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The Effect of Trust and Verification of Social Media News on the COVID-19 Vaccine Attitude

Sosyal Medya Haberlerine Güven ve Doğrulamanın COVID-19 Aşı Tutumuna Etkisi

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ABSTRACT

Aim: *This study aims to examines the effects of university students' social media news trust and verification awareness on their attitudes towards the COVID-19 vaccine.*

Material and Method: *This study was implemented through Google Forms between February-July 2021 when the restrictions were still in effect. A total of 529 students studying in undergraduate departments of universities in Istanbul were reached. "Information Form", "Social media news trust and verification awareness", and "Attitudes towards the COVID-19 vaccine" were used to collect data.*

Results: *Students' (n=529) attitudes towards the COVID-19 vaccine are positive. While it is seen that professional trust is higher than individual trust, it has been found that the participants frequently perform verification awareness. In addition, it was determined that professional trust and verification awareness and positive attitude toward the vaccine were positively related.*

Conclusion: *Students' attitudes towards the COVID-19 vaccine are positive and related to social media trust and verification awareness. Information on social media is important for the protection of public health, especially during pandemics.*

Keywords*: Social media, COVID-19, Vaccination, Behaviour*

ÖZET

Amaç: *Bu çalışmanın amacı, üniversite öğrencilerinin sosyal medya haberlerine olan güveni ve doğrulama farkındalığının, COVID-19 aşısına yönelik tutumlarına etkisini incelemektedir.*

Gereç ve Yöntem*: Çalışma kısıtlamaların halen geçerli olduğu Şubat-Temmuz 2021 tarihleri arasında Google Formlar üzerinden uygulandı. İstanbul'daki üniversitelerin lisans bölümlerinde öğrenim gören toplam 529 öğrenciye ulaşıldı. Veriler "Bilgi Formu", "Sosyal medya haberlerine güven ve teyit ölçeği" ve "COVID-19 aşısına yönelik tutumlar" ölçekleri ile toplandı.*

Bulgular: *Öğrencilerin (n=529) COVID-19 aşısına yönelik tutumları olumludur. Mesleki güvenin bireysel güvenden daha yüksek olduğu görülürken, katılımcıların sıklıkla doğrulama farkındalığını gerçekleştirdikleri tespit edildi. Ayrıca mesleki güven ve doğrulama farkındalığı ile aşıya yönelik olumlu tutumun pozitif yönde ilişkili olduğu belirlendi.*

Sonuç: *Katılımcıların COVID-19 aşısına yönelik tutumları olumlu olup sosyal medya güveni ve doğrulama farkındalığı ile ilişkilidir. Sosyal medyadaki doğru bilgilendirmeler özellikle pandemi döneminde halk sağlığının korunması açısından önem taşımaktadır.*

Anahtar kelimeler: *Sosyal medya, COVID-19, Aşı, Tutum*

INTRODUCTION

Vaccination has been a cornerstone in controlling infectious diseases throughout history, including diseases such as smallpox, polio, and more recently COVID-19. However, it is necessary to have sufficiently high vaccination rates to establish immunity in the population. It is reported that 80% of the population should be vaccinated to ensure herd immunity (Anderson et al., 2020).

Achieving immunity depends on many factors. Some factors are logistically sufficient vaccine access and suitability of vaccine storage conditions, and the most important challenge is people's willingness to get vaccinated. Some people were hesitant and resisted the vaccines used to protect against other infectious diseases in the past. However, in pandemics affecting the world such as COVID-19, vaccine rejection becomes a problem affecting society. The concept of "vaccine indecision-rejection" have been introduced globally, especially in the last two decades, and the increasing rates of vaccine rejection have caused some eradicated diseases to be seen again worldwide. For example, as of March 2019, 153 measles cases were detected in the Rockland region of New York, USA, and unvaccinated children were not allowed to enter public areas such as schools and shopping centers due to the risk of an epidemic (AAP, 2019).

After winning the lawsuit regarding "the necessity of obtaining parental consent in vaccination practices", Türkiye has led to the media coverage of the concept of anti-vaccination since 2015. The effect of this case on the media caused the concept of anti-vaccination to occur more in the media in the following years. Especially, the fact that the win of the case was reflected as a legal victory in the newspapers and social media has led to an increase in the anti-vaccine discourse led by influential people in religious and philosophical fields. The number of people who refused vaccination exceeded 10.000 according to the data announced by the Ministry of Health in 2017 (Bozkurt, 2018).

In 2018, this figure increased to twenty-three thousand (Republic of Türkiye Ministry of Health, 2017). Social media is very effective in the spread of anti-vaccine discourses. Around 3 billion people worldwide use at least one social media platform. In recent studies, it is stated that social media is used not only by the public but also by public health professionals and politicians (Samaras et al., 2020). During the pandemic process, people have used social media more to implement going-out restrictions within the scope of isolation measures. It is reported that the use of social media such as Facebook has increased by 37% during the pandemic process (Perez, 2020). The rapid spread of COVID-19 and the acceleration of vaccine-related clinical research processes have led to the need for people to access more information. Failure to use the right social media resources causes increased fear of COVID-19 and misinformation (Lin et al., 2020). Basch et al. searched YouTube videos using the keywords "vaccine safety" and "vaccines and children" and found 87 videos. 65% of these videos are anti-vaccine, and 36.8% do not have any scientific content (Basch et al., 2017). Once more, when YouTube videos were searched with the keywords "COVID-19" and "coronavirus", it was reported that 27.5% of the videos had unreal and inaccurate information. More than 60 million people watched these videos (Li et al., 2020).

Misinformation refers to “situations where people’s beliefs about factual matters are not valid, are not supported by evidence and expert opinion” by authorities (Dunn et al., 2015). Health-related misinformation refers to conclusions drawn based on incorrect or incomplete information (Southwell et al., 2019). On the other hand, misinformation in vaccine hesitancy particularly affects negative attitudes towards vaccines and is considered a risk for socio-political and healthcare providers (Verger & Dube, 2020). While applying the information on social media by accepting it as correct causes harm to the individual, exposure to online misinformation about the vaccine affects public health (Zhang et al., 2021).

Although several studies have explored social media’s role in spreading vaccine misinformation internationally (Puri et al., 2020; Islam et al., 2021), limited evidence exists on the impact of social media news trust and verification awareness on attitudes towards the COVID-19 vaccine, particularly among university students in Türkiye. Studies conducted in Türkiye show that vaccine rejection and opposition attitudes towards vaccines are discussed (Gülten et al., 2019; Topçu et al., 2019; Özceylan et al., 2020). However, no study has been found on the effect of social media news on the attitude towards the COVID-19 vaccine. This paper aims to identify the effect of university students' social media news trust and

verification awareness on their attitude towards the COVID-19 vaccine.

The results obtained from this study will contribute to the few studies in literature. Determining the attitudes and behaviors of young people, especially during pandemics, is important in terms of protecting and improving the health of future generations and affecting public health. While protecting and improving health will contribute to the protection of public health, it will also provide ideas for reducing financial problems and creating the concept of social justice by protecting the well-being of the individual, family, and the whole society.

MATERIALS AND METHODS

Research Type

This study was conducted as descriptive and correlational research.

Study Population and Sample

The research consisted of students from the faculty of health and social sciences at a university in Istanbul during the 2020-2021 academic year. The data collection process involved sending a questionnaire, created using Google Forms, to 975 students registered at universities in Istanbul, when curfews were applied, to their phone numbers via SMS. The contact information of the students was obtained by the snowball sampling method. 370 of the students did not fill it out by stating that they did not want to participate in the study. It was learned that 99 of the students did not have an internet quota to fill out the questionnaire, and the phone number of 102 students was no longer active. The study was completed with 529 students. The program Epi Info™ version 7 USA: American Centers for Disease Control and Prevention was used for sample calculation with an unknown population. Since there was no similar study, the expected and observed values were accepted as 50%, respectively. According to this formula, the number of students to be included in the study was calculated as 384 with a Type I error ($\alpha = 0.05$) and a coefficient of 95%.

This study aimed to determine the relationships between university students' attitudes towards the COVID-19 vaccine, their trust and verification of social media news about diseases that cause a pandemic such as COVID-19, and their differences according to sociodemographic characteristics.

For this aim, answers to the following questions were sought in the study:

1. What are the mean scores on the Attitudes towards the COVID-19 Vaccine scale and the Social Media News Trust and Verification Awareness scale?
2. Is there a significant relationship between Attitudes towards the COVID-19 Vaccine scale and Social Media News Trust and Verification Awareness scale?
3. Are there significant differences between Attitudes towards the COVID-19 Vaccine scale and Social Media News Trust and Verification Awareness scale scores according to sociodemographic characteristics?

Data Collection Tools

Three main questionnaires were used in this study:

Personal information form: This form consisted of ten questions about the socio-demographic characteristics (age, gender and department), the habits of using social media (media they followed the daily news, mean hours they spent a day on social media) and their attitudes towards the COVID-19 vaccine (the status of having influenza vaccine each year, the state of knowledge about the vaccine, etc.) of students who participated in the study.

The Social Media News Trust and Verification Awareness (SMNT/VA) scale: It was used to evaluate trust and verification behaviours in social media. SMNT/VA scale was developed by Çömlekçi and Başol consists of 10 items. It is rated on a five-point Likert scale. It has three subscales (Verification, trust on professional social media shares, and individual social media shares). Cronbach's α score on the Verification Subscale (VS) is 0.83, the Cronbach's α score of the Trust on Professional Social Media Sharing Subscale (TPSMS) is 0.66, and the Cronbach's α score of Trust on Individual Social Media Sharing Subscale (TISMS) is 0.65. The whole scale Cronbach α score is 0.71. It is understood that the higher the score, the more they confirm their social media news (Çömlekçi & Başol, 2019) In this study, Cronbach's α score of the VS is 0.83, the Cronbach's α score of TPSMS is 0.72, and the Cronbach's α score of TISMS is 0.64. The whole

scale Cronbach α score is 0.83.

The Scale of Attitudes Towards the COVID-19 Vaccine (ATV-COVID-19): It was developed by Geniş et al. consists of 9 items. It is rated on a five-point Likert scale. It has two subscales as positive and negative attitudes. The items in the negative attitude subscale are scored by reversing. A high score from the positive attitude subscale indicates a positive attitude towards vaccination. The higher score obtained from the negative attitude subscale indicates the less negative attitude towards vaccination. Cronbach's α score of the positive attitude subscale is 0.96, the Cronbach's α score of the negative attitude subscale is 0.78, and the overall Cronbach's α score of the scale is 0.80 (Geniş et al., 2020). In this study, Cronbach's α score on the positive attitude towards subscale is 0.91, the Cronbach's α score of the negative attitude towards subscale is 0.66, and the overall Cronbach's α score of the scale is 0.87.

Ethical Considerations

Approval was obtained from the Non-Interventional Ethics Committee (01.18.2021/02) for the study and permission to use the scale in order to to conduct the study. In accordance with the Declaration of Helsinki, electronic informed consent was provided on the first page of the online questionnaire and online consent was obtained.

Data Analysis

Statistical analysis was performed with SPSS 22.0 version. In the study, the distribution of the demographic characteristics of the students was given based on frequency, percentage, mean and standard deviation. Then, Skewness and Kurtosis tests were used for the normal distribution test of the data of the SMNT/VA scales attitudes towards the COVID-19 vaccine. For this reason, the independent t-test was used in paired groups, and the One Way Anova was used in groups with more than two. The Tukey HSD test was used for post-hoc analysis to analyze which group or groups caused the difference. The correlation between the scores of scales was determined using Pearson correlation analysis. Significance was evaluated as $p<0.05$ in all statistical analyses

RESULTS

The mean age of the students was 19.96 ± 2.33 years, 79.6% were female, 73.2% were studying in the health sciences, 32.7% were following the daily news on Instagram, 50.9% reported spending an average of 1-3 hours per day on social media.

It was stated that 94% of them did not have the flu vaccine every year, 92.8% had information about the COVID-19 vaccine, 56.5% had access to information about the COVID-19 vaccine from the internet, 64.8% had people had the COVID-19 vaccine in their relatives, 91.7% reported no side effects developed in patients who were vaccinated in their relatives (Table 1).

Table 1. Descriptive Characteristics of the Participants

	Min-Max	$\bar{X} \pm SD$
Age	17-41	19.96 ±2.33
Characteristics	**n**	**%**
Gender		
Male	108	20.4
Female	421	79.6
Department		
Health sciences	387	73.2
Social sciences	142	26.8
Where do you follow daily news?		
Newspaper	42	7.9
Instagram	173	32.7
TV	125	23.6
Twitter	155	29.3
Other	34	6.4
Mean time spent on social media? (Hours/day)		
1-3 hours	269	50.9
4-7 hours	239	45.2
8 hours and more	21	4
Information about to vaccine		
Getting influenza vaccination every year		
Yes	32	6
No	497	94
Do you know about to COVID-19 vaccine?		
Yes	491	92.8
No	38	7.2
Did you get information about the COVID-19 vaccine?		
TV	178	33.6
Internet	299	56.5
Healthcare professionals	52	9.8
Has anyone close to you been vaccinated?		
Yes	343	64.8
No	186	35.2
Has any side effects developed?		
Yes	44	8.3
No	485	91.7

The mean score of the ATV-COVID-19 was 3.18 ± 0.66, the Cronbach α score was 0.87, the positive attitude total score was 3.19 ± 0.88, and the

Cronbach α score was 0.91, the negative attitude total score was 3.18 ± 0.59, and the Cronbach α score was 0.66. The mean score of the SMNT/VA scale was 3.04 ± 0.69, and the Cronbach α score was 0.83. The mean score of TPSMS subscale was 2.99 ± 0.64, the Cronbach α score was 0.72, the mean of TISMS subscale was 2.50 ± 0.65, and the Cronbach α score was 0.64. The mean score of the verification subscale was 3.65 ± 0.79, and the Cronbach α score was 0.83.

The subscales's Kurtosis and Skewness scores of SMNT/VA and ATV-COVID-19 vaccine scale were between -1 and +1 and were distributed normally (Table 2).

According to some sociodemographic characteristics, significant differences were found in the post-hoc analysis between the scale scores. A significant difference was found between women's positive attitude towards the COVID-19 vaccine and their trust on professional social media news ($p<0.05$). A significant difference was found between those who studied in the health-related department and the trust on professional social media news ($p\leq0.001$).

It was found that there was a statistically significant difference between the TPSMS mean scores of the SMNT/VA scale according to source that the daily news was followed ($p\leq0.001$), and post-hoc analysis showed that this difference was caused by the fact that the TPSMS mean score of students who follow daily news from other sources was lower than the TPSMS mean scores of students who follow daily news from TV ($p=0.002$), Instagram ($p\leq0.001$), newspaper ($p<0.05$) and Twitter ($p\leq0.05$).

It was found that there was a statistically significant difference between the trust on individual social media shares (TISMS) mean scores of the SMNT/VA scale according to source that the daily news was followed ($p\leq0.001$), and post-hoc analysis showed that this difference was caused by the fact that the TISMS mean score of students who follow daily news from TV was higher than the TISMS mean scores of students who follow daily news from newspaper ($p\leq0.001$), and Twitter ($p\leq0.001$).

According to the mean hours spent daily on social media, there was statistically significant difference between the mean scores of the trust in professional social media shares sub-dimension of the SMNT/VA scale ($p<0.05$), and in the post-hoc analysis, the TPSMS score of the students who used social media for 1-3 hours per day was the mean score is significantly lower than the mean score of students who use social media for 8 hours or more ($p<0.05$).

A significant difference was found between those who said they knew about the COVID-19 vaccine and those with a positive attitude ($p\leq0.001$) towards it and the TPSMS ($p\leq0.001$), verification subscales ($p<0.05$). A significant difference was found between those who stated that they received information about the COVID-19 vaccine from healthcare professionals and the verification subscale. ($p<0.05$) A significant difference was found between those whose relatives had been vaccinated and those with a positive attitude towards the vaccine ($p\leq0.001$), the TISMS ($p<0.05$) and the verification subscales. ($p\leq0.001$) A significant difference was found between those who had people in their relatives with no adverse effects after vaccination and the positive attitude towards the vaccine ($p\leq0.001$) (Table 3).

Table 2. Kurtosis, Skewness, Mean and Cronbach α Scores of the Scales

Scale and Subscale		Kurtosis	Skewness	$\bar{x} \pm SD$	Cronbach α scores
ATV-COVID-19 (Total)				3.18 ± 0.66	0.87
Subscales	Positive attitude	0.019	-0.32	3.19 ± 0.88	0.91
	Negative attitude	0.235	0.047	3.18 ± 0.59	0.66
SMNT/VA (Total)				3.04 ± 0.69	0.83
Subscales	Trust on professional social media shares	0.483	-0.582	2.99 ± 0.64	0.72
	Trust on individual social media shares	-0.279	-0.115	2.50 ± 0.65	0.64
	Verification	-0.156	-0.278	3.65 ± 0.79	0.83

ATV-COVID-19: Attitudes towards the COVID-19 vaccine. **SMNT/VA:** Social media news trust and verification awareness.

Table 3. Comparison of the Mean Scores of the Scales According to the Sociodemographic Characteristics of the Participants

Characteristics		ATV-COVID-19 (Total)				SMNT/VA					
		Positive		Negative		TPSMS		TISMS		Verification	
		$\bar{x} \pm SD$	p	$\bar{x} \pm SD$	p	$\bar{x} \pm SD$	p	$\bar{x} \pm SD$	p	$\bar{x} \pm SD$	p
Age		3.19 ± 0.88	0.521	3.18 ± 0.59	0.696	2.99 ± 0.64	0.127	2.50 ± 0.65	0.698	3.65 ± 0.79	0.570
Gender	Male	3.14 ± 0.88		3.18 ± 0.60		3.03 ± 0.62		2.50 ± 0.65		3.62 ± 0.81	
	Female	3.39 ± 0.82	**0.009**	3.19 ± 0.57	0.891	2.84 ± 0.69	**0.007**	2.48 ± 0.67	0.841	3.76 ± 0.68	0.110
Department	Health sci.	3.21 ± 0.83	0.810	3.20 ± 0.62	0.603	2.96 ± 0.66	0.426	2.6 ± 0.67	**0.023**	3.60 ± 0.78	0.332
	Social sci.	3.19 ± 0.89		3.17 ± 0.58		3.01 ± 0.63		2.46 ± 0.65		3.67 ± 0.79	
Where do you follow daily news?	Newspaper[a]	3.16 ± 0.87		3.19 ± 0.58		2.98 ± 0.68		2.34 ± 0.58		3.62 ± 0.89	
	Instagram[b]	3.30 ± 0.86		3.25 ± 0.60		3.03 ± 0.60	**0.005**	2.53 ± 0.66		3.75 ± 0.73	
	TV[c]	3.11 ± 0.80	0.127	3.09 ± 0.55	**0.049**	3.05 ± 0.58		2.66 ± 0.64	**0.000**	3.53 ± 0.77	**0.01**
	Twitter[d]	3.39 ± 1.10		3.34 ± 0.63		3.00 ± 0.68	**e<a,b,c,d***	2.29 ± 0.66		3.94 ± 0.76	
	Other[e]	3.04 ± 1.00		3.14 ± 0.70		2.59 ± 0.76		2.33 ± 0.77	**c>a,d***	3.55 ± 0.61	**c<d***
Mean time spent on social media? (hours/day)	1-3[a]	3.23 ± 0.85	**0.034**	3.21 ± 0.59		2.92 ± 0.64	**0.023**	2.45 ± 0.65		3.65 ± 0.77	
	4-7[b]	3.19 ± 0.88	**c<a,b***	3.17 ± 0.60	0.09	3.05 ± 0.62	**a<c***	2.54 ± 0.66	0.193	3.63 ± 0.80	0.638
	8 and ↑[c]	2.71 ± 1.01		2.91 ± 0.61		3.19 ± 0.67		2.60 ± 0.64		3.81 ± 0.84	
Do you get the influenza vaccine?	Yes	3.31 ± 0.96		3.16 ± 0.59		3.01 ± 0.69		2.68 ± 0.55		3.77 ± 0.68	
	No	3.19 ± 0.87	0.434	3.18 ± 0.59	0.803	2.99 ± 0.63	0.902	2.48 ± 0.66	0.109	3.64 ± 0.79	0.384
Do you know about to COVID-19 vaccine?	Yes	3.24 ± 0.88		3.00 ± 0.61		3.02 ± 0.64		2.49 ± 0.65		3.68 ± 0.78	
	No	2.62 ± 0.72	**0.000**	2.95 ± 0.39	0.06	2.71 ± 0.64	**0.004**	2.51 ± 0.79	0.901	3.38 ± 0.85	**0.023**
… get the information?	TV	3.17 ± 0.82		3.14 ± 0.61		2.99 ± 0.67		2.52 ± 0.71		3.53 ± 0.85	
	Internet	3.18 ± 0.93	0.515	3.18 ± 0.60	0.120	3.03 ± 0.61	0.079	2.50 ± 0.63	0.403	3.71 ± 0.76	**0.026**
	Health. prof.	3.33 ± 0.83		3.33 ± 0.60		2.81 ± 0.70		2.38 ± 0.63		3.79 ± 0.70	
Has anyone close to you been vaccinated?	Yes	3.33 ± 0.87	**0.000**	3.18 ± 0.59	0.06	3.01 ± 0.65	0.596	2.45 ± 0.67	**0.026**	3.74 ± 0.78	**0.001**
	No	2.95 ± 0.85		3.08 ± 0.60		2.98 ± 0.62		2.58 ± 0.64		3.50 ± 0.79	
Has any side effects developed?	Yes	2.84 ± 0.96	**0.005**	3.01 ± 0.60	0.07	2.84 ± 0.77	0.11	2.57 ± 0.71	0.448	3.67 ± 0.71	0.896
	No	3.23 ± 0.86		3.21 ± 0.59		3.01 ± 0.62		2.49 ± 0.65		3.65 ± 0.79	

*Post-hoc analysis, Tukey HSD, ATV-COVID-19: Attitudes towards the COVID-19 vaccine. SMNT/VA: Social media news trust and verification awareness. TPSMS: Trust on professional social media shares. TISMS: Trust on Individual social media share

In the Pearson correlation analysis, there was a statistically significant and positive correlation between the TPSMS and the verification awareness scale and the positive attitude subscale scores of the ATV-COVID-19 vaccine scale (r=0.193; p≤0.001), and there was a statistically significant and a positive relationship between the negative attitude subscale scores of the ATV-COVID-19 vaccine scale (r=0.107; p<0.05). there was a statistically significant and positive relationship between the verification subscale scores of the SMNT/VA scale and the positive attitude subscale scores of the ATV-COVID-19 scale (r=0.174; p≤0.001) (Table 4).

Table 4. Inter-scale Correlation

Subscales of SMNT/VA	Subscales of ATV-COVID-19 (Total)	
	Positive attitude	**Negative attitude**
TPSMS		
r	0.193	0.107
p	**0.000**	**0.014**
TISMS		
r	0.042	-0.01
p	0.338	0.822
Verification		
r	0.174	0.065
p	**0.000**	0.137

ATV-COVID-19: Attitudes towards the COVID-19 vaccine. **SMNT/VA:** Social media news trust and verification awareness. **TPSMS:** Trust on professional social media shares. **TISMS:** Trust on Individual social media shares.

DISCUSSION

As a result of this study, the students stated that they had information about COVID-19 and got it from the internet. In general, it was understood that their attitudes towards the COVID-19 vaccine were positive and affected by some sociodemographic characteristics (female, studying in the health sciences department, having a person close to them who had been vaccinated, and no adverse effects, less time spent on social media). Students verify their social media news, and they trust more professional social media news than individual ones. In addition, they mostly verify their social media news on Twitter, and there is a relationship between their attitudes towards the vaccine.

Students stated that they had information about the COVID-19 vaccine and obtained it from the internet. Internet technology has been developing in Türkiye since the 2000s and has become widespread, being offered to users at low prices (Kırık, 2017). Generation Z, having grown up with this technology, utilizes the internet extensively. A recent study showed that college students are accessing health information online (Kanchan & Gaidhane, 2023), while a report covering seven European countries found that 63% of individuals aged 8-29 sought health information online (National Communications Authority, 2021). In the Health Information National Trends Survey conducted among US adults between 2011 and 2014, it is reported that the first place to search for health-related information is the internet (Jacobs et al., 2017). As in the rest of the world, it is seen that students in Türkiye first apply to the internet to get information.

In this study, it was understood that the attitudes of people who were vaccinated and did not have any negative effects towards the vaccine were positive. The rapidly increasing mortality rates during in the COVID-19 pandemic worldwide have effectively prioritised vaccine research. In addition, the combination of advanced genetic techniques and research phases (phase 1-2-3) in vaccine development studies has provided an advantage, enabling the candidate vaccines being developed for COVID-19 to be put into use in a short period of 12-18 months (Moderna Announces, 2020).

A lack of sufficient knowledge about vaccine development techniques and genetic studies may cause more suspicion in people. Along with these thoughts, the rapid spread of non-scientific information about the vaccine's adverse effects in society and social media also supports the negative attitude towards the vaccine. In a study conducted to evaluate vaccine attitudes, the reasons for vaccine rejection were reported as being developed in a short time, unknown long-term effects, and potential harm due to the substances contained in the vaccine (Cordina & Lauri, 2021). In parallel with the results of the study, it is reported that fear of the adverse effects of the vaccine and thinking that a newly developed vaccine is not reliable are seen as the most common reasons for indecision and rejection against vaccination in studies conducted in TR and the US on the COVID-19 vaccine attitude (Akarsu et al., 2021; Latkin et al., 2021). The fact that the students in this study did not experience vaccine side effects in their immediate environment may have positively affected their attitudes toward vaccination.

Gender can be an important indicator in pandemics. The underlying reasons why gender is a determining factor in the pandemic are various. Studies indicate that although women are more likely to engage in preventive behavior, they do not believe in the protection of the vaccine and are less willing to get vaccinated than men (Lindner-Pawlowicz et al., 2021; Callaghan et al., 2021). In the gender research covering 8 OECD countries, women's lack of risk-taking, gender differences in psychological assessment of health, and aspects of decision-making are emphasized here (Galasso et al., 2020). Based on this evaluation, it is stated that women are more cautious in taking risks and take longer to evaluate the risks (Murphy et al., 2021). One of the underlying reasons for this may be that they are exposed to true or false side effect reports about vaccinated people. Studies have news that after the first dose of the COVID-19 vaccine, at least one local injection site reaction developed in 84.7% and at least one systemic reaction in 77.4% (CDC, 2021). However, these symptoms last for a maximum of two weeks and usually begin to disappear within two days (Walsh et al., 2020). Although it has been reported that vaccine-related side effects disappear in a short time, it is understood that it does not help eliminate the negative attitude towards the vaccine. In the study conducted with medical students in the USA, the high level of vaccine hesitancy is attributed to their concerns about the vaccine's adverse effects and insufficient explanations by public health experts on the subject (Lucia et al., 2021). Because unless information is obtained from healthcare professionals, misinformation will spread, and problems will become difficult to solve (Ballard et al., 2020). Another reason behind women's negative attitudes towards vaccination may be that they are more exposed to social media news. In one study, women's negative attitudes towards vaccination led to them having to make decisions about vaccinating their children and therefore seeking more health-related information. It was also attributed to greater exposure to anti-vaccine content online (Smith & Graham, 2019). Another reason why gender matters in pandemics is social norms. In developing countries such as Türkiye, women's participation in work is limited. Social norms assign women the roles of giving birth and raising children, and because of these roles, women stay away from work life (Jayachandran, 2021). The fact that women have more time may have caused them to search for more information on social media, which may have affected their attitudes. For all these reasons, it is important for health professionals to deliver accurate information to the public. According to the study results, it was understood that the increase in the time spent on social media negatively affected the attitude towards the vaccine. Social media are platforms that people use in all areas of life. The use rate increases even more during pandemic periods and when curfews are applied. In addition, there is a relationship between the frequency of social media use and the level of belief in conspiracy theories (Allington et al., 2021). People who believe in conspiracy theories are exposed to ambiguous news, and their attitudes towards vaccines are affected. Li et al. reported that more than 60 million people watched social media news despite the low scientific content about COVID-19 (Li et al., 2020). In studies conducted in different countries of the world, it is reported that there is a relationship between the duration of social media use and vaccine hesitancy. It is reported that those living in countries with high vaccine resistance, such as the UK and Ireland, are more exposed to social media content (Murphy et al., 2020). Moreover, in the study conducted in the USA, it is reported that the duration of exposure to social media increases vaccine hesitancy (McAndrew & Allington, 2020). Parallel to the studies, it is thought that as the duration of exposure of the students participating in this study to non-scientific information and conspiracy theories on social media increases, their attitudes towards vaccines are negatively affected.

Students verify their social media news on Twitter, and they trust professional social media share more than individual ones. There is also a relationship between the level of verification of social media news and a positive attitude towards the vaccine. Negative news about the vaccine may hinder immunization. Vaccine refusal can result from a lack of information, distrust of institutions, government, healthcare professionals, and pharmaceutical companies (Chirico & Teixeira da Silva, 2023). For this reason, social media should include professional news rather than individual news. Studies have shown that social media effectively increases people's positive attitudes and behaviours during public health crises (Abd-Alrazaq et al., 2020; Duong et al., 2023).

In a study examining tweets about vaccine hesitancy, it is reported that they are related to safety, effectiveness, and trust in government and institutions (Boucher et al., 2021). Since the

beginning of COVID-19, the misinformation on social media platforms such as Facebook and YouTube have been trying to be limited, and hyperlinks have been provided to the government's web page. Although restrictions were tried to be implemented for Twitter, the content, prevalence, and speed of the shared content made it difficult to restrict (Roth & Pickles, 2020). However, it has been possible to reach the real address of health professionals, epidemiologists, scientists, and academics who have scientific knowledge about COVID-19 on Twitter (determined by the blue checkmark) (Lunden, 2020). In this way, people could learn and follow the people whose background opinions they knew. Verification of the accuracy of the news on Twitter and its scientific content may have led to trust in the news and positive effects on their attitudes towards vaccines.

Limitations

This study has several limitations. First, the fact that the study was conducted during the pandemic period prevented the face-to-face participation of students. In addition, university students frequently change their phone numbers, making it difficult to deliver online forms. Therefore, it is impossible to generalize the study results to all university students.

Secondly, the research was conducted only with students studying in Istanbul, making it difficult to generalize the results to the whole country. On the other hand, Istanbul is one of the largest and most populous cities in Türkiye. Therefore, it will provide a perspective in terms of demonstrating population diversity. Students in the faculty of health sciences are the healthcare professionals of the future. Additionally, given their age, they are a sample group that uses technology extensively, making it important to examine their attitudes toward a vaccine developed for a pandemic-causing disease. Finally, the fact that the study was conducted in the early stages of the pandemic gives information about the attitude towards vaccination in the acute period, suggesting that additional studies are needed to evaluate the long-term attitude

CONCLUSIONS

It was understood that the students' attitudes towards the COVID-19 vaccine were positive, they confirmed their social media news, and they trusted their professional media news. In addition, it was found that the positive attitude towards the COVID-19 vaccine was affected by some sociodemographic characteristics (female, studying in the health-related department, having a person close to the person with the COVID-19 vaccine with no adverse effects, short time spent on social media). As a result, it has been seen that university students access information about the COVID-19 vaccine during the pandemic from the internet, confirm the social media news they reach, and have a positive attitude towards the vaccine.

Ethics Committe Approval

Ethics committee approval was received for this study from the Istanbul Atlas University Ethics Committee (Date: 18.01.2021, Approval Number: 02).

Author Contributions

Idea/Concept: D.B., L.K.; Design: D.B.; Supervision/Consulting: D.B., L.K.; Analysis and/or Interpretation: D.B., L.K.; Literature Search: D.B.; Writing the Article: D.B., L.K.; Critical Review: D.B., L.K.

Peer-review

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Conflict of Interest

The authors have no conflict of interest to declare.

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REFERENCES

Abd-Alrazaq, A., Alhuwail, D., Househ, M., Hamdi, M., Shah, Z. (2020). Top Concerns of Tweeters During the COVID-19 Pandemic: Infoveillance Study. *J Med Internet Res,* 21:22(4):e19016 doi:10.2196/19016

Akarsu, B., Canbay Özdemir, D., Ayhan Baser, D., Aksoy, H., Fidancı, İ., Cankurtaran, M. (2021). While studies on COVID-19 vaccine is ongoing, the public's thoughts and attitudes to the future COVID-19 vaccine. *International Journal of Clinical Practice,* 75(4):e13891. doi:10.1111/ijcp.13891

Allington, D., Duffy, B., Wessely, S., Dhavan, N., Rubin, J. (2021). Health-protective behaviour, social media usage and conspiracy belief during the COVID-19 public health emergency. *Psychological Medicine,* 51(10):1763-1769. doi:10.1017/S0033291721000593

American Academi of Pediatrics. AAP Immunization Initiatives Newsletter. Available from: URL: Jan 2019. https://www.aap.org/en-us/documents/ immunization_newsletter.pdf [accessed 02 Sep 2023]

Anderson, R. M., Vegvari, C., Truscott, J., Collyer, B. S. (2020). Challenges in creating herd immunity to SARS-CoV-2 infection by mass vaccination. *Lancet,* 396 (10263): 1614–6. doi:10.1016/S0140-6736(20)32318-7

Ballard, M., Bancroft, E., Nesbit, J., Johnson A., Holeman I., … Palazuelos D. (2020). Prioritising the role of community health workers in the COVID-19 response. *BMJ Global Health,* 5: e002550.doi: 10.1136/bmjgh-2020-002550

Basch, C. H., Zybert, P., Reeves, R., Basch, C. E. (2017). What do popular YouTube TM videos say about vaccines? *Child Care Health Dev.*, 43(4):499. doi:10.1111/cch.12442

Boucher, J. C., Cornelson, K., Benham, J. L., Fullerton, M. M., Tang, T., … Lang R. (2021). Analyzing social media to explore the attitudes and behaviors following the announcement of successful COVID-19 vaccine trials: infodemiology study. *JMIR Infodemiology*, 1(1): e28800. doi:10.2196/28800

Bozkurt, H. B. (2018). An overview of vaccine rejection and review of literature. *Kafkas J Med Sci.*, 8(1): 71-76. doi:10.5505/kjms.2018.12754

Callaghan, T., Moghtaderi, A., Lueck, J. A., Hotez, P., Strych, U., Dor, A., Fowler, E. F., Motta, M. (2021). Correlates and disparities of intention to vaccinate against COVID-19. *Soc Sci Med*., 272:113638. doi: 10.1016/j.socscimed.2020.113638

Centers for Disease Control and Prevention. (2021). Reactions and Adverse Events of the Pfizer-BioNTech COVID-19 *Vaccine.* 2021. https://www.cdc.gov/vaccines/COVID-19/info-by-product/pfizer/reactogenicity.html

Chirico, F., Teixeira da Silva, J. A. (2023). Evidence-based policies in public health to address COVID-19 vaccine hesitancy. *Future Virology*, 18(4), 261-273. doi:10.2217/fvl-2022-0028

Cordina, M., Lauri, M. A. (2021). Attitudes towards COVID-19 vaccination, vaccine hesitancy and intention to take the vaccine. *Pharmacy Practice (Granada),* 19(1). doi:10.18549/pharmpract.2021.1.2317

Çömlekçi, M. F., Başol, O. (2019). Research on social media news trust and news verification awareness. *Galatasaray University Journal of Communication*, (30):55-77. doi:10.16878/gsuilet.518697

Dunn, A. G., Leask, J., Zhou, X., Mandl, K. D., Coiera, E. (2015). Associations between exposure to and expression of negative opinions about human papillomavirus vaccines on social media: An observational study. *Journal of Medical Internet Research,* 17(6): e144. doi:10.2196/jmir.4343

Duong, H. T., Nguyen, L. T. V., Julian McFarlane, S., Nguyen, H. T., & Nguyen, K. T. (2023). Preventing the COVID-19 outbreak in Vietnam: Social media campaign exposure and the role of interpersonal communication. *Health Communication*, 38(2), 394-401. doi:10.1080/10410236.2021.1953729

Galasso, V., Pons, V., Profeta, P., Foucault, M. (2020). Gender differences in COVID-19 attitudes and behavior: Panel evidence from eight countries. *Proc Natl Acad Sci U S A*., 117 (44): 27285-27291. doi: 10.1073/pnas.2012520117

Geniş, B., Gürhan, N., Koç, M., Geniş, Ç., Şirin, B., Çırakoğlu, O. C., Coşar, B. (2020). Development of perception and attitude scales related with COVID-19 pandemia. *Pearson Journal of Social Sciences-Humanities*, 5(7): 306-328.

Gülten, E., Özer Türk, D., Erol, A., Özel, Ç. (2019). The Knowledge, attitudes and beliefs of the healthcare workers about influenza infection and vaccination at a public hospital in Turkey. *Infect. Dis. Clin. Microbiol,* 2:87-96. doi:10.36519/idcm.2019.19013

Islam, M. S., Kamal, A. M., Kabir, A., Southern, D. L., Khan, S. H., Hasan, S. M. M., Sarkar, T., … Seale, H. (2021). COVID-19 vaccine rumors and conspiracy theories: The need for cognitive inoculation against misinformation to improve vaccine adherence. PloS one, 16(5), e0251605. https://doi.org/10.1371/journal.pone.0251605

Jacobs, W., Amuta, A. O., Jeon, K. C., Alvares, C. (2017). "Health information seeking in the digital age: An analysis of health information seeking behavior among US adults," *Cogent Social Sciences*, (3):1. ID 1302785 doi: 10.1080/23311886.2017.1302785

Jayachandran, S. (2021). Social norms as a barrier to women's employment in developing countries. IMF *Economic Review*, 69(3):576-595. doi:10.1057/s41308-021-00140-w

Kanchan, S., Gaidhane, A. (2023). Social media role and its impact on public health: A narrative review. Cureus, 15(1). doi:10.7759/cureus.33737

Kırık, A. M. (2017). Changing communication process with new media: The position of young people in the social sharing networks. *Gumushane University E-Journal of Faculty of Communication*, 5(1):230-261. doi:10.19145/gumuscomm.300815

Latkin, C. A., Dayton, L., Yi, G., Konstantopoulos, A., & Boodram, B. (2021). Trust in a COVID-19

vaccine in the U.S.: A social-ecological perspective. Social science & medicine (1982), 270, 113684. https://doi.org/10.1016/j.socscimed.2021.113684

Li, H.O.Y., Bailey, A., Huynh, D., Chan, J. (2020). YouTube as a source of information on COVID-19: A pandemic of misinformation? *BMJ Global Health*, 5(5): e002604. doi:10.1136/bmjgh-2020-002604

Lin, C. Y., Broström, A., Griffiths, M. D., Pakpour, A. H. (2020). Investigating mediated effects of fear of COVID-19 and COVID-19 misunderstanding in the association between problematic social media use, psychological distress, and insomnia. *Internet Interventions*, 21:100345. doi:10.1016/j.invent.2020.100345

Lindner-Pawłowicz, K., Mydlikowska-Śmigórska, A., Łampika, K., Sobieszczańska, M. (2021). COVID-19 Vaccination acceptance among healthcare workers and general population at the very beginning of the national vaccination program in Poland: a cross-sectional, exploratory study. *Vaccines*, 10(1):66. doi:10.3390/vaccines10010066

Lucia, V. C., Kelekar, A., Afonso, N. M. (2021). COVID-19 vaccine hesitancy among medical students. *Journal of Public Health*, 43(3):445-449. doi:10.1093/pubmed/fdaa230

Lunden, I. (2020). Twitter prioritizes blue-check verifications to confirm experts on COVID-19 and the novel coronavirus. TechCrunch. 2020, Mar 21. URL: https://techcrunch.com/2020/03/21/twitter-prioritizes-blue-check-verifications-to-confirm-experts-on-COVID-19-and-the-novel-coronavirus/.

McAndrew, S., Allington, D. (2020). How do mode and frequency of COVID-19 information updates, political values, and future COVID-19 vaccine attitudes. Preprint. *PsyArXiv*. doi:10.31234/osf.io/j7srx

Moderna Announces. (2020). First Participant Dosed in NIH-led Phase 1 Study of mRNA Vaccine (mRNA-1273) Against Novel Coronavirus. 16 March 2020. https://www.sec.gov/Archives/edgar/data/1682852/000119312520074867/d884510dex992.htm

Murphy, J., Vallières, F., Bentall, R. P., Shevlin, M., McBride, O., Hartman, T. K., McKay, R., Bennett, K., … Hyland P. (2020). Preparing for a COVID-19 vaccine: Identifying and psychologically profiling those who are vaccine hesitant or resistant in two general population samples. Preprint. *PsyArXiv*, doi:10.31234/osf.io/pev2b.

Murphy, J., Vallières, F., Bentall, R. P., Shevlin, M., McBride O., … Hyland P. (2021). Psychological characteristics associated with COVID-19 vaccine hesitancy and resistance in Ireland and the United Kingdom. Nat Commun, 12(1):29. doi: 10.1038/s41467-020-20226-9

National Communications Authority. 2021. "Quarterly Statistical Bulletin on Communications in Ghana," https://nca.org.gh/wp-content/uploads/2021/11/stats-bulletin4.pdf

Özceylan, G., Toprak, D., Esen, E.S. (2020). Vaccine rejection and hesitation in Turkey. Human Vaccines & Immunotherapeutics, 16(5):1034-1039. doi:10.1080/21645515.2020.1717182

Perez, S. (2020). Report: WhatsApp has seen a 40% increase in usage due to COVID-19 pandemic. TechCrunch. March 26. https://techcrunch.com/2020/03/26/report-whatsapp-has-seen-a-40-increase-in-usage-due-to-COVID-19-pandemic/.

Puri, N., Coomes, E. A., Haghbayan, H., Gunaratne, K. (2020). Social media and vaccine hesitancy: new updates for the era of COVID-19 and globalized infectious diseases. Human Vaccines & Immunotherapeutics, 16(11): 2586-2593. doi:10.1080/21645515.2020.1780846

Republic of Türkiye Ministry of Health. Health statistics yearbook 2017. Newsletter, 2018. [accessed 02 Sep 2023]

Roth, Y., Pickles, N. (2020). Updating our approach to misleading information. Twitter. May 11 URL: https://blog.twitter.com/en_us/topics/product/2020/updating-our-approach-to-misleading-information.html

Samaras, L., García-Barriocanal, E., Sicilia, M. A. (2020). Comparing social media and Google to detect and predict severe epidemics. Sci Rep., 10 (4747). doi:10.1038/s41598-020-61686-9.

Smith, N., Graham, T. (2019). Mapping the anti-vaccination movement on Facebook. Information Communication and Society, 22(9): 1310–1327. doi:10.1080/1369118X.2017.1418406

Southwell, B. G., Niederdeppe, J., Cappella, J. N., Gaysynsky, A., Kelley, D. E., Oh, A., Peterson, E. B., Chou, W.Y.S. (2019). Misinformation as a misunderstood challenge to public health. Am. J. Prev. Med., 57 (2):282-285. doi:10.1016/j.amepre.2019.03.009

Topçu, S., Almış, H., Başkan, S., Turgut, M., Orhon F. Ş., Ulukol, B. (2019). Evaluation of childhood vaccine refusal and hesitancy intentions in Turkey. The Indian Journal of Pediatrics, 86(1):38-43. doi:10.1007/s12098-018-2714-0

Verger, P., Dubé, E. (2020). Restoring confidence in vaccines in the COVID-19 era. Expert Review of Vaccines, 19 (11), 991-993. doi:10.1080/14760584.2020.1825945

Walsh, E. E., Frenck, R. W., Falsey, A. R., Kitchin, N., Absalon, J., Gurtman, A., …. Gruber, W.C. (2020). Safety and immunogenicity of two RNA-based COVID-19 vaccine candidates. *N Engl J Med*, 383:2439-2450. doi:10.1056/NEJMoa2027906

Zhang, J., Featherstone, J. D., Calabrese, C., Wojcieszak, M. (2021). Effects of fact-checking social media vaccine misinformation on attitudes toward vaccines. *Preventive Medicine*, 145:106408. doi:10.1016/j.ypmed.2020.106408