Al Mamun, M.A. & Griffiths, M.D. (2018). The association between Facebook addiction and depression: A pilot survey study among Bangladeshi students. *Psychiatry Research,* in press.

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Abstract

Social media addiction has become an area of increasing research interest over the past few years. However, there has been no previous research on social media addiction in Bangladesh. The present pilot study is the first ever in Bangladesh to examine the relationship between one specific form of social media addiction (i.e., '*Facebook* addiction') and its associated predictors. This present study comprised 300 students from the University of Dhaka (Bangladesh) who participated in a survey that included questions relating to socio-demographics, health and behavioral measures, and the Bergen Facebook Addiction Scale (BFAS), and the nine-item Patient Health Questionnaire (PHQ9). The prevalence of FA was 39.7% (cutoff score was ≥18 on the BFAS). Using a regression analysis, the risk of being addicted to *Facebook* was predicted by being single, having less involvement in physical activities, sleep disturbance (more or less than 6 to 7 hours of sleep), time spent on *Facebook* (≥5 hours per day), and depression symptoms. Based on the sample in the present study, the risk of *Facebook* addiction (as assessed using the BFAS) appears to be a significant issue among Bangladeshi students, and depression appears to be one of the main comorbid factors.

Keywords: Social media addiction; Facebook addiction; Problematic Facebook use; Depression; Bangladeshi students

Introduction

Over the past few years, there has been a significant in research investigating social media addiction with most research examining '*Facebook* addiction' (FA) which has been classed by some scholars as a potential behavioral addiction (Hormes, 2016) and subsumed within the more general Internet addiction (IA) research field (Atroszko et al., 2018; Błachnio & Przepiorka, 2016; Griffiths, Kuss, & Demetrovics, 2014). Young (1999) claimed there were five different types of IA comprising computer addiction (i.e., computer game addiction), information overload (i.e., web surfing addiction), net compulsion (i.e., addictions to online gambling, online shopping, online day trading, etc.), cyber-sexual addiction (i.e., online pornography or online sex addiction), and cyber-relationship addiction (i.e., an addiction to online relationships). Although the typology was heavily criticized by Griffiths (2000) who claimed that almost all of these types concerned addictions on the internet rather than addictions to the internet, social media addictions (including FA) arguably falls into the category of cyber-relationship addiction (Andreassen, Torsheim, Brunborg, & Pallesen, 2012; Kuss & Griffiths, 2011). However, Griffiths (2012) argued that activities carried out by individuals on *Facebook* included more than just social networking and could include activities such as gaming and gambling. Like IA, FA can be broadly defined as a non-chemical (i.e., behavioral) addiction, which involves excessive human-machine interaction (Cerniglia et al., 2017), as well as comprising six core criteria of addiction: salience, mood modification, tolerance, withdrawal symptoms, conflict, and relapse (Griffiths, 1996, 1998; 2005).

The prevalence of FA has been wide-ranging (up to 47% in some cases) but almost all studies have used different criteria and methods of assessing FA (e.g., Alzougool, 2018; Jafarkarimi, Sim, Saadatdoost, & Hee, 2016; Masthi, Cadabam, & Sonakshi, 2015; Khumsri et al., 2015; Shettar, Karkal, Kakunje, Mendonsa, & Chandran, 2017; Wolniczak et al., 2013) and typically using non-representative samples. However, one of the very few nationally representative surveys among over 6000 Hungarian adolescents reported that 4% were at risk of social media addiction (Bányai et al., 2017). There are numerous factors that have been reported in relation to social media use more generally, and *Facebook* use more specifically. Sociodemographic factors such as age, gender, relationship status, and occupational/educational status can all play important roles in determining patterns of *Facebook* use (Soron & Tarafder, 2015; Wolniczak et al., 2013). Predictors of problematic *Facebook* use have included a wide range activities and factors including engaging in less physical daily activities (Brailovskaia, Teismann, & Margraf, 2018), drug and alcohol dependence (Hormes, 2016), more time spent using *Facebook* (Hormes, 2016; Przepiorka & Blachnio, 2016; Wright et al., 2013), loneliness (Błachnio, Przepiorka, Boruch, & Bałakier, 2016; Teppers, Luyckx, Klimstra, & Goossens, 2014), poor sleep quality (Wolniczak et al., 2013), and experiencing relationship dissatisfaction (Elphinston & Noller, 2011).

Some studies have also indicated that problematic *Facebook* use can have detrimental effects on mental health and has been associated with a variety of physical and psychological impairments affecting psychological wellbeing (Błachnio, Przepiórka, & Pantic, 2015; Hormes, 2016; Marino, Gini, Vieno, & Spada, 2018) including depression (e.g., Błachnio et al., 2015; Shensa et al., 2017; Wright et al., 2013). Excessive and uncontrolled use of social media (including *Facebook*) has received a considerable attention in recent years (Tang, Chen, Yang, Chung, & Lee, 2016; Wolniczak et al., 2013), but is not yet recognized as a formal disorder by bodies such as the American Psychiatric Association and the World Health Organization. However, there is growing evidence that social media use (including *Facebook* use) can become problematic to a small minority of individuals, and has many similarities with behavioral addictions such as gambling and gaming (Kuss & Griffiths, 2011; Marino et al., 2018).

Dhaka (the capital of Bangladesh and where the present study was carried out), has 20 million active *Facebook* users, which is 0.9 percent of the total monthly active users of the social networking site across the globe and it has been ranked second among the cities globally having the most active *Facebook* user worldwide (Kemp, 2018). Furthermore, the financial cost of using *Facebook* is totally free via smartphone or broadband connection in Bangladesh. However, FA as an emerging mental health issue, has been little studied in Bangladesh. To the best of the present authors' knowledge, only three studies examining *Facebook* use have been carried out in Bangladesh (i.e., Al-Jubayer, 2013; Jahan & Ahmed, 2012; Soron & Tarafder, 2015) but none of these investigated FA. In short, no Bangladeshi study has ever assessed whether there is an association between FA and socio-demographics and psychological factors (e.g., loneliness, stress, self-esteem, depression, etc.). Therefore, the present study examined FA and its association with socio-demographic and psychosocial factors, especially depression symptoms.

Methods

Participants and procedure: The present cross-sectional survey study was conducted among English-speaking students at the University of Dhaka (Bangladesh) with data collected from July to August, 2018. Using a convenience sampling method, data were collected from 341 participants (184 males; 61.3%) using an offline face-to-face survey. Following the removal of incomplete questionnaires, data from 300 participants were used in final analysis. The survey comprised closed questions and took approximately 15 minutes to complete.

Measures

Sociodemographic and behavioral measures: Sociodemographic information was collected and included age, gender, student's status (fresher or non-fresher), place of residence, relationship status, etc. They were also asked about physical and psychological comorbidities (e.g., presence of asthma, physical disabilities, and mental health disorders), smoking status, physical activities, sleep duration, etc. To assess physical activities, participants were asked if they participated in moderate physical activities like walking, playing sports games, cycling, swimming, and any other activity that resulted in an increase in breathing or heart rate for at least 30 minutes each day. Participants reported whether they were smokers with a dichotomous response (i.e., yes/no). As for sleep duration, participants were asked to report the average duration of sleep per day. Sleep duration was categorized as normal (6–7 hours), short (<6 h) and long (>7 h). Participants were also asked how long they spent on *Facebook* each day.

Bergen Facebook Addiction Scale: The Bergen Facebook Addiction Scale (BFAS) was used in the present study to assess the risk of *Facebook* addiction (Andreassen et al., 2012). The BFAS comprises six questions on 5-point Likert-type scale (e.g., 'How often during the last year have you felt an urge to use social media more and more?' and 'How often during the last year have you used social media to forget about personal problems?') ranging from *very rarely* (1) to *very often* (5) with scores ranging from 6-30. Each item reflects a dimension of six basic addiction components as proposed by Griffiths (1996, 2005) (i.e., salience, mood modification, tolerance, withdrawal, conflict and relapse). The questions concerned symptoms experienced during the past year. A higher score indicates greater risk of *Facebook* addiction. Although the original study did not provide cut-off estimates, and considering research on other forms of addiction, two possible categorization approaches for problematic BFAS values are possible. The more liberal approach utilizes a polythetic scoring scheme (cutoff score: 3 on at least four of the six items) whereas a more conservative approach utilizes a monothetic scoring scheme (cutoff score: equal or more than 3 on all six items) (Andreassen et al., 2012; Andreassen & Pallesen, 2014). In the present study, a cutoff score as equal or more than 18 on the BFAS was used (i.e., the monothetic approach). The BFAS has shown good validity and reliability in previous research (e.g., Atroszko et al., 2018; Brailovskaia et al., 2018). In the present study the Cronbach's alpha was very good (0.75).

Patient Health Questionnaire: The PHQ-9 is a 9-item depression subscale of the Patient Health Questionnaire (Spitzer, Kroenke, Williams, & Group, 1999). Each of the PHQ-9's depression items describe one symptom corresponding to one DSM-IV diagnostic criterion for major depression disorder (e.g., "Having little interest or pleasure in doing things", "Feeling tired or having little energy", and "Having trouble in concentration"). Participants rated the frequency of the nine symptoms over the past two weeks on a 4-point Likert scale (0 = not at all, 1 = several days, 2 = more than half of the days, and 3 = nearly every day). The items are scored on a 4-point Likert scale (Spitzer et al., 1999). As a screening tool, the

nine items are added together (score range 0-27 with 0 indicating no depression symptoms and 27 indicating all symptoms occurring nearly daily). A score of ≥10 has been shown to have an 88% sensitivity and 88% specificity for major depression in a general medical population (Kroenke, Spitzer, & Williams, 2001). In the present study, depression symptoms were classified a score of ≥10 in PHQ9. The internal reliability was reported to be high and appropriate in previous studies (Kroenke et al., 2001; Yu, Tam, Wong, Lam, & Stewart, 2012). In the present study the Cronbach's alpha was very good (0.82).

Statistical analysis: Data were analyzed using Statistical Package for Social Science (SPSS) version 22.0 and Microsoft Excel 2016. Firstly, Microsoft Excel was used to enter data and then prepared for SPSS format. Descriptive statistics (e.g., frequencies, percentages, means, and chi-square tests) were performed with SPSS 22.0. All variables found significant in bivariate analysis were then entered into a binary logistic regression model with '*Facebook* addiction' as the dependent variable. The results of logistic regression are reported with 95% confidence intervals.

Ethics: The study procedures were carried out in accordance with the Declaration of Helsinki. Ethical approval was granted by the research team's university ethics committee. All participants were informed about the purpose of the study and their informed consent was obtained prior to the collection of data in the present study. Participants were informed that all their information would be kept anonymous and confidential, and they were provided with information about the nature and purpose of the study, the procedure, and the right to withdraw their data at any time.

Results

The descriptive statistics (means and standard deviations of the variables) for the total sample are presented in Table 1. The participants' mean age was 20.72 years (*SD*=1.70 years). Of the 300 participants, the prevalence of being at risk of *Facebook* addiction was 39.7%, where the cutoff score was ≤18 on the BFAS. A majority of the sample participants were male (61.3%) and an equal percentage of males and females (39.7%) were classed as being at risk of *Facebook* addiction, a finding which was not statistically significant (X^2=0, df=1, p<0.997). A high proportion of the participants reported they were single (70.4%) and not in relationship with a boyfriend or girlfriend. It was found that 41.6% single students were classed as being at risk of *Facebook* addiction, but was not statistically significant compared to those participants who were not single (35.2%) (X^2=1.059, df=1, p<0.303).

The behavioral and health-related characteristics are presented Table 1. Most of the participants reported having no physical comorbidities (79.0%), were non-smokers (84.7%), and lived alone (64.0%). The majority of participants' sleep duration was normal (59.4%), but among the sleep status a larger proportion

of those who had longer than normal sleep time (58.3%) were found to be at risk of FA, followed by those who had a shorter sleep than normal (44.1%) (X^2=11.93, df=2, p<0.003). Although a larger proportion of the participants used *Facebook* less than 5 hours daily (57.2%), among those who spent more than 5 hours or more daily on *Facebook* (52.4%) were more likely to be at risk of FA (X^2=13.92, df=1, p<0.001). The depression status of the participants was 46.3%, but 53.2% of depressed students were at risk of FA compared to 28.0% of non-depressed students (X^2=19.93, df=1, p<0.001).

Results from the regression analysis showed that being single (i.e., not engaged in relationship with boyfriend or girlfriend) was a predictive factor for FA risk (OR=1.31; 95% CI: 0.83-2.20). Other strong predictors of FA risk included not being engaged in physical activities (OR=1.33; 95% CI: 0.83-2.11), and sleep disturbance from normal sleep quality (6-7 hours) (less than normal OR=1.58; 95% CI: 0.86-2.88 vs. more than normal OR=2.80; 95% CI: 1.53-5.11). The strongest predictors for FA risk were spending more than five hours a day on *Facebook* (OR=2.48; 95% CI: 1.64-4.84) and having depression symptoms (OR=2.93; 95% CI: 1.82-4.74) (Table 2).

Discussion

The present study examined the socio-demographic, behavioral, and health-related related factors most associated with the risk of developing '*Facebook* addiction' (FA) among Bangladeshi students using the Bergen Facebook Addiction Scale (BFAS). No previous studies of FA in Bangladesh have ever been carried out so the present study was novel from a cross-cultural perspective. In the present study the prevalence of those at risk of FA was 39.7% (where a cutoff score of ≤18 [out of 30) on BFAS was used). This low cut-off score clearly inflated the rate of FA risk. There were no relevant Bangladeshi data on FA to compare, because the three previous Bangladeshi studies (Al-Jubayer, 2013; Jahan & Ahmed, 2012; Soron & Tarafder, 2015) did not assess social media addiction at all.

In India (a country adjacent to Bangladesh), the prevalence rates of FA using the BFAS have been diverse (again because of convenience non-representative sampling). In a study in Bengaluru City comprising six colleges (Masthi et al., 2015), the prevalence of FA was reported as being 7.25% (along with a further 'high risk' group of 24.75%). In a Southern Indian study among postgraduate university students (Shettar et al., 2017), an FA prevalence rate of 26% was reported with a cutoff score of 15 when using the BFAS. In another study, the prevalence rate among high school students in Thailand was reported as being 41.8% using a cutoff score of 12 or more in the Thai-BFAS (Khumsri et al., 2015). In Jordan, 38.5% of university students classed as being at risk of FA using the BFAS, although no cutoff score was mentioned (Alzougool, 2018). Finally, a study of Malaysian students reported an FA prevalence rate of 47% based on polythetic scoring of the BFAS (Jafarkarimi et al., 2016).

In the present study, there was no statistically significant gender difference between males and females in relation to *Facebook* addiction (based on chi-square). However, in the regression analysis for the adjusted model, compared to females, males were around 1.4 times more likely to be addicted to *Facebook*. However, being female was significantly associated with addictive use of social media in a large-scale Norwegian study of over 23,000 participants (Andreassen et al., 2016). *Facebook* can be used to connect and stay in touch with friends and to maintain relationships with partners, but there may be situations where an individual uses the site excessively (Masthi et al., 2015). However, *Facebook* use has been shown to be associated with relationship dissatisfaction, via jealous cognitions and surveillance behaviors, which can spill over into romantic relationships, resulting in problems such as jealousy and dissatisfaction (Elphinston & Noller, 2011). This finding of being single, which includes those who are not engaged in a relationship with boyfriend or girlfriend as well as separated, and divorced has been identified among those being prone to Internet addiction (Islam & Hossin, 2016).

In the regression analysis of the present study, those with more irregular sleeping patterns and episodes of disturbed sleep were at greater risk of FA. Sleep disturbance has been associated with online addictive behaviors. Studies have reported that both poor sleep quality including lack of sleep (Choi et al., 2009) and excess sleep (Islam & Hossin, 2016) are risk factors for IA and FA (Wolniczak et al., 2013). The findings reported here suggest that *Facebook* use can be problematic and support previous studies that have conceptualized problematic social media use as a behavioral addiction (Cerniglia et al., 2017; Hormes, 2016; Przepiorka & Blachnio, 2016; Wright et al., 2013). Young (2007) suggests that using the internet for 38 hours or more each week may result in addiction which is the main reason why one of the key variables examined was whether the individual spent more or less than five hours a day on Facebook. However, it should also be noted that Griffiths (2010) demonstrated content and context of online use is a more salient factor that time spent in defining online addictive behavior. The fact that the amount of time spent using *Facebook* in the present study was a risk factor for FA contributes to the ongoing debates concerning excessive time usage in the development of behavioral addictions.

Problematic *Facebook* use appears to have detrimental effects on mental health among a minority of individuals and is arguably becoming a public health problem because of the impact on physical health and psychological wellbeing among this minority (Błachnio et al., 2015; Hormes, 2016; Marino et al., 2018). Previous studies outside of Bangladesh have reported associations between FA and depression (e.g., Błachnio et al., 2015; Pantic et al., 2012; Shensa et al., 2017; Wright et al., 2013), so the finding in the present Bangladeshi study supports that literature. In fact, depression independently and strongly correlates with many addictive behaviors including problematic social media use (Shensa et al., 2017). In the field of social media addiction, longitudinal research needs carrying out to determine whether depressed individuals

gravitate towards social media or whether excessive use of social media facilitates depression. In 2011, the American Academy of Pediatrics (AAP) arguably 'jumped the gun' and popularized the phenomenon of '*Facebook* depression' describing the condition of teens who were spending a significant amount of time on *Facebook* and exhibiting symptoms of depression (O'Keeffe & Clarke-Pearson, 2011). However, the situation is more nuanced. For instance, a study conducted among Turkish hemodialysis patients indicated that having a *Facebook* account was related to a lower level of depression symptoms (Afsar, 2013). This finding suggests that using *Facebook* can be helpful in coping with disease and increase mental wellbeing, but such findings relate to normal (rather than problematic and addictive) use of *Facebook.* It should also be noted that some studies have reported no relationship between depression and using social media (e.g., Jelenchick, Eickhoff, & Moreno, 2013; Pantic, 2014). Consequently, further research is needed to delineate more precisely the relationship between *Facebook* use and depression as well as other factors such as time spent engaged in *Facebook* use, gender, and cultural determinants influencing the relationship.

The present study is not without its limitations. The study was cross-sectional in nature and data were collected from a non-representative (convenience) Bangladeshi university sample of students, therefore generalizability to other university student samples in (and outside) the country may be limited. Additionally, the sample size was modest. Such limitations could be remedied in future research by surveying university students (using bigger sample sizes) from different universities both in Bangladesh and other countries as well as trying to include bigger more nationally representative samples. Furthermore, longitudinal investigations of FA are needed to assess causal relationships between the assessed variables, especially in relation to depression. A final limitation is that all the data were self-report and are subject to well-known biases such as memory recall biases and social desirability biases. The only way to overcome such biases is to carry out research using different methodologies in attempting to answer the same questions (e.g., qualitative and/or observational studies). Given the present study is the first on *Facebook* addiction in Bangladesh and shows similarities in findings to previous studies in other countries, future research in Bangladesh should look to test specific models relating to problematic social media use as suggested by other scholars (e.g., Brand et al., 2016; Katz et al., 1973) using the key predictors identified in the present study. Despite these limitations, this study highlighted some of the key characteristics of what problematic *Facebook* users actually do, and how often they do it compared to non-problematic users, which will contribute to further research both in Bangladesh and other countries.

In conclusion, the present study was an essentially a pilot study to collect some baseline regarding of '*Facebook* addiction' in a country where no previous data on the behavior existed. The prevalence of FA and its associations with a variety of risk factors based on data from a sample of university students was established and many of the findings in Bangladesh are consistent with research findings in other countries.

Examining multiple variables, it was found that the symptoms of depression were the most significant risk factors associated with the risk of FA. Longitudinal research is needed to assess the causality of the variables examined in the present study including socio-demographic factors, behavioral and psychiatric comorbidities including depression, anxiety, personality disorders, loneliness, stress, and self-esteem.

Conflict of interest: None
Funding: None

Acknowledgements: The first author would like to thank the trainee team of Undergraduate Research Organization, particularly the following students along with their department or institute of University of Dhaka – Anirul Islam, Public Administration; Esmat Ara Eti, Psychology; Hasibul Hasan, Political Sciences; Maliha Yasmin, Institute of Education and Research; Md. Mehedi Hasan Nahid, Japanese Studies; Md. Naimunnabi Chowdhury Tosar, Political Science; Samema Aktar, Law; Sazzad Shahrear, Genetic Engineering & Biotechnology; for support during data collection and input.

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Table 1: Characteristics of the total sample (n=300) and differences in those at risk to *Facebook* addiction

Variables	n (%)	Facebook Addiction (%)	Chi-square value	df	*p*-value (chi-square test)
Socio-demographic Variables					
Gender					
Male	184 (61.3)	73 (39.7)	0.000	1	0.997
Female	116 (38.7)	46 (39.7)			
Student status					
Fresher	149 (49.7)	59 (39.6)	0.001	1	0.981
Non-fresher	151 (50.3)	60 (39.7)			
Permanent residence					
Village area	135 (45.6)	51 (37.8)	0.451	1	0.502
City area	161 (54.4)	67 (41.6)			
Family type					
Nuclear	255 (85.6)	101 (39.6)	0.078	1	0.780
Joint	43 (14.4)	18 (41.9)			
Relationship status					
Single	209 (70.4)	87 (41.6)	1.059	1	0.303
Partner	88 (29.6)	31 (35.2)			
Behavioral and health-related variables					
Physical comorbidity					
Yes	63 (21.0)	26 (41.3)	0.086	1	0.770
No	237 (79.0)	93 (39.2)			
Smoking status					
Yes	46 (15.3)	18 (39.1)	0.007	1	0.936
No	254 (84.7)	101 (39.8)			
Physical activities					
Yes	159 (53.0)	58 (36.5)	1.437	1	0.231
No	141 (47.0)	61 (43.3)			
Sleeping status					
Normal (6-7 hours)	174 (59.4)	58 (33.3)	11.927	2	0.003
Less than Normal	59 (20.1)	26 (44.1)			
More than Normal	60 (20.5)	35 (58.3)			
Living alone					
Yes	108 (36.0)	44 (40.7)	0.081	1	0.775
No	192 (64.0)	75 (39.1)			
Stressful Life Event					
Yes	136 (45.3)	57 (41.9)	0.524	1	0.469
No	164 (54.7)	62 (37.8)			
Facebook Use Time*					
≥ 5 hours/day	124 (42.8)	65 (52.4)	13.922	1	<0.001
< 5 hours/day	166 (57.2)	51 (30.7)			
Problematic Facebook Use					
Yes	119 (39.7)	-	-		
No	181 (60.3)	-	-		
Depression Status					
Depression	139 (46.3)	74 (53.2)	19.931	1	<0.001
Non-depression	161 (53.7)	45 (28.0)			

Table 2: Regression analysis of factors associated with those at risk of *Facebook* addiction

Variables	Unadjusted OR			Adjusted OR[c]		
	OR[a]	(95% CI[b])	*p* (Chi-square test)	OR	(95% CI)	*p* (Chi-square test)
Sociodemographic variables						
Gender						
Male	1.001	(0.622-1.609)	0.997	**1.427**	(0.780-2.611)	0.248
Female	1			1		
Student Status						
Fresher	0.994	(0.626-1.579)	0.981	0.775	(0.452-1.331)	0.356
Non-fresher	1					
Permanent Residence						
Village area	0.852	(0.533-1.361)	0.502	0.816	(0.463-1.438)	0.482
City area	1			1		
Family Type						
Nuclear	0.911	(0.473-1.755)	0.780	0.748	(0.347-1.610)	0.458
Joint	1			1		
Relationship Status						
Single	**1.311**	(0.782-2.198)	0.304	**1.540**	(0.845-2.806)	0.159
Partnered	1			1		
Physical Comorbidity						
Yes	1.088	(0.618-1.915)	0.770	0.698	(0.345-1.412)	0.317
No	1			1		
Smoking Status						
Yes	0.974	(0.512-1.853)	0.936	0.767	(0.351-1.675)	0.506
No	1			1		
Physical Activities						
Yes	1		0.231	1		0.589
No	**1.328**	(0.835-2.112)		1.156	(0.682-1.960)	
Sleeping Status						
Normal (6-7 hours)	1		0.003	1		0.055
Less than Normal	**1.576**	(0.862-2.880)		1.251	(0.627-2.495)	
More than Normal	**2.800**	(1.533-5.114)		**2.340**	(1.170-4.679)	
Living Alone						
Yes	1.072	(0.663-1.735)	0.775	0.938	(0.525-1.675)	0.829

No	1			1		
Stressful Life Event						
Yes	1.187	(0.746-1.889)	0.469	0.803	(0.448-1.437)	0.459
No	1			1		
Facebook Use Time						
≥ 5 hours/day	**2.484**	(1.643-4.837)	0.000	**2.269**	(1.321-3.897)	0.003
< 5 hours/day	1			1		
Depression Status						
Depression	**2.935**	(1.818-4.738)	0.000	**2.911**	(1.637-5.177)	0.000
Non-depression	1			1		

a- Odds Ratio

b- Confidence Interval

c- Adjusted OR for all variables shown in Table 2.