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*Full Length Research Paper*

# Investigation of high school students' internet addiction levels using various variables: The case of Giresun Province

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The aim of this study is to investigate the internet addiction levels of high school students using various variables. The research consists of a total of 962 students (452 girls and 410 boys) studying at different high schools in Giresun in the fall semester of the 2019 to 2020 academic year. The research data were obtained using the general survey model. The questionnaire consists of 6 items used to determine the introductory characteristics of university students; to obtain the data of the study, the "Internet Addiction Scale (IAS)" consisting of 20 items developed by Young and the "Academic Procrastination Scale" (AEO) consisting of 19 items developed by Çakıcı were used. In analyzing the data, Kolmogorov-Smirnov (K-S), Arithmetic Mean, Standard Deviation, Independent groups t test, one-way ANOVA and Tukey analysis techniques were used. As a result of the research, it was determined that the mean scores of high school students regarding internet addiction levels differ significantly in terms of gender, class level, economic status, mother's education level and father's education level.

**Key words:** Internet, addiction, high school, student, internet addiction.

## INTRODUCTION

The concept of addiction generally refers to the excessive desire of individuals for a physical substance and the inability to give up (Holden, 2001). Ögel (2001) defined addiction as the inability of an individual to quit a habit-forming substance he or she uses of his own free will, increasing the amount of the substance he uses, showing withdrawal symptoms when he cannot reach the substance, using it despite being harmed, and spending most of his time to reach the substance he is addicted to. Among the negative social and psychological consequences, the impact of the Internet is the so-called

Internet addiction phenomenon, which has been the subject of scientific debate for the past 20 years, depending on the development of information technology and its availability.

Young (1996) sees addiction as the destructive effects on the psychological, physical, social, mental and economic status of an individual as a result of a certain activity or substance use, one's inability to give up, the impulse created by habit Campbell (2003) identified it as a disease with symptoms such as the emergence of negative behaviors that are not observed in healthy

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people in personality and behaviors as a result of the continuous use of a habit-forming substance, damage to cognitive perception, and inhibition of willpower.

Addiction is basically divided into two categories as addiction to a physical substance and addiction to a behavioral action. Substance abuse; alcohol, smoking, drugs, etc. It is expressed as the strong need felt by an individual for the substance used as a result of the long and regular use of volatile substances in solid, liquid and gaseous form (Kurupinar and Erdamar, 2014: 66). An individual who has substance addiction gets used to the effects of the substance on his / her body, and when he / she is unable to take the substance or reduces it, fatigue behavior occurs (Bektaş, 1991).

Behavioral addiction is expressed as habits that cause negative consequences in substance addiction despite not using a substance (Sevindik, 2011: 10). Internet addiction is becoming a serious problem, especially among adolescents. Generally, playing video, using SocialNetworking Sites (e.g., Facebook, Twitter) or Internet games are popular online activities among youths. They usually do these activities for entertainment, excitement, challenge seeking, or to cope with their emotions. An individual mentally tends to do this behavior and thinks about it. When he is unable to act, he experiences a mood disorder, his tolerance level decreases, he shows withdrawal symptoms, and he is prone to conflict. Gambling, digital tools, food, sex, etc. addictions are examined under behavioral addiction (Griff, 1999).

Behavioral addiction: A individual is distinguished from substance addiction by being mentally dependent, not using substances, having fewer cases of multiple addiction, observing obsessive-compulsive disorder in behaviors, and getting more positive results than substance addiction in the treatment process (Marks, 1990). Today, the concept of internet addiction, which is examined under behavioral addiction, is an individual's computer, phone, television, tablet, social media, etc. It is used to describe his relationship with technological devices and environments (Shaw and Black, 2008; Young, 1996).

Addictive behavior is one of a deviant behavior forms characterized by a constant desire to receive a subjectively pleasant emotional state and is expressed in an active change in one's mental state (Arshinova and Bartsalkina, 2010; Mendelevich, 2013; Minicheva and Maslova, 2015). Facebook, twitter, instagram, etc. are platforms where multiple access is provided by wide spread use of the Internet, strengthening the connection to infrastructures (Aktan and Koçyiğit, 2016, p.67). Access to social media networks has also become easier. Social media include individuals' words, sound files, images, etc. It is expressed as a virtual-based environment depending on the communication (Arslan et al., 2015: 38).

In the social media environment, individuals from all

walks of life in different places interact without age restrictions. The control of individual shares is usually done by users (Ersoy, 2019, p.11; Vural and Bat, 2010: 321).

Children and young people can easily access unsuitable content due to the fact that people can access social media not only from computers, but also with tablet and mobile phone they carry with them, without any time and place restrictions. This negative aspect of social media worries the society, especially since it harms young children (Şahin and Yağcı, 2017: 525). Dilci and Eranil (2019: 1) state that the use of social media and technology is an important factor in deteriorating cognitive and social skills, especially in children.

Internet addiction generally means one's, inability to prevent the desire to use the internet excessively, the need for more and more time spent on the internet, the loss of importance of time spent without being connected to the internet, the emergence of extreme nervousness, tension, anxiety when deprived leading to the person's work, social and family life deteriorating gradually. It is stated that internet addiction is a primary and progressive disease just like chemical addictions (Chrismore et al., 2011). Although enjoyable behaviors have addictive properties, the enjoyable features of the internet and digital technologies are known. Therefore, a pleasant mood change increases the likelihood of further use (Greenfield, 2011). Internet addiction is a psychological addiction, and especially young people are at risk for this addiction. Overuse of the Internet can cause problems with health, relationship and time management (Chou and Hsiao, 2000). Problematic internet use is a psychiatric condition that includes maladaptive thoughts and pathological behaviors (Davis, 2001). Majority of people who are addicted to Internet use change their mood and avoid problems. In other words, the internet is consumed with the idea of medicine for treatment purposes.

Many internet addicts escape from some things they do not want to face in their lives, but hide what they are running away from. If the person is constantly experiencing problems, stress and excitement, the computer or the internet is a remedy for that person's distraction. In this way, focusing one's attention on another point prevents one from experiencing internal problems or alleviates one's intensity. Studies to define internet addiction include understanding internet addiction as an independent disease or a symptom of another disease. Those who do not define internet addiction as an independent illness claim that a person can use the internet to suppress the troubles caused by another illness. For example, they suggest that this person may exhibit behavior such as excessive internet use or prolonged video game play. It is stated that all individuals who use the internet excessively are not actually internet addicts; they use the internet as an ideal environment for the satisfaction of other addictions, so it

**Table 1.** Descriptive statistics of the study group.

Variable		F	%
Sex	Girl	452	57
	Male	410	43
Class	9th grade	240	26
	10th grade	246	28
	11th grade	238	23
	12th grade	238	23
Economic situation	Very good	240	26
	Good	234	23
	Middle	234	23
	Low	252	30
Mother's education status	Primary school	280	35
	Secondary school	260	27
	High school	268	29
	University	152	19
Father's education status	Primary school	290	36
	Secondary school	282	33
	High school	210	22
	University	180	19

is important to distinguish between those who are really addicted to the internet and those who satisfy their other addictions on the internet (Griffiths, 2000 cited in Arısoy, 2009; Mikowski, 2005; Ögel et al., 2012).

The characteristics of the Internet such as its own norms, its own standards and its unique language make it a unique tool for communication. While it was very difficult to transfer information from one place to another in the past years, today information can be easily transported thanks to the internet. The fact that they can access information so quickly and easily has created satisfaction for people. This satisfaction has played a role in increasing people's internet usage time (Akinoğlu, 2002). The fact that the internet facilitates human life can make it a difficult technology to give up. According to Günüş, there is a difference between internet addiction and substance addiction; in order to get rid of substance addiction, the individual has to abandon 9 substances to which he / she is addicted, whereas in Internet addiction, using it correctly and healthily instead of leaving the Internet will prevent addiction. Thus, the individual can benefit from the numerous opportunities that the internet offers to humanity (Gönüş, 2009).

## METHODOLOGY

In this part of the research, there are information about the research model, universe / sample, data collection tools used, data collection and analysis.

## Working group

The research consists of a total of 962 students, 452 girls and 410 boys, who are studying at different high schools in Giresuncity in the fall semester of the 2019-2020 academic year (Table 1).

## Data collection tools

Data collection tools used in the research is a questionnaire consisting of 6 items used to determine the introductory characteristics of university students; the "Internet Addiction Scale (IAS)" consisting of 20 items developed by Young (1996) and the "Academic" consisting of 19 items developed by Çakıcı (2003). (APÖ)". Academic Procrastination Scale was used. Internet Addiction Scale (IAS): It is a scale consisting of 20 items, adapted from DSM-IV's Pathological Gambling criteria (Young, 1996). This test, which can be accessed at the Internet Addiction Center's <http://www.netaddiction.com> address, is a self-assessment scale. It was adapted to Turkish in 2001 (Bayraktar, 2001). In Bayraktar's study, the Cronbach Alpha internal consistency coefficient of this scale was found to be .91 and the Spearman - Brown value as .87, and that the scale was valid and reliable (YYU Journal of Education Faculty, 2019; 16 (1): 243-278, <http://efdergi.yyu.edu.tr> <http://dx.doi.org/10.23891/efdyu.2019.125> Research Paper ISSN: 1305-020 250). In this scale which is likert type, there are options 'Rarely', 'Sometimes', 'Often', 'Most of the time' or 'Always'. These options were given 1, 2, 3, 4 and 5 points, respectively. Getting a total score of 80 or above on the scale is accepted as an indicator of severe impairment in functionality and these individuals are described as internet addicts. Those with a score of 50-79 are defined as the borderline symptomatic group experiencing some Internet-related problems in their daily lives; those who score 49 or below are defined as a normal internet users who do not have any

**Table 2.** Descriptive statistics for the scale.

Scale	N	Lowest score	Highest score	$\bar{X}$	S
Total score	962	29	145	78.93	24.06
Game	962	11	55	26.04	10.85
Media	962	12	60	37.54	11.90
Effects on daily life	962	6	30	15.35	6.32

**Table 3.** Digital addiction independent groups T test findings of secondary school students by gender variable.

	Sex	N	$\bar{X}$	S	t	p
Total	Girl	452	76.35	324	-3.62	0.000*
	Male	410	85.10	24.68		
Game	Girl	452	23.91	10.02	-6.48	0.000*
	Male	410	31.03	11.14		
Media	Girl	452	37.54	12.12	-.00	0.991
	Male	410	37.55	11.46		
Effects on daily life	Girl	452	14.80	6.20	-2.82	0.010*
	Male	410	16.63	6.30		

problems related to internet usage in their lives.

#### Data collection and analysis

The data of the study were obtained from a total of 962 students, 452 girls and 410 boys, who are studying in different high schools in Giresuncity in the fall semester of the 2019-2020 academic year. Necessary permissions were obtained for the application of the scales and the voluntary principle of the participants was observed. The scales were applied to 1050 students in total, but because 88 of them did not have the necessary features due to the half-filling of the scales and the deficiencies in the demographic information section, 962 scales were evaluated. The analysis of the data was made using the SPSS 17.0 statistics program. The Kolmogorov-Smirnov (K-S) test was applied to determine whether the scores were normally distributed, and it was found that the data showed a normal distribution. Independent groups test to determine whether the internet addiction levels of students differ according to gender variable; One-way ANOVA test was used to determine whether there is a significant difference according to the variables of class level, economic status, and education level of the parents.

#### Purpose of the research

In the study, it is aimed to determine the internet addiction levels of high school students according to the average and various demographic variables. In line with this determined purpose, answers to the following questions are sought:

- 1) What are the average scores of high school students obtained from the total and factors of the Internet addiction scale?
- 2) Do the Internet addiction levels of high school students differ significantly according to the variables of gender, class level,

economic status, mother's education level and father's education level?

## RESULTS

This part of the research consists of the findings obtained from the analyses conducted on whether the Internet addiction levels of high school students differ according to the factors of the scale and the average score in the total score according to the variables of gender, economic status, and educational status of parents. The data obtained regarding the mean scores and standard deviation scores of the students from the scale are presented in Table 2.

According to the findings in Table 2, the internet addiction levels of the students were found to be medium level in the total of the scale (54.43), medium level in the game factor (47.35), medium level in the media factor (62.57) and medium level in the effect on daily life factor (51.17). It is seen that the mean scores of the students regarding internet addiction are in the highest media factor and the lowest in the game factor. The results of the independent groups test applied to determine whether the Internet addiction levels of high school students differ significantly according to the gender variable are shown in Table 3.

When the findings in Table 3 are examined, Internet addiction levels of high school students according to gender variable in the total score of the scale, in the

**Table 4.** Digital addiction ANOVA test findings by high school students' grade level variable.

	Class	N	$\bar{X}$	S	F	p	Significant difference
Total	9 <sup>th</sup> .class	240	83.50	20.72	2.62	0.017*	9-10*, 9-12*
	10 <sup>th</sup> .class	246	75.59	23.84			
	11 <sup>th</sup> .class	238	80.50	24.52			
	12 <sup>th</sup> .class	238	74.52	23.74			
Game	9 <sup>th</sup> .class	240	27.55	10.60	2.14	0.038*	9-11*
	10 <sup>th</sup> .class	246	25.34	11.20			
	11 <sup>th</sup> .class	238	24.75	10.82			
	12 <sup>th</sup> .class	238	24.92	10.81			
Media	9 <sup>th</sup> .class	240	38.39	11.76	2.60	0.028*	9-12*, 11-12*
	10 <sup>th</sup> .class	246	36.19	11.18			
	11 <sup>th</sup> .class	238	39.29	12.73			
	12 <sup>th</sup> .class	238	34.98	11.60			
Effects on daily life	9 <sup>th</sup> .class	240	15.70	6.31	2.84	0.016*	9-10*, 10-11*, 11-12*
	10 <sup>th</sup> .class	246	14.07	4.88			
	11 <sup>th</sup> .class	238	16.46	5.26			
	12 <sup>th</sup> .class	238	14.60	7.65			

factors of the effect of games and general life  $p < 0.05$ , which showed a significant difference in favor of female students,  $p > 0.05$  was determined that there was no significant difference in media factor. It is observed that the mean scores of male students regarding their internet addiction levels are higher than the scores of female students. The findings of the ANOVA test applied to determine whether the Internet addiction mean scores of high school students differ significantly according to the grade level variable are presented in Table 4.

According to the findings in Table 4, It was determined that the mean Internet addiction scores of high school students showed a significant difference  $p < 0.05$  in the total and all factors of the scale according to the grade level variable. According to the analysis results of the TUKEY test, which was applied to determine which classes there is a significant difference; the total score of the scale between "9 and 10", "9 and 12" against the ninth grade; against the ninth grade between "9 and 11" in the game factor; in favor of the twelfth grade between "9 and 12", "11 and 12" in the media factor of the scale; against the ninth grade between "9 and 10" in its effect on daily life, it was determined that there is a significant difference against the eleventh grade between "10 and 11", "11 and 12". The ANOVA test data, which was conducted in order to determine whether there is a significant difference in the mean scores of internet addiction according to the economic status variable of high school students are shown in Table 5.

When Table 5 is examined, it is seen that the mean scores of Internet addiction of high school students do

not show a significant difference in terms of the economic status variable, the total score of the scale, game and media factors  $p > .05$ . On the other hand, it was determined that there is a significant difference between "Average and Good" in favor of good in the factor of its effect on daily life. According to the total scores, it was determined that the group with medium economic status had the highest average score, and the group with the lowest had the lowest score. The mean scores of high school students on Internet addiction differ significantly in terms of the maternal education variable, total of the scale, game and media factors  $p < 0.05$ . It was concluded that  $p > 0.05$  did not show a significant difference in the effect on daily life.

As a result of the Tukey test applied to determine between which groups there is a significant difference, "Primary School and High School", "Primary School and University" in favor of primary school, between "Middle School and High School", "Middle School and University" in favor of secondary school; in the lower part of the game, between "Primary and High School" in favor of primary school, between "Secondary School and High School", "Middle School and University" in favor of secondary school; in the media factor, it was determined that there is a difference between "Primary School and High School", "Primary School and University" in favor of primary school, and between "Secondary School and High School", "Secondary School and University" in favor of secondary school. According to the total score, it is seen that the students' mean scores for internet addiction are highest in the group whose mother is a university

**Table 5.** Internet addiction ANOVA test findings according to the economic status variable of high school students.

	Economic	N	$\bar{X}$	S	F	p	Significant difference
Total	Very good	240	78.82	24.30	0.08	0.965	No
	Good	234	78.60	22.75			
	Middle	234	78.38	24.70			
	Low	252	76.55	33.13			
Game	Very good	240	26.00	10.66	0.25	0.865	No
	Good	234	25.56	10.99			
	Middle	234	26.41	10.72			
	Low	252	25.22	12.88			
Media	Very good	240	37.54	12.52	0.88	0.422	No
	Good	234	38.57	12.18			
	Middle	234	36.48	12.14			
	Low	252	34.36	16.08			
Effects on daily life	Very good	240	15.50	6.67	2.50	0.040*	Middle-Good*
	Good	234	14.40	5.72			
	Middle	234	16.08	6.46			
	Low	252	17.24	8.64			

graduate and the lowest in the group whose mother is a secondary school graduate.

It was concluded that the mean scores of Internet addiction of high school students showed a significant difference in terms of the total of the scale, game and media factors in terms of the father education level variable  $p < .05$ , and  $p > .05$  in the factor of its effect on daily life. Considering the results of Tukey test applied in order to determine between which groups there is a significant difference, in the total of the scale and the game factor, between "Secondary School and University", "High School and University" against the university; in the media factor, it is seen that there is a significant difference against the university between "Primary School and University", "Middle School and University", "High School and University". According to the total score, it is seen that the students' mean scores for internet addiction are highest in the group whose father is a university graduate and lowest in the group whose father is a secondary school graduate. When the findings obtained from the study are examined in general, it is seen that male students have higher internet addiction levels compared to female students; the ninth grades of the group had the highest internet addiction score average from the total score. The group with the lowest average score is the twelfth grade; the group with medium economic status has the highest average score, and the group with the lowest had the lowest score. The students' mean internet addiction score is the highest in the group whose mother is a university graduate; it is seen to be the lowest in the group whose mother is a secondary school graduate.

## DISCUSSION

Here, the comparison and interpretation of the findings obtained from the research with similar studies and suggestions in accordance with the study questions are given. Internet addiction levels of high school students were found to be moderate in the total and all factors of the scale. It is seen that the mean scores of the students regarding internet addiction are in the highest media factor and the lowest in the game factor. It was determined that the internet addiction levels of high school students showed a significant difference in favor of female students in the total score of the scale according to the gender variable, in terms of the effect of games and on the general life factors; while there was no significant difference in the media factor. It is observed that the mean scores of male students regarding internet addiction levels are remarkably higher than the scores of female students.

## CONCLUSION AND RECOMMENDATIONS

According to the findings of the research conducted by Gönüç (2009) on secondary school students, it is concluded that male students' internet addiction levels are higher than female students; this is similar with this study. In the study conducted by Arslan et al. (2015), it was found that there was a significant difference in terms of gender variable, but female students had higher levels of internet addiction. In the study conducted by Eryılmaz and Çukurluöz (2018) on high school students, it was

found that there is a difference between the internet addiction score averages of the students according to the gender variable and this difference is against male students. Similar results were obtained in the study conducted by Gökçearslan and Durakoğlu (2014). In the studies conducted, it is seen that the addiction levels of male students are generally higher than female students. It was determined that the mean internet addiction scores of high school students differ significantly in all factors of the scale, according to the class level variable.

According to the total score, it was determined that the group with the highest internet addiction score average was the ninth grade, and the group with the lowest average score was the twelfth grade. According to the findings of the study conducted by Gönüç (2009), students' mean scores for internet addiction differ significantly from the grade level variable. Consistent with this study, it was determined that the group with the highest mean score was the ninth grade and the group with the lowest average score was the twelfth grade. There are also studies in the literature with different results. In the study of Eryılmaz and Çukurluöz (2018), grade level does not have an effect that would make a significant difference on students' internet addiction averages. According to the research results of Kayri and Gönüç (2016) aiming to determine the relationship between students' internet addiction levels and students' economic levels, it was concluded that students with better economic status have higher addiction levels than those with lower levels. The results indicate that different dimensions of internet addiction can be predicted by a combination of different users' characteristics.

It is accepted that individuals with better economic status have more access to digital tools, which is effective on this situation. Internet addiction scores of students whose mothers are university graduates are also found to be quite high. In the studies, the generally expected situation is that as the education level of the mother increases, the digital addiction of the students decreases. In this case, the judgment that the mother's education will increase the level of consciousness becomes important. According to the total score, it is seen that the internet addiction mean scores of the students are the highest in the group whose father is a university graduate and the lowest in the group whose father is a secondary school graduate. Studies have also determined that parental attitudes have an effect on students' internet addiction levels. Although technology has many blessings and facilitates human life in many different areas, there are situations where it affects individuals and societies negatively. The most important of the negative effects are internet addictions, whose effects are felt more and more in people and social life.

## CONFLICT OF INTERESTS

The author has not declared any conflict of interests.

## REFERENCES

- Akinoğlu P (2002). Eğitimve Sosyalleşme Açısından İnternet Kullanımı: İstanbul Örneği. Yayınlanmamış DoktoraTezi, Sakarya Üniversitesi Sosyal Bilimler Enstitüsü.
- Aktan E, Koçyiğit M (2016). Sosyal Medya'nın Turizm Faaliyetlerindeki Rolü Üzerine Teorik Bir İnceleme Dumlupınar Üniversitesi Sosyal Bilimler Dergisi (ICEBSS ÖzelSayısı) pp. 62-73.
- Arisoy Ö (2009). İnternet bağımlılığıtedavisi. Psikiyatride Güncel Yaklaşımlar 1:55-67.
- Arslan A, Kırık AM, Karaman M, Çetinkaya A (2015). Liseve üniversite öğrencilerindedijitalbağımlılık. Uluslararası Hakemliiletişimve Edebiyat Araştırmaları Dergisi 8:34-58.
- Arshinova VV, Bartsalkina VV (2010). Prevention of gambling in the Internet addiction in the educational environment. Moscow: MGPPU.
- Bektaş H (1991). Uyuşturucubatağı. İstanbul: MilliyetYayınları.
- Campbell WG (2003). Addiction: A disease of volition caused by cognitive impairment. The Canadian Journal of Psychiatry 48(10):669-674.
- Chou C, Hsiao MC (2000). Internet addiction, usage, gratification and pleasure experience: The Taiwan college students' Case. Computers and Education 35:65-80.
- Chrismore S, Betzelberger LB, Tonya C (2011). Twelve-step recovery in inpatient treatment for internet addiction. internet addiction: a handbook and guide to evaluation and treatment, ed. Kimberly S. Young, Cristiano Nabuco De Abreu. John Wiley & Sons pp. 205-222.
- Davis RA (2001). A cognitive-behavioral model of pathological internet use. Computers in Human Behavior 17:187-195.
- Dilci T, Eranil AK (2019).The impact of social media on children. G. Sarı (Ed.). In handbook of research on children's consumption of digital media. (pp. 1-11). 17 Mayıs 2019 tarihinde <https://www.igi-global.com/book/handbook-research-children-consumption-digital/192028#table-of-contents> adresinden alınmıştır.
- Ersoy M (2019). Social media and children. G. Sarı (Ed.). In handbook of research on children's consumption of digital media. (pp. 1-11). 17 Mayıs 2019 tarihinde <https://www.igi-global.com/book/handbook-research-children-consumption-digital/192028#table-of-contents> adresinden alınmıştır.
- Eryılmaz S, Çukurluöz Ö (2018). Lise öğrencilerinin dijital bağımlılıklarının incelenmesi: Ankara İli Çankaya ilçesi örneği, Elektronik Sosyal Bilimler Dergisi 17(67):889-912.
- Griff DM (1999). Internet Addiction Fact or Fiction? The Psychologist 12(5):246-250
- Gökçearslan Ş, Durakoğlu A (2014). Ortaokul öğrencilerinin bilgisayar oyunu bağımlılık düzeylerinin çeşitli değişkenlere göre incelenmesi.. Dicle Üniversitesi Ziya Gökalp Eğitim Fakültesi Dergisi 23(14):419-435.
- Gönüç S (2009). İnternet bağımlılık ölçeğinin geliştirilmesi ve bazı demografik değişkenler ile internet bağımlılığı arasındaki ilişkilerin incelenmesi. Yayınlanmamış Yüksek Lisans Tezi. YüzüncüYıl ÜniversitesiSosyalBilimlerEnstitüsü, Van.
- Greenfield D (2011). The addictive properties of internet usage. internet addiction: a handbook and guide to evaluation and treatment. ed. Kimberly S. Young, Cristiano Nabuco De Abreu. John Wiley & Sons pp. 135-153.
- Holden C (2001). Behavioral' addictions: Do they exist? Science, 294(5544):980-982.
- Kayri M, Gönüç S (2016). Yüksek ve düşük sosyoekonomik koşullara sahip öğrencilerin internet bağımlılığı açısından karşılaştırmalı olarak incelenmesi. The Turkish Journal on Addictions 3(2):165-183.
- Kurupınar A, Erdamar G (2014). Ortaöğretim öğrencilerinde görülen madde bağımlılığı alışkanlığı ve yaygınlığı: Bartın ili örneği. Sosyal Bilimler Dergisi 16(1):65-84.
- Marks I (1990). Behavioural (non-chemical) addictions. British Journal of Addiction 85:1389-1394.
- Mendelevich VD (2013). Features of deviant behavior in the Internet space. Practical Medicine 1:143-146.
- Mikowski PI (2005). Internet social support: A four –quadrant model for understanding the role of Internet social and psychopathological internet usage (Doctoral dissertation). Retrieved from <http://www.proxy2.marmara-elibrary.com/>
- Minicheva TI, Maslova VS (2015). The problem of youth participation in



- social communities online network. Almanac of Modern Science and Education 5:126-128.
- Ögel K (2001). İnsan, yaşamvebağımlılık: Tartışmalarve gerekçeler. İstanbul: IQ Kültür Sanat Yayıncılık.
- Ögel K, Evren C, Karadağ F, Gürol T (2012). Bağımlılık Profil İndeksi'nin (BAPİ) geliştirilmesi: Geçerlikve güvenilirliği. Türk Psikiyatri Dergisi 23(4):264-273.
- Sevindik F (2011). Fırat üniversitesi öğrencilerinde problemlerli internet kullanımivesağlıklı yaşambişim davranışlarının belirlenmesi. Yayınlanmamış Doktora Tezi, İnönü Üniversitesi Sağlık Bilimleri Enstitüsü, Malatya.
- Shaw M, Black DW (2008). Internet addiction: Definition, assessment, epidemiology, and clinical management. CNS Drugs 22(5):353-365.
- Şahin C, Yağcı M (2017). Sosyal medyabağımlılığıölçeği-yetişkin formu: geçerlilikve güvenilirlik çalışması. Ahi Evran Üniversitesi Kırşehir Eğitim Fakültesi Dergisi (KEFAD) 18(1):523-538.
- Vural ZBA, Bat M (2010). "Yeni bir iletişim ortamı olarak sosyal medya: Ege Üniversitesi iletişim fakültesine yönelik bir araştırma", Journal of Yaşar University 20(5)
- Young KS. (1996). Internet addiction: The emergence of a new clinical disorder. Cyberpsychology and Behaviour 3:237-244.

*Full Length Research Paper*

# The potential effect of depression on academic outcomes of students in higher educational institutions of northwest Ethiopia: A cross-sectional study

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The purpose of this study was to document potential effect of depression on academic outcomes. We collected a cross sectional data from 710 pre-engineering university students in northwestern part of Ethiopia using cluster sampling. Depressive symptoms were assessed using a locally validated version of Patient Health Questionnaire (PHQ-9) at a cut off 5-9 and 10 or more indicating mild and major depressive symptoms, respectively. The types of substances that students experienced in the last three months were assessed. Multivariable linear regression was carried out to examine whether depressive symptoms predicted academic outcomes (cumulative GPA and perceived difficulties in learning process). Higher PHQ-9 scores were reported by 71.4% (30% mild and 41.4% major levels): of the students. Increment in depression ( $\beta=0.296$ , 95% CI: 0.223, 0.370), anxiety score ( $\beta=0.119$ , 95% CI: 0.011, 0.227), substance use ( $\beta=0.169$ , 95% CI: 0.045, 0.293) and stressful life events ( $\beta=0.306$ , 95% CI: 0.080, 0.532) scores were positively correlated with perceived difficulties in learning. Each increment in self-efficacy score ( $\beta=0.006$ , 95% CI: 0.001, 0.012) was positively associated with semester GPA. However, PHQ-9 score did not independently associate with semester GPA ( $\beta = -0.001$ , 95% CI: -0.007, 0.00). Depressive symptoms were associated with perceived difficulties in learning. Future follow-up studies and intervention strategies are needed to demonstrate causality.

**Key words:** Depression, academic outcomes, substance use, universities students.

## INTRODUCTION

Depression and substance use are the leading causes of disability and suicide worldwide (WHO, 2017). In the general population, depressive disorders alone accounted for two fifth of Disability Adjusted Life Years (DALYs) caused by mental and substance use disorders (Whiteford et al., 2013). In the general population, depression adversely affected functioning (Senturk,

2012), increased sufferings and reduced productivity (Fisher et al., 2012; Hartley et al., 2011). In Ethiopia, depressive disorders contribute 6.5% of the disease burden, which was even greater than disease burden contributed by either HIV, TB, or malaria (Abdulahi, 2001).

Among adolescent student population, one in every

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eight students were diagnosed with depression (Sajjadi et al., 2013) in spite low diagnosis and recognition of depression among higher educational institution students (Davis, 2005). Using screening tools, three or more students were screened positive in every ten students in Low and Middle Income Countries (LMICs) (Al-Busaidi et al., 2011; Othieno et al., 2014; Sidana et al., 2012). This relatively high prevalence of depressive symptoms in the student population may be due age related emotional turmoil linked to search for identity.

Depression during adolescence increased school dropouts (Boyras et al., 2016); reduced cognition such as sustained attention; verbal memory and planning (Wagner et al., 2014); reduced neuropsychological functioning (Wagner et al., 2014) and reduced sleep quality (Al-Khani et al., 2019); and increased negative emotions and behavioral disorders and reduced social satisfaction (Sadeghi Bahmani et al., 2018) in the adolescent population. However, substance use is a common risk factor for both depression and poor academic outcomes (Alsanosy et al., 2013; Cummings et al., 2014; Ingles et al., 2013) and previous studies did not control substance use to investigate the independent effect of depression on academic outcomes. Indeed, the prevalence of depression and its consequences on academic outcomes independently of substance use and anxiety is seldom examined in the context of higher educational institutions of northwest Ethiopia. Besides, there was high rate of attrition among freshman students in college of technology which motivated the authors to conduct the study.

To prioritize for future intervention to improve academic outcomes, studies on the association between depressive disorders and academic outcome controlling substance use behaviours need to be investigated. This study therefore, aims to investigate the association between depressive symptoms and academic outcomes controlling substance use behaviours of the students.

## METHODOLOGY

### Study design

Cross-sectional quantitative survey was employed to investigate the association between depression and academic outcomes.

### Study area

The study was conducted in higher educational institutions of northwest Ethiopia where there are a total of six universities (DebreMarkos University, Bahir Dar University, Debre Tabor University, University of Gondar, Wollo University and DebreBerhan University) during the study period.

### Population

Freshman students in College of Technology during 2016/2017 academic year were the target population. There were about

18,000 freshman students in College of Technology in the six universities during 2016/2017 academic year. The number of students in the Colleges of Technology was historically high because of the government intention to increase the number of technology graduates. Indeed, 70% of the freshman students were assigned to College of Technology and students were pressured to join the college since 2016. We purposively selected freshman students in College of Technology for the highest attrition rate among this group of students in all universities.

### Sampling techniques and sample size

The target universities belonged to first, second and third generation as per the Ministry of Science and Higher Education labeling. First generation universities were constructed before 2000 and they were relatively old universities in Ethiopia. In our sample, Bahir Dar University belonged to first generation. DebreMarkos and DebreBerhan universities are labeled as second generation universities, while Debre Tabor University was labeled as third generation. We purposively selected one university from each of the three generations. Accordingly, DebreMarkos University (DMU), Bahir Dar University (BDU) and Debre Tabor University (DTU) were purposefully selected representing first, second and third generations, respectively. These target universities were purposively selected based on accessibility and availability of drugs in the university's local areas.

Sample size was estimated using single proportion formula assuming design effect of 1.5 and non-response rate of 10%. Accordingly, 710 participants were required. Finally, we used cluster sampling to select estimated number of participants where unit of clustering was sectioned. Each section contains an average of 50 students.

### Assessment

Data about students' socio-demographic variables, academic performance, current depression status, anxiety, social support and experience of stressful life events and functioning were collected from first year pre-engineering students of selected universities in Amhara region in 2017.

The outcome variable of this study is academic performance of the students as measured both objectively (GPA) and subjectively (perceived difficulties in different areas of schoolwork). Students' objective academic performance was assessed using their semester cumulative grade point (Semester CGPA). To assess perceived difficulty in schoolwork, participants were asked whether they had difficulties in: paying attention to teaching, teamwork, getting along with peers, getting along with teachers, doing homework, preparing for examinations, finding personal learning strategies, doing activities requiring initiative, doing reading tasks and doing writing tasks. The response alternatives for each area of schoolwork was 0 = not at all, 1 = not so much, 2 = quite much, 3 = very much as it was the case in Finland study (Frojda et al., 2008).

The main exposure variable was depressive disorder which was assessed by using a locally validated version of PHQ-9. It has very good sensitivity and specificity to diagnose depression and its severity forms at different cut offs (Gelaye et al., 2013). In addition to socio-economic and demographic variables (sex, age, family income, and occupation), other variables such as substance use, anxiety, self-efficacy, experience of life threatening events were also assessed as potential confounders. Substance use was assessed by items asking how often (never, monthly, weekly, most of the time and daily) did the students use each of the substance in the list (alcohol, tobacco, khat, cannabis, shisha) in the last three months and in their life time.

Anxiety was assessed by a standardized measure of anxiety

**Table 1.** Characteristics of the parti

Characteristics		Count	%
Sex	Male	475	67.6
	Female	193	27.5
Residence	Urban	425	60.5
	Rural	267	38.0
Religion	Orthodox	615	87.5
	Muslim	30	4.3
	Protestant	35	5.0
	Others	9	1.3
Chronic illness	Yes	45	6.4
	No	653	92.9
Number of substance used	0.00	523	74.4
	1.00	138	19.6
	2.00	12	1.7
	3.00	11	1.6
	4.00	6	0.9
	5.00	13	1.8
Status of depressive symptoms	Nil	201	28.6
	Mild	211	30.0
	Major	291	41.4

(Spitzer et al., 2006) and general anxiety disorder scale (GAD). General self-efficacy scale was used to assess self-efficacy (Zhang and Schwarzer, 1995), an individual's perceived beliefs and confidence in doing things. The general self-efficacy scale consists of 10 items with four point Likert scale (Not at all true, Hardly true, Moderately true and Exactly true). The internal reliability (Cronbach's alpha) of the scale ranged from 0.76 to 0.90 and it is correlated to emotion, optimism, work satisfaction (Zhang and Schwarzer, 1995). It was negatively correlated with depression, stress, health complaints, burnout, and anxiety (Zhang and Schwarzer, 1995).

### Analysis

Descriptive statistics was employed to describe participants' characteristics and Pearson's correlation to examine bivariate association between the exposure and outcome variables. Finally, we employed hierarchical multiple regressions to investigate the association between psychiatric problems and academic performance. 95% Confidence Interval (CI) and 5% significance level were used to report statistical significance for the findings. Sex, residence and PHQ-9 were included as independent variables in model 1. Then, GAD and substance use were added as additional predictors in Model2, and finally, self-efficacy and life threatening events score were added in Model 3 as additional predictors to model 2. Normality was observed from histograms and homogeneity of variance from box plots. Durbin Watson's test was observed to test independence. Effect sizes were reported at 95% confidence interval and at a significance level of 0.05.

### Ethical considerations

Ethical clearance was obtained from DMU research and publication directorate, and written consent was guaranteed from the participants.

### RESULTS

The demographic background of the participants is indicated in Table 1. The analysis showed that 67.6% of the participants were males and 60.5% of the participants were from urban areas while the rest were from rural areas. The majority (87.5%) of the participants were orthodox Christians. In relation to their health history, 6.4% of them reported that they had chronic illnesses (Table 1).

When the number of substances that each student has experience of using is considered, 19.6% of the participants used at least one of the substances and 13 (1.8%) of the participants had experience of using all of the five substances (khat, shisha, alcohol, tobacco, depressants). The prevalence of mild level of depression was about 30% and that of major depression was about 41%. Generally, about 70% of participants had a PHQ-9 score of five or more indicating probable depressive symptoms.

**Table 2.** Bivariate Pearson's moment correlation.

Correlation	Anxiety score	Substance use	Self-efficacy	LTE	PHQ-9 total score	Semester GPA	Perceived difficulty in learning score
GAD score	1	0.123**	-0.060	0.277**	0.391**	-0.073	0.248**
Substance use score	-	1	-0.066	0.215**	0.178**	-0.128**	0.191**
Self-efficacy	-	-	1	-0.089*	-0.127**	0.105**	-0.139**
Life threatening (LTTE)	-	-	-	1	0.334**	-0.125**	0.252**
PHQ-9 total score	-	-	-	-	1	-0.078	0.399**
Semester GPA	-	-	-	-	-	1	-0.083*

\*\*Correlation is significant at the 0.01 level; \* Correlation is significant at the 0.05 level. LTE: Life Threatening Events.

**Table 3.** Predictors of semester GPA in multiple regressions.

Variable	B (95.0% Confidence Interval for B)		
	Model 1	Model 2	Model 3
Sex	0.191(0.106, 0.276)**	0.221 (0.135, 0.307)**	0.225 (0.139, 0.311)**
Residence	-0.132 (-0.210, -0.054)**	-0.114 (-0.192, -0.035)**	-0.115 (-0.193, -0.036)**
PHQ-9 total score	-0.006 (-0.012, -0.001)*	-0.003 (-0.009, 0.003)	-0.001 (-0.007, 0.006)
GAD score	-	-0.006 (-0.015, 0.004)	-0.004 (-0.013, 0.005)
Substance use score	-	-0.019 (-0.029, -0.008)**	-0.016 (-0.027, -0.006**
Self-efficacy score	-	-	0.006 (0.001, 0.012)*
Life Threatening Events	-	-	-0.020 (-0.039, -0.001)*
R square	0.241 (F=14.40, 3, 699, p<0.05)	0.277 (F=11.62, 5, 697, p<0.05)	0.299 (F=9.74, 7, 695, p<0.05)

\*\*Correlation is significant at the 0.01 level; \*Correlation is significant at the 0.05 level.

The bivariate analysis using Pearson's moment correlation revealed that GAD (0.248\*\*), substance use ( $r=0.191$ ,  $p<0.01$ ), self-efficacy ( $r=-0.139$ ,  $p<0.01$ ), list of threatening events score ( $r=0.252$ ,  $p<0.01$ ), PHQ-9 ( $r=0.399$ ,  $p<0.01$ ) and GPA ( $r=-0.083$ ,  $p<0.01$ ) were significantly associated to perceived difficulty in learning. Semester GPA was statistically significantly and negatively associated with substance use ( $r=-0.128$ ,  $p<0.05$ ), experience of threatening events ( $r=-0.125$ ,  $p<0.05$ ) and positively associated with self-efficacy ( $r=0.105$ ,  $p<0.05$ ). Students' semester GPA was not significantly associated with anxiety score ( $r=-0.073$ ,  $p>0.05$ ) and PHQ-9 ( $r=-0.078$ ,  $p>0.05$ ). However, PHQ-9 becomes significantly associated with student semester GPA after controlling for sex and residence (Table 3).

When other variables (anxiety, self-efficacy, substance use and threatening events) were added into the model (Table 3), the association between depression and semester GPA reduced by half from its effect size in its original model (Model 1) in Table 3. This indicates that anxiety and/or substance use are potential confounders of the association between the exposure and the outcome. Finally, when self-efficacy score and list of threatening events (LTE) were adjusted in a fully adjusted model (model 3), the association between the PHQ-9 score and semester GPA totally disappeared ( $\beta=-0.001$ , 95% CI: -0.007, 0.006). Thus depressive symptoms were not independently associated with student semester

GPA. But, it may be associated through other potential confounders such as anxiety, substance use, self-efficacy and experience of threatening experiences.

In the bivariate analysis in Pearson's moment correlation (Table 2), perceived learning difficulty of the students was significantly associated with PHQ-9 ( $r=0.399$ ,  $p<0.05$ ). This association remained unchanged after controlling sex and residence. Only slight reduction was observed in the effect size of the association between depressive symptoms and perceived difficulty in learning when the remaining variables were adjusted in model 2 and in the final model (model 3) in Table 4. Thus, depressive symptoms were independently and significantly associated with students' perceived difficulty in learning ( $\beta=0.296$ , 95% CI: 0.223, 0.370).

In multiple regression model, increment in anxiety score ( $\beta=0.119$ , 95% CI: 0.011, 0.227), substance use score ( $\beta=0.169$ , 95% CI: 0.045, 0.293), self-efficacy score ( $\beta=-0.073$ , 95% CI: -0.138, -0.009) and life threatening scores ( $\beta=0.306$ , 95% CI: 0.080, 0.532) were significantly associated with increased perceived difficulties in learning process (Table 4).

## DISCUSSION

The study examined the potential impact of depressive symptoms on academic outcomes in the context of higher

**Table 4.** Predictors of perceived difficulty in learning in multiple regression models.

Variable	B (95.0% Confidence Interval for B)		
	Model 1	Model 2	Model 3
Sex	0.965 (-0.132, 2.063)	0.803 (-0.212, 1.817)	0.742 (-0.266, 1.751)
Residence	-0.842 (-1.846, 0.162)	-0.574 (-1.497, 0.350)	-0.581 (-1.500, 0.339)
PHQ-9 total score	0.386 (0.320, 0.452)**	0.328 (0.256, 0.400)**	0.296 (0.223, 0.370)**
GAD score	-	0.328 (0.256, 0.400)**	0.119 (0.011, 0.227)*
Substance use score	-	0.144 (0.037, 0.251)**	0.169 (0.045, 0.293)**
Self-efficacy score	-	-	-0.073 (-0.138, -0.009)*
Life Threatening Events score	-	-	0.306 (0.080, 0.532)*
R square	0.168 (F=46.95, 3, 699, P<0.05)	0.435 (F=32.45, 5, 697, p<0.05)	0.451 (F=25.34, 7, 695, p<0.05)

\*\*Correlation is significant at the 0.01 level; \* Correlation is significant at the 0.05 level.

educational institution students of northwest Ethiopia. The findings of the study are supposed to contribute to design intervention strategies for depressive symptoms so as to improve students' mental wellbeing and so their academic performance. Using a locally validated version of measure of depressive symptoms, 70% of participants had a PHQ-9 score of five or more indicating probable depressive symptoms (about 30% mild and 40% major depressive symptom levels). Increased PHQ-9 score was independently associated with increased perceived difficulties in learning. But, the association between PHQ-9 and semester GPA disappeared after controlling substance use and anxiety.

The prevalence of depression varies across settings depending on cut offs and sampled population. The prevalence of depressive symptoms in our study sample is very high compared to the 12% prevalence of depressive symptoms reported in the general population in southern Ethiopia (Fekadu et al., 2014). This population based study reported about 12% of depressive symptoms using the same measure (Fekadu et al., 2014). But, the finding is comparable with other findings in the student population. For example, a 43.5% prevalence of depression in a meta-analysis of about 53 studies (Sajjadi et al., 2013) was reported. Relatively comparable results have also been reported in University of Gondar (Brugha et al., 1985), Addis Ababa (Wolie, 2014), and Ambo Universities (WHO, 2017) in Ethiopia in similar populations to our study. These studies used screening tools to assess depressive symptoms. The high prevalence of the depressive symptoms among the study population may be explained by (1) worries of exam results since data was collected about three weeks after final exam; (2) anxiety to adapt new university environment and (3) high developmental stage related prevalence of emotional turmoil in the universities students population (Hale et al., 1993).

Our finding about positive association between PHQ-9 score and perceived difficulties in learning independently of substance use supported our hypothesis that assumed substance use as a confounding factor in the association

depression and academic outcomes. In other words, substance use affects both depressive symptoms and academic outcomes. There is well established evidence that both psychoactive and depressant substance ultimately affect depressive symptoms. On the other hand, substance use also affects academic outcomes through the positive and negative emotions linked to use of such substances as reported in previous studies (Sadeghi Bahmani et al., 2018). Thus, the association between depressive symptoms and increased difficulty in learning process may be explained by positive and negative emotions linked to use of substance (Sadeghi Bahmani et al., 2018) and poor sleep quality (Al-Khani et al., 2019), loss of interest on common task and lack of attention linked to depression that may reduce the functioning of the individual.

In a model adjusted for gender and residence, the negative association between PHQ-9 score and academic performance disappeared when anxiety and substance use are controlled in the model. This confirmed that depression was not independently associated with students' academic GPA. That is the association between depression and academic performance was confounded by substance use. This finding is consistent with previous findings which reported negative but weaker association between depression and academic achievement (Sadeghi Bahmani et al., 2018). The weak association between depression and academic performance in this previous study may be because, this previous study did not control substance use and anxiety (Sadeghi Bahmani et al., 2018). Anxiety, substance use and depression are associated with poor sleep quality. But, poor sleep quality was associated with increased academic performance in previous study (Al-Khani et al., 2019). This may be because the poor sleep quality among students with depressive symptoms may also be related to use of psychoactive substance such as khat, which is widely available in the study area. Our finding indicated that the use of such substance was in turn associated with increased difficulty in learning and reduced student GPA. Thus, depressive symptoms might have affected

academic outcomes through substance use and associated poor sleep quality.

The present study found that substance use is associated with reduced cumulative GPA. This finding supports previous studies (Berg, 2018) which reported negative correlation between substance use and academic achievement mainly due to lack of planned behavior among individuals with substance use. Substance use may affect study schedules and study habits and could ultimately lead to poor academic performance. Similarly, low educational success is also found to be an antecedent to different risk behaviors including substance use.

Using locally validated measure of depressive symptoms and relatively large sample, the current study has come up with important findings which will be inputs for future decisions about diagnosis and treatment of depression. But, the findings should be understood in light of the following limitations. Data collection was conducted about three weeks after final exam which might have inflated depressive symptoms. Besides, poor sleep quality, which was not adjusted in our final regression models, might explain the non-significant association between depressive symptoms and semester GPA. The variation of the students' results from the actual might have temporarily affected their emotions and so the association between the exposure and the outcome. As a proxy measure of the students' expectation, we controlled self-efficacy of the students. But, this may not be a fair measure of students' expectation of their results. Thus, students' expectations was not properly assessed and controlled in this study.

## Conclusion

The prevalence of depressive symptoms in the study sample was very high with adverse consequences on learning. *Mental well-being of university students is important for smooth academic progress.* Thus, future follow up studies and intervention studies are required to demonstrate causality and then to design intervention strategies for substance use and depression among university students.

## CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

## REFERENCES

- Abdulahi H, Mariam DH, Kebede D (2001). Burden of disease analysis in rural Ethiopia. *Ethiopian Medical Journal* 39(4):271-281.
- Al-Busaidi Z, Bhargava K, Al-Kindi R, Al-Shafaee M, Al-Maniri A (2011). Prevalence of Depressive Symptoms among University Students in Oman. *Oman Medical Journal* 26(4):235-239.
- Al-Khani AM, Sarhandi MI, Zaghoul MS, Ewid M, Saquib N (2019). A cross-sectional survey on sleep quality, mental health, and academic performance among medical students in Saudi Arabia. *BMC Res Notes* 12(1):665. doi: 10.1186/s13104-019-4713-2
- Alsanosy RM, Mahfouz MS, Gaffar AM (2013). Khat Chewing Habit among School Students of Jazan Region, Saudi Arabia. *PLoS ONE* 8(6).
- Berg L, Beutel M, Hinz A, Zenger M, Härter M, Nater U, Brähler E (2018). Social support in the general population: Standardization of the Oslo social support scale (OSSS-3). *BMC Psychology* 6(1):1-8.
- Boyras G, Horne SG, Owens AC, Armstrong AP (2016). Depressive Symptomatology and College Persistence among African American College Students. *Journal of General Psychology* 143(2):144-160. doi: 10.1080/00221309.2016.1163251
- Brugha T, Bebbington P, Tennant C, Hurry J (1985). The list of threatening experiences: a subset of 12 life event categories with considerable long-term contextual threat. *Psychological Medicine* 15. doi: 10.1017/S003329170002105X
- Cummings CM, Caporino N, Kendal PC (2014). Comorbidity of Anxiety and Depression in Children and Adolescents: 20 Years After. *Psychological bulletin* 140(3):816-845. doi: doi:10.1037/a0034733.
- Davis N (2005). Depression in Children and Adolescents. *The Journal of School Nursing* 21(6):311-317.
- Fekadu A, Girmay M, Medhin S, Maji H, Atalay A, Tedla W. G, Erica B, Crick L Martin P, Charlotte H (2014). Population level mental distress in rural Ethiopia. *BMC Psychiatry* 14:194.
- Fisher J, Mello M, Patel V, Rahman A, Tran T, Holtn S, Holmes W (2012). Prevalence and Determinants of Common Perinatal Mental Disorders in low income and lower middle income Countries: A systematic Review. *Bulletin of the World Health Organization* 90:139-149. doi: 10.2471/BLT.11.091850
- Fro" jda S, Nissinena E, Pelkonen M, Marttunen M, Koivisto A, Kaltiala-Heinoa R (2008). Depression and school performance in middle adolescent boys and girls. *Journal of Adolescence* 31:485-498.
- Gelaye B, Williams M, Lemma S, Deyessa N, Bahretibeb Y, Shibre T, Andrew Zhou X (2013). Validity of the patient health questionnaire-9 for depression screening and diagnosis in East Africa. *Psychiatry research* 210(2):653-661. doi: 10.1016/j.psychres.2013.07.015
- Hale W, Dingemans P, Cornelissen E (1993). Depression and Assessment of Intellectual Functioning *Journal of Clinical Psychology* 49(6).
- Hartley M, Tomlinson M, Greco E, Comulada S, Stewart J, Roux J Mbewu N, Rotheram-Borus N (2011). Depressed mood in pregnancy: Prevalence and correlates in two Cape Town peri-urban settlements. *Reproductive Health Journal* 8(9).
- Ingles C., Torregrosa M, Rodríguez-Marín J, Castill J, Gázquez J, García-Fernández J, Delgad B (2013). Alcohol and tobacco use and cognitive-motivational variables in school settings: Effects on academic performance in Spanish adolescents *ADICCIONES* 25(1):63-70.
- Othieno C, Okoth R, Pengpid K, Malla L (2014). Depression among university students in Kenya: Prevalence and sociodemographic correlates. *Journal of Affective Disorders* 165:120-125.
- Sadeghi Bahmani D, Faraji P, Faraji R, Lang UE, Holsboer-Trachsler E, Brand S (2018). Is emotional functioning related to academic achievement among university students? Results from a cross-sectional Iranian sample. *Brazilian Journal of Psychiatry* 40(3):290-295. doi: 10.1590/1516-4446-2017-2434
- Sajjadi H, Hossein S, Kamal M, Rafiey H, Vameghi M, Forouzan A, Rezaei M (2013). A Systematic Review of the Prevalence and Risk Factors of Depression among Iranian Adolescents. *Global Journal of Health Science* 5(3).
- Senturk V, Hanlon C, Medihin G, Dewey M, Araya M, Alem A, Prince M, Stewart R (2012). Impact of Perinatal somatic and common mental disorder symptoms on functioning on Ethiopian Women: The P-MaMiE population based cohort study. *Journal of Affective Disorders* 136:340-3349. doi: 10.1016/j.jad.2011.11.028
- Sidana S, Kishore J, Ghosh V, Gulati D, Jiloha R, Anand A (2012). Prevalence of depression in students of a medical college in New Delhi: A cross-sectional study. *Australasian Medical Journal* 5(5):247-250.
- Spitzer R, Kroenke K, Williams J (2006). A Brief Measure for Assessing Generalized Anxiety Disorder The GAD-7. *Archives of Internal*

- Medicine 166(10):1092-1097. doi: doi:10.1001/archinte.166.10.1092
- Wagner S, Müller C, Helmreich I, Huss M, Tadic A (2014). A meta-analysis of cognitive functions in children and adolescents with major depressive disorder. *Eur Child Adolesc Psychiatry*.
- Whiteford H, Degenhardt L, Rehm J, Baxter A, Ferrari A, Erskine H (2013). Global burden of disease attributable to mental and substance use disorders: findings from the Global Burden of Disease Study 2010. *Lancet*.
- World Health Organization (WHO) (2017). Depression and Other Common Mental Disorders: Global Health Estimates.
- Wolie D (2014). Determinants of sexual behaviors among adolescents in Addis Ababa: The role of individual, familial and neighbourhood characteristics. PhD thesis Psychology. Addis Ababa University Addis Ababa University.
- Zhang JX, Schwarzer R (1995). Measuring optimistic self-beliefs: A Chinese adaptation of the General Self-Efficacy Scale. *Psychologia: An International Journal of Psychology in the Orient*.



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