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ORIGINAL RESEARCH

Relationship Between Perceptions of COVID-19 and Social Media Use: A Cross-Sectional Study in Turkey

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Abstract

Objective: Although social networks offer a valuable opportunity to share the most up-to-date information and to assist in the management of the pandemic, they may also be associated with intensification of the societal concerns and fear. In this study, we aimed to investigate the relationship between perceptions of regarding the Novel Coronavirus Disease (COVID-19), social media use and perceived stress in a community sample in Turkey.

Methods: The target study population consisted of the healthcare workers of Gazi University and their close relatives/friends. Of the 1564 participants 375 were healthcare workers (24.0%), 481 were non-healthcare workers (30.8%), 297 were students (19.0%), 210 were unemployed subjects (13.4%), and 201 were retired (12.9%) individuals. For data collection sociodemographic form, Perception of COVID-19 (P-COVID-19), Perception of Causes of COVID-19 (PCa-COVID-19), Perception of Control of COVID-19 (PCo-COVID-19), Perceived Stress Scale (PSS), and Social Network Addiction Scale (SNAS). The scales used were compared among the five groups that made up the sample.

Results: Perception of COVID-19 dangerousness and contagiousness was significantly lower in retirees ($p=0.003$, $p<0.001$, respectively). "Macro control perception" regarding COVID-19, which evaluates whether countries or governments have taken adequate measures, was highest in healthcare workers ($p<0.001$). In other words, compared to other groups, healthcare workers think that the measures were taken at a sufficient level. Students had the highest perception of controllability regarding COVID-19 ($p<0.001$). In addition, there was a significant positive correlation between SNAS scores and COVID-19 dangerousness perception scores in all five groups ($p<0.05$).

Conclusion: Stress increases the perception of dangerousness associated with COVID-19. Social networks have a significant impact on these perceptions, and COVID-19 can have a variety of effects on individuals who make up the society.

Keywords: Stress, COVID-19, Healthcare Workers, Social Media, Social Media Addiction

INTRODUCTION

In the last three decades, we have witnessed an increased number and heterogeneity of the epidemics, with significant psychosocial, environmental, and economical burden. Among these, Severe Acute Respiratory Syndrome (SARS, 2003), Bird Flu (H5N1, 2004), Swine Flu (H1N1, 2009), and Ebola Virus Disease (EBOV, 2014) have led to significant global socioeconomic damage (1). Most recently, the Novel Coronavirus Disease (COVID-19) originated in the Wuhan province of China in December 2019 (2). Despite the similarity between COVID-19 and other disease outbreaks in terms of the emerging panic and uncertainty, this most recent pandemic is associated with more pronounced concerns due to higher level of viral contagiousness and absence of clearly defined therapeutic options (3).

Major responsibilities are implied on governments, health facilities, and media in terms of both sociological and psychological management of the pandemic (4). Although the traditional media such as radio, newspapers, and television are quite valuable with respect to provision of information, they may be associated with certain limitations in news delivery (5). In times of high uncertainty, individuals tend to have instant access to information rather than daily or hourly news bulletins, in an effort to alleviate the concerns

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associated with uncertainty (3). This has resulted in an increased social media use during catastrophic events such as earthquake, flood disasters, or epidemics (6). Also, the habit of listening to radio or reading newspapers has significantly declined as opposed to more frequent use of social networks to obtain information, particularly among the newer generations (6). Studies performed after H1N1 (Swine flu) epidemics, which has close resemblance to COVID-19 pandemics in terms of the routes of transmission and protection, have shown intense usage of social networks to gather and share information in the general population (7). Social networks are very valuable for sharing most up-to-date information and managing the outbreak, and they are also used by governments and health institutions for the very same purpose (8). Studies on social media and outbreak management after swine flu epidemic showed that, compared to the information publicized by health institutions, information shared on an individual basis is much less likely to be accurate, intensifying the anxiety and concerns related with the outbreak (9). Even in one study it was stated that the largest outbreak was due to increasing fear and anxiety in the population triggered by the social media (10). In recent months, studies regarding COVID-19 pandemics and social media are being published (7, 8). However, studies on the COVID-19 pandemic are brought to the service of humanity very quickly by scientists (3, 6, 9). In a recent study investigating the coronavirus related content in Tweeter after COVID-19 pandemics it was found that between 2nd February and 15th March 2020, 16.5% of the tweets related to China, 4.47% to the origin, time, and place of the outbreak, 7.65% to eating habits, 1.21% to biological war theory, 10.54% to fear, anxiety, and the impact on social and economic life, 2% to wearing masks, and 1.2% to lockdown measures (11). One important implication of the study was the fact that there was a significant interest on when and where the outbreak originated as well as on its effects. There is a significant inter-individual difference in the concerns associated with the outbreak, together with very heterogeneous underlying dynamics. Although the disease contagiousness is a common theme in the general population, each occupational or age category may experience different types of concerns.

After the epidemic, many researchers started to investigate the psychological effect of the pandemic and the relationship between these effects and behavioral attitudes (12-15). In a study involving many segments of the society in China, it was stated that the anxiety level was higher in those with a contact or an infected relative (12). In addition, it has been shown that anxiety and stress are lower in those who think that the society is properly informed and those who have a higher perception that the epidemic can be controlled with protective behavior. This study is very valuable in terms of showing the relationship between correct information, individual perception and psychological effects during the pandemic duration. In a study conducted with healthcare workers in our country, it was found that one out of every five healthcare workers had severe symptoms related to depression, anxiety or stress (16). These symptoms were closely related to variables such as female gender, past psychiatric illness, and need for psychosocial support. Studies investigating the effects of the COVID-19 pandemic in students have stated that stress level is associated with many variables such as family type, ethnicity, presence of individuals with chronic diseases in the family, frequency of following news about the pandemic, source of news, sleep problems (15, 17). Studies conducted in the geriatric population show that variables such as long stay at home, sleep disturbances, decreased contact with their loved ones, not being able to get physical and mental support from their children, fear of losing a partner, fear of death are associated with stress (18, 19). In the light of the information obtained from the studies in the literature, it is revealed that the groups with different characteristics that make up the society after the pandemic will be affected quite differently from each other. Therefore, in our study, we aimed to investigate the relationship between perceptions about COVID-19, social media use and perceived stress in different groups (healthcare workers, non-healthcare workers, unemployed, students and retirees).

The study had three main objectives;

1 – To compare perceptions about COVID-19 and perceived stress level between groups

2 – Identifying variables affecting the perception of danger and contagiousness related to COVID-19 within each group

3 – Evaluating the relationship between the use of social networks and perceptions about COVID-19 within each group

METHODS

This research is a cross-sectional descriptive study. The COVID-19 pandemic period is a time when it is difficult

to reach participants due to limitations in social life or the risk of disease transmission. In cases where it is difficult to reach the universe, Non-Probability sampling methods are used to reach the participants (20). Therefore, the snowball sampling method, which is a Non-Probability (Purposeful) sampling method, was used in this study. The population is not clear in studies using Non-Probability sampling methods (21). In this study, although the size of the universe is not clear, the main groups that can represent the society are tried to be determined. As a result, the study was planned to be conducted in five different groups as healthcare workers, non-healthcare workers, unemployed, students and retirees.

The sample size for the study was calculated with the G * Power software package (22). There was a Non-Probability sampling method in the study. Therefore, Cohen effect size was taken as 0.10 (small effect size) to reach a large sample. In power analysis, it was found that at least 1200 participants should be reached when the alpha error rate is 0.05, the test power is 80% and the number of groups is five.

Participants and Data Collection

An online questionnaire prepared over Google Forms was sent to healthcare workers via electronic mail, WhatsApp, and other social media platforms. Subjects over 18 years of age who had access to internet connection, spoke Turkish, and were able to provide informed consent were considered eligible. Each subject was asked to share the link of the questionnaire with a close relative/friend, in order to collect data from non-healthcare worker group such as individuals employed in other sectors, students, and retired people. In the first phase of the study, where the purpose and nature of the study was explained, participants entered the study after ticking the checkbox for their willingness for study participation and their right to leave the study any time without giving any reason. The study link was shared between 15.05.2020-30.05.2020. Between these dates, 1613 people participated in the study. The data of 49 participants with missing data or inconsistent data were not included in the analysis. As a result, the data of 1564 participants were included in the analysis.

Ethical Approval

This study was conducted in accordance with the World Medical Association (WMA), Helsinki Declaration, Ethical Principles of Medical Researches on People. The study was approved by Ethics Committee of Gazi University on Clinical Research (No: 2020-298).

Measurement Tools

Study instruments included the Sociodemographic Form, Perception of COVID-19 (P-COVID-19), Perception of Control of COVID-19 (PCo-COVID-19), Perception of Causes of COVID-19 (PCa-COVID-19), Perceived Stress Scale (PSS), and Social Network Addiction Scale (SNAS).

Sociodemographic Form: It is a form prepared to identification sociodemographic characteristics such as age, gender, marital status, and educational status.

Perception of COVID-19 (P-COVID-19): The scale was developed by Genis et al (23). This 7-item two-factor (Dangerousness and Contagiousness) scale is a 5-point Likert (1=Strongly Disagree, 5=Strongly Agree) scale. The dangerousness sub-dimension evaluates the perceptions and beliefs regarding the dangers of the disease, while the contagiousness sub-dimension assesses the perceptions regarding the contagiousness of the disease. The increase in the scores indicates the height of the perception in the relevant sub-dimension. While the Cronbach's alpha value was 0.74 in the study in which the validity and reliability of this scale were performed, it was determined as 0.76 in our study.

Perception of Control of COVID-19 (PCo-COVID-19): This is a 5-point Likert scale that assesses beliefs regarding the disease control at the individual or institutional level with three sub-dimension and 12 items. The Macro-control sub-dimension evaluates the beliefs regarding the precautions at the institutional, national, or global level. The individual control sub-dimension is on the beliefs regarding individual precautions for protection against the disease. The controllability sub-dimension evaluates the belief about whether the epidemic can be controlled or not in the measures taken. High scores from the macro control sub-dimension reflect the perception that national and global measures are sufficient, and high scores from the personal control sub-dimension reflect the perception that the epidemic can be prevented by paying attention to personal precautions. High scores from the controllability sub-dimension indicate that the belief that the epidemic can be controlled is high. The scale was developed by Genis et al (23). While the Cronbach's alpha value was 0.79 in the study in which the validity and reliability of this scale were performed, it was determined as 0.81 in our study.

Perception of Causes of COVID-19 (PCa-COVID-19): This evaluates the beliefs regarding the possible causes of the outbreak, with a 5-point Likert scale, three sub-dimension, and 14 items. The conspiracy sub-dimension relates to the beliefs that can be commonly encountered in the social media, i.e. the virus is a biological weapon,

and the outbreak is actually a political construct or is made up to sell vaccines by the developed countries. The environmental sub-dimension is on beliefs that the main source of the outbreak was the unhealthy lifestyle, pollution of fresh water resources, or environmental pollution. The belief sub-dimension evaluates the belief that the cause of the outbreak is disobedience against God or a punishment for societal corruption. Higher scores in the sub-dimension indicate higher levels of belief for that particular sub-dimension. The scale was developed by Genis et al (23). While the Cronbach's alpha value in the validity and reliability study of this scale was 0.88, it was found to be 0.85 in our study.

Perceived Stress Scale: This scale developed by Cohen et al. consists of 14 items and aims to measure the perceived level of stress in certain life situations (24). Higher scores reflect higher perceived stress levers. It is a 5-point Likert type scale, with scores ranging between 0 (Never) and 4 (Very Frequent). The positive statements are reverse scored. The validity and reliability studies of this instrument were performed by Eskin et al. (25). While Eskin et al found the cronbach alpha value to be 0.87 in their study, this value was found to be 0.82 in our study.

Social Network (Media) Addiction Scale: This was developed by Karaca et al. in 2018 (26). It is a 5-point Likert scale (1= Strongly Disagree, 5= Strongly Agree) consisting of 26 items. Higher scores indicate higher social network addiction. While the cronbach alpha value was 0.87 in the study conducted by Karaca et al., The cronbach alpha value was 0.80 in our study.

Statistical Analysis

The study data were analyzed by SPSS 23.0 software pack. The descriptive statistics were expressed using frequency, percentage, mean, and standard deviation. Since the skewness and kurtosis values of the numerical variables varied between ±2, it was assumed that the data showed normal distribution (27). Therefore, parametric tests were used in the analysis. The comparison of numerical variables across the three and above groups was performed with One-Way Analysis of Variance. When variances were homogeneous, post hoc Tukey analysis was used, while when they were non-homogenous, Tamhane's T2 test was utilized. The association between numerical variables was evaluated with Pearson's correlation test. The Dangerousness and Contagiousness sub-dimension scores of the P-COVID-19 were evaluated as dependent variables according to the groups in the multiple linear regression analysis. In these regression analyses the following were included as independent variables: PCo-COVID-19 sub-dimensions, PCa-COVID-19 sub-dimensions, PSS, and SNAS. In order to avoid multicollinearity problem, a stepwise technique was used. To assess the reliability of the scales, coefficients of internal reliability (Cronbach alpha) were used. For statistical analyses, a p level of <0.05 was considered significant.

RESULTS

Sociodemographic Characteristics

Table 1 shows the sociodemographic characteristics of the sample. The mean age of the participants was 34.58 ± 12.04 years, and the median age was 30 years (min: 18, max: 70). Females comprised 69.8% (n=1092) of the overall group. Fifty-two percent were single, 35.5% were smoking, and 39.8% reported alcohol consumption. Of the healthcare workers 21.8% (n=82) were physicians, 32.2% (n=121) were nurses, and 45.8% (n=172) were other types of healthcare personnel. Of the non-healthcare workers 29.3% (n=141) were employed in private sector, 24.5% (n=118) were teachers, 9.3% (n=45) were academicians, 6.0% (n=29) were pharmacists, 6.6% (n=32) were engineers, and 24.1% (n=116) were other civil servants. The groups were similar in terms of gender (p=0.393). However, there were significant differences between the groups in terms of age, educational status, marital status, alcohol use and smoking (p<0.001 for each).

Evaluation of the Predictors of COVID-19 Dangerousness and Contagiousness Perceptions

Table 2 shows the multiple linear regression analyses for the sub-dimension scores of the P-COVID-19. In workers (healthcare or non-healthcare) and students, the Conspiracy sub-dimension had significant predictive value for the Dangerousness sub-dimension (Table 2). Also, "Macro Control" was another significant predictor for the Dangerousness sub-dimension in healthcare workers (β=-0.133; p=0.008), non-healthcare workers (β=-0.245; p<0.001), and unemployed (β=-0.281; p<0.001). Conspiracy sub-dimension (β=-0.193; p<0.001), macro-control sub-dimension (β=-0.169; p<0.001) and SNAS scores (β=-0.113; p<0.001) were significant predictors of COVID-19 dangerousness perception in the whole sample. The models based on occupational categories developed for the Contagiousness sub-dimension of the COVID-19 Disease Perception Scale were significant and explained 3.4% to 18.6% of the variance. In healthcare workers and retirees, the most important variable predictive of contagiousness was high social network addiction scores

(p = 0.017 and p <0.001, respectively). Similarly, in the whole sample, the most important variable predicting the perception of COVID-19 Contagiousness was higher SMB scores (β=0,114; p<0.001). Another variable closely related to the perception of COVID-19 Contagiousness was controllability (Table 2).

Table 1. Sociodemographic characteristics of the sample

		Health care worker (n=375)	Non-Health care worker (n=481)	Unemployed (n=210)	Student (n=297)	Retired (n=201)	Total (n=1564)
Gender	Female	262 (69.9)	321 (66.7)	151 (71.9)	217 (73.1)	141 (70.1)	1092 (69.8)
	Male	113 (30.1)	160 (33.3)	59 (28.1)	80 (26.9)	60 (29.9)	472 (30.2)
Marital status	Single	172 (45.9)	210 (43.7)	109 (51.9)	293 (98.7)	32 (15.9)	816 (52.2)
	Married	186 (49.6)	253 (52.6)	93 (44.3)	4 (1.3)	128 (63.7)	664 (42.5)
	Divorced / Widow	17 (4.5)	18 (3.7)	8 (3.8)	0 (0.0)	41 (20.4)	84 (5.4)
Education status	Primary	1 (0.3)	2 (0.4)	6 (2.9)	0 (0.0)	0 (0.0)	9 (0.6)
	High school	11 (2.9)	28 (5.8)	31 (14.8)	30 (10.1)	44 (21.9)	144 (9.2)
	University	278 (74.1)	406 (84.4)	154 (73.3)	249 (83.8)	133 (66.2)	1220 (78.0)
	Master / Doctorate	85 (22.7)	45 (9.4)	19 (9.0)	18 (6.1)	24 (11.9)	191 (12.2)
Smoking	No	277 (73.9)	276 (57.4)	135 (64.3)	208 (70.0)	113 (56.2)	1009 (64.5)
	Yes	98 (26.1)	205 (42.6)	75 (35.7)	89 (30.0)	88 (43.8)	555 (35.5)
Alcohol use	No	256 (68.3)	253 (52.6)	136 (64.8)	159 (53.5)	137 (68.2)	941 (602)
	Yes	119 (31.7)	228 (47.4)	74 (35.2)	138 (46.5)	64 (31.8)	623 (39.8)
Age (mean±sd)		32.8±8.1	35.1±8.4	32.7±9.5	22.5±3.2	56.1±5.6	34.5±12.0

Table 2. Multiple linear regression analyses for the sub-dimension scores Dangerousness and Contagiousness of the P-COVID-19

P-COVID-19	Groups	Predictors	β (Beta)	t	p	Model Analysis Results			
						F	p	R^2	CI
Dangerousness	Healthcare worker	Conspiracy	-0.167	-3.217	0.001	11.292	<0.001	0.084	8.680
		Macro Control	-0.133	-2.647	0.008				
		Faith	-0.134	-2.590	0.010				
	Non-Healthcare worker	Conspiracy	-0.254	-5.925	<0.001	40.670	<0.001	0.145	6.603
		Macro Control	-0.245	-5.711	<0.001				
	Unemployed	Macro Control	-0.281	-4.086	<0.001	12.766	<0.001	0.157	10.742
		Environment	-0.139	-2.146	0.033				
		Personal Control	-0.137	-2.000	0.047				
	Student	Conspiracy	-0.257	-4.511	<0.001	9.799	<0.001	0.091	20.929
		Environment	0.113	1.979	0.049				
		SNAS	0.170	3.048	0.003				
	Retired	Environment	-0.302	-4.506	<0.001	16.178	<0.001	0.140	18.091
		SNAS	0.282	4.207	<0.001				
	Total	Conspiracy	-0.193	-7.900	<0.001	58.436	<0.001	0.101	17.968
		Macro Control	-0.169	-6.820	<0.001				
		SNAS	0.113	4.638	<0.001				
Contagiousness	Healthcare worker	SNAS	0.122	2.403	0.017	6.869	<0.001	0.085	24.047
		Faith	-0.137	-2.579	0.010				
		Controllability	-0.171	-3.265	0.001				
		Personal Control	0.143	2.729	0.007				
		Conspiracy	-0.111	-2.130	0.034				
	Non-Healthcare worker	Faith	-0.151	-3.335	0.001	8.499	<0.001	0.034	8.103
		Controllability	-0.130	-2.856	0.004				
	Unemployed	Controllability	-0.167	-2.443	0.015	5.967	0.015	0.028	6.563
	Student	Faith	-0.143	-2.509	0.013	7.512	0.001	0.049	9.725
		Controllability	-0.167	-2.935	0.004				
	Retired	SNAS	0.363	5.288	<0.001	11.167	0.003	0.186	26.309
		Personal Control	0.278	3.803	<0.001				
		Environment	-0.253	-3.588	0.000				
		Macro Control	0.152	2.160	0.032				
	Total	SNAS	0.114	4.527	0.000	16,058	<0,001	0,049	22,569
		Controllability	-0.146	-5.648	0.000				
		Conspiracy	-0.081	-3.072	0.002				
		Personal Control	0.094	3.622	0.000				
		Faith	-0.075	-2.815	0.005				

SNAS: Social Network Addiction Scale, CI: Condition Index

Evaluation of the Relationship of SNAS with Scales Evaluating Perceptions Associated with COVID-19

Table 3 shows the relationships between SNAS, PSS, and COVID-19 perception attitudes by social groups. Except for the retired subjects, there was a positive and significant association between PSS scores and SNAS scores ($p < 0.01$, for each). In all groups, SNAS scores were positively correlated with dangerousness perception ($p<0.05$) and negatively correlated with faith sub-dimension ($p<0.001$ each for). There was a significant negative correlation between SNAS and macro control scores in all groups except healthcare workers ($p < 0.01$, for each).

Comparison of Scale Scores According to Groups

Figure 1 shows the comparison of scales evaluating perceptions about COVID-19 by groups. P-COVID-19 Dangerousness ($p=0.003$) and Contagiousness ($p<0.001$) sub-dimension differed significantly according to groups. Retired subjects had the lowest Dangerousness and Contagiousness scores (Figure 1). While the Personal Control ($p=0.140$) sub-dimension of PCo-COVID-19 did not differ significantly according to groups, the Macro-control ($p=0.006$) and Controllability ($p<0.001$) sub-dimensions showed a significant difference. Controllability sub-dimension scores were the highest in students. CIRPQ Conspiracy and Environmental sub-dimension were high among retired individuals, while there were no significant differences according to groups ($p=0.349$, and $p=0.267$, respectively). A significant difference with regard to Faith sub-dimension was noted between groups ($p<0.001$), with highest scores in healthcare workers (Figure 1).

Figure 2 shows the comparison of SNAS and PSS scores according to groups. PSS and SNAS scores differed significantly according to the groups ($p<0.001$ for each). While the perceived stress was significantly higher in unemployed individuals ($p<0.001$), the social network addiction was significantly higher among students ($p < 0.001$).

Table 3. Evaluation of the relationships between scale scores applied according to social groups

Scales and sub-dimensions		Social Network Addiction Scale					
		Health care worker (n=375)	Non-Health care worker (n=481)	Unemployed (n=210)	Student (n=297)	Retired (n=201)	Total (n=1564)
		r	r	r	r	r	r
P	Dangerousness	0.139**	0.155**	0.167*	0.157**	0.229**	0.159**
	Contagiousness	0.163**	0.066	0.041	0.072	0.245**	0.130**
PCo	Macro Control	-0.084	-0.214**	-0.232**	-0.206**	-0.262**	-0.170**
	Personal Control	-0.033	-0.059	-0.093	-0.039	-0.123	-0.022
	Controllability	-0.063	-0.008	0.068	0.025	-0.302**	0.015
PCa	Conspiracy	-0.078	-0.171**	-0.109	0.027	0.032	-0.089**
	Environment	0.043	-0.017	0.071	-0.057	0.175*	0.012
	Faith	-0.193**	-0.176**	-0.219**	-0.157**	-0.440**	-0.181**
PSS		0.202**	0.259**	0.415**	0.295**	0.096	0.283**

**p<0.05; **p<0.01, P: Perception of COVID-19, PCo: Perception of Control of COVID-19, PCa: Perception of Causes of COVID-19*

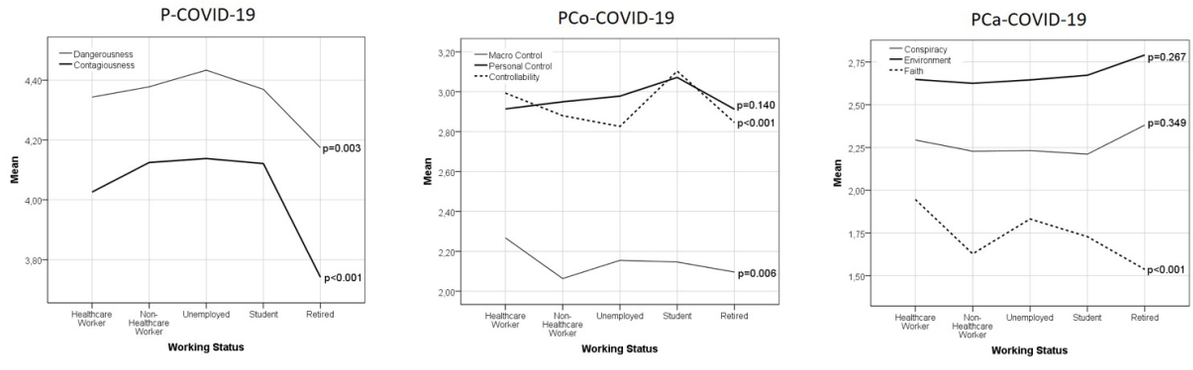

Figure 1. Comparison of scales evaluating perceptions about COVID-19 by groups

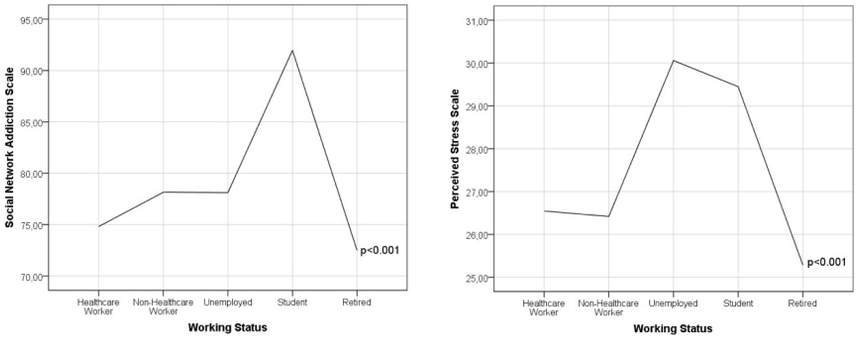

Figure 2. Comparison of SNAS and PSS scores according to groups

DISCUSSION

During disease outbreaks, a multitude of problems may arise both at the individual and societal level. The fear and anxiety associated with the outbreak affect the individuals and communities at varying degrees depending on the precautionary measures taken at these two different levels. The information obtained through previous experiences show that the use of social networks during outbreak periods have both positive and negative consequences (8, 28, 29). While 64% of the Turkish population are active users of social media, this figure is 49% around the globe (30). On the other hand, while 64% of the global social media users are concerned about the abuse of personal/private data, this figure is 56% in our country (31). In other words, the proportion of individuals with social media use is higher and the proportion of concerned individuals is lower in Turkey as compared to the rest of the world. Therefore, it would be particularly interesting to examine both the effect of COVID-19 pandemics as well as the impact of the social media "pandemics" in the Turkish population. In our study, it was determined that the dangerousness and contagiousness perceptions of COVID-19 were lowest in retirees, the perception that COVID-19 could be controlled was highest in students, and the perceived stress was highest in unemployed (Figure 1, 2). While the most important variable predicting the perception of dangerousness in the whole sample was conspiracy thoughts, the most important variable predicting the perception of contagiousness was social media addiction (Table 2). Although social media addiction is significantly higher in students (Figure 2), the use of social media in all groups that make up the sample increases the perception of dangerousness related to COVID-19 (Table 3).

Despite their unquestionable importance, social media tools are also associated with significant risks during periods of outbreak (3, 6, 9). Our findings showed an increasing social addiction (except for retired subjects) with increasing levels of perceived stress. The increase in social network addiction increases the perception of COVID-19 dangerousness in all groups in our sample. However, it also increases the fear of contagiousness among health sector workers and retirees. In a review examining the associations between disease outbreaks and social media use, 20% to 30% of the videos released during the outbreak actually convey misleading information (29). In a study analyzing the videos shared during the West Nile virus outbreak, it was found that despite high numbers of useful videos vs. those with misleading content (79.2% vs. 20.8%), the total daily viewership for misleading videos was higher (28). The investigators claimed that individuals could have shared such videos intentionally or unintentionally as a means for increasing their popularity. Such misleading data obtained through social media may also elevate the perceived contagiousness and dangerousness in the society. However, in our cohort, retired subjects had significantly lower perception for both of these sub-dimensions. In a Chinese study examining the initial psychological impact of COVID-19 outbreak, depression and anxiety were found to be independent of the age (32). In another study where the perceived threat during the Zika virus outbreak in the US between 2015 and 2016 was assessed, again age did not show any significant associations. The lower level of perceived dangerousness and contagiousness among the elderly in our country may relate to the lockdown precautions for people aged ≥ 65 years as well as with a number of positive or negative factors such as feeling secure, increased acceptance of death with aging, relatively

reduced sensitivity to anxiety between 50 and 65 years of age, life experiences, or the more common use of denial as a primitive coping strategy (33-35).

A comparison of the news content in traditional versus social media after H1N1 outbreak showed that in contrast with the traditional media, social media was an "area of accusation", where social media posts were seeking for an initiator or offender in addition to discussions regarding the goals of the outbreak (5). The posts contained various conspiracy theories and claimed, for instance, that the outbreak was actually planned by some governments or masonic organizations, was released in a controlled manner by drug companies in order to sell vaccines/drugs, or it was actually a biological weapon. Although conspiracy theories have been put forward in other historical periods, they have certainly found a new channel to spread with the contribution of the social media. Throughout history, conspiracy theories tend to arise under certain social and/or political conditions (36). In our study, belief of conspiracy theories was an important variable that was associated with reduced perception of dangerousness (Table 2). Although this appears paradoxical at first glance, it actually reflects a kind of consistency, in which individuals can explain this frightening, dangerous, and uncertain situation using conspiracy theories. The individual has now deciphered the issue and attained a kind of "false power". Conspiracy theories have been and are being used by emperorships or dictatorial regimes in order to maintain their authority and suppress the opposition (5). When individuals, communities, or governments reach a deadlock, these theories provide feelings of "security". According to some authors, conspiracy theories are more likely to be embraced by subjects with paranoid inclinations (37). A fundamental component of paranoia is an alteration in the perceived social threat. The outbreak represents a significant threat both from a societal and mental perspective. In the light of studies suggesting that up to a one third of populations may frequently experience paranoid thoughts, it is not surprising to see an upsurge of conspiracy theories during such outbreaks (38). Therefore, conspiracy theories may have emerged at comparable levels in all groups, with a significant role in reducing the perceived dangerousness.

According to Global Digital Yearbook 2020 data, the average daily use of internet and social media in our country is considerably higher than the global average. Moreover, Turkey is in the first place in the world for Instagram use, with 58% of the population being Instagram users (the global average is 15%), and is in the fifth place for Twitter usage, with 9 million users. These figures clearly indicate a very prevalent use of social media in our country (30). A vicious cycle is present in the relationship between social media use and anxiety. Individuals with anxiety are more likely to use social media, which in turn, is a source of more information for causing more concerns (39). This relationship also applies to periods of outbreak (29). Our study showed that increased addiction to social media was associated with intensified perceptions of contagiousness in healthcare workers as well as in retirees (Table 3). However, our regression analysis for perceived contagiousness showed that social media use was a significant variable for perceived contagiousness for healthcare workers and retirees (Table 2). Interestingly, although social media addiction scores were the lowest in these two groups, these two groups were the most affected by social media use in the contagiousness perception variable. During periods of outbreak, healthcare workers may share the most recent treatment protocols, regulatory information and health practices, news, and additional precautionary measures via certain social networks in order to achieve a more rapid means of communication. However, despite less frequent use of social media by healthcare workers than other groups, they may also be overwhelmed with posts that convey this type of information. If one considers the unavoidable presence of misleading information in these posts (5, 7, 29), our results may be more readily understood.

Tirkkonen and Luoma-aho (2011) examined the views of Finnish citizens on the crisis management by the authorities. Despite the generally high level of trust in authorities, such a high level of trust did not exist online. The participants did not have enough trust in preventive measures, believed that the authorities failed to amend misleading information in a timely manner, and thought that the information provided relied on only a limited of sources (40). In our study, the Macro Control domain questioned the perceptions regarding the adequacy of the nationwide protective measures in general. Although study groups did not differ significantly in terms of their perceptions regarding the adequacy of precautionary measures, healthcare workers generally had more positive perceptions in this regard (Figure 2). On the other hand, increased social network addiction was associated with a strengthened perception of inadequate measures (Table 3), again questioning the accuracy of the information provided in social networks. Do social networks provide accurate information and pin down the failure of the authorities, or give misleading

information to make the individual to falsely conceive that these precautions are inadequate? Literature data on the positive and negative impacts of social media is quite controversial (41). While some studies suggest that despite presence of some useful information, the content in social network is insufficient (28, 41), while others claim that social media actually does its part (28). Although the conclusions may be related with how one views and interprets these data, both traditional and digital media seemed to admit their important contribution in the emergence of the anxiety during H1N1 outbreak (42). Another aspect of the discussion relates to the fact that people with higher levels of stress express more dissatisfaction with the information provided by health authorities (32). In the light of these data, it appears that during periods of high levels of stress, anxiety, and fear, it may be very difficult for an individual to objectively assess the precautions taken.

The strengths of our study are that it included a large sample group with different occupational categories and compared many different parameters related to COVID-19. However, some limitations should also be mentioned. Firstly, our sample consisted only of individuals who had access to smart phones, electronic mails, internet connection, and social media. Thus, the sample may represent the higher-educated part of the population, and some areas to be asked (such as history of psychiatric disorder, whether they have COVID-19) may be missing. Also, participants had to speak Turkish, and therefore different results could have been obtained in those with no knowledge of Turkish, or in those with lower level of education. Second limitation is the fact that the group of retired individuals was smaller, as compared to other study subgroups. Therefore, our conclusions regarding the retired subjects should be interpreted with more caution. Second limitation is that even though there was no significant difference in terms of gender between the groups, variables such as marital status, educational status, alcohol and cigarette use differed significantly. These variables, which differ significantly, may have influenced the results. In addition to these limitations, it should be considered that the study was conducted with a Non-Probability sampling method. In addition, perceptions about COVID-19 may differ significantly between time periods according to the impact of the epidemic in society. The results obtained in this study should be evaluated according to the pandemic course in the time period of the study.

CONCLUSIONS

COVID-19 is associated with differential effects at an individual level. While stress increases social network addiction, this in turn intensifies the perceived contagiousness and dangerousness. Use of social network is associated with a more pronounced effect on perceived contagiousness among healthcare workers and retirees. This may be related with the fact that healthcare workers use social networks for more rapid sharing of the updated treatments, guidelines, regulations, practices, additional precautions, and health news. Healthcare workers represent the most important professional category in our combat with the outbreak. Therefore, further research on the effects of social network use among healthcare workers are warranted, in addition to increased awareness among them regarding the fact that frequent use of social networking may have an impact on their disease perception. The use of social networks increases the perception of dangerousness related to COVID-19. In further studies, studies should be conducted in which the networks used are also defined to determine which social network usage increases the perception of dangerousness. We further recommend that studies should also be performed to evaluate the effect of the traditional media such as radio, television, and newspapers on disease perceptions.

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