Journal of Education and Future
year: 2022, issue: 22, 85-97
DOI: 10.30786/jef.879958

Evaluation of Healthy Lifestyle Behaviors and Stress Levels of Dentistry Students during the COVID-19 Pandemic

Article Type	Received Date	Accepted Date
Research	15.02.2021	22.04.2022

Didem Özkal Eminoğlu* **Tuğba Aydın****

Abstract

Covid-19, which threatens human health worldwide, affects people not only emotionally, but also by exposing them to necessary changes in their social behaviors and lifestyles. Psychological health and daily life habits have been transformed by the COVID-19 pandemic. Closure of universities, suspension of clinical training, and transition to online education are likely to affect students negatively. This paper focuses on the stress levels and daily lifestyle changes of students because of the pandemic. A total of 601 participants of dentistry faculty, including 402 preclinical (PC) and 199 intorn (INT) students, filled an online survey questionnaire including sociodemographic data form, "Health-promoting Lifestyle Profile-II (HPLP-II)" form, and "Perceived Stress Scale-10 (PSS-10)" form. IBM SPSS version 25.0. program was used for statistical analyses. HPLP-II and PSS-10 mean scores of PC and INT students were found as moderate. It was determined that variables as gender, educational grade, financial status, living with a relative who is at risk of contracting COVID-19 or having a relative who has the disease caused difference in HPLP-II and PSS-10 total mean score and the average score in the majority of subscales. The current study's findings reveal that COVID-19 pandemic has devastating effects on students' stress levels and lifestyle routines. It is vital to provide services to individuals in order to sustain healthy lifestyle behaviors in order to protect communal health.

Keywords: COVID-19, dentistry, pandemics, severe acute respiratory syndrome coronavirus 2

* *Corresponding Author:* Assist. Prof. Dr., Atatürk University, Faculty of Dentistry, Department of Periodontogy, Erzurum, Turkey. E-mail: ddm_ozkal@hotmail.com https://orcid.org/0000-0001-9406-3368

** Assist. Prof. Dr., Atatürk University, Faculty of Dentistry, Department of Periodontogy, Erzurum, Turkey. E-mail: dtkoseoglu@hotmail.com https://orcid.org/0000-0002-9675-5509

Diş Hekimliği Öğrencilerinin Sağlıklı Yaşam Biçimi Davranışlarının ve Stres Düzeylerinin COVID-19 Pandemisi Sürecinde İncelenmesi

Makale Türü	Başvuru Tarihi	Kabul Tarihi
Araştırma	15.02.2021	22.04.2022

Didem Özkal Eminoğlu* **Tuğba Aydın****

Öz

İnsan sağlığını dünya çapında tehdit eden Covid-19 salgını sadece insanları duygusal olarak değil, sosyal davranışlarını ve yaşam stillerini de zorunlu değişliklere maruz bırakarak etkilemektedir. Psikolojik sağlık ve günlük yaşam alışkanlıkları COVID-19 pandemisinden büyük ölçüde etkilenmiştir. Üniversitelerin kapatılması, klinik eğitimin askıya alınması ve çevrimiçi eğitime geçişin öğrencileri olumsuz yönde etkilemesi muhtemeldir. Bu araştırmanın amacı, COVID-19 salgınından etkilenen öğrencilerin stres düzeylerini ve yaşam tarzı değişikliklerini değerlendirmektir. 402 klinik öncesi (PC) ve 199 intorn (INT) dahil olmak üzere toplam 601 dişhekimliği öğrencisi, sosyodemografik özelliklerini belirlemeye yönelik soruları, "Sağlıklı Yaşam Biçimi Davranışları Ölçeği-II (HPLP-II)" ve "Algılanan Stres Ölçeği-10 (PSS-10)" formlarını içeren bir çevrimiçi anketi doldurdu. IBM SPSS 25.0. programı verilerin istatistiksel olarak anlamlılığını belirlemek üzere kullanılmıştır. PC ve INT öğrencilerinin HPLP-II ve PSS-10 puan ortalamaları orta düzeyde bulundu. Öğrencinin cinsiyeti, eğitim düzeyi, ekonomik durumu, COVID-19 hastalığına yakalanma riski taşıyan veya hastalığa yakalanmış bir bireyle birlikte yaşamanın HPLP-II ve PSS-10 toplam puan ortalamasında ve alt ölçeklerin pek çoğunun puan ortalamasında farklılığa neden olduğu belirlendi. Bu kesitsel çalışmanın sonuçları, COVID-19 salgınının öğrencilerin stres seviyeleri ve yaşam tarzı rutinleri üzerinde yıkıcı etkileri olduğunu göstermektedir. Halk sağlığının idamesi sağlamak amacıyla bireylerin sağlıklı yaşam tarzı davranışlarını sürdürebilmelerini imkan sağlayan bilgi ve hizmetlerin geliştirilmesi fayda sağlayabilir.

Anahtar Sözcükler: COVID-19, diş hekimliği, pandemik, şiddetli akut solunum sendromu koronavirüs 2

* *Sorumlu Yazar:* Dr. Öğr. Üyesi, Atatürk Üniversitesi, Diş Hekimliği Fakültesi, Periodontoloji Anabilim Dalı, Erzurum, Türkiye. E-posta: ddm_ozkal@hotmail.com https://orcid.org/0000-0001-9406-3368

** Dr. Öğr. Üyesi, Atatürk Üniversitesi, Diş Hekimliği Fakültesi, Periodontoloji Anabilim Dalı, Erzurum, Türkiye. E-posta: dtkoseoglu@hotmail.com https://orcid.org/0000-0002-9675-5509

Introduction

In December 2019, 4 people working in a market in Hubei / Wuhan, China that sells various live animals and 23 people who visited this market were diagnosed with acute respiratory failure syndrome. The World Health Organization (WHO) recognized COVID-19 to be the first pandemic caused by coronaviruses as the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) virus was contracted by 446.360.000 people and caused more than 6.005.443 deaths worldwide in 2022. 14.332.089 cases and 95.553 deaths were reported in Turkey as of March 2022 (Dong, Du & Gardner, 2020). Despite vaccination and medical efforts, the spread of the virus is still not fully controlled, and deadly effects of COVID-19 continue to threaten public health (Arpaci, Karataş & Baloğlu, 2020).

The pandemic has brought many restrictions in daily routine life, and strict measures have been taken both in individual provinces and across the nation in order to avoid the infestation of the disease. The measures taken include the suspension of intercity travel, lockdowns for citizens over 65 and under 20, the closure of shopping centers, cinemas, theaters, sports centers, restaurants, barbers, hairdressers, cafes and the declaration of a nationwide lockdown in periods of time. The closure of schools and the transition to the distance education system were among these measures (Özdede & Sahin, 2020).

A broad variety of psychological consequences have been discovered at the individual, national, and international levels during the virus outbreak. Sudden life changes that started with the pandemic had serious psychological effects on healthcare personel, children, elderly individuals, students, and the public at large. Studies have shown that individuals in isolation and quarantine suffer severe stress-related problems. It has been recorded that individuals affected by the COVID-19 outbreak experience emotional distress, insecurity, depression, mood disorder, denial, irritability, insomnia, anger, and post-traumatic stress. The prevalence of stress caused by the pandemic was determined as 29.6 (Salari et al., 2020). The currency of major depression accounted for %7, and post-traumatic stress disorder (PTSD) ranges from %4 to %41 after the outbreak (Torales, O'Higgins, Castaldelli-Maia & Ventriglio, 2020).

Hans Selye introduced the concept of stress as the wear rate of the body against incoming stimuli. In addition, stress refers to the effort to maintain integrity and return to the original state (Tan, Yip & Hans, 2018). Stress is one of the most influential research topics in the field of health, since it is thought to be associated with psychological disorders, suicide attempts, and disorders such as cancer, diabetes, cardiovascular / respiratory system / rheumatic diseases etc. (Cohen, Janicki-Deverts, & Miller, 2007). Scientific studies indicate that stress is highly related to mental deprimention as well due to a strong causal relationship between exposure to stressful events and major depression (Salari et al., 2020). It has been found out that suicidal behaviours were more common among people who experienced stressful events. Exposure to stressful events also increases the risk of using harmful products such as tobacco, alcohol, and cannabis (Onaemo, Fawehinmi & D'Arcy, 2020; Gebo, Keruly & Moore, 2003; O'Connor, Gartland & O'Connor, 2020).

Health professionals show more attention on the psychology and social-family relationships, diet and physical health. Researchers have begun to highlight that an individual's health is affected by habits in his/her daily life (Holden, Rollins & Gonzalez, 2022). Healthy behaviour can be defined as the behaviours related to the preservation and improvement of well-being. They are the behaviours shown by the individual so as to stay in good health and to prevent disease. Healthy life behaviours are known as the choices of diet, physical activity, hygiene habits, supportive relationship with family and friends that can positively affect the personal well-being while performing daily routine activities (Hoying, Melnyk, Hutson & Tan, 2020). Stress affects physical and psychological status in addition to the daily activities of people. Healthy living habits and social interactions have a strong impact on coping with stress. It is expected that the stress conditions and healthy living habits of university students will be affected due to the continued spread of the pandemic, the postponement of the opening of universities, and the online education (Gottschalk, Domschke & Schiele,2020; Smith et al., 2020). Clinical education was suspended also in dentistry faculties given that close contact and/or aerosol- producing treatment procedures of asymptomatic COVID-19 patients (Ö zdede & Sahin, 2020).

The aims of the present survey are as follows:

1) to examine stress levels and healthy daily life routines -by a universally preferred measurement scale- of the dentistry students due to the COVID-19 pandemic *and*

2) to investigate whether variables such as gender, educational grade, economic status, etc. have an effect on students' healthy lifestyle habits and stress parameters during the COVID-19 pandemic.

Method

Research Design

The present research is a survey model, which is "a research model that intents to determine a past or present status as it exists". So as to carry out the study, consent was received from the ethics committee of the institution where the research would be conducted (decision/protocol number of the approval: 07.07.2020 / 21) and from the authors who developed the Turkish version of the data collection tools.

Research Sample

In scale studies, it is suggested to take 10 people for each question included in the scale (Karasar, 2020). During the nationwide lockdown, 601 students of the Faculty of Dentistry of Atatürk University, who volunteered to participate, were employed for the study. The questionnaire with an informative text was sent to the students via the online survey portal “docs.google” (Mansor, 2012). Students were divided into two groups as preclinical period (PC) and internship period (INT). The data of the study were collected by using “Personal Information Form” and the Turkish versions of the “Health-promoting Lifestyle Profile II (HPLP-II)” and "Perceived Stress Scale-10 (PSS-10)" forms.

Perceived Stress Scale (PSS) Research Design

"Perceived Stress Scale" is a highly popular measurement tool which that addresses the subjective stress perception of the person (Huang et al., 2020). PSS is a measurement scale to determine the degree of the emotions in a person’s life perceived as stress, which was developed by Cohen et al. in 1983. Participants answer each question on a 5 point Likert scale ranging from "never (0)" to "very often (4)". Questions containing positive statements from the items are scored in reverse. In addition to the 14-item long form, PSS has two other forms, with 10 and 4 items. Although the data from all three versions contain strong psychometric meanings, researchers prefer the 10-item version. The internal consistency reliability coefficient for the Turkish versions of the PSS-10 is 0.82 (Eskin et al., 2013). PSS-10 has two subscales: Perceived Helplessness (1-2-3-6-9-10) and Perceived Self-efficacy (4-5-7-8). Scores of PSS-10 vary between 0 and 40. Higher scores indicate that the person has an excessive perception of stress (Roberti, Harrington & Storch, 2006).

Health-promoting Lifestyle Profile (HPLP)

HPLP scale was developed in 1987 based on Pender, whose health promotion model is widely preferred in studies when measuring lifestyle habits (Walker, Sechrist & Pender, 1987). The first version of the HPLP scale was reworked and revised in 1996 and renamed "HPLP-II". The Cronbach Alpha value of the scale is 0.94 for the total scale and varies between 0.70-0.85 for the subscales. Bahar et al. (2008) tested the validity and reliability of the Turkish version of the HPLP. There are 52 items on the scale. The scale consists of six subscales, namely Interpersonal Relations (1, 7, 13, 19, 25, 31, 37, 43, 49), Nutrition (2, 8, 14, 20, 26, 32, 38, 44, 50), Health Responsibility (3, 9,15, 21, 27, 33, 39, 45, 51), Physical Activity (4, 10, 16, 22, 28, 34, 40, 46), Stress Management (5, 11, 17, 23, 29, 35, 41, 47) and Spiritual Growth (6, 12, 18, 24, 30, 36, 42, 48, 52). Each subscale can be used independently. The rating of the scale is 4-point Likert is as “never (1)”, “sometimes (2)”, “often (3)” or “routinely (4)”. The lowest score is 52 and the maximum score for the scale is 208. Higher scores on the scale imply that the individual shows healthy lifestyle behaviors.

Data Analysis

In the evaluation of the results, Independent Samples t-test, One-way Analysis of Variance (Tukey multiple comparison test for determining the difference between the means) were used for

statistical analyses and correlation analysis methods were used to determine the relations between the variables. These analyzes were performed using IBM SPSS version 25.0.

Results

Cronbach alpha value of the scale was calculated as 0.929 (95% GA 0,90-0). There were 402 (66.8%) students in the PC group and 199 (33.1%) students in the INT group. Of the 601 students included in the study, 57.9% (n: 348) were female and 42.1% (n: 253) were male. According to the economic status of their families; 32.3% (n: 194) of students expressed as "financial income more than expenses"; 54.2% (n: 326) expressed "financial income equal to expenses", and 13.5% (n: 81) expressed "financial income less than expenses". 35.9% (n: 216) of the students signed the question of "Does anyone in your household belong to the COVID-19 risk group?" as "yes" and 64.1% (n: 385) as "no". 15 students had a COVID-19 positive family member in their households and 586 students din't have any relative who were Covid-19 positive (Table 1).

Table 1

Distribution of students based on a variety of factors

	%	**n**
Grade (n:601)		
PC	66.8	402
INT	33.1	199
Gender (n:601)		
Female	57.9	348
Male	42.1	253
Financial status (n:601)		
Income < expenditure	32.3	194
Income = expenditure	54.2	326
Income > expenditure	13.5	81
Is there anyone in the covid-19 risk group in your household? (n:601)		
Yes	35.9	216
No	64.1	385
Anyone in household who are Covid-19 positive? (n:601)		
Yes	02.5	15
No	97.5	586

PC: Pre-clinic, INT: Intorn

Findings Related to PSS-10

The mean PSS-10 score of 402 students in the PC group was found to be 21.55 ± 0.33. The mean of 199 INT students according to the PSS-10 score was determined as 23.14 ± 0.47. The difference between PC and INT students' perceived stress values was statistically significant ($p<0.05$). "Perceived Helpnessness" score of PC group was statistically lower compared to INT group ($p<0.05$). However, there was no significant difference between the "perceived self-efficacy" scores according to students' level of education ($p>0.05$) (Table 2).

Table 2

Average score of PSS-10 and subsacles according to students' level of education

Grade	**PSS-10**	**Perceived Helplessness**	**Perceived Self-efficacy**
PC	**21.55±0.33[a]**	**13.89±0.24[a]**	7.66±0.15
INT	**23.14±0.47[b]**	**15.13±0.37[b]**	8.01±0.20

Values are presented mean±standart deviation.

[a,b] values means; different letter statistically different from each other ($p<0.05$).

PC: Pre-clinic, INT: Intorn

It was observed that the PSS-10 and "Perceived Helplessness" values of the female students participating in the study were relatively higher than the values of male students, and this was statistically significant ($p<0.05$). There wasn't statistically significant difference between scores of "Perceived Self-efficacy" according to students' gender ($p>0.05$). It was determined that students' financial situation did not make a significant difference on perceived stress values ($p>0.05$). It was also found out that the PSS-10, "Perceived Helplessness" and "Perceived Self-efficacy" values of the students who had a family member in the COVID-19 risk group in their household were statistically significantly higher than the students who did not have a risky individual in their household ($p<0.05$). It was observed that the presence of a family member with a positive diagnosis of COVID-19 in household did not make a significant difference on values related to stress ($p>0.05$) (Table 3).

Table 3

Average score of perceived stress according to students' descriptive features

		PSS-10	**Perceived Helplessness**	**Perceived Self-efficacy**
Gender	Female	**23.28±0.36[a]**	**15.32±0.26[a]**	7.96±0.16
	Male	**20.40±0.39[b]**	**12.88±0.30[b]**	7.52±0.19
Financial Status	I < E	21.42±0.49	13.80±0.38	7.62±0.21
	I = E	22.44±0.35	14.57±0.27	7.86±0.16
	I > E	22.17±0.82	14.37±0.56	7.80±0.36
Risk for Covid-19	Yes	**23,50±0.46[a]**	**15.25±0.33[a]**	**8.25±0.20[a]**
	No	**21.27±0.33[b]**	**13.76±0.25[b]**	**7.51±0.15[b]**
Covid-19 Diagnosed İndividual	Yes	24.47±1.40	16.00±1.05	8.46±0.57
	No	22.01±0.27	14.25±0.21	7.75±0.12

Values are presented mean±standart deviation.
[a,b] values means; different letter statistically different from each other (p<0.05).
PSS-10: Perceived Strss Scale-10, I: Income, E: Expenditure

Findings Related to HPLP-II

Among PC and INT groups for HPLP-II and subscale scores, it was seen that statistically significant increase was only in the "interpersonal relationships" subscale. "Interpersonal relationships" subscale score for PC was significantly higher from INT group ($p<0.05$). Despite the higher score of HPLP-II in PC group, this difference was not found as statistically significant ($p>0.05$) (Table 4).

Table 4

Average score of HPLP-II and subsacles according to students' level of education

	PC	**INT**
HPLP-II	126.48±0.93	123.51±1.31
Spiritual Growth	25.20±0.23	24.47±0.33
Health Responsibility	19.77±0.21	19.31±0.30
Physical Activity	17.76±0.24	16.96±0.34
Nutrition	20.20±0.18	20.27±0.27
Interpersonal Relations	**24.43±2.21[a]**	**23.41±0.31[b]**
Stress Management	19.12±0.16	19.10±0.27

Values are presented mean±standart deviation.
[a,b] values means; different letter statistically different from each other (p<0.05).
PC: Pre-clinic, INT: Intorn, HPLP-II: Health Promoting Lifestyle Profile-II

Scores of the "physical activity" subscale of male students were relatively higher than the values of female students, and this was statistically significant ($p<0.05$). HPLP-II and subscales except "physical activity" didn't show any significant difference according to gender ($p>0.05$). Financial situation caused a statistically significant difference in the HPLP-II, "physical activity", "nutrition"

and "stress management" scores of the students ($p<0.05$). As the financial situation improved, the scores increased (Table 5).

HPLP-II values of the students with family members in the covid risk group in their households were found to be statistically significantly lower than the students who did not have a risky family member ($p<0.05$). Risk of Covid-19 for family members didn't make any significant difference for subscales of HPLP-II ($p>0.05$). "Spiritual growth" and "interpersonal relations" subscale values were found to be statistically significantly lower in the students who had family members diagnosed with covid-positive in their households ($p<0.05$). HPLP-II score and other subscale scores were higher for answer "no" category, but these differences weren't significant ($p>0.05$) (Table 5).

Table 5

Average score of healthy lifestyle behaviours according to students' descriptive features

	Gender		**Financial Status**		
	Female	Male	I < E	I= E	I > E
HPLP-II	125.25 ±1.01	125.83±1.29	**127.50±1.46[a]**	**125.16±1.08[ab]**	**122.03±1.96[b]**
SG	24.82 ±0.24	25.13 ±0.30	25.12±0.32	24.87±0.26	24.89±0.48
HR	19.67 ±0.23	19.54 ±0.27	19.61±0.34	19.67±0.22	19.42±0.47
PA	**16.84 ±0.25[a]**	**18.40±0.31[b]**	**17.88±0.35[a]**	**17.57±0.28[ab]**	**16.27±0.50[b]**
N	20.45 ±0.20	19.93 ±0.25	**20.80±0.27[a]**	**20.15±0.22[ab]**	**19.20±0.41[b]**
IR	24.25 ±0.22	23.88 ±0.29	24.35±0.35	23.98±0.23	23.91±0.41
SM	19.22 ±0.17	18.95 ±0.23	**19.73±0.26[a]**	**18.93±0.18[ab]**	**18.34±0.37[b]**

	Risk for Covid-19		**Covid-Diagnosed Individual**	
	Yes	No	Yes	No
HPLP-II	**123.22±1.35[a]**	**126.77±0,99[b]**	117.20±5,14	125.70±0.80
SG	24.31±0.33	25.31±0.23	**22.01±0.96[a]**	**25.03±0.19[b]**
HR	19.13±0.29	19.89±0.22	19.20±1.25	19.63±0.17
PA	17.31±0.35	17.60±0.24	16.87±1.13	17.51±0.20
N	19.77±0.26	20.49±0.19	19.93±0.88	20.24±0.16
IR	23.90±0.30	24.21±0.22	**21.20±0.87[a]**	**24.16±0.18[b]**
SM	18.80±0.23	19.28±0.18	18.00±1.15	19.14±0.14

Values are presented mean±standart deviation.

[a,b] values means; different letter statistically different from each other ($p<0.05$).

HPLP-II: Health Promoting Lifestyle Profile-II, I: Income, E: Expenditure, SG: Spiritual Growth, HR: Health Responsibility, PA: Physical Activity, N: Nutrition, IR: Interpersonal Relations, SM: Stress Management

The correlation between PPS-10 with HPLP-II mean scores was found as -0.375. This correlation was statistically significant ($p<0.01$). Statistically significant correlations between PPS-10 and all subscales of HPLP-II was shown in "Table 6" ($p<0.01$).

Table 6

*Correlation between PPS-10 and subscales of HPLP-II (tüm değerlere ** konulacak)*

	PSS-10	**HR**	**PA**	**N**	**SG**	**IR**	**SM**
PSS-10	-	-0.244**	-0.301**	-0.163**	-0.437**	-0.212**	-0.342**
HR		-	0.482**	0.527**	0.502**	0.534**	0.539**
PA			-	0.525**	0.419**	0.351**	0.482**
N				-	0.409**	0.371**	0.493**
SG					-	0.659**	0.605**
IR						-	0.546**
SM							-

PSS-10: Perceived Stress Scale-10, SG: Spiritual Growth, HR: Health Responsibility, PA: Physical Activity, N: Nutrition, IR: Interpersonal Relations, SM: Stress Management

** means that $p<0.05$, ** means that $p<0.01$*

Discussion

Dental education is considered to be an extremely stressful process in many respects. Because it depends of a broad spectrum of theoretical knowledge in addition to communication and clinical skills, education life is also demanding (Mocny-Pachońska, 2020). This study is based on evaluating the stress perceptions and differentiating healthy lifestyle behaviors of the dental faculty students who are isolated due to the pandemic and receive online education.

Discussion of Sociodemographic Variables

Findings of the recent study according to sociodemographic variables showed that the majority of the students participating in the study are in the PC group. The PC group includes 1st, 2nd and 3rd year students, and INT group includes 4th and 5th grade students. This may be due to the higher number of students studying in the first 3 grades. The majority of students participating in the recent study were females. According to Council of Higher Education input indicators, the number of female students placed in the Faculty of Dentistry at Atatürk University is higher than the number of male students (yok.atlas, 2022). Most of the students stated that they had a moderate economic status. Turkey was among the low-middle-income group countries in 1955-2005, and it has been in the high-middle-income group countries since 2005. Among the countries in the middle income group, Turkey is one of the three countries that have stayed in this income group for the longest time (Alçın & Güner, 2015). Although the number of family members at risk of contracting Covid-19 was relatively high, only 15 students' family members were diagnosed with Covid.

Discussion of Stress-Related Findings

In the recent study, students from INT group, female students, and those who have a household member in the COVID-19 risk group showed higher PSS-10 scale and "Perceived Helplessness" subscale scores. The "Perceived Self-efficacy" value was significantly higher only if there were family members in the risk group for COVID. The fact that COVID-19 is a newly discovered virus, its rapid transference, high mortality rate, and distress about what might happen in the future can be causes of stress. Similarly, several authors have shown that COVID-19 leads to negative psychological disturbances such as anxiety symptoms, acmes, or post-traumatic stress disorder (Wang, Di, Ye & Wei, 2020). Despite various adjustements made to suppress the infectiousness of the virus during the pandemic, such as social distancing and self-isolation, number of cases and mortality rate continues to increase. According to the reported cases in April 20, 2020, Turkey was the country with the seventh highest number of cases reported, and as of March 07, 2022, Turkey ranked eighth (Dong, Du & Gardner, 2020). Faculties including dentistry were either postponing opening until October 2020 or were using online education methods. The inability to practice clinical practices, which form the basis of dental education, is responsible for the deterioration of students' psychological status. A survey showed that 24.9% of college students suffer from stress due to the outbreak (Özdin & Bayrak Özdin, 2020). White (2022) stated that college students experienced high anxiety and stress during COVID-19 pandemic. Younger adults struggling with Covid-19 were in the high risk group associated with mental health breakdown (Breslau et al., 2021). As expected, our stress-related findings revealed a strong detrimental effect of the pandemic on students' perception of stress.

Özdede and Şahin (2020) stated that education level does not affect students' **stress** levels. In our study, INT students showed higher stress levels in contrast with the study of Loh et al. (2005). INT students' anxiety about pandemic might have been related to the influence of the self-isolation on their lacking dental education and future employment. Also, increased level of stress in INT group was thought to be related to the high-risk of contamination doe to dental procedures with a close contact to the patients when face-to-face education starts. Otherwise, students' increased susceptibility to stress may have been caused by weakened relationships between people resulting from social isolation. Lack of interpersonal communication leads to the emergence and worsening of anxiety disorders (Boon & Yoshimura, 2020).

Studies showed that women are more susceptible to emotional disorders than men. According to previous researches, post-traumatic stress disorder symptoms are more likely to be seen among females after pandemics, and during the COVID-19 outbreak, women had three times higher levels of

anxiety disorder than men (Wang, Di, Ye & Wei, 2020; Adams et al., 2014). Bakioğlu et al. (2020) found that anxiety of COVID-19 was significantly higher among females in a study conducted on 960 adults. Recent studies have shown that the prevalence of depression and stress experienced during the outbreak is higher in females (Moghanibashi-Mansourieh, 2020; Zhou et al., 2020). In the light of our current knowledge, it is not an unexpected finding that women had higher PSS-10 scores in this study.

Chronic diseases such as advanced age, obesity, cardiovascular diseases, respiratory system diseases, and hypertension have been defined as the risk factors to be considered the most for 2019 novel coronavirus (2019-nCoV)-related mortality. Bakioğlu, Korkmaz and Ercan (2020) found that the level of COVID-19 fear did not differ according to the risk of a relative contracting the disease. In other studies, individuals with a family member, relative or friend infected with COVID-19 have a significant level of anxiety and fear (Moghanibashi-Mansourieh, 2020; Wang et al., 2020). Cao et al. (2020) stated that college students' concerns about the pandemic were connected to their parents or a relative infected with COVID-19 they lived with. Due to the high contagiousness of the coronavirus, it may be suggested that the infection of family members or close relatives with COVID-19 is an effective risk factor in college students' relevance of the pandemic. Parallel to all these findings, we found statistically significant difference in terms of PSS-10 and subscale scores between individuals living with a person who has increased risk level of COVID-19. However, no significant difference was found among students living with a family member contracted COVID-19. This may be because the number of students living with family members contracted COVID-19 is very low.

Studies have shown that the pandemic has significant effects on the economic status of the nation and individuals in addition to the national health status. Family members and students who have seen their income flow stopped due to the pandemic can worry for paying for nutrition, care and tuition fees (Manjula, 2020; McKee & Stuckler, 2020). In contrast to these studies, we found no significant difference between students according to their economic situations. The reason for this may be the low level (13.5%) of students in our study who stated that their financial income was insufficient. Paralel to our survey, as a result of a study aiming to determine the reasons that cause stress in students and to determine the relationship between stress and the variables of gender, age, income level, success level, place of residence, there was no significant difference at perceived stress scores in terms of family income variable (Özgan, Balkar & Eskil, 2008).

Discussion of Findings associated with Healty Life-Style Routine

When the HPLP-II total score of the participants was evaluated, the mean score for PC is 126.48 ± 0.93, and the mean score for INT is 123.51 ± 1.31. HPLP-II total score was affected by students' grade, financial status, and existence of risky family member. Financial status created difference in PA, N, and SM subscales. Male gender only increased scores of PA subscale. IR subscale scores showed an increase in PC group who did not have a family member who contracted COVİD-19.

In a survey that included dentistry students, the mean score of all grades was found to be 125.84 (Arpağ, Adigüzel & Öztürk, 2020). In a study conducted with nursing students, the total score was 128.16 (Al-Kandari & Vidal, 2007). The highest score that can be obtained for HPLP-II is 208, so we can interpret that the healthy lifestyle behaviors of our study group is at a medium level. The subscales of the scale showed a positive correlation with total HPLP-II scores.

It is impressive that the participants achieved the lowest score in the physical activity subscale and the highest score in the spiritual growth subscale. In previous studies conducted in Turkey, the highest scores were witnessed in the areas of spiritual development, and the lowest scores were detected in physical activity subscales. The mean scores of spiritual growth in our study are consistent with the findings of studies conducted in Japan and Turkey (Nacar et al., 2014; Wei et al., 2012). Similar to our results, studies have reported that the lowest scores were obtained in the exercise subscale (Gore et al., 2020). The COVID-19 pandemic, on the one hand, increases the stress levels of individuals, causing a wide range of psychological problems; on the other hand, it affects people's healthy lifestyle habits. It has been shown that obeying social isolation rules decreases the level of physical activity. WHO periodically states that a healthy lifestyle should be adopted to protect mental and physical health during COVID-19 restrictions (World Health Organization, 2019). Male students obtained a statistically significantly higher score in the "physical activity" subscale among students

participating in our survey. The findings of our research are similar to some studies in the literature. The distinction between the physical activities of male and female students can be explained by biological and sociocultural behaviors (Gore et al., 2020). It was stated that men and women spend their free time differently. Men have relatively more free time for exercise, while women mostly have routine house chores in their free time (World Health Organization, 2019).

In our study, the "interpersonal relationship" subscale values were found to be statistically significantly higher (24.43 ± 2.21) in PC group students. Studies have reported that the increase in the grade level of students and the average score of interpersonal relations was directly proportional and this increase was significant (Alpar, Şenturan, Karabacak & Sabuncu, 2008). This situation may be related to the inability of the students who are left behind from their internship training, concerned about their future vocational inadequacy and prospects of not being able to find a job, and not having enough interpersonal support. While education level was effective in "interpersonal relationships" subscale, it did not cause any difference in total HPLP-II and other subscale scores.

As the students' financial situation improved, their HPLP-II scores and the "stress management" subscale scores increased statistically. Our findings also indicated that students with better economic status were more likely to assess their physiological activities and nutrition. Obtained data are consistent with studies conducted in other countries (Nacar et al., 2014). Arpağ et al. (2020) found that students with a higher income received higher scores in the physical activity subscale than those with lower income. Recent studies determined that HPLP-II total and subscale mean scores of students statistically significantly increased with their level of economic status (Çalışkan, Arberk & Üner, 2017).

The total HPLP-II score of participants living with individuals at risk of developing COVID-19 was significantly lower. This could be due to fear for a family member who appears to be in danger. The insufficiency of effective treatment for COVID-19 has made non-pharmacological interventions (NPIs) necessary for individuals and relatives seen at risk. NPIs include mandatory home isolation. Isolation at home increases unhealthy diet, screen time, and sedentary activities, and reduces the time spent outdoors (Balanzá–Martínez, Atienza–Carbonell, Kapczinski &De Boni, 2020). Significantly higher stress scores of the same group support these findings. The significantly low "spiritual growth" and "interpersonal relations" scores of students living with a family relative diagnosed with COVID-19 in their household is evidence of the negative impact of COVID-19 on anxiety, fear, stress and healthy life behaviors. Significant correlation between PPS-10 with HPLP-II and correlation between PPS-10 with HPLP-II subscales shows that as the stress level of students increase, they move away from healthy living habits.

Conclusion

The results of present study affirmed that during the COVID-19 pandemic, the stress levels of students increased and their daily healthy living habits were affected as a result of the precautions and restrictions imposed. It has been showed that there is a concrete interconnection between students' stress perception and healthy living habits.

For the maintenance of public health, it is a necessary to provide information and services to individuals on maintaining healthy lifestyle behaviours during COVID-19 pandemic. In terms of limitations, as in other cross-sectional studies, our study contains detailed information about a particular period of the pandemic. However, further studies with participants from different countries and various groups at different stages of the pandemic are necessary.

References

Adams, Z.W., Sumner, J.A., Danielson, C.K., McCauley, J.L., Resnick, H.S., Grös, K., Paul, L.A., Welsh, K.E., & Ruggiero, K.J. (2014). Prevalence and predictors of PTSD and depression among adolescent victims of the Spring 2011 tornado outbreak. *Journal of child psychology and psychiatry*, 55 (9): 1047-55. doi: 10.1111/jcpp.12220

Al-Kandari, F., & Vidal VL. (2007). Correlation of the health-promoting lifestyle, enrollment level, and academic performance of College of Nursing students in Kuwait. *Nursing & health sciences*, 9 (2): 112-9. doi: 10.1111/j.1442-2018.2007.00311.x

Alçın, S., & Güner, B. (2015). Orta gelir tuzaği: Türkiye üzerine bir değerlendirme. *Marmara Üniversitesi İktisadi ve İdari Bilimler Dergisi*, 37(1), 27-45. doi: 10.14780/iibd.66467

Arpaci, I., Karataş. K., & Baloğlu, M. (2020). The development and initial tests for the psychometric properties of the COVID-19 Phobia Scale (C19P-S). *Personality and Individual Differences*, 110108. doi: 10.1016/j.paid.2020.110108

Alpar, Ş.E., Şenturan, L., Karabacak, Ü., & Sabuncu N. (2008). Change in the health promoting lifestyle behaviour of Turkish University nursing students from beginning to end of nurse training. *Nurse Education in Practice*, 8 (6): 382-8. doi: 10.1016/j.nepr.2008.03.010

Arpağ, O., Adigüzel, M., & Öztürk C. (2020). Diş hekimliği öğrencilerinin sağlikli yaşam biçimi davranişlarinin değerlendirilmesi (Evaluatıon of healthy lıfestyle behavıours of dental students). *Atatürk Üniversitesi Diş Hekimliği Fakültesi Dergisi (J Dent Fac Atatürk Uni)* , 30 (2): 233-41. doi: 10.17567/ataunidfd.690713

Bahar, Z., Beşer, A., Gördes, N., Ersin, F., & Kıssal, A. (2008). Sağlıklı yaşam biçimi davranışları ölçeği II'nin geçerlik ve güvenirlik çalışması (Healthy Life Style Behavior Scale II:A Reliability

And Validity Study). *Cumhuriyet Üniversitesi Hemşirelik Yüksekokulu Dergisi (Journal of Cumhuriyet University School of Nursing)*, 12 (1): 1-13.

Bakioğlu, F., Korkmaz, O., & Ercan H. (2020). Fear of COVID-19 and Positivity: Mediating Role of Intolerance of Uncertainty, Depression, Anxiety, and Stress. *International Journal of Mental Health and Addiction*, 1. doi: 10.1007/s11469-020-00331-y

Balanzá–Martínez, V., Atienza–Carbonell, B., Kapczinski, F., & De Boni, R.B. (2020). Lifestyle behaviours during the COVID-19–time to connect. *Acta Psychiatrica Scandinavica*, 141: 399–400. doi: 10.1111/acps.13177

Boon, S.D., & Yoshimura, S.M. (2020). Revenge as social interaction: Merging social psychological and interpersonal communication approaches to the study of vengeful behavior. *Social and Personality Psychology Compass*, 14 (9): e12554. doi: 10.1111/spc3.12554

Breslau, J., Finucane, M.L., Locker, A.R., Baird, M.D., Roth, E.A., & Collins, R.L. (2021). A longitudinal study of psychological distress in the United States before and during the COVID-19 pandemic. *Preventive medicine*, 143, 106362. doi: 10.1016/j.ypmed.2020.106362

Cao, W., Fang, Z., Hou, G., Han, M., Xu, X., Dong, J., & Zheng, J. (2020). The psychological impact of the COVID-19 epidemic on college students in China. *Psychiatry research*, 287. doi: 10.1016/j.psychres.2020.112934

Cohen, S., Janicki-Deverts, D., & Miller, G.E. (2007). Psychological stress and disease. *Jama*, 298 (14): 1685-1687. doi: 10.1001/jama.298.14.1685

Çalışkan, C., Arberk, K., & Üner, S. (2017). Healthy lifestyle behaviors of university students. *Prehospital and Disaster Medicine*, 32 (S1): S213-S. doi: 10.1017/S1049023X17005544

Dong, E., Hongru, D., & Lauren G. (2020). An interactive web-based dashboard to track COVID-19 in real time. *The Lancet infectious diseases* 20(5): 533-34. doi: 10.1016/S1473-3099(20)30120-1

Eskin, M., Harlak, H., Demirkıran, F., & Dereboy, Ç. (2013, October). Algılanan stres ölçeğinin Türkçeye uyarlanması: güvenirlik ve geçerlik analizi. *In New/Yeni Symposium Journal*, 51 (3): 132-140.

Gebo, K.A., Keruly, J., & Moore, R.D. (2003). Association of social stress, illicit drug use, and health beliefs with nonadherence to antiretroviral therapy. *Journal of general internal medicine*, 18(2): 104-11.

Gore, M.N., Menon, K.C., Safai, A.A., Shukla, S., & Yeravdekar, R. (2020). Determinants of health-promoting lifestyles amongst Indian University students. *International Journal of Health Promotion and Education. Research Square*, 1-10. doi: 10.1080/14635240.2020.1726202

Gottschalk, M.G., Domschke, K., & Schiele, M.A. (2020). Epigenetics underlying susceptibility and resilience relating to daily life stress, work stress, and socioeconomic status. *Frontiers in Psychiatry*, 11: 163. doi: 10.3389/fpsyt.2020.00163

Holden, C.L., Rollins, P., & Gonzalez, M. (2022). Health-Promoting Behaviors, Relationship Satisfaction, and Resilience Among a Community Sample. *Contemporary Family Therapy*, 1-11. doi: 0.1007/s10591-021-09624-3

Hoying, J., Melnyk, B.M., Hutson, E., & Tan, A. (2020). Prevalence and Correlates of Depression, Anxiety, Stress, Healthy Beliefs, and Lifestyle Behaviors in First-Year Graduate Health Sciences Students. *Worldviews on Evidence-Based Nursing*, 17 (1): 49-59. doi: 10.1111/wvn.12415

Https://yokatlas.yok.gov.tr/lisans.php?y=101410012. (2022)

Huang F, Wang H, Wang Z, Zhang J, Du W, Su C, Jia X, Ouyang, Y., Wang, Y., Li, L., Jiang, H., & Zhang, B. (2020). Psychometric properties of the perceived stress scale in a community sample of Chinese. *BMC psychiatry*, 20 (1): 1-7. doi: 10.1186/s12888-020-02520-4

Karasar, N. (2020). *Bilimsel araştirma yöntemi: Kavramlar, ilkeler, teknikler (Scientific research method: Concepts, principles, techniques)*. Ankara: Nobel Akademik Yayıncılık Eğitim Danışmanlık Tic. Ltd. Şti.

Loh, L.C., Ali, A.M., Ang, T.H., & Chelliah, A. (2005). Impact of a spreading epidemic on medical students. The Malaysian journal of medical sciences: *MJMS*, 12 (2): 43-49.

Manjula Bai, H. (2020). The Socio-Economic Implications of the Coronavirus Pandemic (COVID-19): A Review. *ComFin Research*, 8 (4): 8–17. doi: 10.34293/

commerce.v8i4.3293

Mansor, A.Z. (2012). Google docs as a collaborating tool for academicians. *Procedia - Social and Behavioral Sciences*, 59: 411 – 419. doi: 10.1016/j.sbspro.2012.09.295

McKee, M., & Stuckler, D. (2020). If the world fails to protect the economy, COVID-19 will damage health not just now but also in the future. *Nature Medicine*, 26 (5): 640-2. doi: 10.1038/s41591-020-0863-y

Mocny-Pachońska, K., Doniec, R., Trzcionka, A., Pachoński, M., Piaseczna, N., Sieciński, S., Osadcha, O., Łanowy, P., & Tanasiewicz, M. (2020). Evaluating the stress-response of dental students to the dental school environment. *PeerJ*, 8: e8981. DOİ:10.7717/peerj.8981

Moghanibashi-Mansourieh, A., (2020). Assessing the anxiety level of Iranian general population during COVID-19 outbreak. *Asian journal of psychiatry*, 51: 102076. doi: 10.1016/j.ajp.2020.102076

Nacar, M., Baykan, Z., Cetinkaya, F., Özer, A., Karaoğlu, N., & Yılmaze, G. (2014). Health promoting lifestyle behaviour in medical students: a multicentre study from Turkey. *Asian Pacific Journal of Cancer Prevention*, 15 (20): 8969-8974. doi: 10.7314/APJCP.2014.15.20.8969

O'Connor, D.B., Gartland, N., & O'Connor, RC. (2020). Stress, cortisol and suicide risk. *International review of neurobiology*, 152: 101-30. doi: 10.1016/bs.irn.2019.11.006

Onaemo, V.N., Fawehinmi, T.O., & D'Arcy, C. (2020). Alcohol Use Disorder and the Persistence/Recurrence of Major Depression. *The Canadian Journal of Psychiatry*, 65 (9). doi: 10.1177/0706743720923065

Organization WH. Global action plan on physical activity 2018-2030: more active people for a healthier world: World Health Organization; Licence: CC BY-NC-SA 3.0 İGO; 2019.

Özdede, M., & Sahin, S. (2020). Views and anxiety levels of Turkish dental students during the COVID-19 pandemic. *Journal of Stomatology*, 73 (3): 123-8. doi: 10.5114/jos.2020.96867

Özdin, S., & Bayrak Özdin, Ş. (2020). Levels and predictors of anxiety, depression and health anxiety during COVID-19 pandemic in Turkish society: The importance of gender. *International Journal of Social Psychiatry*, 66 (5): 504–511. doi: 10.1177/0020764020927051

Özgan, H., Balkar, B., & Eskil, M. (2008). Eğitim fakültesi öğrencileri tarafindan sinifta algilanan stres nedenleri ve kişisel değişkenlerin strese olan etkisi (Causes of stress perceived by education faculty students in the classroom and the effect of personal variables on stress). *Elektronik Sosyal Bilimler Dergisi (Electronic Journal of Social Sciences)*, 7 (24): 337-50.

Roberti, J.W., Harrington, L.N., & Storch, E.A. (2006). Further psychometric support for the 10-item version of the perceived stress scale. *Journal of College Counseling*, 9 (2): 135-47. doi: 10.1002/j.2161-1882.2006.tb00100.x

Salari, N., Hosseinian-Far, A., Jalali, R., Vaisi-Raygani, A., Rasoulpoor, S., Mohammadi, M., Rasoulpoor, S., & Khaledi-Paveh, B. (2020). Prevalence of stress, anxiety, depression among the general population during the COVID-19 pandemic: a systematic review and meta-analysis. *Globalization and health*, 16 (1): 1-11. doi: 10.1186/s12992-020-00589-w

Smith, T., Johns-Wolfe, E., Shields, G.S., Malat, J., Jacquez, F., & Slavich, G.M. (2020). Associations between lifetime stress exposure and prenatal health behaviors. *Stress and Health*, 36: 384–395. doi: 10.1002/smi. 2933

Tan, S.Y., & Yip, A. (2018). Hans Selye (1907–1982): Founder of the stress theory. *Singapore medical journal*, 59 (4): 170. doi: 10,11622/smedj.2018043

Torales, J., O'Higgins, M., Castaldelli-Maia, J.M, & Ventriglio, A. (2020). The outbreak of COVID-19 coronavirus and its impact on global mental health. *International Journal of Social Psychiatry*, 66 (4): 317-320. doi: 10.1177/0020764020915212

Walker, S.N., Sechrist, K.R., & Pender, N.J. (1987) The health-promoting lifestyle profile: development and psychometric characteristics. *Nursing research*, 36 (2): 76–81. doi: 10.1097/00006199-198703000-00002

Wang, C., Pan, R., Wan, X., Tan, Y., Xu, L., Ho, C.S., & Ho, R.C. (2020). Immediate psychological responses and associated factors during the initial stage of the 2019 coronavirus disease (COVID-19) epidemic among the general population in China. *International journal of environmental research and public health*, 17 (5): 1729. doi: 10.3390/ijerph17051729

Wang, Y., Di, Y., Ye, J., & Wei, W. (2020). Study on the public psychological states and its related factors during the outbreak of coronavirus disease 2019 (COVID-19) in some regions of China. *Psychology, Health & Medicine*, 26 (1): 13-22. doi: 10.1080/13548506.2020.1746817

Wei, C.N., Harada, K., Ueda, K., Fukumoto, K., Minamoto, K., & Ueda, A. (2012). Assessment of health-promoting lifestyle profile in Japanese university students. *Environmental health and preventive medicine*, 17 (3): 222-7. doi: 10.1007/s12199-011-0244-8

White, H.A. (2022). Need for cognitive closure predicts stress and anxiety of college students during COVID-19 pandemic. *Personality and Individual Differences*, 187, 111393. doi: 10.1016/j.paid.2021.111393

Zhou, S.J., Zhang, L.G., Wang, L.L., Guo, Z.C., Wang, J.Q., Chen, J.C., Liu, M., Chen, X., & Chen, J.X. (2020). Prevalence and socio-demographic correlates of psychological health problems in Chinese adolescents during the outbreak of COVID-19. *European Child & Adolescent Psychiatry*, 29: 749–758. doi: 10.1007/s00787-020-01541-4