

## Türkiye’de Covid-19 Pandemisi Sırasında Bir Grup Adölesanda Algılanan Stresin Değerlendirilmesi

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### Özet

**Amaç:** Covid-19 virüsünü kontrol altına almak için dünya genelinde getirilen kısıtlamalar, ruh sağlığını etkileyen yaygın bir sosyal izolasyona yol açmıştır. Bu kısıtlamalar, duygusal destek ihtiyacının özellikle arttığı bu dönemde için ergenler için özellikle zor olabilir. Bu çalışma, pandeminin ilk döneminde Algılanan Stres Ölçeği-10’un (ASÖ-10) Türkçe versiyonunu kullanarak Covid-19 pandemisinin bir grup adölesan üzerindeki Algılanan Stres (AS) etkisini belirlemeyi amaçlamıştır.

**Materyal ve Metot:** Google Dokümanlar platformu aracılığıyla 14-18 yaş arası 316 adölesana kesitsel bir anket uygulanmıştır. Analiz, IBM SPSS Statistics sürüm 1.0.0.1347 (IBM, New York, ABD) kullanılarak yapılmıştır. Demografik verilerin kategorik değişkenlerini analiz etmek için ki-kare testleri, bağımsız örneklem için gruplar arasında daki farklılıkları karşılaştırmak amacıyla t-testi kullanılmıştır. Ortalama fark, 0.05’te istatistiksel olarak anlamlı kabul edilmiştir.

**Bulgular:** Çalışmaya 316 adölesan dahil edilmiştir. Adölesanlarda orta düzeyde AS (19,91±3,54) tespit edilmiştir. Erkekler kızlardan anlamlı derecede daha yüksek puan almış ( $p=0,046$ ), daha yüksek aile gelir grubu, düşük aile gelir gruplarından önemli ölçüde daha yüksek bir AS göstermiştir ( $p<0.05$ ;  $F=5.144$ ). Ebeveynlerinin sağlık çalışanı olduğunu bildiren adölesanların, ebeveynlerinin sağlık çalışanı olmadığını bildiren adölesanlara kıyasla daha yüksek AS’ye sahip olduğu bulunmuştur. Çoklu doğrusal regresyon analizi, daha yüksek aile gelirinin ASÖ-10 puanlarını 1,71 ( $p=,016$ ) artırdığını göstermiştir.

**Sonuç:** Bu çalışmada artan pandemi önlemlerine paralel olarak adölesanların algıladıkları stress düzeyine ve buna bağlı olarak artması muhtemel ruh sağlığı sorunlarına dikkat çekmeyi amaçladık. Sonuçlarımız, tahminlerimiz doğrultusunda, bilhassa ebeveynleri sağlık çalışanı olan adölesanlarda AS düzeyinin daha yüksek olduğunu, ek olarak gelir düzeyi fazla olan erkek adölesanların daha fazla AS’ye sahip olduklarını göstermektedir. ASÖ-10 kullanıcı dostudur ve özellikle pandemi sırasında hızlı bir ölçüm sağlayarak yalnızca birkaç dakika içinde uygulanabilmektedir.

**Anahtar Kelimeler:** Algılanan Stres, Algılanan Stres Ölçeği, Covid-19, Adölesan

## Evaluation Of Perceived Stress Among A Group Of Adolescents During The Covid-19 Pandemic In Turkey

### Abstract

**Objectives:** Restrictions imposed worldwide to contain the Covid-19 virus have led to widespread social isolation affecting mental health. These restrictions can be particularly challenging for adolescents during this period when the need for emotional support is particularly heightened. This study aimed to determine the Perceived Stress (PS) impact of the Covid-19 pandemic on a group of adolescents using the Turkish version of the Perceived Stress Scale-10 (PSS-10) during the first period of the pandemic.

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**Materials and Methods:** A cross-sectional survey was administered to 316 adolescents aged 14–18 years who were invited to participate in the online survey via the Google Docs platform. The analysis was conducted using IBM SPSS Statistics version 1.0.0.1347 (IBM, New York, USA). Chi-squared tests were used to analyze the categorical variables of the demographic data, and the *t*-test was used to compare the differences between the groups for the independent samples.

**Results:** A sample of 316 adolescents were enrolled in the study. The study population reported moderate levels of PS ( $19.91 \pm 3.54$ ). Boys scored significantly higher than girls ( $p=0.046$ ). The higher family income group showed a significantly higher PS than low-income groups ( $p<0.05$ ;  $F=5.144$ ). Participants who reported mother's and father's job were health care workers (HCWs) had higher PS compared with participants who reported mother's and father's job wasn't related HCWs. Multiple linear regression analysis showed the higher family income increased their PSS-10 scores by 1.71 ( $p=.016$ ).

**Conclusion:** In this study, we aimed to draw attention to the level of stress perceived by adolescents in parallel with the increasing pandemic measures and the possible mental health problems that may increase accordingly. Our results show that, in line with the predictions, the level of AS is higher, especially in adolescents whose parents are health workers, and in addition, male adolescents with higher income levels have more AS. The ASQ-10 is user-friendly and can be administered in just a few minutes, providing a rapid measurement, especially during a pandemic.

**Key Words:** Perceived Stress, PSS-10 (Perceived Stress Scale-10), covid-19, adolescent

## Introduction

On March 11, 2020, the World Health Organization (WHO, 2020) declared the novel coronavirus disease (Covid-19) a global pandemic because people in many countries were being rapidly infected (Bao, Sun, Meng, Shi & Lu, 2020). At the same day, the Turkish government also announced a quarantine even though this has negative psychological effects on people, such as acute stress, anxiety, and depressive symptoms, and even the possibility of post-traumatic stress disorder (Taylor, Agho, Stevens & Raphael, 2008).

Covid-19 has caused public panic and mental health stress, and the high number of confirmed cases globally has increased public fear (Bao, et al., 2020).

Studies have found that the public has experienced negative emotional responses to Covid-19, such as symptoms of anxiety and depression (Liao, Cowling, Lam & Fielding, 2014; Van Bortel et al., 2016). It has further been ascertained Covid-19 has caused moderate-to-severe symptoms of anxiety and depression in about one-third of Chinese adults (Wang et al., 2020). Notwithstanding, the number of cases and distribution of stress and anxiety symptoms among adolescents have not been established. Adolescents are a particularly vulnerable group as they face increasingly complex issues (Membride, 2016). The depressive and anxiety symptoms among Chinese adolescents affected by the outbreak of Covid-19 were assessed with the Patient Health Questionnaire (PHQ-9) and the Generalized Anxiety Disorder (GAD-7) questionnaire (Zhou et al., 2020).

Longitudinal studies show that experiences such as instability in family relationships and aggression in childhood are associated with mental health problems in adolescence (Bakker et al., 2012; Schwartz et al., 2014). In addition, difficulties experienced between parents and children, such as family discord, have been found to be associated with adult mental health problems later in life (Weich et al., 2009; Pompili et al., 2014). It has been suggested that the relationship between parents and adolescents may be negatively affected by pandemic quarantines and other pandemic-related factors (Prime et al., 2020).

Although adolescents' relationships with their families continue to be at the center of their social development, peer relationships become much more important during this period (Flynn et al., 2017).

Therefore, in addition to good relationships within the family during adolescence, healthy relationships with peers and being in communication with them are important factors that contribute to adolescents' well-being.

Remembering that adolescence is a period of independence, adolescents' efforts to become independent from their parents result in increased time spent with peers, and for the first time, peer groups become the primary source of influence instead of parents (Meuwese et al. 2017).

The quarantine measures taken in the pandemic are likely to have more negative effects on adolescents than adults because many of the basic tasks of adolescence are performed by interacting with other people (Blakemore & Mills, 2014; La Greca & Prinstein, 1999; Papini et al., 1990). Loneliness is associated with a range of negative outcomes in adolescents, including poor physical and mental health (Eccles et al., 2020). Pandemic lockdowns have led to a severe reduction in social contacts, possibly increasing experiences of loneliness and psychological distress (Barari et al., 2020).

Considering the developmental characteristics of adolescence, it is possible to argue that the sources of social and emotional disorders observed in adolescents during this period, together with pandemic-induced restrictions, are that adolescents conduct their education online, spend most of their time indoors, and are physically separated from their peers, which means that the risk of developing psychological problems during the Covid-19 pandemic may increase (Magson et al., 2021).

Nevertheless, few studies have quantified about perceived stress during quarantines (Pedrozo-Pupo, Pedrozo-Cortes & Campo-Arias, 2020). However, most of the available studies dealing with the stress experience of health workers during pandemic do not consider outpatient care separately. Indeed, there is no studies that have qualitatively examined the overall situation in high school children in Turkey. In particular, no comprehensive studies have been conducted on the mental health status of high school students facing the pandemic using PSS-10.

The Perceived Stress Scale (PSS), one of the most widely used psychological scales, was developed by Cohen and Williamson (Cohen & Williamson, 1998) and it has shown sufficient reliability and validity ((Cohen & Williamson, 1998; Cohen, Kamarck & Mermelstein, 1983). The Turkish version of the PSS-10 was developed by Eskin et al (Eskin, Harlak, Demirkıran & Dereboyu, 2013).

The Cohen PSS was originally developed in 1983 as a 14-item Likert type questionnaire in order to measure one's own perception and appraisal of life events as stressful (Cohen & Williamson, 1998). Four questions were dropped from the PSS14- when it was found that they did not load on either of the two factors obtained using exploratory factor analysis for the PSS14-. The PSS10- was found to have adequate reliability and validity and a slightly higher internal reliability than PSS14- (Alpha coefficient of 0.78 vs. 0.75). The 10 items in the scale inquire about feelings and thoughts that tap the degree to which respondents find their current life situation unpredictable, uncontrollable and stressful. The higher the score the higher the perceived stress is. The scale correlates with different psychosocial measures specifically depression, anxiety, and perception of poor health as well as with decreased satisfaction with self, job and life in general (Cohen et al, 1983; Roberti, Harrington & Storch, 2006).

The aim of the present study to identify the impact of Covid-19 pandemic on Perceived Stress (PS) among a group of adolescents using the Turkish version of the PSS-10. In addition, we want to evaluate relationship between perceived stress and age, gender, having healthcare workers parents during Covid-19 pandemic and who have infected by Covid-19.

## Methods

**Ethical approval:** This study was approved by the ethics committee of the Bakırköy Dr. Sadi Konuk Hospital (approval number 2020-200). The procedures for this study complied with the provisions of the Declaration of Helsinki regarding research on human subjects.

## Participants

All participants were randomly selected from Bahçelievler Oral and Dental Health Hospital's Pediatric Dentistry Clinic's during the dates between 01.01.2019 to 31.12.2019. The study participants aged 14–18 years who were invited to participate in the online survey via the Google Docs platform on May, 2020 during partial closure in pandemic.

Online survey was send for parents who were informed that the children should fill in the questionnaire themselves. Therefore, all participants answered questions voluntarily and alone. Besides parents choosed inclusion and/or exclusion criteria appropriating their child's.

## Inclusion and Exclusion criterias

Inclusion criterias were: (1) age 14 years or older; (2) healthy children; (3) being informed parents about the study and willing to participate in the survey.

Exclusion criterias were: a history of mental illness; or suffering from other brain organic lesions or serious physical diseases; psychiatric disorders (such as depression, anxiety, psychosocial stress) and chronic diseases.

Elimination criteria were: (1) filling out the electronic questionnaire in too short a period of time; and (2) submission of a questionnaire that was obviously inconsistent with the actual situation.

After removing the data of the participants, 316 participants were included in the analysis.

## PSS-10

The Turkish version of the PSS-10 was used to measure the degree of the perception of stress (e.g., "In the last month, how often have you felt nervous and stressed?") on a five-point response scale where from 0= "Never" and 4 = "Very often" (Behice, 2006; Eskin, Harlak, Demirkıran & Dereboy, 2013).

The participants with scores ranging between 0 and 13 were deemed to have low PS associated with Covid-19, those scoring between 14 and 26 were deemed have moderate PS associated with Covid-19, and those with scores of 27 and above had high levels of PS associated with Covid-19.

In this study, we used the Turkish version of PSS-10 and sociodemographic questions as well as additional psychological factors to measure the responses to the validated and standardized self-report inventories. We included gender, age, parents' occupations, and Covid-19 positive (+) test results as predictive factors. To provide differentiated norm values, standard deviations, mean sum scores, and the percentiles of each factor of the PSS-10 were calculated separately for gender and age.

## Analysis of Data

The analysis was conducted using IBM SPSS Statistics version 1.0.0.1347 (IBM, New York, USA) and descriptive statistics (frequency, mean, standard deviation, range) were used to describe the characteristics of the sample, perceived stress, and their relationship with some of the factors. One-way analysis of variance and a post hoc analysis using the Scheffé test were performed to examine the differences in PS among the adolescents during the COVID-19 pandemic. Chi-squared tests were used to analyze the categorical variables of the demographic data, and the *t*-test was used to compare the differences between the groups for the independent samples. The mean difference was considered statistically significant at 0.05. Although it was stated that regression analysis was performed in the findings section, these analyzes were not mentioned in the statistical analysis section. All statistics made must be specified.

## Finding

A sample of 316 adolescents were enrolled in the study. The observed statistical power was 1.0 with an alpha = 0.05 and a sample error of 0.00.

The PSS-10 scores differed based on the sociodemographic variables of gender, parental occupation, and income class. The mean  $\pm$  standard deviation (SD) age of the respondents was  $15.97 \pm 1.24$  years. Among the adolescents, 185 (58.55%) were girls, and their mean age was  $16.00 \pm 1.19$  years. A total of 131 (41.45%) of the participants were boys, and their mean age was  $15.94 \pm 1.31$  years. The mean of the PSS-10 was  $19.88 \pm 7.04$ . The majority of the study population 202 (63.92%) reported moderate levels (ranged between 14 and 26) of PS ( $19.91 \pm 3.54$ ). *Table 1* shows the Mean $\pm$ SD levels of the PSS-10 scores.

**Table 1.** Mean±SD of Low, Moderate and High level of Perceived Stress Scale (PSS-10) scores

Level of PSS-10 scores n(%)	mean±SD	p
<b>Low</b> 56 (17.72%)	9.34±3.01	0.000
<b>Moderate</b> 202 (63.92%)	19.91±3.54	
<b>High</b> 58 (18.35%)	29.95±2.92	
<b>Total</b> <b>N=316</b>	19.88 ±7.04	

There were gender differences among the item descriptive statistics in the PSS-10 for both the positive items (items 4, 5, 7, and 8) and the negative items (1, 2, 3, 6, 9, 10;  $p < 0.05$ ). The most negative response score for an item in the scale was for "In the last month, how often have you felt confident about your ability to handle your personal problems?" (mean score  $\pm$  SD,  $2.27 \pm 1.07$ ), whereas the most positive response was for "In the last month, how often have you felt nervous and "stressed"?" (mean  $\pm$  SD,  $1.57 \pm 1.14$ ). The descriptive statistics for each item of the PSS-10 are presented in **Table 2**.

**Table 2.** Item Descriptive Statistics for the Perceived Stress Scale (PSS-10)

Item In the last month. how often...	Mean $\pm$ SD
1 ...have you been upset because of something that happened unexpectedly?	2.14 $\pm$ 1.12
2 ...have you felt that you were unable to control the important things in your life?	1.93 $\pm$ 1.17
3 ...have you felt nervous and "stressed"?	1.57 $\pm$ 1.14
4 ...have you felt confident about your ability to handle your personal problems?	2.27 $\pm$ 1.07
5 ...have you felt that things were going your way?	1.90 $\pm$ 1.10
6 ...have you found that you could not cope with all the things that you had to do?	2.18 $\pm$ 1.15
7 ...have you been able to control irritations in your life?	2.22 $\pm$ 1.09
8 ...you felt that you were on top of things?	2.08 $\pm$ 1.10
9 ...you been angered because of things that were outside your control?	1.79 $\pm$ 1.13
10 ...have you felt difficulties were piling up so high that you could not overcome them?	1.82 $\pm$ 1.24
Total score	19.88 $\pm$ 7.04

The boys scored ( $21.85 \pm 6.78$ ) significantly higher on the PSS-10 than the girls ( $18.48 \pm 6.89$ )  $p = 0.046$ ;  $F = 1.462$ . Those in the 14–15-year age group showed a significantly higher level of PS than those in the 17–18-year age group ( $p < 0.05$ ;  $F = 6.132$ ). The higher family income group also showed a significantly higher level of PS than the low-income groups ( $p < 0.05$ ;  $F = 5.144$ ; **Table 3**).

**Table 3.** Comparisons of PSS-10 scores for Age and Family Income

AGE	PSS-10 Score Mean SD	F	p	AGE	14	15	16	17	18
14 (N=32)	21.88±6.48			14		0.814	0.357	0.010*	0.001*
15 (N=98)	21.55±6.97	6.132	0.000	15	0.814		0.335	0.002*	0.001*
16 (N=82)	20.57±7.32			16	0.357	0.335		0.0028*	0.001*
17 (N=58)	18.02±6.33			17	0.001*	0.002*	0.0028*		0.081*
18 (N=46)	16.02±6.02			18	0.001*	0.001*	0.001*	0.081*	

FAMILY INCOME	PSS-10 scores Mean ± SD	F	p	FAMILY INCOME	0-5000	5001-10000	10001-15000	15001 +
(0-5000) (N=147)	18.91±6.66			0-5000		0.947	0.014*	0.001*
(5001-10000) (N=81)	18.98±6.75			5001- 10000	0.947		0.027*	0.004*
(10001-15000) (N=39)	21.97±7.18	5.14	0.002	10001-15000	0.014*	0.027*		0.677
(15001+) (N=49)	22.59±7.63			15000 +	0.001*	0.004*	0.677	

The participants who reported that their mothers were health care workers had higher levels of PS (20.50±7.75) compared to those who reported that their mother's occupation was not related to health care (19.83 ± 6.99) (p=0.667). Similarly, the participants who reported that their fathers were health care workers had higher levels of PS (24.63 ±5.89) compared with those who reported that their father's occupation was not related to health care (19.88±7.03) (p=0.002).

The participants who received COVID-19 + test results reported higher levels of PS compared with the participants who had received COVID-19 – test results; although this difference was not statistically significant (p > 0.05). The confirmed cases in the family also did not affect the PSS-10 scores in the study group (p > 0.05; **Table 4**).

**Table 4.** Perceived Stress Scale (PSS-10) score of adolescent's Covid-19 (+) test results and confirmed cases in the family

COVID-19 test (students) N=66	PSS-10 score	p
COVID-19 (+) N=7	21.00±8.44	0.584
COVID-19 (-) N=59	19.34 ± 7.44	
confirmed cases in the family	PSS-10 score	p
COVID-19 (+) N= 28	17.79 ±7.61	0.100
COVID-19 (-) N=288	20.08 ± 6.96	

Multiple linear regression analysis was carried out for all the demographic factors, including age, gender, mother's occupation, father's occupation, Covid-19 test result, and confirmed/suspected cases of Covid-19 in the family. These factors explained 20% of the model. High PS in the boys ( $B = 5.78$ ;  $p = 0.002$ ) was important as it was related to the total PSS-10 score for the adolescents. Furthermore, a higher family income increased their PSS-10 scores by 1.71 ( $p = 0.016$ ; **Table 5**).

**Table 5.** Multiple linear regression model predicting the level of PSS-10 scores related to sociodemographic variables in adolescents whose parents are healthcare professionals

Model	B	Unstandardized Coefficients		Standardized Coefficients		Collinearity Statistics	
		Std. Error	Beta	t	P	Tolerance	VIF
1	(Constant)	16.706	1.195		13.981	.000	
	@2.Gender	5.794	1.716	.389	3.376	.001	1.000
2	(Constant)	13.371	1.771		7.551	.000	
$R^2=0.202$	@2.Gender	5.478	1.656	.368	3.308	.002	.994
	@5.Family income	1.718	.694	.275	2.476	.016	.994

a. Dependent Variable: PSS-10 SCORE

## Discussion

Our results confirmed that the pandemic was perceived as a stressful experience. The participants declared that, on average, the pandemic had a strong impact on their daily routines. Limitations to their personal freedom and changes in their emotions have been found to have a significant impact on adolescents' personal well-being and psychological distress (Flesia, Fietta, Colicino, Segatto & Monaro, 2020).

As a result of Covid-19, all the cities in Turkey have shut down schools at all levels indefinitely. Students have joined the online classes because they have been isolated at home and have not travelled anywhere. These online platforms have supplied online psychological support for students during the pandemic and reduced the risk of virus transmission owing to the absence of face-to-face contact. During online education, teachers should evaluate students' anxiety and depressive symptoms and contact their parents to arrange effective interventions (Zhou et al., 2020).

In this study, the prevalence of high PS was 18.35%, which was relatively lower than the results of previous studies. In Taylor's et al (2008) study, 34% of the participants reported high perceived distress levels during an equine influenza quarantine, and reported that 35% of the participants suffered from high levels of psychological distress (Qui et al, 2020). During the pandemic, the prevalence of depressive and anxiety symptoms in middle and high school students in China was 43.7% and 37.4%, respectively (Zhou et al, 2020). Similar to the values reported during the SARS outbreak in 2003, which placed the scores at 18.5 (Chua et al., 2004). Different study found that the mean PS score among an Italian population was 18.81 (Flesia et al, 2020). The mean values of the single items of the PSS-10 suggested that, in addition to feeling nervous and stressed, feeling unable to control one's personal life was the feeling that accounted most for PS. This in turn implies that the unpredictability and uncontrollability characterizing the pandemic play a significant role in PS during the crisis ((Flesia et al, 2020).

Furthermore, we found that the PS scores were higher for the boys than the girls. But some studies found that higher level of stress among girls than boys in different countries (Cohen & Janicki-Deverts, 2012; Nordin & Nordin, 2013). Shuang-Jiang Zhou et al. showed that female students have suffered from greater psychological impact, as well as higher levels of stress, anxiety, and depressive symptoms, during the Covid-19 outbreak. This finding is consistent with previous epidemiological studies that found that women were at a higher risk of depression (Lim et al, 2018). A similar study among students found that female students were more likely to be anxious (Putwain, 2007). In contrast, researchers found no significant gender differences with respect to stress among college students during the

pandemic in China (Cao et al., 2020). Hormones that increase during puberty, especially testosterone increase, begin to change all the thoughts and behaviors of the male adolescent's brain (Archer, 2009). The vasopressin hormone affected by testosterone makes the adolescent more "sensitive and fragile" compared to childhood (Shirtcliff, 2009).

On the other hand, with the concentration of hormones during adolescence, it is observed that boys are more bored than normal, more unresponsive and less surprised (Becker et al., 2007). In order for the brain of a male adolescent in this age to be affected more intensely, the adolescent must either be deeply afraid or shocked (Bell et al., 2006). The sudden impact of the coronavirus on the world can also be considered to have such a profound effect on adolescents, especially those who are physician parents or whose family unexpectedly develop virus-related deaths. And also, it seems possible for the adolescent, who tends to hide their emotions in face-to-face communication, to express these emotions in an online questionnaire in which their identity information will not be revealed.

In terms of grades, Zhou et al (2020) stated that the higher the grade, the greater the risk of depressive and anxiety symptoms, with senior high school being a risk factor for depressive and anxiety symptoms. In comparison to, our results showed that the 14–15-year-old adolescents felt significantly more stressed than those who were 17–18 years old. It seems normal that the 14-15 age group is less mature in terms of cognitive development compared to the 17-18 age group. It seems normal that the 14-15 age group is less mature in terms of cognitive development compared to the 17-18 age group, therefore both their abstract assessment skills and affect regulation skills are still developing, and therefore fail to manage their emotions in a situation that their parents are also concerned about. The most important feature of a pandemic is that it is unexpected, contradictory statements about whether it is real or not, the inability to perceive the extent of the damage it will cause and therefore paralyze the existing coping mechanisms. Therefore, the younger group seems more likely to be more intense anxiety about this unknown (Steinberg & Cauffman, 1996; Luna, 2009).

During the pandemic, people have been worried about being infected due to the rising numbers of patients and increased contact between people without Covid-19 and those who are Covid-19 positive (Bao et al., 2020). Factors such as the fact that one or two of their parents are doctors and works in the field during the pandemic process, the long working hours of the doctors due to the uncertainty of the process, especially in the first period of the pandemic, the limited meeting with them to protect their families, the loss of their lives as a result of the contamination that occurs in the covid outpatient clinics in our country, confronted their parents with the fact that they could irreversibly lose (Jiao et al., 2020; Dubey, S., Dubey MJ., Ghosh, Chatterjee, 2020). In our study, a small number of the adolescents' parents left their homes to work. These people may have been doctors, nurses, government workers, security workers, or similar who provided essential services for citizens. On the other hand, the adolescents who reported that their mothers or fathers were health care workers had higher levels of PS compared to those who reported that neither parent worked in health care. Younger adults may be more stressed and worried about the loss of their family's income because of their own or their families' infection with the coronavirus (Yan et al., 2020). Considering only the student population, having an infected parent, economic hardships, and/or delayed academic activities can increase their risk of developing anxiety symptoms (Wang, 2020). For Chinese students living in urban areas, a stable family income, living with parents, and good social support were found to be protective factors against anxiety (Carstensen, 1995).

For adolescents whose parents are not health professionals, the destructiveness of the coronavirus may not have been so deeply experienced, which may explain the lower levels of anxiety. At the beginning of the pandemic, statements that this virus affects older people may have created the perception that the coronavirus does not pose a threat to themselves or their relatives in some adolescents (Golberstein, Wen & Miller, 2020).

Family/cohabitation monthly income was negatively correlated with the PSS-10 scores in their study, where higher income was associated with lower levels of PS among adults (Flesia et al., 2020). This result is consistent with those of previous studies; higher income may be associated with less concern about the economic effects of self-isolation or with more comfortable housing (Flesia et al, 2020; Carstensen, 1995). In contrast, we found that higher monthly income was positively correlated with higher PS among the high school students in our study. In Turkey, many high school students who have a higher family income attend college and private schools rather than public schools. One of the outcomes of the pandemic is that some families will lose either their entire or part of their income, and their children may feel anxious about the payment of their school tuition and fees. Stable family income was also a significant factor among the students who were experiencing anxiety during the Covid-19 pandemic (Liu et al., 2020). This could be explained by increased psychological and economic pressure. The economic difficulties brought about

by the pandemic raise the fear of losing their jobs, and the disappearance of the wealth level fixed by families with middle-high and high income levels, especially those who manage their own workplaces. Besides, the reflection of the parents' increasing anxiety level on their children in the form of secondary losses may also cause children to develop secondary concerns about the pandemic (Osofsky, JD., Osofsky, HJ. & Mamon, 2020).

We found that the Covid-19 (+) adolescents had higher PS levels than the Covid-19 (-) adolescents. Contrary to our results, one study found that there was no difference between adolescent's anxiety levels and their parents whose healthcare workers stress have been Covid-19 (+) (Sahin, Onal & Hosoglu, 2021). In our study, 10.6% of the participants tested positive for the virus, supporting Flesia's et al. (2020) results.

We found that the PSS-10 scores of the adolescents were affected by gender, family income, and the father and/or mother's occupation as a health care worker. Our findings were similar in Chinese study (Qi et al., 2020).

Face-to-face communication has been limited by restrictions imposed by governments, factors such as interest in social media and increased time spent in front of the screen are also sources of anxiety (Gokler & Turan, 2020; Yildiz & Bektas, 2020; Rolland et al., 2020; Kazan Kizilkurt & Dilbaz, 2020). It is seen that the increase in time spent at home increases the frequency of communication with parents, but it is not known whether this increased communication frequency provides the environment for conflicts or a closer relationship (Losada-Baltar et al., 2021).

It seems possible for parents to experience burnout or to have a decrease in their tolerance towards their children due to their increased workload, household chores, and more intensive work with tasks for children, as a result of working from home (Spinelli, Lionetti, Pastore & Fasolo, 2020).

## Limitations:

One of limitations of this study is that using one scale as Turkish version of PSS-10. There was partial closure during pandemic period when invited participants online survey on May, 2020. Adolescents stayed at home during this period. Everything was changing month by month and pandemic was progressing aggressively. We aimed to use only one scale for taking more realistic answers. Therefore our aim was to evaluate perceived stress solely. The scale was quickly and easily answered by participants.

The other limitation of the study is that it is not clear whether the level of anxiety observed in adolescents is only due to the effect of coronavirus or the closure caused by restrictions altering the balance within the family. We think that some adolescents experience negative domestic situations due to restrictions. Future studies suggested to choose different scales about stress or anxiety levels including families.

## Conclusion

We aimed to draw attention to adolescents in this study because we think that they should receive support to help them cope with pandemic-related stress and get them through this period with a healthier spirit. Longitudinal studies are necessary to determine whether stress are sustained, reduced, or exacerbated over time

**Informed Consent:** Informed consent was not obtained from patients due to the cross-sectional survey of this study. All participants stated that they participated in our study according to their requests by marking the relevant question.

**Ethics committee approval:** Approved by the ethics committee of Bakırköy Sadi Konuk Training and Research Hospital (2020-200).

**Author Contributions:** Conception: B.G.; Design: B.G.; Data collection and/or processing: B.G.; Analysis and/or interpretation: B.G.; S.G.; B.K.; Literature review: B.G.; S.G.; B.K.; Writing: B.G.; S.G.; B.K.

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