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**INTERNET ADDICTION AND ITS RELATION TO STRESS AND DEPRESSION  
AMONG DUHOK MEDICAL COLLEGE STUDENTS**

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**ABSTRACT**

**Background:** By Jun 2020, 4.6 Billion (59.6% of the total world population) people worldwide were using the internet. Internet is regarded as one of the greatest creations as it provides access to a great amount of knowledge and entertainment. Nevertheless, it can have harmful effects on the physical and emotional health as it has been linked to several psychiatric illnesses, such as, anxiety, depression, insomnia...etc. This study aims to assess the relationship between internet addiction and stress and depression among Duhok-medical college students.

**Methodology:** An online held, cross-sectional study was conducted among students of the University of Duhok-College of medicine; 345 students were involved. The data were collected by a Google form using Internet Addiction Test and DASS 21. The form was used to assess the following: internet addiction, stress and depression, along with socio-demographic data. Data were analyzed using SPSS and a p-value less than 0.05 was considered statistically significant.

**Results:** The prevalence of IA, stress and depression among the sample was 74.8%, 42.9% and 59.7%, respectively. The p-value for the relation between the age groups and gender and IA, stress and depression was >0.5. However, it was found that internet addiction had a highly significant effect on stress and depression ( $p < 0.0001$ ).

**Conclusion:** The prevalence of internet addiction was found to be high with a positively statistically significant relation to depressive and stressful traits among medical students. However, no significant relation between the genders nor the different age groups regarding internet addiction was found.

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**Keywords:** *Depression; Internet Addiction; Medical Students; Stress.*

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**I**n 1995, only 16 million people worldwide were using the internet, corresponded to 0.4% of the total world population. During the past 25 years, internet has evolved and introduced into various life aspects, and by Jun 2020, the total number of internet users reached 4.6 Billion, corresponding to 59.6% of the

entire world population<sup>1</sup>.

Despite the benefits, internet can harm the physical and emotional health of its users; vision problems, insomnia, depression, aggression, and many other illnesses are linked to internet<sup>2</sup>. These physical and psychological illnesses occur among problematic internet users who develop

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internet Addiction<sup>3</sup>.

Internet Addiction is defined as a behavioral pattern characterized by excessive or obsessive online and offline computer use for various purposes that lead to distress and impairment<sup>4</sup>. However, internet addiction is yet not recognized as a disorder in the DSM – V (Diagnostic and Statistical Manual of mental disorders – 5). Many Literatures show the consequences of internet addiction, which include: academic failure, decreased productivity among employees, less time used on work-related tasks and psychiatric illnesses such as low self-esteem, anxiety, depression, insomnia, and stress<sup>5-7</sup>. Despite all the consequences, internet addiction is found to be common among university students; 82.3% according to Taha et al., and 82.7% according to Sgery & Agha et al.,<sup>7-9</sup>.

Several studies were done on the relation of internet addiction and depression<sup>6-7</sup>. Depression, which affects more than 264 million people worldwide<sup>10</sup>, is defined by the American Psychological Association dictionary as a negative effect state that ranges from unhappiness and discontent to an extreme feeling of sadness, pessimism, and despondency, that interferes with an individual's daily life. The condition can be associated with various physical, cognitive and social changes, such as lack of energy, difficulty concentrating or making decisions, and withdrawal from social activities, respectively<sup>11</sup>.

Moreover, stress, which is regarded as an inevitable part of life and is a normal psychological and physical reaction to the demands of life which helps to meet the daily life challenges and tasks, can have a direct effect on internet addiction when it becomes excessive. Stress can become problematic when it becomes excessive

and affect an individual's health even though it might not be realized early<sup>12-14</sup>.

The prevalence of internet addiction was estimated to be related to the degree of the education; the higher the level of education the higher the prevalence of internet addiction<sup>15</sup>. In a study by Dahlin and colleagues found that a total of 2.7% of the medical students had made suicide attempts<sup>16</sup> additionally, medical school is considered as a stressful environment with the due to the academic burden, pressure of passing exams, fear of stepping into the real world of medicine and the undue expectations from self and family members<sup>17</sup>.

This study aims to assess the relationship between internet addiction, stress and depression among Duhok-medical college students.

## **METHODOLOGY**

Survey procedure and sampling: This was a cross-sectional questionnaire-based survey held online by using a google form. The study was conducted among students of the University of Duhok-College of medicine during one week period, from 5th – 12th of April 2020. Inclusion criteria: students from both genders were included. Students were involved from all 6 stages and the total number of the participants reached 345 students, the lowest percentage of participants per stage was 46.7 % (2<sup>nd</sup> stage) and the highest percentage of participants per stage was 62.2% (5<sup>th</sup> stage), representing 55% of the total college students.

Data collection: The data were collected by a Google form, using a self-administered standardized survey tool based on two internationally validated and reliable questionnaires, namely the Internet

Addiction Test and the Depression Anxiety Stress Scales (DASS 21).

Participants: sociodemographic data about the age and gender of the participants were obtained.

Internet Addiction Test: internet addiction presence and severity were measured by using internet addiction test. This test consists of a 20-item, 6-point Likert scale from 0 to 5 corresponding to “Not Applicable” and “Always”, respectively. The cut-off scores used were the same as standard, i.e. a score of 0-30 corresponded to normal levels of internet usage, while 31-49, 50-79 and 80-100 corresponded to mild, moderate and severe dependence upon the internet, respectively. Those with a score > 30 were considered internet addicts.

Stress and Depression: stress and depression were measured using the short version of the Depression Anxiety Stress Scales (i.e. DASS 21). This scale is a reliable and useful screening tool for university students [25]. This scale consists of a 21-item, 4-point Likert scale from 0 to 3 corresponding to “did not apply to me at all” and “applied to me very much, or most of the time” respectively. Due to the aim of the research, only stress and depression subscales were used: the cut-off scores used for each subscale were the same as standard (i.e. not changed): stress: normal (0–7), mild (8–9), moderate (10–12), severe (13–16) and extremely severe (17+); depression: normal (0–4), mild (5–6), moderate (7–10), severe (11–13) and extremely severe (14+). Those with a score > 7 and > 4 were considered to have stress and depression, respectively. Statistical Analysis: Data were analyzed using SPSS version 26. The Data were described in forms of frequencies and percentages. For assessing the association

between categorical variables, Pearson Chi-Square was used. A p-value less than 0.05 was considered statistically significant.

## RESULTS

A total of 345 participated in the current study, of them, 133 (38.6%) were male students and 212 (61.4%) were female students. Their age ranged between 17- 28 years and the mean of age was  $21.1 \pm 1.8$  years. The Socio-demographic characteristics of the participated students are summarized in Table 1.

**Table 1. Socio-demographic characteristic of the students participated in the study. (N = 345).**

Character	No. (%)
<b>Stage</b>	
First	54 (15.7)
Second	50 (14.5)
Third	67 (19.4)
Forth	76 (22.0)
Fifth	56 (16.2)
Sixth	42 (12.2)
<b>Age in years</b>	
17 – 20	126 (36.5)
21 – 24	202 (58.6)
25 – 28	17 (4.9)
<b>Gender</b>	
Female	212 (61.4)
Male	133 (38.6)
<b>Total</b>	<b>345 (100)</b>

As shown in table 2, the prevalence of internet addiction, stress and depression among the participated students was 74.8%, 42.9% and 59.7%, respectively. There was a variation in the prevalence in regards to the severity of the underlying variable.

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**Table 2. Number and Percentage of participated students according to variable categories.**

Variable		N (%)	Prevalence	Mean (SD)
<b>Internet Addiction</b>	<b>No-Addiction</b>	87 (25.2)	74.8%	42.1 (16.8)
	<b>Mild</b>	143 (41.4)		
	<b>Moderate</b>	110 (31.9)		
	<b>Severe</b>	5 (1.4)		
<b>Stress</b>	<b>Normal</b>	197 (57.1)	42.9%	14.8 (9.7)
	<b>Mild</b>	49 (14.2)		
	<b>Moderate</b>	40 (11.6)		
	<b>Severe</b>	43 (12.5)		
	<b>Extremely Severe</b>	16 (4.6)		
<b>Depression</b>	<b>Normal</b>	139 (40.3)	59.7%	13.1 (10.2)
	<b>Mild</b>	50 (14.5)		
	<b>Moderate</b>	90 (26.1)		
	<b>Severe</b>	28 (8.1)		
	<b>Extremely Severe</b>	38 (11.0)		
<b>Total</b>		345 (100)		

The analysis of variables in regard to the demographic characteristics showed that there were no significant differences between the age groups and gender regarding the internet addiction, stress and depression respectively, as the p-value for the variables was > 0.5 (Table 3).

**Table 3. Prevalence of variables according to Age and Gender.**

Character	Internet Addiction		Total	p-value
	Present	Absent		
Age	17 – 20 (%)	93 (73.8%)	33 (26.2%)	.748*
	21 – 24 (%)	151 (74.8%)	51 (25.2%)	
	25 – 28 (%)	14 (82.4%)	3 (17.6%)	
Gender	Female (%)	155 (73.1%)	57 (26.9%)	.387*
	Male (%)	103 (77.4%)	30 (22.6%)	
	<b>Stress</b>			
Character	Present	Absent	Total	p-value
Age	17 – 20 (%)	64 (50.8%)	62 (49.2%)	.077*
	21 – 24 (%)	78 (38.6%)	124 (61.4%)	
	25 – 28 (%)	6 (35.3%)	11 (64.7%)	
Gender	Female (%)	99 (46.7%)	113 (53.3%)	.072*
	Male (%)	49 (36.8%)	84 (63.2%)	

	Depression			p-value
	Present	Absent	Total	
Age				.827*
	17 – 20 (%)	73 (57.9%)	53 (42.1%)	123 (100)
	21 – 24 (%)	122 (60.4%)	80 (39.6%)	202 (100)
	25 – 28 (%)	11 (64.7%)	6 (35.3%)	17 (100)
Gender				.094*
	Female (%)	134 (63.2%)	78 (36.8%)	212 (100)
	Male (%)	72 (54.1%)	61 (45.9%)	133 (100)

\* Pearson's Chi square was used, a value < 0.5 was considered statistically significant.

Table 4 shows the multi-variant analysis of the potential effect of internet addiction on both stress and depression. It was found that the internet addiction was significantly associated ( $p < 0.0001$ ) with both stress and depression with variable degrees of the severity.

**Table 4. Relation of Internet addiction to Stress and Depression.**

		Internet Addiction				P-value
		No Addiction (%)	Mild (%)	Moderate (%)	Severe (%)	
<b>Stress</b>	No Stress	75 (86.2)	81 (56.6)	41 (37.3)	Nil	< .00001*
	Mild	8 (9.2)	25 (17.5)	16 (14.5)	Nil	
	Moderate	2 (2.3)	14 (9.8)	22 (20)	2 (40)	
	Severe	2 (2.3)	18 (12.6)	22 (20)	1 (20)	
	Extremely Severe	Nil	5 (3.5)	9 (8.2)	2 (40)	
<b>Depression</b>	No Depression	63 (72.4)	56 (39.2)	20 (18.2)	Nil	< .00001*
	Mild	8 (9.2)	26 (18.2)	16 (14.5)	Nil	
	Moderate	12 (13.8)	37 (25.9)	41 (37.3)	Nil	
	Sever	1 (1.2)	14 (9.8)	12 (10.9)	1 (20)	
	Extremely Severe	3 (3.4)	10 (6.9)	21 (19.1)	4 (80)	

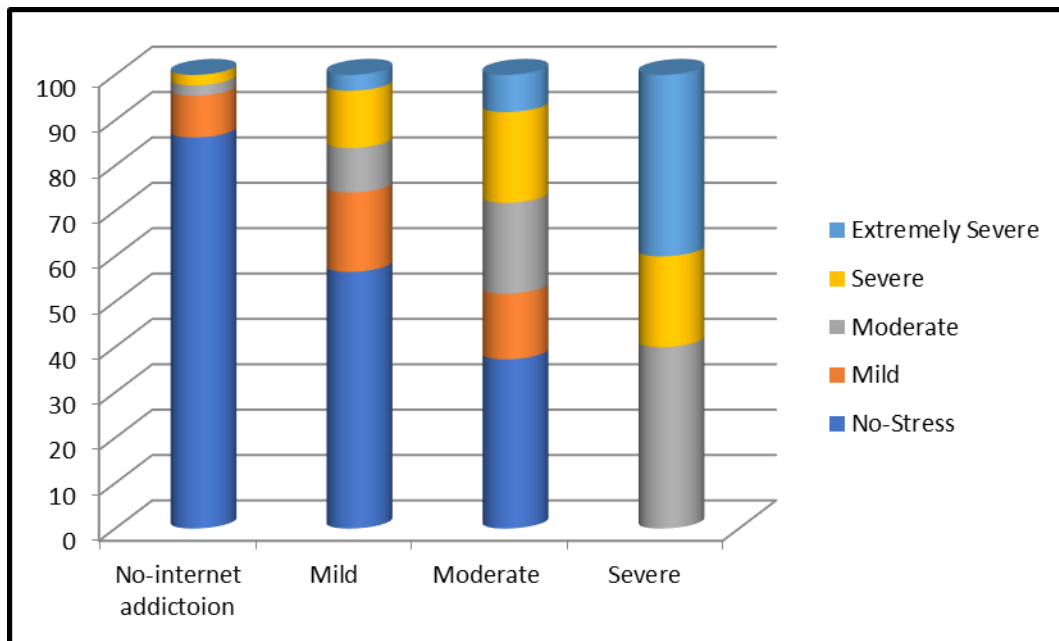
\* Pearson's Chi square was used, a value < 0.5 was considered statistically significant.

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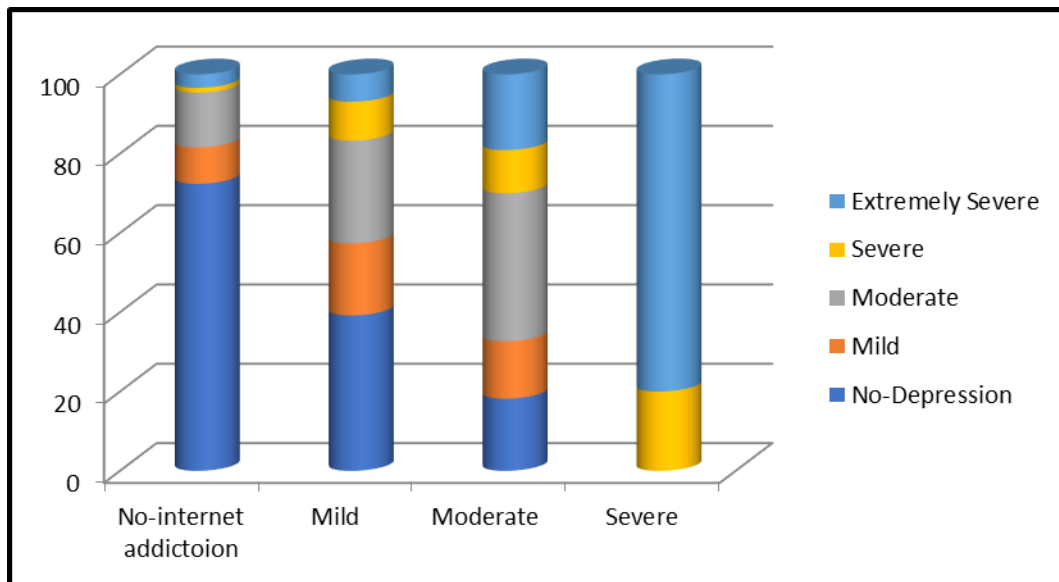
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Figure 1 and 2 shows the percentage distribution of stress and depression according to the degree of stress.



**Figure 1: Percent distribution severity of stress by the degree of internet addiction.**



**Figure 2: Percent distribution severity of depression by the degree of internet addiction.**

### DISCUSSION

Internet has become a necessary tool for living in the professional, academic, and social life and is no longer considered as only a simple means of communication<sup>18</sup>. The introduction of the internet use into

daily life has developed major problems for different social sectors and in some it has become an internet addiction (IA) with adverse consequences among some of them, especially students. Most of those studies have shown that students with

internet addiction may develop depression, social anxiety, attention deficit-hyperactivity disorder impaired physical health, obesity, sleep disorders and behavioral problems<sup>19-20</sup>.

The prevalence of Internet use is increasing among our society, particularly among university students<sup>8-9</sup>, and this rapid need for Internet use is questionable regarding its effects, both advantageous and disadvantageous. The present study showed that mild, moderate, and severe internet addictions were reported among the studied students with variable rates (41.4%, 31.9%, and 1.4%), respectively, whereas 25.2% of the involved students were non-addicts. These findings support the high prevalence of internet addiction among earlier studies done in the same university<sup>8-9</sup>. The high prevalence of internet addiction in the current study could be due to that university students have much unstructured time, they usually use the internet for communication and use it as a tool to relieve the university pressure and stress of continuous study and which has also been justified by Young<sup>21</sup>. Many other studies have shown variable rates of internet addiction among university students<sup>22-24</sup>.

In the present study, no direct correlation was found between the severity of internet addiction and age groups ( $p = 0.748$ ), in contrast to the findings of other researchers where a direct association between the age groups of the studied population and the internet addiction was found; more severe internet addiction is present among older students<sup>25</sup>. This controversy could be due to the availability of internet access for the student and the ways of the assessments used in different studies. Also, the current research has revealed that there was no significant relationship between the gender

and the potential internet addiction (Males 77.4%, females 73.1%,  $p = 0.387$ ). Our data are comparable with other researchers<sup>26</sup>, yet an earlier research conducted by Taha et al., shows contrary results<sup>8</sup>. Additionally, other studies found a significant relation of internet addiction to gender<sup>7,27</sup>. Also, some other studies have reported that the prevalence of internet addiction was higher among males<sup>7,28</sup>. This variation in the relation of gender and internet addiction could be due to the differences in the social and cultural background and activities among the studied groups.

Regarding the relationship between internet addiction with depression and stress, we demonstrate a highly significant association among the students in the study. Since the greater use of internet is related to some social and psychological maladaptive variables such as declines in the size of social circle, loneliness<sup>29</sup>, lower self-esteem and life satisfaction<sup>30</sup>, sensation seeking<sup>31</sup>, and low-family function<sup>32</sup>, based on that, internet addiction could be a cause for enhancing depression and stress. Consistent with these findings and suggestions, the observations in our study shows that internet addiction was linked positively to depression and stress, and could indicate that the more internet addiction among students, the more stress and depression.

In a research, students were found to be more likely addicted to internet if they used it for social media rather than academic purposes<sup>33</sup>, this might indicate that internet addiction among medical students could be attributed to the higher academic stress as the addiction on internet can serve as a distraction and possibly used as a coping mechanism.

Internet addiction, stress and depression can be regarded as a phenomenon among medical students as they were found to exist/co-exist in various studies<sup>7,15-17</sup>. Furthermore, our study clearly demonstrates presence of a relation between internet addiction, and stress and depression; the higher the degree of internet addiction, the more severe stress/depression. The triangle of DIAS (Depression, Internet addiction and Stress) requires further investigation to determine the presence and severity of other psychiatric illness associated with.

The co-existence of COVID-19 pandemic at the time of research conduction could be another probable reason, and possibly a limitation, for the association of in the study, in which this pandemic state by itself might act as a source for stress and depression among the studied group.

### **CONCLUSION**

The prevalence of internet addiction was found to be high with a positively statistically significant relation to depressive and stressful traits among medical students. However, no significant relation between the genders nor the different age groups regarding internet addiction was found.

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None.

### **Conflict of Interest**

Authors declare no conflict of interest.

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## پوخته

### په یوه نډیا دناڤه را هوگړیا (ئیدمانا) ئینتەرنتی و ستریس و خه موکی و دناڤ فوتابین کولیزا پزیشکی - دهوک

#### پیشه کی و نارمانج:

هه تا کو حوزه بیرانا سالا ۲۰۲۰، ۶، ۴ بلیون (۶، ۵۹٪) ژ پیکهاتی ئاکنجین سهر رویی ئهردی) ژ ئاکنجین دنیاپی ئینتەرنت بکار دئینا. ئینتەرنت دهیته هژمارتن ب ئیک ژ مهزنتین داهینانان کو هژماره کا مهزن ژ پیزانینان و دهم بوراندی بهردهست دکهت. ههلبهت د شیانداپه چند کاریگه ریپن نه باش لسهر ساخلمیا لهشی و ههستی ههبن ههروهک هاتیه گریدان ب چند نه خوشیپن دهروونی، وهک کیمیا باوه ریپن بخو، دلراوکی، خه موکی، نه نقستن، و ههروهسا ستریسا دهروونی. نارمانجا فی فیه کولینی دیارکرن په یوه نډیپه دناڤه را هوگړیا (ئیدمانا) ئینتەرنتی و ستریس و خه موکیپه دناڤ فوتابین کولیزا پزیشکی - دهوک.

#### ریکن فیه کولینی:

ئه فیه کولینه ب ریکا ئولاین لسهر فوتابین کولیزا پزیشکی زانکوبا دهوک هاته نهجامدان؛ هژمارا فوتابین به شدار ۳۴۵ فوتابیوون. پیزانین ب ریکا فورمین گووگل هاتنه وهرگرت ب بکارئینانا پیغه رین Internet Addiction Test و Depression Anxiety Stress Scales (DASS) پیزانین لسهر هوگړیا (ئیدمانا) ئینتەرنتی، ستریسا دهروونی، خه موکی و ههروهسا باری دیموگرافی هاتنه وهرگرتن. پیزانین ب ریکا SPSS هاتیه شروقه کرن ههروهسا بهایی- $p$  کیمتر ژ ۰,۰۵ دهیته بهرچاف وهرگرتن ژلای ئاماریقه.

#### نهجام:

فیه کولینی دیارکر کو ریزا هوگړیا (ئیدمانا) ئینتەرنتی گه هشته ۷۴,۸٪، ریزا ستریسا دهروونی گه هشته ۴۲,۹٪، ههروهسا ریزا خه موکی گه هشته ۵۹,۷٪. بهایی (p) ژبو په یوه نډیپ دناڤه را ژی و رهگزی و هوگړیا (ئیدمانا) ئینتەرنتی، ستریسا دهروونی و خه موکی کیمتربوو ژ ۰,۰۵. بهلی هاته دیارکرن کو هوگړیا (ئیدمانا) ئینتەرنتی کاریگه ریه کا زورا بهرچاف ههبو لسهر ستریسا دهروونی و خه موکی.  $P < 0.0001$ .

#### دهر نهجام:

هاته دیارکرن کو ریزا هوگړیا (ئیدمانا) ئینتەرنتی یا مشهیه دناڤه را به شداریویان دگهل په یوه نډیه کا ئه رینی یا بهرچاف دگهل سه خله تین خه موکی و ستریسا دهروونی دناڤه را فوتابیناندا. ههلبهت چ په یوه نډیپ بهرچاف نه هاتنه دین دناڤه را رهگزیپن جودا و ژین جودادا سه بارهت هوگړیا (ئیدمانا) ئینتەرنتی.

## الخلاصة

### العلاقة بين إدمان الإنترنت والتوتر والاكتئاب بين طلاب كلية الطب - دهوك

#### الخلفية والأهداف:

بحلول يونيو 2020 ، كان 4.6 مليار شخص (59.6٪ من إجمالي سكان العالم) يستخدمون الإنترنت في جميع أنحاء العالم. يعتبر الإنترنت أحد أعظم الإبداعات لأنه يوفر الوصول إلى قدر كبير من المعرفة والترفيه. ومع ذلك، يمكن أن يكون لها آثار ضارة على الصحة الجسدية والعاطفية حيث تم ربطها بالعديد من الأمراض النفسية، مثل تدني احترام الذات والقلق والاكتئاب والأرق والتوتر. تهدف هذه الدراسة إلى تقييم العلاقة بين إدمان الإنترنت والتوتر والاكتئاب بين طلاب كلية الطب - دهوك.

#### طريقة البحث:

أجريت دراسة مقطعية عبر الإنترنت بين طلاب كلية الطب بجامعة دهوك. شارك 345 طالباً. تم جمع البيانات بواسطة استمارة Google باستخدام اختبار ادمان الانترنت ومقاييس الاكتئاب، القلق والضغط العصبي (DASS 21). تم استخدام النموذج لتقييم ما يلي: إدمان الانترنت، التوتر والاكتئاب، إلى جانب البيانات الاجتماعية والديموغرافية. تم تحليل البيانات باستخدام SPSS واعتبرت قيمة أقل من 0.05 ذات دلالة احصائية.

#### النتائج

كان انتشار إدمان الإنترنت والتوتر والاكتئاب بين العينة 74.8٪ و 42.9٪ و 59.7٪ على التوالي. كانت قيمة p للعلاقة بين الفئات العمرية والجنس وإدمان الانترنت، والتوتر والاكتئاب  $> 0.5$ . ومع ذلك، فقد وجد أن إدمان الإنترنت له تأثير كبير على التوتر والاكتئاب ( $p > 0.0001$ ).

#### الاستنتاجات

وجد أن انتشار إدمان الإنترنت مرتفع مع وجود علاقة ذات دلالة إحصائية إيجابية بالسماوات الاكتئابية والضغط العصبي بين طلاب الطب. ومع ذلك، لم يتم العثور على علاقة ذات دلالة إحصائية بين الجنسين ولا الفئات العمرية المختلفة فيما يتعلق بإدمان الإنترنت.