.4% of students had continuous family problems and 34.5% had sometimes family problems. Forty two students (10.8%) were exposed to physical or psychiatric violence. More than half of them (51.5%) had sometimes study or academic problems whereas 10.1% had these problems continuously. Drug or alcohol intake was reported by 5.2% of the students. Financial problems were observed among 44.4% of the students; 3.9% of them were continuous. Family history of depression was reported by 14.7% of the participants. Organic and psychiatric health problems were reported by 7% and 4.6% of the students, respectively.

Table 3: History of factors that could be associated with depression among senior medical students, Taif University

	Frequency	**Percentage**
Family problems		
Yes	**13**	**3.4**
Sometimes	**134**	**34.5**
Never	**241**	**62.1**
Exposure to physical or psychiatric violence		
Yes	**42**	**10.8**
No	**346**	**89.2**
Study/academic problems		
Yes	**39**	**10.1**
Sometimes	**200**	**51.5**
Never	**149**	**38.4**
Drugs/alcohol intake		
Yes	**20**	**5.2**
No	**368**	**94.8**
Financial problems		
Yes	**15**	**3.9**
Sometimes	**157**	**40.5**
Never	**216**	**55.6**
Family history of depression		
Yes	**57**	**14.7**
No	**331**	**85.3**
Organic health problems		
Yes	**27**	**7.0**
No	**361**	**93.0**
Psychiatric problems		
Yes	**18**	**4.6**
No	**370**	**95.4**

-Prevalence of depression

As displayed from figure 2, the prevalence of depression among senior medical students, based on PHQ-9 tool was 62.4%; 36.3% was mild whereas 19.6% and 6.4% was moderate or severe, respectively.

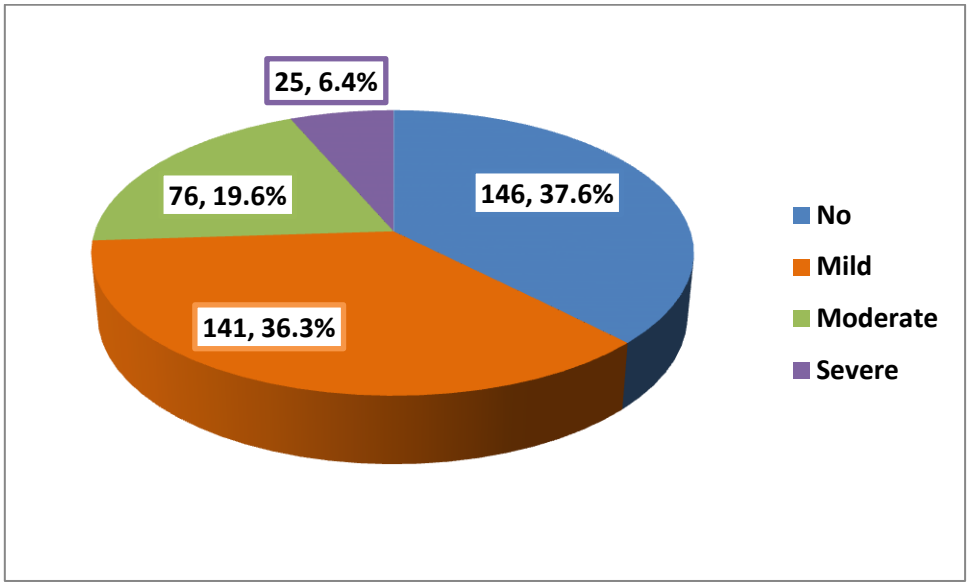

Figure 2: Prevalence of depression and its severity among senior medical students, Taif University

-Factors associated with depression and its severity

- **Socio-demographic factors**

Table 4 shows that depression was more significantly reported among female students compared to males (72.4% versus 56.4%), p=0.002. Regarding severity, moderate and severe depressions were reported among 23.4% and 10.3% of female students, respectively compared to 17.3% and 4.1% of male students, respectively. The difference was statistically significant, p=0.003. Concerning marital status, depression was more significantly reported among single compared to married students (64.4% versus 42.1%), p=0.007. Regarding severity, moderate and severe depressions were reported among 20.6% and 6.6% of single students, respectively compared to 10.5% and 5.3% of married students, respectively. However, the difference was borderline not statistically significant, p=0.055. Student`s age and academic level were not significantly associated with depression and its severity.

Table 4: Socio-demographic factors associated with depression and its severity among senior medical students, Taif University

	Depression				**P1**	**P2**
	No N=146 N (%)	**Mild N=141 N (%)**	**Moderate N=76 N (%)**	**Severe N=25 N (%)**		
Age in years						
22-24 (n=348)	136 (39.1)	122 (35.1)	66 (19.0)	24 (6.9)		
>24 (n=40)	10 (25.0)	19 (47.5)	10 (25.0)	1 (2.5)	**0.082**	**0.160**
Academic level						
Fifth year (n=202)	80 (39.6)	67 (33.2)	41 (20.3)	14 (6.9)		
Sixth year (n=186	66 (35.5)	74 (39.8)	35 (18.8)	11 (5.9)	**0.403**	**0.600**
Gender						
Male (n=243)	106 (43.6)	85 (35.0)	42 (17.3)	10 (4.1)		
Female (n=145)	40 (27.6)	56 (38.6)	34 (23.4)	15 (10.3)	**0.002**	**0.003**
Marital status						
Single (n=350)	124 (35.4)	131 (37.4)	72 (20.6)	23 (6.6)		
Married (n=38)	22 (57.9)	10 (26.3)	4 (10.5)	2 (5.3)	**0.007**	**0.055**

P1 (Chi-square test): Depression versus no depression

P2 (Chi-square test): Severity of depression

-Academic performance

It is evident from table 5, that moderate and severe depression were reported among 28.1% and 12.5%, respectively among students who just passes the last semester compared to 18.6% and 2.9% of those who got excellent in the last semester, p=0.018. Although 60% of students who got excellent compared to 71.9% of those just passed the semester reported depression, the difference was not statistically significant.

Table 5: Last semester GPA associated with depression and its severity among senior medical students, Taif University

	Depression				P1	P2
	No N=146 N (%)	Mild N=141 N (%)	Moderate N=76 N (%)	Severe N=25 N (%)		
Excellent (n=70)	28 (40.0)	27 (38.6)	13 (18.6)	2 (2.9)		
Very good (n=192)	81 (42.2)	67 (34.9)	33 (17.2)	11 (5.7)		
Good (n=93)	28 (30.1)	37 (39.8)	21 (22.6)	7 (7.5)		
Pass (n=32)	9 (28.1)	10 (31.3)	9 (28.1)	4 (12.5)		
Weak (n=1)	0 (0.0)	0 (0.0)	0 (0.0)	1 (100)	**0.203**	**0.018**

P1 (Chi-square test): Depression versus no depression

P2 (Chi-square test): Severity of depression

-Risk factors for depression

Majority of students who had family problems (92.3%) compared to 52.3% of those who never had family problems expressed depression, p<0.001. Furthermore, severe depression was higher observed among students with family problems than those without these problems (15.4% versus 5%), p<0.001. Majority of students who exposed to physical/psychological violence (92.9%) compared to 58.8% of those who not exposed to violence expressed depression, p<0.001. Also, severe depression was higher observed among students who exposed to physical/psychological violence than those not exposed to violence (23.8% versus 4.3%), p<0.001. Majority of students who had study/academic problems (94.9%) compared to 44.3% of those who had no study/academic problems expressed depression, p<0.001. Also, severe depression was higher observed among students with study/academic problems than those without these problems (25.6% versus 3.4%), p<0.001. Majority of students who had history of drug/alcohol intake (85%) compared to 61.1% of those who never had drugs or alcohol got depression, p=0.024. Although severe depression was more reported among students who used drugs/alcohol than their counterparts (15% versus 6%), the difference was not statistically significant. Most of students who had financial problems (74.3%) compared to 49.1% of those who had no such problems had depression, p<0.001. Also, severe depression was higher observed among students with financial problems than those without these problems (13.3% versus 2.8%), p<0.001. Majority of students who had family history of depression (84.2%) compared to 58.6% of those who had no family history of depression expressed depression, p<0.001. Also, severe depression was higher observed among students with family history of depression than those without such history (14% versus 5.1%), p<0.001. Majority of students with organic health problems (85.2%) compared to 60.7% of those without organic health problems had depression, p=0.007. Also, severe depression was higher observed among students with organic health problems than those without these problems (25.9% versus 5%), p<0.001. Although students with other psychiatric problems were more likely to have depression than those without such problems (77.8% versus 61.6%), the difference was not statistically significant. However, severe depression was more observed among students with history of other psychiatric illnesses than others (38.9% versus 4.9%), p<0.001. Table 6

Table 6: Association between risk factors for depression and depression severity among senior medical students, Taif University

	Depression				P1	P2
	No N=146 N (%)	Mild N=141 N (%)	Moderate N=76 N (%)	Severe N=25 N (%)		
Family problems						
Yes (n=13)	1 (7.7)	6 (46.2)	4 (30.8)	2 (15.4)		
Sometimes (n=134)	30 (22.4)	52 (38.8)	41 (30.6)	11 (8.2)		
Never (n=241)	115 (47.7)	83 (34.4)	31 (12.9)	12 (5.0)	**<0.001**	**<0.001**
Exposure to physical or psychiatric violence						

Yes (n=42)	3 (7.1)	10 (23.8)	19 (45.2)	10 (23.8)		
No (n=346	143 (41.3)	131 (37.9)	57 (16.5)	15 (4.3)	**<0.001***	**<0.001**
Study/academic problems						
Yes (n=39)	2 (5.1)	9 (23.1)	18 (46.2)	10 (25.6)		
Sometimes (n=200)	61 (30.5)	86 (43.0)	43 (21.5)	10 (5.0)		
Never (n=149)	83 (55.7)	46 (30.9)	15 (10.1)	5 (3.4)	**<0.001**	**<0.001**
Drugs/alcohol intake						
Yes (n=20)	3 (15.0)	10(50.0)	4 (20.0)	3 (15.0)		
No (n=368	143 (38.9)	131 (35.6)	72 (19.6)	22 (6.0)	**0.024***	**0.096**
Financial problems						
Yes (n=15)	4 (26.7)	3 (20.0)	6 (40.0)	2 (13.3)		
Sometimes (n=157)	32 (20.4)	70 (44.6)	38 (34.2)	17 (10.8)		
Never (n=216)	110 (50.9)	68 (31.5)	32 (14.8)	6 (2.8)	**<0.001**	**<0.001**
Family history of depression						
Yes (n=57)	9 (15.8)	16 (28.1)	24 (42.1)	8 (14.0)		
No (n=331)	137 (41.4)	125 (37.8)	52 (15.7)	17 (5.1)	**<0.001**	**<0.001**
Organic health problems						
Yes (n=27)	4 (14.8)	9 (33.3)	7 (25.9)	7 (25.9)		
No (n=361)	142 (39.3)	132 (36.6)	69 (19.1)	18 (5.0)	**0.007***	**<0.001**
Psychiatric problems						
No (n=18)	4 (22.2)	4 (22.2)	3 (16.7)	7 (38.9)		
Yes (n=370)	142 (38.4)	137 (37.0)	73 (19.7)	18 (4.9)	**0.127***	**<0.001**

P1 (Chi-square test): Depression versus no depression *** Fischer exact test**

P2 (Chi-square test): Severity of depression

-Social media use

As illustrated in table 7, there was no statistically significant association between type of used social media and depression. However, severe depression was reported among 17% of students using Youtube among none of those using Twitter, Instagram and others, p=0.005. Depression was reported among 60% of students who used social media for more than 3 years compared to 89.5% among those who used them for less than one year, p=0.041. Regarding severity, severe depression was highest reported among students who used social media for a period between >2 and 3 years (8.3%) compared to none among those who used them for less than one year, p=0.034. Daily duration of using social media was not significantly associated with depression. However, severe depression was reported among 9.4% of students who used social media for a duration of 6-9 hours daily compared to none among those who used them for a duration of less than one hour daily, p=0.045. Concerning the most frequent activity followed on social media, the highest rate of depression was seen with politics (87.5%) followed by religion (80%) and economics (75%) whereas the lowest rate of depression was observed with news (38.5%) and sports (53.9%), p=0.040.

Table 7: Association between social media use and depression among senior medical students, Taif University, Taif

	Depression				**P1**	**P2**
	No N=146 N (%)	**Mild N=141 N (%)**	**Moderate N=76 N (%)**	**Severe N=25 N (%)**		
Using social media						
Chatting programs (n=118)	41 (34.7)	43 (36.4)	24 (20.3)	10 (8.5)		
Twitter (n=84)	25 (29.8)	43 (51.2)	16 (19.0)	0 (0.0)		
Youtube (n=47)	17 (36.2)	11 (23.4)	11 (23.4)	8 (17.0)		
Snapshot (n=99)	43 (43.4)	31 (31.3)	18 (18.2)	7 (7.1)		
Instagram (n=38)	20 (52.6)	12 (31.6)	6 (15.8)	0 (0.0)		
Others (n=2)	0 (0.0)	1 (50.0)	1 (50.0)	0 (0.0)	**0.111**	**0.005**
Duration of using social media (years)						
<1 (n=19)	2 (10.5)	13 (68.4)	4 (21.1)	0 (0.0)		
1 -2 (n=16)	5 (31.3)	3 (18.7)	7 (43.7)	1 (6.3)		
>2-3 (n=48)	17 (35.4)	19 (39.6)	8 (16.7)	4 (8.3)		
>3 (n=305)	122 (40.0)	106 (34.8)	57 (18.7)	20 (6.5)	**0.041**	**0.034**

Daily duration of using social programs (hours)						
<1 (n=6)	3 (50.0)	3 (50.0)	0 (0.0)	0 (0.0)		
1-3 (n=133)	52 (39.1)	48 (36.1)	27 (20.3)	6 (4.5)		
3-6 (n=141)	55 (39.0)	51 (36.2)	26 (18.4)	9 (6.4)		
6-9 (n=64)	25 (39.1)	23 (35.9)	10 (15.6)	6 (9.4)		
>9 (n=44)	11 (25.0)	16 (36.4)	13 (29.5)	4 (9.1)	**0.452**	**0.045**
Most frequent activity you follow on social media						
Religious (n=10)	2 (20.0)	6 (60.0)	2 (20.0)	0 (0.0)		
Culture (n=48)	16 (33.3)	21 (43.8)	8 (16.7)	3 (6.3)		
Politics (n=16)	2 (12.5)	6 (37.5)	5 (31.3)	3 (18.8)		
Economy (n=4)	1 (25.0)	2 (50.0)	1 (25.0)	0 (0.0)		
Sports (n=89)	41 (46.1)	34 (38.2)	11 (12.4)	3 (3.4)		
Arts (n=50)	18 (36.0)	15 (30.0)	13 (26.0)	4 (8.0)		
News (n=26)	16 (61.5)	6 (23.1)	2 (7.7)	2 (7.7)		
Recreation (n=138)	47 (34.1)	49 (35.5)	32 (23.2)	10 (7.2)		
Others (n=7)	3 (42.9)	2 (28.6)	2 (28.6)	0 (0.0)	**0.040**	**0.209**

P1 (Chi-square test): Depression versus no depression *** Fischer exact test**

P2 (Chi-square test): Severity of depression

Results of multivariate logistic regression analysis:

Table 8 revealed that female students were at almost double risk for depression compared to male students (adjusted odds ratio "aOR"=2.38; 95% confidence interval "CI"=1.44-3.93, p=0.001. Compared to single students, married students were 60% at lower risk to develop depression (aOR=0.40; 95% CI=0.19-0.85. p=0.017). Compared to students who exposed to physical or psychological violence, those not exposed were at 75% lower risk for depression (aOR=0.25; 95% CI=0.07-0.89. p=0.032). Opposed to students who had study or academic problems, those reported sometimes or no problems were at reduced risk for depression (aOR=0.14; 95% CI=0.03-0.64. p=0.011 and aOR=0.06; 95% CI=0.01-0.30. p<0.001, respectively). Compared to students who reported drug or alcohol intake, those not exposed to drugs or alcohol were at 77% lower risk for depression (aOR=0.23; 95% CI=0.06-0.93. p=0.039). Duration of using social media, most frequent activity followed on social media, having organic health problems, financial problems, family history of depression, and family problems were not significantly associated with depression.

Table 8: Predictors of depression among senior medical students, Taif University: Results of multivariate logistic regression analysis

	B	SE	adjusted OR	95% CI	p-value
Gender					
Male [(a)]				1.0	
Female	0.818	0.259	2.38	1.44-3.93	0.001
Marital status					
Single [(a)]				1.0	
Married	-0.920	0.385	0.40	0.19-0.85	0.017
Exposure to physical or psychiatric violence					
Yes [(a)]				1.0	
No	-1.377	0.641	0.25	0.07-0.89	0.032
Study/academic problems					
Yes [(a)]				1.0	
Sometimes	-1.960	0.773	0.14	0.03-0.64	0.011
Never	-2.744	0.781	0.06	0.01-0.30	<0.001
Drugs/alcohol intake					
Yes [(a)]				1.0	
No	-1.450	0.705	0.23	0.06-0.93	0.039

[(a)] Reference category B: Slope SE: Standard error

OR: Odds ratio CI: Confidence interval

Association between academic performance and social media use

From table 9, it is concluded that:

-Academic performance expressed as GPA was not significantly associated with the type of using social media and the most frequent activity followed on social media.

-Duration of using social media was significantly associated with GPA as 47.4% 0f students who used social media since less than one year got excellent and 52.6% of them got very good and none of them passes or got weak. On the other hand, 24.3% of those who used social media for a duration of more than 3 years got good and 9.8% just passed or got weak GPA=0.008.

-Daily duration of using social media was significantly associated with GPA as 22.7% of those using it for more than 9 hours daily passed or got weak whereas 50% of those using it for less than one hour got very good, p<0.001

Table 9: Association between academic performance and use of social media among senior medical students, Taif University

	GPA				P-value*
	Excellent N=70 N (%)	V. good N=192 N (%)	Good N=93 N (%)	Pass/weak N=33 N (%)	
Using social media					
Chatting programs (n=118)	15 (12.7)	63 (53.4)	28 (23.7)	12 (10.2)	
Twitter (n=84)	16 (19.0)	49 (58.3)	14 (16.7)	5 (6.0)	
Youtube (n=47)	6 (12.8)	20 (42.6)	13 (27.7)	8 (17.0)	
Snapshot (n=99)	22 (22.2)	45 (45.5)	26 (26.3)	6 (6.1)	
Instagram (n=38)	10 (26.3)	14 (36.8)	12 (31.6)	2 (5.3)	
Others (n=2)	1 (50.0)	1 (50.0)	0 (0.0)	0 (0.0)	**0.172**
Duration of using social media (years)					
<1 (n=19)	9 (47.4)	10 (52.6)	0 (0.0)	0 (0.0)	
1 -2 (n=16)	5 (31.3)	6 (37.5)	4 (25.0)	1 (6.3)	
>2-3 (n=48)	10 (20.8)	21 (43.8)	15 (31.3)	2 (4.2)	
>3 (n=305)	46 (15.1)	155 (50.8)	74 (24.3)	30 (9.8)	**0.008**
Daily duration of using social programs (hours)					
<1 (n=6)	1 (16.7)	3 (50.0)	2 (33.3)	0 (0.0)	
1-3 (n=133)	28 (21.1)	67 (50.4)	35 (26.3)	3 (2.3)	
3-6 (n=141)	27 (19.1)	79 (56.0)	27 (19.1)	8 (5.7)	
6-9 (n=64)	10 (15.6)	26 (40.6)	16 (25.0)	12 (18.8)	
>9 (n=44)	4 (9.1)	17 (38.6)	13 (29.5)	10 (22.7)	**<0.001**
Most frequent activity you follow on social media					
Religious (n=10)	5 (50.0)	5 (50.0)	0 (0.0)	0 (0.0)	
Culture (n=48)	12 (25.0)	29 (60.4)	5 (10.4)	2 (4.2)	
Politics (n=16)	2 (12.5)	8 (50.0)	4 (25.0)	2 (12.5)	
Economy (n=4)	1 (25.0)	2 (50.0)	1 (25.0)	0 (0.0)	
Sports (n=89)	9 (10.1)	37 (41.6)	31 (34.8)	12 (13.3)	
Arts (n=50)	10 (20.0)	26 (52.0)	10 (20.0)	4 (8.0)	
News (n=26)	4 (15.4)	16 (61.5)	6 (23.1)	0 (0.0)	
Recreation (n=138)	26 (18.8)	64 (46.4)	35 (25.4)	13 (9.4)	
Others (n=7)	1 (14.3)	5 (71.4)	1 (14.3)	0 (0.0)	**0.083**

*** Chi-square test**

5. DISCUSSION

Most students are using social media networks tools mainly for their personal benefits which could impact negatively their academic performance[37] while some of them get benefits in relation to education as a result of social network participation. [38] Also, conflicting results have been reported on the link between the utilization of social media and depression. Therefore this study was conducted to investigate the impact of over use of social media use on academic performance as well as depression among senior medical students at Taif University, KSA.

In the current study, the prevalence of depression among senior medical students was 62.4%. This rate is comparable to others reported among King Khalid University students, KSA (67.4%),[39] Qassim University female students, KSA (66.6%),[40] and in Pakistan (60-70%)[41, 42] However, this rate was higher than those observed in other studies conducted in KSA among medical students in King Faisal University in Al Ahsaa region (53%)[43] King Saud University in Riyadh (48.2%),[44] Umm Al-Qura University in Makkah Al-Mukarramah (30.9%),[3]Taibah University in Al-Madinah Al-Munawarrah (28.3%)[4]. In addition, it is higher than rates reported from other Arabic studies. In UAE (Dubai), a prevalence of 28.6% has been reported among medical students.[45] In Lebanon[46] a rate of 28% has been observed and in Egypt, a rate of 28.3% has been reported.[47] Also, the rate reported in the present study was higher than those reported in other overseas countries. In Pakistan, a prevalence of 35.1% was reported among medical students.[48] In Nigeria, the rate of depression among medical students was 23%.[49] In India, the prevalence of depression among first to fourth year medical was49.1%.[6] In USA, prevalence of depressive symptoms among medical students ranged between 12-25%. [50-53] This difference in the prevalence rate of depression observed between our study and others might be due to utilizing different instruments for defining depression and different categories of medical schools involved in studies as well as various characteristics and background of students and methods of teaching in different universities.

In this study, female students were at almost double risk of depression compared to male students after controlling for confounders in multivariate logistic regression analysis. This finding agrees with those reported from other studies carried out in Saudi Arabia,[3, 4, 39] other developing countries[6] and developed countries.[51] This is could be explained by theory that females generally express depressive symptoms easier than males.[54] Also, as a result of presence of two separate campuses for female and male students, according to Saudi higher educational policy in KSA, a study carried out by Sultan et al observed, in their study carried out at Taibah University, a relatively poor learning environment presents in the female campus with lesser educational facilities and recreation opportunities than male campus, which suggested to increase the level of stress and depression among them.[4]

In agreements with findings from a similar study, students with study/academic problems and those exposed to violence were more likely to be depressed than their other colleagues.[55]

In the current study, depression was more observed among single than married students. In a systematic review and meta-analysis research, Sarokhani et al[56] reported that single students were likely to be depressed compared with married students. This may be explained by the fact that single students usually face more stressful issues than the married students. However, in disagreement with our findings, Bayram and Bilgel reported that married students had higher levels of depression. [57]

Drug and /or alcohol users in the present study were more prone to depression than their counterparts. This finding is quite expected to observe this association between these two issues as it has been documented by others. [58]

The present study, in agreement with others,[16, 39, 59] no significant association has been observed between social media use (tool and duration) and depression. However, other investigators, [17, 24, 60] documented an association between them. Therefore, further research on larger scale including students from all levels and from different Universities in the Kingdom is warranted.

In disagreement with others,[24] the present study did not reveal an association between the duration of internet use and depression. Interestingly, some authors observed an increase in depression among individuals with low internet use.[59]

In the present study, there was s significant association between duration of using social media and academic performance expressed as GPA as those got higher GPA tended to use social media less than those who got lower GPA; in other wards social media use had a negative impact on the GPS of medical students. This was supported by the study of Kirschner and Karpinski (2010),[61] who reported a significant negative association between academic performance and Facebook use and also they observed that users of social media networks reported lower mean GPA and spending fewer hours per week studying on average than nonusers. Also, they reported that a high number of students confirmed that their GPAs could improve if they controlled participating on social media networks. In addition, Malaney (2005),[62] observed that a considerable percentage of students reported that their GPA had suffered as a result of too much time spent on social media networks. In Ghana, majority of the students reported a drop in their GPAs when they started participating on social networks.[63]

The study has two important limitations that should be addressed. First, the cross-sectional design of the study, which impacts the direction of the association between social media use and depression, in particular. Second, the conduction of the study in one medical college in the Saudi Arabia among senior students in particular could affect the generalizability of results.

6. CONCLUSION

Depression is highly prevalent among senior medical students at Taif University. Female, single students, those with study/academic problems, drug and/or alcohol users and students exposed to physical or psychological violence were more likely to develop depression than others. There was no significant association between social media use and depression. Academic performance of students was significantly affected by the duration of social media use.

7. RECOMMENDATIONS

Based on the findings of the study, the following recommendations are suggested.

1. Promoting the use of social media tools by students for useful issues such as academic purposes.

2. Family counselling and college authorities should have a significant role in preventing social media addiction among students.

3. Encouragement of students by their instructors to use the right tools for a proper time.

4. Education medical students regarding the use of social networks and exploring its impact on their academic performance

5. Further study is recommended including students from other medical colleges in the Kingdom and investigates how social media over-use could affect students' habits with regards to study, interaction at university and at home.

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