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The Effect of Social Media Addiction on Postural Habit and Awareness in High School Students

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ABSTRACT

The aim of this research was to determine whether social media addiction had an effect on high school students' posture habits and awareness. This study has done among high school students in Keşan, Edirne. Sample size was calculated as 770 and 5 high schools in the district with a total number of 956 students were randomly selected by using the cluster sampling method. This study was conducted face-to-face using a 38-questions personal information form, Social Media Addiction Scale for Adolescents (SMASA) and Postural Habits and Awareness Scale (PHAS). In addition to descriptive and inferential analysis, correlation analysis, multivariate linear regression analysis were conducted. Statistical significance level was taken as $p<0.05$. 771 students in high schools in the sample group participated in the research. In this study, 53.8% of participants are women and 34.9% of students attend from high school grade 3. While the mean value of the Social Media Addiction Scale for Adolescents is 20.2 (7.3), the mean value of the Postural Habits and Awareness Scale is 61.2 (7.0). There is a moderately positive correlation between time spent on social media and SMASA score ($p<0.001$; $\tau=0.440$). There is a weak negative relationship

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between SMASA point and PHAS point ($p<0.001$; $r=-0.186$). One standard deviation increase in the SMASA score reduces the PHAS score by 0,115 standard deviation ($p=0.003$). Based on the results of this study, we can conclude that an increase in social media addiction affects a decrease in postural habits and awareness. Nevertheless, social media addiction cannot be attributed as the sole cause of decreased postural habits and awareness. Reducing inappropriate social media use in students and providing students with exercise habits will be beneficial in terms of preventing bad posture habits during adolescence.
Keywords: Adolescents, High School Student, Postural Awareness, Posture, Social Media Addiction

INTRODUCTION

Standing in an upright and balanced position of an individual person is defined as a posture (Fialka-Moser et al., 1994). Considering that all of the musculoskeletal components of the body help to maintain the posture, although the good posture is difficult to define, possible to imply the good posture as the one that provides the least level of pressure on the joints and the structures that support them (Paterson, 2009). The term "postural fault" defines to a posture that deviates from its normal alignment without structural limitations (Fialka-Moser et al., 1994). Bad posture implies may occur as a result of inefficient use or frank misuse of joints and their associated muscles and ligaments, resulting in progressive and, ultimately, irreversible injury to the body, thereof physical disabilities and possibly painful injuries (Paterson, 2009).

Typical posture including when using smartphones or other touchscreen devices primarily includes holding the device with one or both hands below the level of the eyes, looking at it, and touching the screen with the thumb. Due to that behavior, users could adopt a bad posture, such as forward neck flexion for a prolonged period of time (Eitivipart et al., 2018). According to studies, playing digital games and using social media can develop psychological issues in people like depression, anxiety, and unsocialized, as well as musculoskeletal problems (headache, pain in the neck and shoulders, fatigue, bad posture) (Mustafaoğlu et al., 2018; Rahman et al., 2020). Another study discovered that smartphone use significantly increased lumbar lordosis and thoracic kyphosis (Betsch et al., 2021).

Social media usage is increasing day after day. The proportion of internet usage in Türkiye for people between the ages 16 to 74 increased from 82.6% in 2021 to 85.0% in 2022, according to the findings of a household information technologies usage survey conducted by the Turkish Statistical Institute (TURKSTAT) (Turkish Statistical Institute [TURKSTAT], 2022). Again, the previous household information technology usage survey indicated that children ages between 6 to 15 had been using proportion of internet 82.7%. In this survey, 31.3% of children who use the internet regularly claimed to use it for social media. Furthermore, it was observed that children who use social media regularly spend an average of 2 hours and 54 minutes per day on the social media on weekdays, and an average of 2 hours and 44 minutes per day on weekends (TURKSTAT, 2021).

Addiction is the difficulty to stop using a substance or behavior or the impulsive expression of greater interest in it in daily life (Egger & Rauterberg, 1996). Spending more time participating in internet-related activities, continuing to use the internet despite the awareness that it contributes to continuous or recurrent physical, social, occupational, or psychological problems are only a few of Goldberg's suggested diagnostic criteria for Internet Addiction Disorder (Goldberg, 1996).

In the 11th Revision of the International Classification of Diseases (ICD-11), the World Health Organization (WHO) defined it as a health problem under the name of gaming disorder as a model of gaming behavior characterized by impaired control over gaming, prolonged play despite negative consequences, and increased priority given to play (World Health Organisation, 2020). Nevertheless, the WHO has not yet described social media addiction as a disorder.

Sam defined body awareness as "the conscious perception and understanding of one's body, in relation to somatic and internal sensations which one feels" (Sam, 2013). Cramer et al. described postural awareness as the subjective, conscious awareness of one's own body posture based on proprioceptive feedback from the body's periphery to the central nervous system (Cramer et al., 2018).

Despite there has not been much research on social media addiction and postural awareness, a significant relationship between computer/phone use and neck pain was discovered in a study examining the effects of digital game addiction on the musculoskeletal system of secondary school students. Additionally, a significant relationship was seen between game addiction and wrist, back, and low back pain (Cankurtaran et al., 2022).

Adolescence is a period during which the anterior frontal lobe, which controls impulses and behaviors, continues to develop. Furthermore, it can be said that this is a period when hormonal changes are accompanied by an increase in impulsivity, which is associated with taking a risk and acting without considering the consequences. As with all addictions, adolescence is therefore the riskiest period for the development of behavioral addictions including those to the internet, social media, and in parallel with those problems of a similar nature (Turkish Green Crescent Society, 2022). The purpose of this research was to determine whether social media addiction had an effect on high school students' posture habits and awareness.

METHODOLOGY

High school students in the Keşan district of Edirne consist of the population of this cross-sectional study. According to the information obtained from the Provincial Directorate of National Education, the population size is 3,862 people studying in 15 high schools. Taking 95% confidence interval, 5% margin of error, 50% population proportion and design effect as 2, the sample size was calculated as 700 people. Considering the 10% probability of data loss, a sample size of 770 people was calculated. By using the cluster sampling method, 5 high schools in the district with a total number of 956 students were selected by random.

The dependent variables of the study are social media addiction, postural habits and awareness. The independent variables of the study were determined as age, gender, height, weight, grade level, the time spent on social media, (mobile/fixed-line) continuous accessibility to internet, frequency of exercising, condition of having orthopedic vertebral diseases and social media addiction.

The data of the study were collected by two of the researcher face-to-face questionnaires consisting of 38 questions. The questionnaire used consists of three parts: personal information form, Social Media Addiction Scale for Adolescents (SMASA) and Postural Habits and Awareness Scale (PHAS).

Social Media Addiction Scale for Adolescents (SMASA) was developed according to the APA DSM-5 criteria. The scale form is rated on a 5-point Likert scale (Never-1, Rarely-2, Sometimes-3, Often-4, Always-5). The scale consists of 9 items. A participant can get a minimum of 9 scores and a maximum of 45 scores from the scale. The high total score calculated indicates that the partici-

pant's social media addiction is high, and the low total score indicates that the participant's social media addiction is low (Özgenel et al., 2019).

Postural Habits and Awareness Scale (PHAS) consists of 19 items. The scale form is rated on a 5-point Likert scale. Each item of the scale is scored between (1) strongly disagree and (5) strongly agree. Seven items are reverse coded. The Postural Habits (PH) subscale has a maximum possible score of 35, and the Postural Awareness (PA) subscale has a maximum possible score of 60. The maximum total score that can be obtained from the scale is 95. Good posture and awareness are indicated by a high score (Bayar et al., 2022).

Researchers transferred the data to Microsoft Excel and used IBM SPSS Statistics (Version 29.0) to analyze them. Descriptive data of the participants are presented with summary data such as number, percentage, mean, standard deviation, median and interquartile range. Student's t-test, ANOVA, Mann-Whitney U and Kruskal Wallis tests were used to analyze the difference between groups. Pearson and Kendall tau-b correlation analysis were used to analyze the relationship between continuous and ordinal variables. Multivariate linear regression analysis was used to examine the effect of independent variables on the Postural Habits and Awareness Scale score. Statistical significance level was taken as $p<0.05$.

Necessary permissions for this study were approved from Edirne Provincial Directorate of National Education and Istanbul Medipol University Non-Interventional Clinical Research Ethics Committee on 24.11.2022 (Number: E-10840098-772.02-7181).

RESULTS

In this study, the data of 771 high school students in the sample group were included within the scope of the research. As shown in Table 1, 53.8% of the participants are female. 37.5% of students indicated spending between 1-3 hours a day on social media. 27.5% of those responding to the survey said they exercised less than once a week. 85.2% of students do not have any of the orthopedic vertebral diseases specified in the questions, and 95.7% of all students have the right dominant side. Among the orthopedic vertebral diseases indicated, 42 of the participants had only thoracic kyphosis, 18 had only scoliosis, 15 had only loss of cervical lordosis, 13 had only thoracolumbar kyphosis, and 5 had only loss of lumbar lordosis.

Table 1: Identifying characteristics of participants

	n	%
Gender		
Female	415	53.8
Male	356	46.2
Grade		
9th Grade (1st year)	148	19.2
10th Grade (2nd year)	147	19.1
11th Grade (3rd year)	269	34.9
12th Grade (4th year)	207	26.8
Continuous accessibility to mobile internet		
Yes	702	91.1
No	69	8.9
Continuous accessibility to fixed-line internet		
Yes	681	88.3
No	90	11.7
The time spent on social media		
0-1 hour	70	9.1
1-3 hours	289	37.5
3-5 hours	266	34.5
5-7 hours	79	10.2
>7 hours	67	8.7
Frequency of exercising		
Less than once a week	212	27.5
Once a week	166	21.5
2-3 times per week	202	26.2
4-5 times per week	80	10.4
6-7 times per week	111	14.4
Condition of having orthopedic vertebral diseases		
No	657	85.2
Yes*	114	14.8
Thoracic kyphosis	49	6.4
Scoliosis	34	4.4
Thoracolumbar kyphosis	23	3.0
Loss of cervical lordosis	21	2.7
Loss of lumbar lordosis	8	1.0
Dominant side of the body		
Right side	738	95.7
Left side	33	4.3
Total	**771**	**100**

* Because of those with multiple vertebral diseases, the sum of the subgroups exceeds 100%.

As shown in Table 2, mean age of the participant is 16.0 (1.2). While the mean value of the Social Media Addiction Scale for Adolescents is 20.2 (7.3), the mean value of the Postural Habits and Awareness Scale is 61.2 (7.0).

Table 2: Identifying values of the participants' age, height, weight, SMASA and PHAS scores

	Mean (SD)	Median (IQR)
Age	16.0 (1.2)	16.0 (15.0-17.0)
Height (cm)	171.1 (9.3)	170 (165.0-178.0)
Weight (kg)	63.1 (13.6)	60 (53.0-70.0)
SMASA Score	20.2 (7.3)	19 (15.0-25.0)
PHAS Score	61.2 (7.0)	61 (57.0-66.0)
PH Score	21.0 (4.3)	21 (18.0-24.0)
PA Score	40.3 (5.0)	40 (37.0-44.0)

SD, standard deviation; IQR, interquartile range; SMASA, Social Media Addiction Scale for Adolescents; PHAS, Postural Habits and Awareness Scale; PH, Postural Habits Subscale; PA, Postural Awareness Subscale.

As can be seen in Table 3, a significant difference was found between the genders for the SMASA, PHAS, and Postural Habits subscales scores ($p=0.002$, $p=0.009$, and $p<0.001$, respectively). A significant difference was found between the grades for the SMASA scores ($p=0.006$). This significant difference is due to first year of high school get higher scores than other grades students.

Table 3: Comparison of the scale results to the descriptive characteristics of the participants

	n	SMASA	PH	PA	PHAS
		Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
Gender					
Female	415	20.9 (7.3)	20.2 (4.0)	40.4 (4.7)	60.6 (6.7)
Male	356	19.3 (7.1)	21.9 (4.4)	40.1 (5.2)	61.9 (7.2)
p		**0.002**	**<0.001**	0.332	**0.009**
Grade					
9th Grade (1st year)	148	21.8 (7.8)	21.0 (4.4)	40.9 (4.8)	61.9 (7.0)
10th Grade (2nd year)	147	19.6 (7.5)	21.0 (4.2)	39.4 (5.2)	60.4 (7.0)
11th Grade (3rd year)	269	20.3 (7.0)	20.8 (4.4)	40.4 (4.7)	61.2 (7.0)
12th Grade (4th year)	207	19.2 (6.9)	21.1 (4.1)	40.2 (5.0)	61.3 (6.9)
p		**0.006**	0.899	0.057	0.350

SD, standard deviation; SMASA, Social Media Addiction Scale for Adolescents; PH, Postural Habits Subscale; PA, Postural Awareness Subscale; PHAS, Postural Habits and Awareness Scale.

According to Table 4, condition of having orthopedic vertebral diseases resulted in a significant increase in the SMASA, PHAS, and Postural Habits subscales ($p<0.001$ in all comparisons)**.** When vertebral diseases are evaluated in detail, SMASA scores of those with thoracic kyphosis are significantly higher, PHAS and Postural Habits subscale scores are lower ($p=0.007$, $p<0.001$ and $p<0.001$, respectively). Likewise, the score of SMASA is higher in those with thoracolumbar kyphosis, however the scores of Postural Habits subscale are higher in those without thoracolumbar kyphosis and scoliosis ($p=0.001$, $p=0.003$ and $p=0.027$, respectively).

Table 4: Comparison of the scale results against the vertebral diseases the participants have

	n	SMASA	PH	PA	PHAS
		Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
Condition of having orthopedic vertebral diseases					
Yes	114	22.4 (8.2)	18.9 (4.1)	39.6 (5.0)	58.5 (6.4)
No	657	19.8 (7.00)	21.3 (4.2)	40.4 (4.9)	61.7 (7.0)
p		**<0.001**	**<0.001**	0.112	**<0.001**
Thoracic kyphosis					
Yes	49	22.8 (8.2)	18.1 (3.8)	39.0 (4.9)	57.1 (6.5)
No	722	20.0 (7.2)	21.2 (4.2)	40.3 (4.9)	61.5 (6.9)
p		**0.007**	**<0.001**	0.063	**<0.001**
Scoliosis					
Yes	34	22.6 (10.0)	19.4 (4.0)	40.3 (5.5)	59.7 (6.4)
No	737	20.0 (7.1)	21.0 (4.3)	40.3 (4.9)	61.3 (7.0)
p		0.156	**0.027**	0.982	0.181
Thoracolumbar kyphosis *					
Yes	23	26.3 (9.7)	18.7 (4.2)	40.9 (4.7)	59.6 (5.8)
No	748	20.0 (7.1)	21.0 (4.3)	40.2 (4.9)	61.3 (7.0)
p		**0.001**	**0.003**	0.299	0.211
Loss of cervical lordosis *					
Yes	21	21.4 (6.9)	20.1 (4.4)	38.7 (5.1)	58.8 (6.2)
No	750	20.1 (7.3)	21.0 (4.3)	40.3 (4.9)	61.3 (7.0)
p		0.338	0.275	0.122	0.129
Loss of lumbar lordosis *					
Yes	8	17.0 (7.3)	22.5 (4.2)	41.4 (3.6)	63.9 (5.6)
No	763	20.2 (7.3)	21.0 (4.3)	40.2 (4.9)	61.2 (7.0)
p		0.202	0.242	0.556	0.309

*Mann Whitney-U test. SD, standard deviation; SMASA, Social Media Addiction Scale for Adolescents; PH, Postural Habits Subscale; PA, Postural Awareness Subscale; PHAS, Postural Habits and Awareness Scale.

As shown in Table 5, whereas there was no significant difference in SMASA scores between continuous access to mobile and fixed-line internet, a difference was found between the categories of times spent on social media ($p<0.001$). The significant difference in the SMASA results according to the time spent on social media is due to the fact that social media users in other groups scored lower than the following categories.

Table 5: Comparison of SMASA results to the participants' internet usage specifications

		SMASA
	n	**Mean (SD)**
Continuous accessibility to mobile internet		
Yes	702	20.3 (7.3)
No	69	19.0 (6.9)
p		0.187
Continuous accessibility to fixed-line internet		
Yes	681	20.3 (7.3)
No	90	19.0 (6.8)
p		0.102
The time spent on social media		
0-1 hour	70	15.2 (5.7)
1-3 hours	289	17.8 (6.0)
3-5 hours	266	21.0 (6.4)
5-7 hours	79	24.8 (8.2)
>7 hours	67	26.6 (7.9)
p		**<0.001**

SD, standard deviation; SMASA, Social Media Addiction Scale for Adolescents.

As seen in Table 6, the frequency of exercise resulted in a significant variation in the PHAS and PH subscales ($p<0.001$ and $p<0.001$, respectively). The significant difference is due to the lower scores of those who exercised less than once a week compared to the other participants. Furthermore, students with dominant left side determined higher scores on both PHAS and PH subscales ($p=0.013$ and $p=0.017$, respectively).

Table 6: Comparison of PHAS results based on participants' characteristics of exercising and dominant side of their bodies

	n	PH	PA	PHAS
		Mean (SD)	Mean (SD)	Mean (SD)
Frequency of exercising				
Less than once a week	212	19.8 (4.3)	39.3 (5.3)	59.1 (7.6)
Once a week	166	20.7 (4.1)	40.7 (3.9)	61.4 (5.5)
2-3 times per week	202	21.4 (4.3)	40.4 (4.9)	61.8 (7.2)
4-5 times per week	80	21.8 (3.8)	40.8 (5.3)	62.6 (6.0)
6-7 times per week	111	22.2 (4.2)	40.8 (5.2)	63.0 (7.0)
p		**<0.001**	0.023	**<0.001**
Dominant side of the body				
Right side	738	20.9 (4.3)	40.2 (4.9)	61.1 (7.0)
Left side	33	22.7 (4.5)	41.5 (4.3)	64.2 (6.6)
p		**0.017**	0.150	**0.013**

SD, standard deviation; PH, Postural Habits Subscale; PA, Postural Awareness Subscale; PHAS, Postural Habits and Awareness Scale.

Table 7 demonstrates a moderately positive correlation between time spent on social media and SMASA score ($p<0.001$; $\tau=0.440$). A weak negative correlation was found between the SMASA score and the PHAS score ($p<0.001$; $r=-0.186$)**.** Scatter plot of this correlation is shown in Figure 1.

Table 7: The correlation analysis of participants' identifying data and scale scores

		Age	The time spent on social media*	Frequency of exercising*	Height (cm)	Weight (kg)	SMASA Score
SMASA Score	r p	-0.084 **0.019**	0.440 **<0.001**	-	-	-	-
PH Score	r p	0.042 0.241	-0.108 **0.003**	0.195 **<0.001**	0.118 **0.001**	0.093 **0.010**	-0.273 **<0.001**
PA Score	r p	0.007 0.855	-0.064 0.075	0.096 **0.007**	0.007 0.837	-0.029 0.427	-0.026 0.465
PHAS Score	r p	0.031 0.396	-0.112 **0.002**	0.188 **<0.001**	0.077 **0.031**	0.037 0.309	-0.186 **<0.001**

*Kendall's tau. SMASA, Social Media Addiction Scale for Adolescents; PH, Postural Habits Subscale; PA, Postural Awareness Subscale; PHAS, Postural Habits and Awareness Scale.

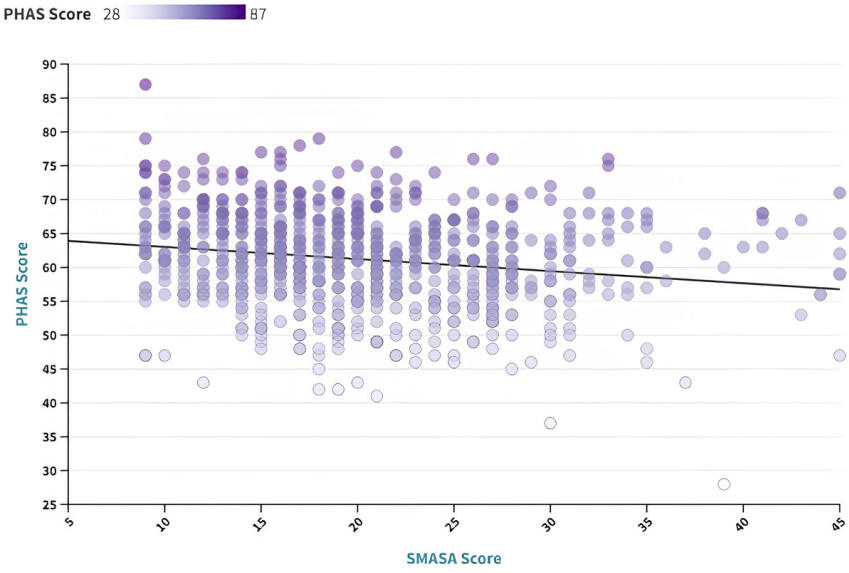

Figure 1. Distribution chart of the relationship between SMASA score and PHAS score. SMASA, Social Media Addiction Scale for Adolescents; PHAS, Postural Habits and Awareness Scale

The regression model developed for analyzing PHAS data is shown in Table 8. The Adjusted R value of the model is 0.087 ($p<0.001$). One standard deviation increase in the SMASA score reduces the PHAS score by 0,115 standard deviation ($p=0.003$).

Table 8: The regression model set up for analysis of PHAS scale results

Variable	β	Standard Error	Beta	t	p
Fixed	50.878	6.795			
Gender*	-0.034	0.699	-0,002	-0.048	0.961
Age	0.277	0.215	0,046	1.286	0.199
Height (cm)	0.025	0.042	0.034	0.601	0.548
Weight (kg)	-0.007	0.024	-0.014	-0.297	0.766
The time spent on social media	-0.350	0.255	-0.053	-1.371	0.171
Having orthopedic vertebral diseases**	-3.031	0.686	-0.154	-4.418	<0.001
Dominant side of the body***	3.142	1.193	0.091	2.633	0.009
Frequency of exercising	0.928	0.188	0.181	4.944	<0.001
SMASA Score	-0.110	0.038	-0.115	-2.931	0.003

R: 0.313 R^2: 0.098 Adj. R: 0.087 p<0.001
*Ref: Male, **Ref: No, ***Ref: Right. PHAS, Postural Habits and Awareness Scale; SMASA, Social Media Addiction Scale for Adolescents.

DISCUSSION AND CONCLUSIONS

In this study which studied the effects of social media addiction on posture, postural habits and awareness in high school students, the mean value for SMASA was found to be 20.2 (7.3). This value indicates that the participants' social media addiction is not high in general. Likewise, the mean PHAS value of 61.2 (7.0) indicates that the participants have generally good postural habits and high awareness based on self-reporting.

Studies in different populations have shown that bad postural habits are more common in adolescents. Although there was no difference between grades in terms of postural habits in our study, the prevalence of bad posture was found to be high in a study by students aged 11-16 years and have seen this prevalence decreased over a 3-year follow-up period (Minghelli et al., 2016; Noll et al., 2017). The investigation of postural habits and awareness based on self-report and different societies may have led to these differences between studies, but further examinations are needed to fully understand.

According to the findings of our study, there is a weak negative correlation between social media addiction which is determined by the SMASA score, and postural habits and awareness. SMASA score shows a positive correlation with the time spent on social media. In systematic reviews, it has been reported that increased inappropriate use of smartphones, which are frequently used to access social media, causes musculoskeletal system problems in the head, neck and arm areas (Achangwa et al., 2022; Eitivipart et al., 2018).

Social media and technological devices like phones can cause developmental issues in alongside musculoskeletal problems depending on overuse, frequency, and duration of use (Mustafaoğlu et al., 2018). A cross-sectional study conducted in the university community discovered that increased smartphone use caused considerable musculoskeletal pain in people who use their smartphones for more than 60 minutes daily (Han & Shin, 2019). Studies have shown that an increase the duration of computer use, along with phone usage, cause to an increase in trunk and head flexion, and a decrease in lumbar angle. Physical examinations and computer-aided systems have demonstrated the findings (Brink et al., 2014; Straker et al., 2007). In our study, an increase in social media addiction was demonstrated to have a negative impact on postural habits and awareness as indicated with use of scales by participants' self-report. However, bad postural habits and the decrease in awareness cannot be attributed to just social media addiction, and the effects of other variables should also be evaluated because the correlation indicated in our study is weak.

In this study, we observed that participants with orthopedic vertebral disease had bad postural habits and awareness, and having a vertebral disease caused a decrease of approximately 3 points in the scale score. At the same time, social media addiction scores of participants with vertebral disease were found to be higher than those without vertebral disease. In a study by Betsch et al. also were found that smartphone use leads to significant changes in spinal posture, such as increased thoracic kyphosis and body tilt while standing and walking (Betsch et al., 2021).

In this study, the weekly exercise frequency was positively related to PHAS scores. There are studies that address the negative effects of exercise habits on posture. The adverse effects caused by different types of exercise may increase as the duration of exercise increases (Salsali et al., 2023; Xing & Popik,

2020). As in the systematic review by Kiers et al. there are also studies that mention the effect of different types of exercise on postural awareness and the determinant effect of exercise type and frequency on awareness (Kiers et al., 2013). However, our study does not provide an evaluation of exercise types. In a systematic review examining the effectiveness of exercise interventions in improving postural malalignment in the body; It is stated that the available evidence on the efficacy of exercise in postural malalignment is insufficient and mostly of low or moderate quality (Bayattork et al., 2020). Another systematic examination to evaluate the efficacy of scoliosis-specific exercise (SSE) in adolescent patients with adolescent idiopathic scoliosis (AIS) similarly showed a lack of high-quality evidence to recommend the use of SSE for AIS (Romano et al., 2012). Therewithal, Pilates, McKenzie therapy, and functional restoration have been found to be more effective than other types of exercise treatments in reducing pain intensity and functional limitations in a systematic review that including randomized controlled trials in adults for chronic non-specific low back pain, which can be shown as another negative effect of inappropriate phone use. In addition, a negative correlation was observed between the duration of exercise, low back pain and functional limitation in the most types of exercise performed (Cankurtaran et al., 2022; Hayden et al., 2021).

When looking at the data from a secondary analysis of a randomized controlled trial conducted by Lauche et al. on adult participants with at least moderately chronic nonspecific neck pain, investigating whether postural awareness contributed to exercise-induced improvements in neck pain intensity, it was observed that the postural awareness of the participants, including their posture with Tai Chi and neck exercises, changed. They reported being more aware of their sitting postures compared to their previous state (Lauche et al., 2017). When the study of Lauche et al. is evaluated with the results of our study, it is thought that the evaluation of the effect of encouraging students to do sports with lessons such as physical education will also provide useful findings on the improvement of postural habits and expanding awareness. Further studies should be carried out to obviate postural and musculoskeletal disorders through physical exercise.

In the study of social media usage and addiction among high school students by Mehmet Güney and Taşkın Taştepe, considering the average score (19.31), it was seen that the social media addiction scores of the adolescents were close to

the average score in our study. Over again, other similarity to our findings it was observed that women's social media addiction levels were higher than men (Güney & Taştepe, 2020). In terms of posture, that was found that female students' Postural Habits subscale scores and total PHAS scores were lower than male students. Female adolescents had a higher prevalence of incorrect posture than male in a population-based cross-sectional study conducted in China. Researchers believe that the worsening postural habits in female students who enter puberty earlier than males and experience changes in body perception may be explained also by their have lower levels of physical activity (Yang et al., 2020). For this reason, targeting female students becomes more important in interventions to be conducted for both social media addiction and gaining correct posture habits.

This research has some limitations. Since it is a cross-sectional study, the current condition can be determined, but no certain results concerning the cause-and-effect relations can be established. Furthermore, some students refused to participate in the research because the study was based on volunteerism. As postural habits and awareness are based on participants' self-report, detecting of postural characteristics have some limitations. In addition, the social media addiction scale used in this research does not examine the use of devices such as smartphones and computers for gaming and other purposes.

In conclusion, in this study which was conducted with high school students, it was found that posture habits and awareness which were determined based on the self-report of the students, affected by variables of social media addiction, frequency of exercising, and having orthopedic vertebral diseases. Reducing inappropriate social media use in students and providing students with exercise habits will be beneficial in terms of preventing bad posture habits during adolescence. Nevertheless, the impact of physical exercise on the correction of postural disorders necessitates further studies. Due to not only have higher social media addiction but also worse postural habits, it is suggested that female students, in particular, should be taken into account while planning an intervention.

Ethical Approval: Istanbul Medipol University Non-Interventional Clinical Research Ethics Committee - 24.11.2022 (Number: E-10840098-772.02-7181)

Authors' Contributions: The data of the study were collected by KEA and NY of the researchers. These data were analyzed by KEA ans AZTF. The researchers are taken parts in the writing of the article for abstract and introduction NY, BŞ, KEA and FA, for methods NY and KEA, for results KEA and AZTF also, for discussion and conclusion all researchers have part in. Besides, the organizations of article were arranged by KEA and AZTF.

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REFERENCES

Achangwa, C., Ryu, H. S., Lee, J. K., & Jang, J. D. (2022, December). Adverse effects of smartphone addiction among university students in South Korea: A systematic review. Healthcare, 11(1), 14.

Bayar, B., Güp, A. A., Özen Oruk, D., İpek Dongaz, Ö., Doğu, E., & Bayar, K. (2023). Development of the postural habits and awareness scale: A reliability and validity study. International Journal of Occupational Safety and Ergonomics, 29(2), 815–820.

Bayattork, M., Sköld, M. B., Sundstrup, E., & Andersen, L. L. (2020). Exercise interventions to improve postural malalignments in head, neck, and trunk among adolescents, adults, and older people: Systematic review of randomized controlled trials. Journal of Exercise Rehabilitation, 16(1), 36.

Betsch, M., Kalbhen, K., Michalik, R., Schenker, H., Gatz, M., Quack, V., Siebers, H., Wild, M., & Migliorini, F. (2021). The influence of smartphone use on spinal posture – A laboratory study. Gait & Posture, 85, 298–303.

Brink, Y., Louw, Q., Grimmer, K., & Jordaan, E. (2014). The spinal posture of computing adolescents in a real-life setting. BMC Musculoskeletal Disorders, 15, 1–9.

Cankurtaran, F., Menevşe, O., Namlı, A., Kızıltoprak, H. Ş., Altay, S., Duran, M., Demir, E. B., Şahan, A. A., & Ekşi, C. (2022). The impact of digital game addiction on musculoskeletal system of secondary schoolchildren. Nigerian Journal of Clinical Practice, 25(2), 153–159.

Cramer, H., Mehling, W. E., Saha, F. J., Dobos, G., & Lauche, R. (2018). Postural awareness and its relation to pain: Validation of an innovative instrument measuring awareness of body posture in patients with chronic pain. BMC Musculoskeletal Disorders, 19, 1–10.

Egger, O., & Rauterberg, M. (1996). Internet behaviour and addiction [Semester thesis]. Swiss Federal Institute of Technology.

Eitivipart, A. C., Viriyarojanakul, S., & Redhead, L. (2018). Musculoskeletal disorder and pain associated with smartphone use: A systematic review of biomechanical evidence. Hong Kong Physiotherapy Journal, 38(02), 77–90.

Goldberg, I. (1996). Internet addiction disorder. CyberPsychol. Behavior, 3(4), 403–412.

Güney, M., & Taştepe, T. (2020). Ergenlerde sosyal medya kullanımı ve sosyal medya bağımlılığı. Ankara Sağlık Bilimleri Dergisi, 9(2), 183–190.

Han, H., & Shin, G. (2019). Head flexion angle when web-browsing and texting using a smartphone while walking. Applied Ergonomics, 81, 102884.

Hayden, J. A., Ellis, J., Ogilvie, R., Stewart, S. A., Bagg, M. K., Stanojevic, S., Yamato, T. P., & Saragiotto, B.T. (2021). Some types of exercise are more effective than others in people with chronic low back pain: A network meta-analysis. Journal of Physiotherapy, 67, 252–262.

Kiers, H., van Dieën, J., Dekkers, H., Wittink, H., & Vanhees, L. (2013). A systematic review of the relationship between physical activities in sports or daily life and postural sway in upright stance. Sports Medicine, 43, 1171–1189.

Lauche, R., Wayne, P. M., Fehr, J., Stumpe, C., Dobos, G., & Cramer, H. (2017). Does postural awareness contribute to exercise-induced improvements in neck pain intensity? A secondary analysis of a randomized controlled trial evaluating tai chi and neck exercises. Spine, 42(16), 1195–1200.

Minghelli, B., Oliveira, R., & Nunes, C. (2016). Postural habits and weight of backpacks of Portuguese adolescents: Are they associated with scoliosis and low back pain?. Work, 54(1), 197–208.

Mustafaoğlu, R., Zirek, E., Yasacı, Z., & Özdinçler, A. R. (2018). The negative effects of digital technology usage on children's development and health. Addicta: The Turkish Journal on Addictions, 5(2), 13–21.

N., Sam M.S. (2013). Body awareness. Psychology Dictionary. Retrieved September 6, 2021, from https://psychologydictionary.org/body-awareness/

Noll, M., Candotti, C. T., da Rosa, B. N., do Valle, M. B., Antoniolli, A., Vieira, A., & Loss, J. F. (2017). High prevalence of inadequate sitting and sleeping postures: A three-year prospective study of adolescents. Scientific Reports, 7(1), 14929.

Özgenel, M., Canpolat, Ö., & Ekşi, H. (2019). Ergenler için sosyal medya bağımlılığı ölçeği (ESMBÖ): Geçerlik ve güvenirlik çalışması. Addicta: The Turkish Journal on Addictions, 6, 629–662.

Paterson, J. (2009). Good posture and how it can be achieved. Teaching Pilates for Postural Faults, Illness & Injury (pp. 1–49). Butterworth-Heinemann.

Rahman, S. A., Al Marzouqi, A., Variyath, S., Rahman, S., Rabbani, M., & Ahamed, S. I. (2020, July). Effects of social media use on health and academic performance among students at the university of Sharjah. 2020 IEEE 44th Annual Computers, Software, and Applications Conference (COMPSAC), Madrid, Spain, 2020, pp. 711-716, doi: 10.1109/COMPSAC48688.2020.0-176

Romano, M., Minozzi, S., Zaina, F., Saltikov, J. B., Chockalingam, N., Kotwicki, T., Hennes, A. M., & Negrini, S. (2012). Exercises for adolescent idiopathic scoliosis. Cochrane Database of Systematic Reviews, 8, https://doi.org/10.1002/14651858.CD007837.pub2

Salsali, M., Sheikhhoseini, R., Sayyadi, P., Hides, J. A., Dadfar, M., & Piri, H. (2023). Association between physical activity and body posture: A systematic review and meta-analysis. BMC Public Health, 23(1), 1670.

Straker, L. M., O'Sullivan, P. B., Smith, A., & Perry, M. (2007). Computer use and habitual spinal posture in Australian adolescents. Public Health Reports, 122(5), 634–643.

Turkish Green Crescent Society. (2022). Teknoloji bağımlılığı: Ergenler sosyal medya bağımlılığında risk grubunda. Retrieved June 12, 2022, from https://www.yesilay.org.tr/tr/makaleler/ergenler-sosyal-medya-bagimliliginda-risk-grubunda

Turkish Statistical Institute. (2021). Survey on information and communication technology usage by children. https://data.tuik.gov.tr/Bulten/Index?p=Survey-on-Information-and-Communication-Technology-Usage-by-Children-2021-41132

Turkish Statistical Institute. (2022). Survey on Information and Communication Technology (ICT) usage in households and by individuals. https://data.tuik.gov.tr/Bulten/Index?p=Survey-on-Information-and-Communication-Technology-(ICT)-Usage-in-Households-and-by-Individuals-2022-45587

World Health Organization. (2020). Addictive behaviours: Gaming disorder. Retrieved November 11, 2022, from https://www.who.int/news-room/questions-and-answers/item/addictive-behaviours-gaming-disorder

Xing, L., & Popik, S. (2020). A systematic review of the impact of sports on body posture in adolescents. Journal of Medical Imaging and Health Informatics, 10(5), 1159–1164.

Yang, L., Lu, X., Yan, B., & Huang, Y. (2020). Prevalence of incorrect posture among children and adolescents: Finding from a large population-based study in China. Iscience, 23(5).