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# Burnout status among Health and Non-Health Sciences students during the COVID-19 pandemic: a nutritional perspective

*Estado de Burnout entre estudantes de Ciências da Saúde e Não-Ciências da Saúde durante a pandemia da COVID-19: uma perspectiva nutricional*

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## ABSTRACT

### Objective

The study aimed to assess the factors associated with burnout among university students studying online during the COVID-19 lockdown, with a focus on nutrition and lifestyle habits.

### Methods

This cross-sectional web-based study was conducted with university students in Türkiye. Demographic characteristics, dietary habits, dietary supplement usage, the Multidimensional COVID-19 scale, and the Maslach Burnout Inventory-Student Scale of university students were questioned with an online survey.

### Results

A total of 747 students (health science faculties:68.9% and non-health faculties:31.1%) participated in the study. Non-health sciences students had higher median scores of emotional exhaustion (17 vs 15), cynicism (13 vs 10), and total Multi-Dimensional COVID-19 scale (84 vs 80) than health sciences students (respectively;  $p=0.001$ ,  $p<0.001$ ,  $p<0.001$ ). The emotional exhaustion score was positively associated with thoughts about COVID-19 ( $\beta=0.266$ ,  $p<0.001$ ) and negatively with paying attention to diet ( $\beta=-1.142$ ,  $p=0.005$ ). Students who consumed meat, eggs, and legumes at least once a day had lower emotional exhaustion ( $\beta=-0.925$ ,  $p=0.029$ ), cynicism scores ( $\beta=-0.804$ ,  $p=0.025$ ), and higher academic efficacy ( $\beta=0.550$ ,  $p=0.034$ ). Consumption of milk and dairy products at least once a day was negatively related to emotional exhaustion ( $\beta=-0.844$ ,  $p=0.033$ ) and cynicism ( $\beta=-0.817$ ,  $p=0.015$ ). Students who consumed at least five daily portions of fruit and vegetables had greater academic efficacy ( $\beta=0.669$ ,  $p=0.015$ ).

## Conclusion

Faculty, grade, thoughts about COVID-19, precautions taken related to COVID-19, and paying attention to diet are the factors that affect students' burnout during the COVID-19 pandemic. Health education and adopting healthy eating habits are beneficial for combating burnout in critical periods such as pandemics.

**Keywords:** Burnout. COVID-19. Feeding behavior. Students, health occupations. Students.

## RESUMO

### Objetivo

O estudo teve como objetivo avaliar os fatores associados ao burnout entre estudantes universitários que estudaram online durante o bloqueio da COVID-19, com foco em hábitos nutricionais e de estilo de vida.

### Métodos

Este estudo transversal baseado na web foi realizado com estudantes universitários em Türkiye. Características demográficas, comportamentos nutricionais, uso de suplementos nutricionais, escala Multidimensional COVID-19 e Maslach Burnout Inventory-Student Scale de estudantes universitários foram questionados por meio de um questionário online.

### Resultados

Um total de 747 estudantes (faculdades de ciências da saúde: 68,9% e faculdades não relacionadas à saúde: 31,1%) participaram do estudo. Estudantes de áreas não relacionadas à saúde apresentaram maiores pontuações medianas em exaustão emocional, cinismo e pontuação total na escala Multi-Dimensional COVID-19 do que estudantes de ciências da saúde. A pontuação de exaustão emocional estava positivamente associada aos pensamentos sobre a COVID-19 ( $\beta=0,266$ ,  $p<0,001$ ) e negativamente associada à atenção à dieta ( $\beta=-1,142$ ,  $p=0,005$ ). Estudantes que consumiram carne, ovos e legumes pelo menos uma vez ao dia tiveram menores pontuações de exaustão emocional ( $\beta=-0,925$ ,  $p=0,029$ ) e cinismo ( $\beta=-0,804$ ,  $p=0,025$ ), e maior eficácia acadêmica ( $\beta=0,550$ ,  $p=0,034$ ). O consumo diário de leite e produtos lácteos foi negativamente relacionado à exaustão emocional ( $\beta=-0,844$ ,  $p=0,033$ ) e cinismo ( $\beta=-0,817$ ,  $p=0,015$ ). Estudantes que consumiram pelo menos cinco porções diárias de frutas e vegetais tiveram uma maior eficácia acadêmica ( $\beta=0,669$ ,  $p=0,015$ ).

### Conclusão

Faculdade, série, pensamentos sobre a COVID-19, precauções relacionadas à COVID-19 e atenção à dieta são os fatores que afetam o burnout dos estudantes durante a pandemia da COVID-19. A educação em saúde e a adoção de hábitos alimentares saudáveis são benéficas para combater o burnout em períodos críticos, como pandemias.

**Palavras-chave:** Burnout. COVID-19. Hábitos alimentares. Estudantes de ciências da saúde. Estudantes universitários.

## INTRODUCTION

Burnout is a state of emotional exhaustion, depersonalization, and a reduced sense of personal accomplishment that can occur among individuals working with people in a specific capacity. The term "burnout" was initially utilised to characterise fatigue syndrome noted among mental health practitioners [1,2]. Burnout is a syndrome characterized by emotional exhaustion and cynicism that frequently manifests in individuals engaged in "human work." A crucial feature of burnout syndrome is experiencing heightened emotional exhaustion [3]. Burnout is also likely to occur among students, even though they are not formally employed. From a psychological perspective, their primary activity could be considered "work". They take part in structured, compulsory activities with a clear objective, such as passing exams, attending classes, and finishing assignments. Burnout among students refers to feeling exhausted because of academic pressure, adopting a detached and cynical approach to teaching, and feeling inadequate as a learner [4].

The Coronavirus Disease 2019 (COVID-19) pandemic has severely affected the entire society. A systematic review reported an increase in several psychiatric symptoms, including depression,

stress, anxiety and post-traumatic stress disorder, because of the pandemic in many societies in low-, middle- and high-income countries, including Türkiye [5]. Students were more negatively affected by the pandemic than other demographic groups, according to another study [6]. During the pandemic, burnout symptoms among university students varied, with the majority experiencing mild to moderate symptoms. However, a subset of students experienced alarming levels of symptoms and needed urgent support [7]. However, during the pandemic, research has predominantly focused on burnout among medical and health students [8-10], with comparatively less research [11,12] on burnout among students in the general university population.

Academic degree, socio-economic level, gender, housing, marital status, health problems, mental disorders and sleep problems are among the many factors that influence the burnout status of university students [13]. Maintaining a healthy diet and engaging in physical activity are recognized to have potentially beneficial effects in reducing symptoms of burnout [14,15]. This relationship between diet and mental health is explained by the impact of specific foods or dietary patterns on glycemic control, immunological activation, anti-inflammatory capacity, and gut microbiota [16].

However, to date, no research examining the relationship between healthy eating habits and burnout in university students (either health science or non-health science) during the COVID-19 epidemic has been identified. Therefore, the main objective of this research is to investigate the factors associated with burnout among all university students, with a special focus on dietary and lifestyle behaviours, as well as thoughts, emotions, and cautions related to COVID-19. The secondary aim of the study is to compare health and non-health students regarding these related factors.

## METHODS

This study was designed as a cross-sectional web-based survey conducted with university students studying at universities in Türkiye. The sample of this study consisted of 747 university students from health science faculties (audiology, child development, dentistry, health management, medicine, nursing, and pharmacy) and non-health faculties (science and literature, law, educational sciences, engineering, and others). The sample size was calculated in G\*Power with power analysis as a minimum 213 to evaluate the confounding factors affecting the burnout scale sub-dimensions with 0.5 error ( $\alpha$ ) and 0.95 power ( $1-\beta$ ) in linear regression.

Data was collected between October and November 2021 using convenience sampling methods. An online questionnaire survey link was shared on various social media platforms including Facebook, Instagram, Twitter, and WhatsApp. Participants were encouraged to complete the survey and invite their friends or social network to take part in the study. This approach was deliberately chosen to leverage the network effect and significantly expand the reach beyond the initial connections. The ethical approval for this study was obtained from the Ankara University Ethics Commission, under number 56786525-050.04.04/279716. The study was conducted in accordance with the Declaration of Helsinki, and all participants were ensured to approve the informed consent form at the beginning of the web-based questionnaire. The inclusion criteria for the study are being an undergraduate student at any university in Türkiye and volunteering, and the exclusion criteria are lack of internet access, pregnancy or lactation, diagnosis of any disease including anxiety, depression or psychiatric.

The web-based questionnaire included students' demographic characteristics, dietary habits during COVID-19, and dietary supplement use before and during COVID-19, also "Multi-Dimensional COVID-19 Scale" and "Maslach Burnout Inventory-Student Scale (MBI-SS)". The basic dietary habits were assessed through a series of questions, following dietary recommendations on the national

dietary guidelines. “Do you have breakfast every day?”, “Do you consume milk or dairy products every day?”, “Do you consume at least five portions of vegetables and fruits every day?”, “Do you consume at least one type of meat, eggs or legumes every day?”, and “Do you pay attention to your nutrition?” The questions were answered with a “yes” or “no” option. In addition, to facilitate the correct answer to the question about vegetables and fruits, examples of portion sizes of vegetables and fruits in the Türkiye Dietary Guideline were given as an explanation [17].

The “Multi-Dimensional COVID-19 scale” was developed to evaluate individuals’ feelings, thoughts, and behaviours and the precautions they take against COVID-19 in terms of the psychological effects of the pandemic. This scale, which is based on a 5-point Likert assessment of 22 statements, consists of three sub-dimensions: “Feelings and behaviours related to COVID-19”, “Thoughts about COVID-19,” and “Precautions taken related to COVID-19”. The evaluation of the scale is made based on the total score of each sub-dimension. Higher scores indicate stronger emotions, thoughts, or behaviours related to COVID-19. The “Multi-Dimensional COVID-19 scale” developed by Durak Batıgün and Şenkal Ertürk was found to be valid and reliable in the Turkish population [18].

Maslach Burnout Inventory-Student Scale is based on 5-point Likert evaluations of 13 statements and consists of three sub-dimensions. These sub-dimensions are “Exhaustion” caused by course intensity, “Cynicism” related to students’ mental distance from the lesson, and “Efficacy” related to academic success. Higher scores in the exhaustion and cynicism sub-dimensions and lower scores in the efficacy sub-dimension indicate higher burnout scores. The MBI-SS developed by Schaufeli et al. [19] was found valid and reliable in the Turkish population by Çapri et al. [3].

All statistical analyses were performed using IBM®SPSS® Statistics version 25.0 (Armonk, NY, USA). The results were represented according to the data type and parametric test assumptions. The Chi-square test was applied to evaluate categorical variables, and the Mann-Whitney U test was used to compare quantitative variables among independent groups. Since quantitative variables were not provided parametric test assumptions, generalized linear regression analysis was performed to investigate the predictor or confounding factors associated with MBI-SS sub-dimension scores. Also, the regression model was adjusted for the following potential confounding factors: sex, presence of chronic disease, having a history of COVID-19 diagnosis, having a person diagnosed with COVID-19 in their social circle, having a dead person due to COVID-19 in their social circle, presence of chronic disease, the scores of feelings and behaviours related to COVID-19. A *p*-value less than 0.05 was considered statistically significant in all performed analyses. The manuscript follows the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) recommendations.

## RESULTS

A total of 747 university students participated in this study, most (83.8%) women. Data from 19 participants were excluded due to missing data and lack of eligibility. The mean age was 21.20 (2.57) years. Health sciences students (N=515, 68.9%) were more than twice as many non-health sciences students (N=232, 31.1%). Most students (95.9%) did not have a chronic disease, and most of the students (76.4%) had known someone diagnosed with COVID-19 (Table 1).

According to Table 2, the proportion of dietary supplement use was similar among health sciences (16.9%) and non-health sciences students (13.4%) prior to the COVID pandemic. However, during the pandemic, the use of dietary supplements was significantly more common among health sciences students (27.6%) than among other students (20.7%) (*p*=0.046). There were also significant differences between the two groups regarding dietary habits and physical activity changes (*p*=0.001) during the pandemic. Among health sciences students, the proportion of those who consumed at least five portions of fruit and vegetables (24.9%) and at least once a day of meat, eggs, and legumes

(77.3%), and those who paid attention to their diet (46.4%) was higher than the students of non-health sciences (respectively 18.1%, 69.0%, and 34.1%). No significant difference was found between health sciences and non-health sciences students regarding other dietary habits.

**Table 1** – Sociodemographic and pandemic characteristics of university students during the COVID-19 Pandemic (n=747).

Characteristics	n	%
Gender		
Women	626	83.8
Men	121	16.2
Age, Mean± Standard deviation	21.20±2.57	
Program		
Health sciences	515	68.9
Non-health sciences	232	31.1
Presence of chronic disease		
Yes	31	4.1
No	716	95.9
Having a history of COVID-19 diagnosis		
Yes	129	17.3
No	618	82.7
Having a person diagnosed with COVID-19 in their social circle		
Yes	571	76.4
No	176	23.6
Having a dead person due to COVID-19 in their social circle		
Yes	231	30.9
No	516	69.1

**Table 2** – Comparison of dietary supplement use, physical activity, and dietary habits of health (n=515) and non-health sciences (n=232) students during the COVID-19 Pandemic (n=747).

Variables	Total		Health sciences		Non-health sciences		p<0.05 <sup>a</sup>
	n	%	n	%	n	%	
Dietary supplement use-before COVID-19 pandemic							
Yes	118	15.8	87	16.9	31	13.4	p=0.221
No	629	84.2	428	83.1	201	86.6	
Dietary supplement use-during COVID-19 pandemic							
Yes	190	25.4	142	27.6	48	20.7	<b>p=0.046</b>
No	557	74.6	373	72.4	184	79.3	
Change in doing physical activity during the COVID-19 pandemic							
More than before	81	10.8	64	12.4	17	7.3	<b>p=0.001</b>
Not change	130	17.4	102	19.8	28	12.1	
Less than before	536	71.8	349	67.8	187	80.6	
Doing breakfast every day during the COVID-19 pandemic							
Yes	484	64.8	337	65.4	147	63.4	p=0.583
No	263	35.2	178	34.6	85	36.6	
Consumption of at least five portions of fruit and vegetables per day during the COVID-19 pandemic							
Yes	170	22.8	128	24.9	42	18.1	<b>p=0.042</b>
No	577	77.2	387	75.1	190	81.9	
Consumption of milk and dairy products at least once a day during the COVID-19 pandemic							
Yes	487	65.2	347	67.4	140	60.3	p=0.062
No	260	34.8	168	32.6	92	39.7	
Consumption of meat, eggs, or legumes at least once a day during the COVID-19 pandemic							
Yes	558	74.7	398	77.3	160	69.0	<b>p=0.016</b>
No	189	25.3	117	22.7	72	31.0	
Paying attention to nutrition during the COVID-19 pandemic							
Yes	318	42.6	239	46.4	79	34.1	<b>p=0.002</b>
No	429	57.4	276	53.6	153	65.9	

Note: <sup>a</sup>Chi-Squared test. p<0.05 highlighted in bold.

Non-health sciences students had higher emotional exhaustion [17.00 (12.25-21.00),  $p=0.001$ ] and cynicism scores [13.00 (10.00-16.00),  $p<0.001$ ] but lower academic efficacy scores [11.50 (10.00-14.00),  $p=0.003$ ] than health sciences students [respectively, 15.00 (11.00-19.00), 10.00 (8.00-14.00), and 12.00 (10.00-15.00)]. The total score of the Multi-Dimensional COVID-19 scale of non-health sciences students [84.00 (75.00-93.00)] also were higher than health sciences students [80.00 (71.00-89.00),  $p<0.001$ ]. Non-health sciences students showed stronger thoughts [32.00 (29.00-36.00),  $p=0.001$ ], feelings and behaviours related to COVID-19 [30.00 (25.00-35.75),  $p=0.038$ ] and precautions taken regarding COVID-19 [22.00 (20.00-24.00),  $p<0.001$ ] compared to health sciences students [respectively, 31.00 (28.00-34.00), 29.00 (24.00-34.00), 21.00 (18.00-23.00)] (Table 3).

**Table 3** – Comparison of sub-dimensions scores of the MBI-SS and Multi-Dimensional COVID-19 scale of health (n=515) and non-health sciences (n=232) students during the COVID-19 Pandemic (n=747).

Scores	Total	Health sciences	Non-health sciences	$p<0.05^a$
	Median (25-75 percentile)	Median (25-75 percentile)	Median (25-75 percentile)	
MBI-SS-Emotional exhaustion	15.00 (11.00-20.00)	15.00 (11.00-19.00)	17.00 (12.25-21.00)	<b>0.001</b>
MBI-SS-Cynicism	11.00 (8.00-15.00)	10.00 (8.00-14.00)	13.00 (10.00-16.00)	<b>&lt;0.001</b>
MBI-SS-Academic efficacy	12.00 (10.00-14.00)	12.00 (10.00-15.00)	11.50 (10.00-14.00)	<b>0.003</b>
Multi-Dimensional COVID-19 Scale-Feelings and behaviours related to COVID-19	29.00 (24.00-35.00)	29.00 (24.00-34.00)	30.00 (25.00-35.75)	<b>0.038</b>
Multi-Dimensional COVID-19 Scale-Thoughts about COVID-19	31.00 (28.00-35.00)	31.00 (28.00-34.00)	32.00 (29.00-36.00)	<b>0.001</b>
Multi-Dimensional COVID-19 Scale-Precautions taken related to COVID-19	21.00 (18.00-23.00)	21.00 (18.00-23.00)	22.00 (20.00-24.00)	<b>&lt;0.001</b>
Multi-Dimensional COVID-19 Scale-Total score	82.00 (72.00-90.00)	80.00 (71.00-89.00)	84.00 (75.00-93.00)	<b>&lt;0.001</b>

Note: <sup>a</sup>Mann-Whitney U test.  $p<0.05$  highlighted in bold.

The factors associated with the dimensions of burnout syndrome are shown in Table 4. Results of the generalized linear model show that students of health science students were more likely to have lower scores in emotional exhaustion ( $\beta=-0.985$ ,  $p=0.014$ ) and cynicism scores ( $\beta=-1.818$ ,  $p<0.001$ ), and higher scores in academic efficacy ( $\beta=0.819$ ,  $p=0.001$ ). Having a higher year of education was more likely to have higher scores in emotional exhaustion ( $\beta=0.523$ ,  $p<0.001$ ) and cynicism ( $\beta=0.293$ ,  $p=0.015$ ) and lower scores in academic efficacy ( $\beta=-0.523$ ,  $p<0.001$ ). The eating habits of the students were also associated with burnout syndrome. Students who paid attention to nutrition and consumed meat, eggs, and legumes at least once a day had lower emotional exhaustion (respectively,  $\beta=-1.142$ ,  $p=0.005$  and  $\beta=-0.925$ ,  $p=0.029$ ), cynicism scores (respectively,  $\beta=-0.823$ ,  $p=0.017$  and  $\beta=-0.804$ ,  $p=0.025$ ), and higher academic efficacy (respectively,  $\beta=0.627$ ,  $p=0.012$  and  $\beta=0.550$ ,  $p=0.034$ ). Consumption of milk and dairy products at least once a day was negatively related to emotional exhaustion ( $\beta=-0.844$ ,  $p=0.033$ ) and cynicism ( $\beta=-0.817$ ,  $p=0.015$ ). Additionally, students who consumed at least five daily portions of fruit and vegetables had greater academic efficacy ( $\beta=0.669$ ,  $p=0.015$ ). However, using dietary supplements before or during the COVID-19 pandemic was not associated with burnout syndrome ( $p>0.05$ ). Moreover, COVID-19-related thoughts and precautions were found to be associated with some sub-dimensions of burnout syndrome ( $p<0.05$ ), while the score for COVID-19-related feelings and behaviours showed no association with any of the burnout sub-dimensions ( $p>0.05$ ). Students with more intense thoughts about COVID-19 had higher emotional exhaustion ( $\beta=0.266$ ,  $p<0.001$ ) and cynicism scores ( $\beta=0.192$ ,  $p<0.001$ ). Those with stronger precautions taken regarding COVID-19 had higher academic scores ( $\beta=0.166$ ,  $p<0.001$ ) and lower cynicism scores ( $\beta=-0.105$ ,  $p<0.045$ ).

**Table 4** – The results of the generalized linear model, including factors related to emotional exhaustion, cynicism, and academic efficacy scores of university students during the COVID-19 Pandemic (n=747).

Independent factors	Emotional exhaustion			Cynicism			Academic efficacy		
	$\beta$	SE	$p < 0.05$	$\beta$	SE	$p < 0.05$	$\beta$	SE	$p < 0.05$
Program (Nonhealth science=0, Health science=1)	-0.985	0.400	<b>0.014</b>	-1.818	0.338	<b>&lt;0.001</b>	0.819	0.245	<b>0.001</b>
Year of education (Number)	0.523	0.142	<b>&lt;0.001</b>	0.293	0.120	<b>0.015</b>	-0.236	0.087	<b>0.007</b>
Paying attention to nutrition*	-1.142	0.408	<b>0.005</b>	-0.823	0.345	<b>0.017</b>	0.627	0.250	<b>0.012</b>
Consumption of milk and dairy products at least once a day*	-0.844	0.396	<b>0.033</b>	-0.817	0.335	<b>0.015</b>	0.262	0.243	0.281
Consumption of meat, eggs, or legumes at least once a day*	-0.925	0.425	<b>0.029</b>	-0.804	0.359	<b>0.025</b>	0.550	0.260	<b>0.034</b>
Consuming at least five daily portions of fruit and vegetables*	-0.621	0.447	0.165	-0.201	0.378	0.596	0.669	0.274	<b>0.015</b>
Doing breakfast every day*	0.208	0.396	0.600	0.589	0.335	0.078	-0.298	0.242	0.220
Thoughts about COVID-19 (Number)	0.266	0.049	<b>&lt;0.001</b>	0.192	0.041	<b>&lt;0.001</b>	0.007	0.030	0.821
Precautions taken related to COVID-19 (Number)	-0.099	0.062	0.110	-0.105	0.052	<b>0.045</b>	0.166	0.038	<b>&lt;0.001</b>
Dietary supplement use during COVID-19*	0.736	0.502	0.142	0.790	0.424	0.063	-0.399	0.308	0.195
Dietary supplement use- before COVID-19*	-0.649	0.588	0.269	-0.811	0.497	0.103	0.248	0.360	0.491

Note: \*No=0, Yes=1. Adjusted for gender, presence of chronic disease, having a history of COVID-19 diagnosis, having a person diagnosed with COVID-19 in their social circle, having a dead person due to COVID-19 in their social circle, the scores of feelings and behaviours related to COVID-19.  $\beta$ : Standardized Coefficients; SE: Standard Error.  $p < 0.05$  highlighted in bold.

## DISCUSSION

This study explored burnout factors among university students during the COVID-19 pandemic, with a specific emphasis on dietary and lifestyle behaviours and COVID-19-related thoughts, emotions, and precautions. Additionally, it compared the circumstances of health and non-health students. The study's principal outcome is that non-health science students, students with more advanced years of education, those who pay less attention to their diet, and those who do not practice some healthy eating habits during the pandemic are at higher risk in terms of emotional exhaustion, cynicism, and lower academic efficacy.

Research has indicated relationships between burnout and COVID-19, stress, depression, and anxiety [8,11,15,20]. A rapid systematic review of findings demonstrated that anxiety levels remained stable among health science students throughout the COVID-19 pandemic, whereas anxiety levels increased among non-health science students and the general population [21]. Furthermore, a Chinese study reported that students in non-health faculties had higher burnout scores than those in health science faculties during the COVID-19 pandemic [22]. The results of this research suggest that non-health science students reported greater burnout symptoms than their health science counterparts, experienced higher levels of negative emotions such as anxiety, fear, and sadness related to COVID-19, and perceived the severity and duration of the pandemic more negatively. Health sciences students' knowledge of infectious diseases, their prevention and treatment, and their greater familiarity with the concept of pandemic may have caused them to be less affected by the COVID-19 period and to have less burnout. Interestingly, health sciences students were found to have lower scores of precautions taken related to COVID-19 compared to non-health sciences students. A possible explanation may be non-health sciences students' stronger thoughts, feelings, and behaviours related to COVID-19. Because the scores obtained from other sub-dimensions of the Multi-Dimensional COVID-19 Scale (feelings and behaviours related to COVID-19 and thoughts about COVID-19) were higher in non-health students. However, this behavioural difference needs to be examined in further research.

On the other hand, adequate and balanced nutrition is essential for the immune system to function healthily, so a healthy diet is one of the leading preventive measures that can be taken against COVID-19 [23]. This study showed that although the precautions taken by non-health sciences students against virus transmission such as wearing masks, hand washing, and paying attention to social distancing were higher than by health sciences students, important immune supportive behaviours such as general healthy eating habits and levels of attention to nutrition were lower. This may be because non-health sciences students have less knowledge about the importance of healthy nutrition compared to health sciences students. As a matter of fact, the importance of healthy lifestyle habits in the prevention and treatment of diseases is well emphasized in the education programs of health sciences students.

Healthy lifestyle habits are associated with reducing the risk of burnout [15,24]. Healthy eating and exercise are not only directly related to burnout but also indirectly through their effects on burnout-related stress, anxiety, and depression [14,15,25-27]. The role of some foods, food components, and dietary patterns in the pathogenesis of mental disorders is well known. For instance, Mediterranean-style diets, provide benefits for mental function via plant compounds and nutrients [28]. Another study found that plant-based diets are associated with lower psychological stress in female college students [29]. Some studies suggest that a higher intake of non-refined grains, fruits, and vegetables is associated with a lower risk of depression and anxiety symptoms [30-32]. The study discovered a noteworthy correlation between being attentive to nutrition, dietary habits, and burnout, which is in line with the existing literature. Specifically, meat-egg and legumes consumption was associated with all sub-dimensions of burnout. Milk and dairy consumption were also found to be negatively associated with emotional exhaustion and cynicism. Furthermore, it was found that consuming fruits and vegetables has a positive correlation with academic efficiency. Therefore, another possible factor in explaining why health science students experienced less burnout than non-health science students may be related to their dietary habits during the pandemic.

This study showed that during the pandemic process, a higher year of education was associated with a higher risk of emotional exhaustion, cynicism, and lower academic efficacy. This relationship has also been observed in earlier research investigating burnout among students before [33,34] and during [34,35] the COVID-19 pandemic. Another study found that senior students suffered from higher rates of burnout during online education compared to the pre-COVID-19 period and this was related to the pressure created by the abrupt cessation of professional practices affecting senior students [9]. In a study of medical students, 84.3% expressed concerns about the practical components of online education, while 78.8% reported less motivation to learn online. In addition, decreased learning motivation was associated with burnout [36]. Although clinical experiences are particularly emphasised in health sciences, students from other faculties also undertake internships in their final year to obtain professional qualifications, and such experiences are equally valuable for them. In parallel with this, a study of 30,383 university students found that the transition to online education has led to concerns among students about their future careers [37]. The lack of laboratory and clinical applications is one of the disadvantages of online education, which is also associated with burnout.

The strength of this study is that it contributes to the literature in terms of comparing the burnout status of health sciences and non-health sciences students during the COVID-19 pandemic. Another strength of the study is that the scales used were validated for the Turkish population. This study has some limitations, one of them is typical of cross-sectional studies, which is the inability to present causality. Also, an online questionnaire shared in various groups limits the generalizability of

the findings to the all students, as it may have led to a selection bias among internet users who are interested in burnout and/or COVID-19 pandemic. Although it complies with the national dietary guideline, the fact that dietary habits were not questioned with a validated scale is a limitation of the study. Another limitation of this study is that the health sciences and non-health sciences groups did not have similar sample sizes, and the related factors could not be analysed separately for the two groups. The study was completed with university students who voluntarily participated in the online questionnaire, so it is not appropriate to generalize these findings to all university students.

## CONCLUSION

This study shows that during the pandemic, non-health sciences students were more afraid of COVID-19, emotional exhaustion and cynicism scores were higher, and academic efficacy scores were lower compared to health sciences students. Furthermore, faculty, years of education, COVID-19-related thoughts, and precautions, paying attention to diet, and consuming milk, dairy products, meat, eggs, and legumes at least once a day were identified as factors influencing university students' burnout during the pandemic. It is seen that health education is beneficial for combating critical periods such as pandemics and improving healthy lifestyle behaviours. In this context, it is recommended to improve the health and nutrition literacy levels of not only health education students but also non-health science university students. In addition, it can be said that adopting healthy eating habits will be beneficial in terms of combating burnout in university students.

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