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Research Article

Evaluation of Antidepressant Medication Use and Determination of Risk Factors for Depression among University Students in Istanbul

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Abstract: Depression is one of the most common mental health illnesses that can get worse without proper medical interventions. Estimates of the depression prevalence among university students occupy a fair portion of the general depressed populations. This study aimed to assess the prevalence of depression among university students and identifying their characteristics. The conducted cross-sectional study obtained data from different schools located in Istanbul. The highest participation in the study was from Altınbaş, Istanbul, Yeni Yüzyıl and Istinye Universities. The other universities are Yeditepe, Maltepe, Biruni, Istanbul Technical, Yıldız Technical, Bezmialem, Istanbul Kültür, Beykent and Marmara Universities. This study was conducted between December 2019 and March 2020 after the ethical committee approval. A total of 286 students were included in the study. 75% were female and the mean age and standard deviation (SD) of the students was 21.79 ± 1.775 years. Based on 'Beck Depression Inventory', the depressive state was observed to be no or minimal in 59%, mild in 20%, moderate in 16%, and severe in 5% of the participants. The student-related factors, such as the type of the school, cultural-social-financial issues were among the most factors that affect the incidence of depression in students. The students included in this study had only few information about depression and antidepressants which is not enough to understand the whole concept of depression and antidepressants.

Keywords: *Depression; anxiety; antidepressant; university students; Beck Depression Inventory*

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1. Introduction

Our modern technological lifestyle is indeed a transit card to enter a lot of unexpected mental problems such as dissatisfaction, being overfed, malnourished, sedentary, and socially isolated. Changes of this sort in

human lifestyle contribute to poor physical health and affect the incidence of depression which was defined in the latter days as a disease of modernity (Korkmaz, 2006). More than 264 million people, in other words 4.3% of the world population, suffer from depression. These alarming numbers reflect the wider prevalence of mental ill-health more generally. In a survey of 25,916 people in 15 different countries including Turkey, depression and anxiety were the most prevalent psychiatric conditions (James et al., 2018; Sartorius et al., 1996).

University students are susceptible to depression due to potential factors such as the accompanying stress to get high marks, fear from taking the adulthood responsibilities, finances, or possibly feeling isolated after moving away from friends and family. All these factors can lead to anxiety and behavioral disturbances (Buchanan, 2012; Hür et al., 2014). Depression that develops in this early stage of life can have a negative influence on an individual's career and social life. Studies have shown that depression in college students influences their study habits, self-acceptance, and cognitive performance as well as it has been associated with poor academic achievement, relationship discord, suicidal thoughts, and reduced productivity (Ibrahim et al., 2013; Newman et al., 1996). A study in United States has concluded that 447 out of 1338 undergraduate students reported problems during their childhood (such as financial difficulties, parental divorce, or orphan) as the main contributor to depression (Newhart et al., 2019).

Although psychosocial intervention is the first treatment method to treat minor depression symptoms, antidepressant drug use is increasing among university students without having enough information about the whole concept of depression, antidepressant, how these drugs work, and the adherence necessity with this type of drugs to get the full utility of them (Hammonds et al., 2015; Maruf et al., 2019). Different antidepressants with different mechanisms of action have been developed and used during the recent years. Sertraline, citalopram, fluoxetine, escitalopram, paroxetine, and fluvoxamine are among the most widely used antidepressants in young adults and children. Nevertheless, most of these drugs bear the Food and Drug Administration (FDA) black box warning that people under the age of 25 are at high risk of suicidal thoughts (Kadison, 2005; Korczak, 2013).

Determining the depression prevalence, risk factors, identifying and addressing the causes of depression among university students are all a significant part in increasing the academic performance of the students and improving their general health conditions by avoiding chronic disease aggravating factors, prevent the recurrence of them which will lead to decrease the suicide likelihood as well (Hür et al., 2014; İskender et al., 2018). This study therefore aimed to assess the prevalence of depression among university students and identifying their characteristics.

2. Materials and Methods

2.1. *Study Design*

'Beck Depression Inventory' and demographic properties self-reported scale were used in the study. The study was initiated after the ethical committee approval. Surveys were conducted through online via Google forms. The questionnaire was delivered to all the universities in Istanbul via e-mail and phone by university representatives or research assistants. The questionnaire was sent to the students studying in 27 different departments; and was based on volunteering. 286 students were randomly selected. It took

about 8 minutes to complete the questionnaire. Also, a consent form was received from the students that the information they provided in the questionnaire would be used. The sample size was calculated using the level of the confidence interval of 95% and power at 80%.

2.2. *Study Population*

University students in Istanbul aged between 18 to 30, who accepted and signed the consent forms included in the study.

2.3. *Demographic Variables*

Demographic variables such as age, gender, school, department, educational status, antidepressant use, drug name, duration of antidepressant use, lifestyle, social history were documented using a pre-prepared form.

2.4. *Beck Depression Inventory (BDI)*

This is a self-report scale containing 21 items developed by Beck, Mendelson, Mock, Erbaugh, and Ward to evaluate the severity of the individual's depression (Beck et al., 1961). The questionnaire employed in the study is the Turkish version which has been translated and validated by Hisli (1988).

The students were asked to mark the option that best describes their feelings during the last week. At the end of the survey, the depression levels were classified as following:

- severe depression "30-63 points",
- moderate depression "17-29 points",
- mild depression "10-16 points",
- and lastly the minimal depression was between "0-9 points".

Within the scope of the questionnaire, depressed mood, social withdrawal, feeling of failure, pessimism, weight loss, unsatisfaction, feelings of guilt, crying spells, work inhibition, anxiety, indecision, distortion of the bodily image, sleep disturbance, fatigue, decreased appetite, and loss of libido were assessed (Hisli, 1989). The reliability coefficient of BDI was found to be $\alpha = 0.86$ and where the validity coefficient was $\alpha = 0.75$ (Akçagöz, 2017).

2.5. *Statistical Analysis*

For all statistical analysis, Statistical Package for the Social Sciences (SPSS) 26 was used. The 95% confidence interval with $p<0.05$ was used to assess results. As the data is normally distributed means and standard deviations were used to describe participant characteristics. Chisquare cross tabs and independent t-test were executed to determine if significant differences were present among the categorical variables and continuous variables, respectively.

3. Results

3.1 *Demographic Characteristics of the Students*

The conducted cross-sectional study obtained data from different schools located in Istanbul. The highest participation in the study was from Altınbaş (21.33%), Istanbul (20.63%), Yeni Yüzyıl (10.49%), and Istinye Universities (12.59%). Yeditepe (0.70%), Maltepe (%0.70), Biruni (8.74%), Istanbul Technical (3.85%), Yıldız Techinical (5.24%) Istanbul Kültür (1.40%), Bezmialem (5.25%), Beykent (1.75%) and Marmara (7.34%) Universities are other universities that students attended. The study extended over 4 months upon the approval of the ethics committee. The sociodemographic characteristics of the students are shown in Table 1.

A total of 286 out of 600 students consented and completed the study, with a response rate of 47.6%. Also, a total of 286 students who were compatible with the inclusion criteria were asked to complete the questionnaire. The data from the students were collected from 27 different departments most of whom were from the faculty of pharmacy (n=220, 76.92%). The mean age and SD of the student was 21.79 ± 1.775 years, and 75% of the participants were female students. In this study, alcohol use was common among the students (44%), furthermore 27% of them were smokers (Table 1).

Table 1. Demographic and clinical characteristic of the students participating in the study

		n=286
Age (mean ± SD)		21.79 ± 1.775
University types	Private	63%
	Public	37%
Departments	Health sciences	81%
	Physical sciences	14%
	Social sciences	5%
University degree	Associate	0.3%
	Bachelor's	95.5%
	Master/PhD	4.2%
Gender	Female	75%
	Male	25%
Alcohol status	Yes	44%
	No	56%
Smoking status	Smoker	27%
	Non-smoker	73%
Doing sport	Yes	39%
	No	61%
Household composition	Alone (home, dormitory)	56%
	With family	44%
Family structure	Married parents	89%
	Divorced parents	7%
	One parent deceased	4%
Beck scores	Minimal	59%
	Mild	20%
	Moderate	16%
	Severe	5%

Nearly, 11% of the participants stated that they were using antidepressants; however, the SSRIs was the most common antidepressant group used by the participants. Among the SSRIs group, the most used drug was fluoxetine with 33.25% while the use of citalopram and sertraline was 19.35%.

Regarding the duration of antidepressant usage, 55% of the students have been using antidepressant drugs for less than 1 year, 39% have been using them for 1 to 3 years, and 6% for more than 3 years. For instance, while 94% of the students stated that they have received advice from the doctor regarding the use of the antidepressant, the last 4% of the students declared that they have got medical counsel from their pharmacists. The demographic variables, characteristics and the use of antidepressants are shown in Table 2.

Table 2. The questions answered by the students about their antidepressant use

		n=286
Age (mean ± SD)		21.79±1.775
University types	Private	63%
	Public	37%
Departments	Health sciences	81%
	Physical sciences	14%
	Social sciences	5%
University degree	Associate	0.3%
	Bachelor's	95.5%
	Master/PhD	4.2%
Gender	Female	75%
	Male	25%
Alcohol status	Yes	44%
	No	56%
Smoking status	Smoker	27%
	Non-smoker	73%
Doing sport	Yes	39%
	No	61%
Household composition	Alone (home, dormitory)	56%
	With family	44%
Family structure	Married parents	89%
	Divorced parents	7%
	One parent deceased	4%
Beck scores	Minimal	59%
	Mild	20%
	Moderate	16%
	Severe	5%

90% of students using antidepressants also think their treatments are effective. While 50% of the students using antidepressants indicated positive changes, 10% stated that negative changes were observed, and 40% stated that they did not observe any changes (Table 2).

When asked about the side effects observed with antidepressant use, the students using antidepressants reported that 28% of them were feeling sleepy, 18% suffered from severe anxiety, 18% faced confusion, 18% complains about nausea, 9% suffered from emotional disturbance while 9% experienced movement disorder. Additionally, when the participants were asked if they are planning to stop using their antidepressant drugs, 68% of the students answered "Yes" while the rest 33% answered "No". All the students involved in this study n=286 were asked whether they think they need to use antidepressant medicine; 30% of the whole involved population replied: "Yes", and 70% replied, "No" (Table 2).

Moreover, when the students were asked about the medications other than the antidepressants they used, levothyroxine (25%) and isotretinoin (25%) were found to be the most used drugs.

3.2 *Beck Depression Inventory*

Demographic variables such as age and gender were recorded, and the Beck score was additionally documented. The mean Beck Score and SD was found to be 13.16 ± 8.17. Looking at the scores of 286 students noticed that 59% of them suffer from no or minimal depression, 20% mild, 16% moderate, and 5% of them were suffering from severe depression.

3.3 *Statistical Analysis Between Demographic Variables and Depression Level*

In terms of the significance between the type of university "private or public" and the depression's level ($p < 0.05$), 63% of the participants were studying in a private university while 37% were studying in a public university. The rate of severe depression was 1.9% and 4.9% in students studying at public and private universities respectively (Table 3). For instance, the departments were examined and there was a significant difference between the departments and the levels of depression as well ($p<0.05$) (Table 3). However, there was no significant difference between the education level "Associate degree, Bachelor's degree, Master/PhD degree" against the level of depression ($p>0.05$).

Table 3 shows the significant difference between student factors and their level of depression, taking into consideration that severe depression was more common in female participants.

Table 3. The total effect of the students' factors (gender, university type and departments) against the depression level

Factors	No or Minimal Depression	Mild Depression	Moderate Depression	Severe Depression	p* Value
Gender					
Female	53.0%	21.9%	18.6%	6.5%	0.001*
Male	77.5%	15.5%	7.0%	0.0%	
Type of University					
Public	52.3%	26.2%	19.6%	1.9%	0.028*
Private	59.1%	20.3%	15.7%	4.9%	
Departments					
Health science	62.8%	16.5%	15.6%	5.2%	0.023*
Physical science	46.2%	30.8%	17.9%	5.1%	
Social science	37.5%	50%	12.5%	0%	

* p value significant at < 0.05

* p value is given for depression level

With regards to the reasons that the students used the antidepressants, 29% of the students used antidepressants to treat depression while 19% of the students used it only to treat anxiety where no relationship was observed between the depression level and the reason for using the antidepressant drugs. Furthermore, some students stated that they have used antidepressants for the treatment of diseases such as obsessive-compulsive disorder, panic attack, and post-traumatic disorder. For instance, there was a significant difference between the need for antidepressant medications and the level of depression (p=0.001). Where severe depression was observed in 11.7% of the students who stated that they needed antidepressant medication, the rest 73% of those who did not need antidepressant medications showed minimal depression in Beck score (Table 4).

Table 4. The ratio of the students' antidepressants needs and their level of depression

Do you think you need an antidepressant?	Minimal Depression	Mild Depression	Moderate Depression	Severe Depression	p* value
Yes	29.9%	28.6%	29.9%	11.7%	0.001*
No	73.6%	18.0%	6.7%	1.7%	

* p value significant at < 0.05

* p value is given for depression level

In terms of the significance between the family structure and the level of depression (p<0.05), severe depression was more common in students with divorced parents (21.1%), orphan students (16.7%), and students with married parents (3.1%), respectively (Table 5).

Table 5. The total effect of the family structure on the depression level of the students

Family status	Minimal Depression	Mild Depression	Moderate Depression	Severe Depression	p* value
Married parents	59.6%	20.8%	16.5%	3.1%	0.012*
Divorced parents	52.6%	15.8%	10.5%	21.1%	
One parent deceased	58.3%	16.7%	8.3%	16.7%	

* p value significant at < 0.05

* p value is given for depression level

However, no significant correlation was found between alcohol use or smoking and level of depression (p>0.05). It was observed that there were no significant differences between the level of depression and other medications such as levothyroxine or isotretinoin used (p>0.05). Besides, there was no significant difference between age and depression level (p>0.05). Also, there was no significant difference between the education level "Associate degree, Bachelor's degree, Master/PhD degree" against the level of depression (p>0.05).

4. Discussion

From a psychological point of view, any changes in lifestyle, either good or bad, may lead to stress and anxiety. Starting the university is one of the major changes in life for the students as they have to make their own decisions, develop the ability to act independently and individually. These changes are accompanied by emotional changes, depression, and anxiety which may affect their academic performance and quality of life (Hür et al., 2014).

This study was conducted to determine the level of depression in university students and the risk factors affecting this condition. Demographic variables such as age and gender were recorded and the Beck score was additionally documented.

In a study conducted in Iran, the depression prevalence of university students was found to be 33% (Sarokhani et al., 2013). However, they did not find any significant difference between the genders as in our study. Also, a total of 113 studies were included in a study from China to estimate the depression prevalence among college students. It has been observed that the prevalence of depression in China is 28.4%. In another study conducted with 631 university students in the United States, it was stated that 46.94% of the participants showed mild to severe depression symptoms. Similar to our study, higher depressive symptoms were observed in women compared to men. In a study conducted in Tanzania with 1047 participants, 21.7% of the students had moderate to severe depression. In our study however, the prevalence of depression from mild to severe symptoms was observed to be 40.9%. This result is very similar to the study done in the United States. Generally, differences may have been caused by

different measurement tools, different methods, or cultural differences (Acharya et al., 2018; Gao et al., 2020; Lugata et al., 2020)

According to the literature, females suffer from depression in higher rates comparing to males especially during their adolescencehood (Kessler & Walters, 1998). In our study, there was a significant difference between the students' gender and their level of depression ($p<0.05$); for instance, the female students were more prone to depression than the male students.

A study conducted by Mirowsky & Ross (1992) has shown that the depression occurrence rate is the highest among elderly people, a little bit lower among the young and adults where the lowest depression rate was seen among the middle-aged people. In this study conducted with university students who are considered as young adults as their mean age was 21.79 ± 1.775 years, no significant relationship was found between the age of the students and their depression level (23 years ≥ 86%, 23 years <14%). This may be due to the narrow age range of the participants (18-30 years old).

In a study conducted by Adewuya et al. (2006) with university students in Western Nigeria, a strong correlation was found between smoker or alcohol users and their level of depression. However, in this study, smoking or alcohol use did not affect the level of depression, which suggests the necessity of detailed research focusing on smoking and alcohol addiction among university students.

Another trial conducted by North et al. (1990) regarding the effect of physical exercises on depression level, reported that the depression rate was less in the group who are physically active. However, in this study, there was no significant difference between the physically active and inactive students regarding their depression level ($p>0.05$).

Although the brain produces endorphins during the exercises which have a positive effect on depression, this study did not support this statement. The reason may be that students' depression levels were not observed before and after the exercises in addition to the small sample size. That is why the subsequent studies may record the depressive symptoms experienced by participants before and after exercise to observe the effect of physical activity on depression more clearly (North et al., 1990).

In this study, a significant difference was observed between the university type and the depression level, higher depression rates have been seen in students who are studying in private universities than those who are studying in public ones. The reason should be investigated to understand if the students are suffering from financial problems that lead to be depressed or suffering from facing issues related to the education environment. As a result of a study conducted among medical faculty students in Pakistan with 300 participants, it was stated that more depression was observed in public universities compared to private universities (Zafar et al., 2017). In a study conducted in Jordan with 455 student participants, it was stated that the mental health level of students studying at private universities was higher than those studying at a state university (Alhabees et al., 2018).

In this study, 81% of the involved students were from health science faculties where 14% of them were from faculty of physics and the last 5% were studying social sciences. A significant relationship was found between the departments and the students' depression level ($p<0.05$). Severe depression was higher

among students studying in the health science faculties (5.2%) and physical sciences (5.1%) compared to students studying in the faculty of social sciences (0%). Mild depression was observed with a rate of 50% among students studying in social sciences. Possible reasons such as difficult lessons and a higher number of exams may be faced in students who showed depressive symptoms.

According to the results of our study, 11% of the students who participated were using antidepressant drugs and the SSRIs were the most used drug with the favor of 77%. Maruf et al. (2019) stated that the most used antidepressant class in young adults and children are SSRIs. Although their clinical effectiveness is similar to that of the tricyclic antidepressants (TCAs), they are better tolerated and safer as the overdoses are less toxic than the others. Moreover, SSRIs have a lot of clinical properties for a better choice as the low incidence of weight gain, less anticholinergic effects, alleviating sleep disturbance in depression without causing psychomotor dysfunction during the day, and they have a role in managing depression-related anxiety (Lane et al., 1995). However, it should be noted that SSRIs have some side effects and patients should be informed about all the treatment options and their uses, advantages, and side effects.

The duration of antidepressant usage varies between students. 55% of the students have been using antidepressant drugs for less than 1 year, 39% have been using them for 1 to 3 years, and 6% for more than 3 years. The treatment of depression consists of three phases:

Acute phase where the remission is induced (minimum 6 – 12 weeks in duration). The purpose of this phase is to stabilize the first depressive symptoms, cooperate with the patient, providing training, selecting the best fit treatment, and assessing the response. The second one is the continuation phase where the remission is preserved, and relapse is prevented (6 months or more after remission). The purpose of this period is to prevent the exacerbation or recurrence of a current attack, while in the maintenance phase – susceptible patients are free for relapses (12 to 36 months in duration). Patients with significant risk factors should undergo maintenance treatment in maximum doses (Cohen, 1997; Demyttenaere, 2001). This means that most of the students stop their medication directly after the induction phase which may indicate the necessity of follow up with these students to evaluate the possibility of relapse symptoms.

Patients who have a complex, variable clinical picture of major depressive disorder may need a multimodal treatment including education, psychotherapy, and pharmacotherapy. Clinical responses, including suicidal thoughts, adverse effects, and behaviors should be monitored during the treatment of depression. To promote compliance to the treatment, an awareness session should be done with the patients themselves and their families about the side effects that may be seen during the treatment period (Gelenberg et al., 2010). The average recovery time which may extend to 6 months should be discussed as well besides the probability of getting a new attack in the future (Gelenberg et al., 2010). Pharmacists may play a significant role in the treatment of the patients suffering from depression by:

- giving recommendations, assessing patients' adherence,
- counseling about medicines,
- and following up with the patients regarding the drug side effects (Demyttenaere, 2001).

Patients who do not benefit from treatment or who experience intolerable side effects should be referred to a doctor (Scheerder et al., 2008). Considering the adverse effects, most of the students complained about drowsiness, severe anxiety, confusion, and nausea. These side effects were one of the reasons that forced 68% of the participants to discontinue the medication. To choose the most suitable antidepressant for each patient, his/her medical file should be evaluated individually. The role of the clinical pharmacist could be seen here clearly, as he/she is the only eligible person to make the best treatment option taking the patient preferences and the possible side effects into consideration.

Although a study done by Wysowski et al. (2001) found a relationship between depression, suicide, and isotretinoin, our study did not show any relationship between the level of depression and the other medications used. Sokratous et al. (2014) in their study which involved 1500 university students reported a higher prevalence of depressive symptoms than the students who were living alone. In this study, most of the students were living away from their homes but no significant difference was found ($p>0.05$). In this study, there was a significant relationship between the pattern of the students' families and their depression level ($p <0.05$). There is substantial evidence that depressed adults and children experience difficulty in family lives, such as marital discord or disruption (Burbach & Borduin, 1986; Keitner & Miller, 1990). Sokratous et al. (2014) indicated in their study that the incidence of clinical depressive symptoms was higher in orphan students or those who have divorced parents. The study, conducted by Ngin et al. (2018) over 403 university students, has shown the same aspect as well. This also goes in the same line with our study and it can be explained by the fact that parents' divorce can cause a decrease in the family moral and material support which may lead to a depressive disorder or even traumatic stress for the child (Sokratous et al., 2014).

The results of the study should be evaluated considering some limitations that need to be outlined, all the data are subjective affecting the reliability of the study. Some students did not want to state that they used antidepressants. So, although the rate is high, the number of students who used antidepressants may be underestimated. Lastly, the study is limited with only university students in Istanbul.

Conclusion

As a result of the study, it was observed that although depression is not very common among university students, it has a rate that cannot be underestimated. Severe depression has been observed especially in individuals studying at the faculties of health science, physics, and life sciences, students studying at a private university, and those who are experiencing negative family impacts. Additionally, being female is also a risk factor for depression.

Among the students, SSRIs were the most used antidepressant class and since these drugs have serious side effects, individuals should be monitored by healthcare professionals to taper the doses safely. Health education and psychological units of the schools are extremely important for individuals at high risk of developing mental illnesses. Besides, workshops on depression management should be organized for students to teach them how to cope with stress and prevent depression.

Ethical Approval

All procedures performed in this study involving human participants followed the ethical standards of the institutional and/or national research committee (Institutional Review Board of Medipol University 27.11.2019/1006) and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

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Conflict of Interest

Authors declared no conflict of interest.

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