ORIGINAL PAPERS

© Copyright by Wydawnictwo Continuo

ISSN 1734-3402, eISSN 2449-8580

Attitudes of family medicine residents in Ankara towards COVID-19 vaccines administered in Turkey: a descriptive, cross-sectional study*

HÜSNA SARICA ÇEVİK^{1, A-F}, RANA BAYKAN^{2, A-F}, AYŞE GÜLSEN CEYHUN PEKER^{2, A, D, E}, ORCID ID: 0000-0002-4292-4696 ORCID ID: 0000-0003-4279-2184 ORCID ID: 0000-0002-0856-9790 SELDA TEKİNER^{2, D, E}

ORCID ID: 0000-0002-7610-3909

¹Çankaya District Health Directorate, Ankara, Turkey ² Family Medicine Department, Ankara University Medical School, Ankara, Turkey

A – Study Design, B – Data Collection, C – Statistical Analysis, D – Data Interpretation, E – Manuscript Preparation, F – Literature Search, G - Funds Collection

Summary Background. The difficulty of accessing accurate information during the COVID-19 pandemic resulted in many questions being asked to family physicians about vaccination.

Objectives. The aim of this study was to determine the attitudes of Family Medicine (FM) residents in Ankara about the inactivated and mRNA COVID-19 vaccines being administered in Turkey.

Material and methods. An anonymous online survey was distributed to FM residents between 22.05.2021–06.06.2021. Information on socio-demographic data and residents' attitudes towards COVID-19 vaccines administered in Turkey were evaluated.

Results. 11.1% of the participants were not vaccinated for the following reasons: having positive Anti-Spike antibody values, thinking that there had not been enough studies on vaccines, vaccine safety concerns, belief that innate immunity would be more protective, pregnancy, breastfeeding or not believing in the protection of the vaccine. While 12.2% of the participants recommended Sinovac-CoronaVac, 23.7% recommended Pfizer/BioNTech, and 63.3% stated that they would evaluate the patient and make recommendations. Most of the participants stated that they thought the Pfizer/BioNTech is more protective against new variants (70.4%), more effective and produces a higher antibody response (84.2%) and provides longer-term protection (74.8%). However, 74.1% of the participants stated that they thought Sinovac-CoronaVac is safer. Sinovac-CoronaVac was recommended to patients with a history of allergic reaction/anaphylaxis (69.8%), autoimmune diseases (60.4%), oncology/chemotherapy patients (49.6%), immunosuppressed patients (49.6) and lactating women (44.6%).

Conclusions. In some case-basis recommendations, it was seen that the residents showed a traditionalist approach. Informing individuals based on scientific information on the safety and effectiveness of the COVID-19 vaccines by family physicians is crucial. Key words: SARS-CoV-2, pandemics, primary health care, COVID-19 vaccines, BNT162 vaccine, SARS-CoV-2 inactivated vaccines.

Sarıca Çevik H, Baykan R, Ceyhun Peker AG, Tekiner S. Attitudes of family medicine residents in Ankara towards COVID-19 vaccines administered in Turkey: a descriptive, cross-sectional study. Fam Med Prim Care Rev 2022; 24(2): 156-161, doi: https://doi.org/10.5114/ fmpcr.2022.115871.

Background

With the rapidly increasing rate of cases worldwide, the World Health Organization (WHO) announced COVID-19 as a pandemic on 11 March 2020 [1]. According to the official data of the Ministry of Health, the total vaccine doses administered has exceeded 118 million in Turkey. To date, two different CO-VID-19 vaccines have been administered in Turkey: inactivated vaccine (Sinovac-CoronaVac) and mRNA vaccine (Pfizer-BioN-Tech [BNT162b2]) [2].

Family Medicine (FM) provides comprehensive, evidencebased health services for the protection and improvement of health and the early diagnosis, treatment, follow-up and rehabilitation of all health problems that may be encountered in order to contribute to individual, family and community health, regardless of age, gender and disease [3]. The difficulty in accessing accurate information, especially in the presence of an intense infodemic [4], resulted in many questions being asked to healthcare professionals, especially to family physicians, about COVID-19 vaccination and vaccination preference.

Objectives

The aim of this study was to determine the attitudes of FM residents in Ankara about the inactivated and mRNA COVID-19 vaccines being administered in Turkey.

Material and methods

As of 4 April 2021, there was a total of 460 FM residents within the scope of the FM residency programme in Ankara, and these residents made up the core of this study. No sample calculation was made, as the research was a cross-sectional, descriptive study.

The survey contained 30 questions in total. The first part of the questionnaire was designed to evaluate "Socio-demo-

^{*} The results of this article were presented by Hüsna Sarıca Çevik at the 15th Family Medicine Fall School Congress on 21 October 2021 in Antalya, Turkey, and the summary text was published in the proceedings book.



graphic Information" (consisting of 5 questions), and the second part was designed to evaluate "Residents' attitudes towards COVID-19 vaccines administered in Turkey" (consisting of 25 questions).

Ministry of Health of Turkey Scientific Research Platform and Ankara University Faculty of Medicine Human Research Ethics Committee approval (I5-304-21) was obtained for this study. The web link of the questionnaire, which was uploaded via Google forms, was sent to the residents via WhatsApp and other social media platforms. Online informed consent was obtained from each participant before starting the study. Data collection lasted for 2 weeks between 22.05.21–06.06.21. Participation in the study was completely voluntary, and the data was collected anonymously. Questionnaires which were not fully completed were excluded from the analysis.

Descriptive statistics were reported as mean \pm standard deviation values for variables with normal distribution, as median (minimum–maximum) values for variables with non-normal distribution and as number (*n*) and percentage (%) for nominal variables. Nominal variables were evaluated with the Fisher's Exact Test. A value of *p* < 0.05 was considered statistically significant. The data was analysed using IBM SPSS version 23 software (SPSS Inc., Chicago, IL, USA).

Results

A total of 139 residents in Ankara participated in this study (Response Rate: 30.2%), comprising 74.8% females, with a mean age of 28.9 \pm 4 years (Table 1). 89.9% (n = 125) of the participants were vaccinated. Reasons for not being vaccinated are given in Table 2.

Most of the participants (63.3%) stated that instead of recommending a vaccine brand directly, they would evaluate the patient and make recommendations (Figure 1).

No statistically significant difference was found in the vaccination recommendation status according to the vaccination status of the participants. (p = 0.09, [Fisher's Exact Test]) (Figure 2).

The analysis of socio-demographics according to vaccination status of the participants, and socio-demographics according to vaccination recommendation status can be seen in Table 3.

Vaccine recommendation status was questioned on a casebasis. Most of the participants stated that they thought the Pfizer-BioNTech vaccine is more protective against new variants/mutations (70.4%), more effective and produces a higher antibody response (84.2%) and provides longer-term protection (74.8%) when compared to Sinovac-CoronaVac. However, 74.1% of the participants stated that they thought the Sinovac-CoronaVac vaccine is safer. Case-basis vaccine recommendation status of the residents is given in Table 4.

Table 1. Socio-demographic characteristics of the participants				
Socio-demographic characteristics (<i>n</i> = 139)	n (%)			
Gender				
female	104 (74.8)			
male	35 (25.2)			
Marital status				
married	65 (46.8)			
single	74 (53.2)			
Type of residency				
full time FM resident	121 (87.1)			
contracted FM resident (CFMR)*	18 (12.9)			
Place of work				
Training and Research Hospital (TRH)	77 (55.4)			
University Hospital (UH)	44 (31.7)			
Primary Care Clinic (PCC)	18 (12.9)			

* Contracted FM residency is a specialisation training completed in 6 years where non-specialised general practitioners working as family physicians in the PCC are assigned to a UH or TRH to receive rotation training for an average of 3 months a year. CFMR is a form of specialisation supported by the government to rapidly increase the number of specialists.

Table 2. Reasons of unvaccinated participants for not being vaccinated (It was possible to tick all appropriate options)				
Reasons for not being vaccinated (n = 14)	n (%)			
Having positive Anti-Spike antibody values against COVID-19	6 (42.8)			
Thinking that there have not been enough studies on vaccines due to the 'Emergency Use Approval'	4 (28.5)			
Vaccine safety concerns	3 (21.4)			
Belief that innate immunity from a previous COVID-19 infection would be more protective	3 (21.4)			
Pregnancy	3 (21.4)			
Breastfeeding	2 (14.2)			
Not believing in the protection of the vaccine	1 (7.1)			



Vaccination recommendation status



Figure 2. Vaccination recommendation status of vaccinated and unvaccinated participants

Table 3. Analysis of socio-demographic data according to vaccination status of the participants, and socio-demographic data accord- ing to vaccination recommendation status									
Vaccination status		p	Vaccination recommendation status				p		
		Yes	No		Pfizer- BioNTech	Sinovac-Coro- naVac	Making recom- mendations after patient evaluation	No vaccination recommended	
Gender	female	93 (89.4)	11 (10.6)	0.99	21 (20.2)	13 (12.5)	70 (67.3)	0 (0)	0.09
	male	32 (91.4)	3 (8.6)		12 (34.2)	4 (11.4)	18 (51.4)	1 (2.9)	
Marital status	married	58 (89.2)	7 (10.8)	0.79	16 (24.6)	8 (12.3)	41 (63.1)	0 (0)	0.99
	single	67 (90.5)	7 (9.5)		17 (23)	9 (12.2)	47 (63.5)	1 (1.4)	
Type of resi- dency	full time FM resident	108 (89.3)	13 (10.7)	0.69	30 (24.8)	13 (10.7)	77 (63.6)	1 (0.8)	0.42
	CFMR	17 (94.4)	1 (5.6)		3 (16.7)	4 (22.2)	11 (61.1)	0 (0)	
Place of work	TRH	69 (89.6)	8 (10.4)	0.92	24 (31.2)	8 (10.4)	45 (58.4)	0 (0)	0.13
	UH	39 (88.6)	5 (11.4)		6 (13.6)	5 (11.4)	32 (72.7)	1 (2.3)	
	PCC	17 (94.4)	1 (5.6)		3 (16.7)	4 (22.2)	11 (61.1)	0 (0)	

*Fisher's Exact test was used for statistical analysis.

Table 4. Case-basis vaccine recommendation status of the participants

Case-basis vaccine recommendation status (Please tick which vaccine you recommend in the following situations, or that this situation does not affect your choice, or that you do not recommend a vaccine)

	This situation does not affect my choice	Pfizer-BioNTech mRNA Vaccine	Sinovac- CoronaVac Inactivated Vaccine	I do not recommend vaccination
History of allergic reaction/anaphylaxis	20.9% (<i>n</i> = 29)	4.3% (<i>n</i> = 6)	69.8% (<i>n</i> = 97)	5% (<i>n</i> = 7)
Oncology patients/patients receiving chemotherapy	20.9% (<i>n</i> = 29)	24.5% (<i>n</i> = 34)	49.6 % (<i>n</i> = 69)	5% (<i>n</i> = 7)
Immunosuppressive treatment	20.1% (<i>n</i> = 28)	23.7% (<i>n</i> = 33)	49.6 % (<i>n</i> = 69)	6.5% (<i>n</i> = 9)
Autoimmune diseases	18% (<i>n</i> = 25)	17.3% (<i>n</i> = 24)	60.4 % (<i>n</i> = 84)	4.3% (<i>n</i> = 6)
Pregnancy (first trimester)	13.7% (<i>n</i> = 19)	5% (<i>n</i> = 7)	11.5% (<i>n</i> = 16)	69.8 % (<i>n</i> = 97)
Pregnancy (second and third trimes- ter)	15.8% (<i>n</i> = 22)	9.4% (<i>n</i> = 13)	36.7% (<i>n</i> = 51)	38.1 % (<i>n</i> = 53)
Lactation	19.4% (<i>n</i> = 27)	15.1% (<i>n</i> = 21)	44.6 % (<i>n</i> = 62)	20.9% (<i>n</i> = 29)
Individuals who live with immunosup- pressed and/or elderly patients at home	34.5% (<i>n</i> = 48)	30.2% (<i>n</i> = 42)	33.8% (<i>n</i> = 47)	1.4% (n = 2)

Table 4. Case-basis vaccine recommendation status of the participants

Case-basis vaccine recommendation status

(Please tick which vaccine you recommend in the following situations, or that this situation does not affect your choice, or that you do not recommend a vaccine)

	This situation does	Pfizer-BioNTech	Sinovac- CoronaVac	I do not recommend
	not affect my choice	mkina vaccine	Inactivated vaccine	Vaccination
Age > 65 years	33.8% (<i>n</i> = 47)	31.7% (<i>n</i> = 44)	33.1% (<i>n</i> = 46)	1.4% (n = 2)
Healthcare professionals	38.1% (<i>n</i> = 53)	51.8 % (<i>n</i> = 72)	9.4% (<i>n</i> = 13)	0.7% (<i>n</i> = 1)
Persons who had a COVID-19 infection				
more than 6 months ago	45.3% (<i>n</i> = 63)	36.7% (<i>n</i> = 51)	17.3% (<i>n</i> = 24)	0.7% (<i>n</i> = 1)
Individuals who have Anti-Spike anti-				
bodies (IgG) against COVID-19	37.4% (<i>n</i> = 52)	20.1% (<i>n</i> = 28)	14.4% (<i>n</i> = 20)	28.1 % (<i>n</i> = 39)
Patients with multiple comorbidities	35.3% (<i>n</i> = 49)	27.3% (<i>n</i> = 38)	36% (<i>n</i> = 50)	1.4% (<i>n</i> = 2)
Blood coagulation disorders	36% (<i>n</i> = 50)	18% (<i>n</i> = 25)	43.9 % (<i>n</i> = 61)	2.2% (<i>n</i> = 3)
Individuals with a history of anaphy- laxis after the first dose of the Pfizer-				
BioNTech vaccine	7.9% (<i>n</i> = 11)	2.2% (<i>n</i> = 3)	46.8 % (<i>n</i> = 65)	43.2 % (<i>n</i> = 60)
Individuals with a history of anaphy-				
laxis after the first dose of the Sinovac-				
CoronaVac vaccine	7.9% (<i>n</i> = 11)	39.6 % (<i>n</i> = 55)	2.9% (<i>n</i> = 4)	49.6 % (<i>n</i> = 69)
A patient who has a known allergy to		8.6 % (<i>n</i> = 12)	34.5% (<i>n</i> = 48)	24.5% (<i>n</i> = 34)
polyethylene glycol [PEG]	32.4% (<i>n</i> = 45)			
Individuals who have had contact with a confirmed case of COVID-19 in the				
past 10 days	12.2% (<i>n</i> = 17)	7.2% (<i>n</i> = 10)	4.3% (<i>n</i> = 6)	76.3 % (<i>n</i> = 106)

Discussion

This study is the first to determine physicians' attitudes towards COVID-19 vaccines in Turkey. The study results indicated that participants were not vaccinated at a rate that can be considered high for the physician group, considering 96% of physicians have been fully vaccinated for COVID-19 in the USA. When the reasons of the participants who were not vaccinated and participants' case-basis vaccination recommendation status were examined, it was determined that they exhibited some attitudes incompatible with scientific evidence [5].

The main reasons for COVID-19 vaccine hesitancy among healthcare professionals were similar to the present study: safety and efficacy concerns, innate immunity preference, distrust of healthcare organisations and the government, autonomy and self-identity [6].

In the present study, 95% of the participants stated that they recommend the COVID-19 vaccination to oncology patients. A meta-analysis has shown that the death rate among COVID-19 infected cancer patients was 25.4% [7]. According to the safety and immunogenicity study of Pfizer-BioNTech for patients with cancer, positive Anti-Spike IgG titres occurred 21 days after the first dose, and no serious side effects and toxicity have been shown after vaccination [8].

According to the study results, 93.5% of the participants stated that they recommend vaccination to patients receiving immunosuppressive therapy (49.6% recommended Sinovac-CoronaVac). Since immunosuppressed patients have been excluded from clinical trials of Sinovac-CoronaVac, there is no information on this group [9, 10]. In a study of a cohort of immunosuppressed patients with COVID-19 mRNA vaccines, antibody responses were demonstrated without significant side effects or disease exacerbation [11].

In this study, 3 participants reported that they were not vaccinated due to pregnancy, and 2 due to breastfeeding. Whereas 20.9% of the participants stated that they did not recommend vaccination to breastfeeding women, the majority of those who recommended the vaccine suggested Sinovac-CoronaVac. In a prospective cohort study in Israel [12], Anti-SARS-CoV-2 specific IgA and IgG antibody levels were detected at high levels in

the milk of lactating women vaccinated with two doses of Pfizer-BioNTech. The presence of antibodies in breast milk is thought to be potentially protective for the infant, and therefore, Centers for Disease Control and Prevention (CDC) encourages vaccination [13]. No safety concerns have been reported for pregnant women and their infants according to data from Safety Monitoring Systems [14]. In the current study, the frequency of recommending vaccination in the first trimester of pregnancy was lower than in the second and third trimesters (30.2% vs 61.9%), and the inactivated virus vaccine Sinovac-CoronaVac was recommended at a higher rate. According to these results, FM residents may think that the inactivated virus vaccine is safer during pregnancy and breastfeeding than the mRNA vaccine, which was supported by 74.1% of the participants who stated in a different question that the Sinovac-CoronaVac vaccine is safer. Inactivated COVID-19 vaccines in China are more accepted by the public, as they are thought to be safer than vaccines produced with other technologies [15]. In Italy, apart from scientific results, it has been reported that mRNA vaccines are distrusted by the public, as it is a relatively new technology [16].

Most of the respondents to this survey stated that they thought Pfizer-BioNTech is more protective against new variants/mutations and is more effective. Pfizer-BioNTech clinical trial results have shown that it is 95% effective in preventing COVID-19 infection [17]. Sinovac-CoronaVac phase III clinical trials have announced that efficacy rates in different countries vary from 50% to 91.25% [18–20].

Contraindications to the Pfizer-BioNTech vaccine are a severe allergic reaction after the first dose and/or known allergy to any vaccine components, including polyethylene glycol [21]. In the present study, 8.6% of the participants stated that they would recommend the Pfizer-BioNTech vaccine to individuals with polyethylene glycol (PEG) allergy. This result highlights the lack of information about the vaccine content. Even though PEG allergy is not a contraindication for Sinovac-CoronaVac, 24.5% of the participants stated that they do not recommend vaccination in this situation.

For cases with a history of anaphylaxis after the first dose of vaccine, 46.8% of the participants stated that they recommend a vaccine change to Pfizer-BioNTech, and 39.6% for Sinovac-CoronaVac. It was seen that the participants are open to interchanging the vaccines. The Com-COV Study showed that prime-boost vaccination of the AstraZeneca and Pfizer-BioN-Tech yielded strong immune responses and supported flexibility in the use of heterologous regimens [22].

For patients with blood coagulation disorders, 2.2% of the participants stated that they do not recommend vaccines, and 43.9% reported that they suggest Sinovac-CoronaVac in these circumstances. We thought that the participants' concerns about the risk of inducing coagulation by mRNA vaccines led them to make such a choice. However, COVID-19 infection increases the risk of thromboembolic events, and the results of a retrospective cohort showed that the incidence of cerebral venous thrombosis (CVT) after COVID-19 infection was higher than CVT incidence after influenza and after receiving mRNA vaccines [23]. It has been reported in literature that the risk of blood clots is mostly associated with Oxford-Astra Zeneca [24] and Janssen/Johnson&Johnson [25].

For patients who have autoimmune diseases, 60.4% of the participants stated that they recommend Sinovac-CoronaVac. We thought this preference was due to misinformation that mRNA vaccines could trigger autoimmunity. However, it has been reported in the literature that disease activity remained stable after Pfizer-BioNTech vaccination in patients with autoimmune inflammatory rheumatological diseases [11, 26].

In a dissertation study conducted with family medicine residents in Turkey, 90.4% of the residents stated that they had the COVID-19 vaccine, similar to our study results (89.9%). Of the unvaccinated participants, 30.3% stated they were considering getting vaccinated, 42.4% were undecided, and 6.1% stated they would vaccinate after pregnancy, but 21.2% stated that they would not be vaccinated. 99.1% of the participants stated that they recommend vaccination to their patients, similar to the present study (99.3%) [27].

In a previous study conducted with healthcare professionals, the concerns of healthcare professionals who refuse or are undecided about COVID-19 vaccination included fear of vaccine content, side-effects, contracting COVID-19 through vaccines, lack of information, low trust in authorities and pharmaceutical companies, dubious efficacy and believing that innate immunity is more protective [28]. In a survey study conducted on 1,557 physicians in Turkey in December 2020, 7.6% of the participants stated that they did not want to be vaccinated due to lack of scientific data, having had COVID-19 infection, innate immunity and concerns about vaccine side-effects [29]. The reasons given in the current study for not being vaccinated were very similar to those in literature. In a study on 2,058 individuals in China, 80% of the participants stated that the doctor's advice was an important factor in COVID-19 vaccine acceptance, and they tended to be vaccinated in a short time after the recommendation [30]. In a previous survey conducted with healthcare professionals in Turkey, the participants stated that they would prefer to be vaccinated in Family Health Centres (FHCs). FHCs are reliable centres in the fight against the COVID-19 pandemic, as they have longstanding experience of vaccination [31]. These results show the importance of healthcare professionals, especially family physicians, in the vaccination programme. In the current study, some suggestions that are not compatible with literature and the lack of knowledge of physicians on some subjects (e.g. PEG allergy) show the need for one to keep up to date with the latest scientific data to inform the public correctly.

Limitations of the study

The relatively low response rate (30.2%) may be a source of selection bias. Since the self-reported data from web surveys cannot be confirmed, the results may be affected by a social-desirability bias. However, the "Surveys in Covid-19 and Post Covid-19 Days" report stated that data collection on health, especially demographic and health surveys, was adversely affected during the pandemic. It was reported that the response rate in web surveys was lower than for face-to-face surveys, and there are serious differences in response rates between countries [32].

Conclusions

In this study, some of the FM residents showed inconsistent attitudes with scientific data in some cases, especially pregnancv. breastfeeding and vaccine content. It was seen that residents exhibited a traditionalist approach in cases of allergic reaction history, immunosuppression and autoimmunity. Information on vaccines is updated on a daily basis. While it is a great challenge for healthcare professionals to follow publications about vaccines, it is important to provide accurate information to the public, who have more difficulty accessing scientific information and who have the potential to have difficulty in understanding what is correct and what is false in the infodemic. One of the most important tasks of health authorities in the fight against COVID-19 has to be to inform the public about the safety and effectiveness of COVID-19 vaccines. General practitioners/family physicians in Turkey and all over the world are physicians who play a role in primary care in maintaining effective vaccination, informing individuals correctly and coping with the infodemic.

Source of funding: This work was funded from the authors' own resources. Conflicts of interest: The authors declare no conflicts of interest.

References

- WHO Director-General's opening remarks at the media briefing on COVID-19 11 March 2020 [cited 18.06.2021]. Available from URL: https://www.who.int/director-general/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---11-march-2020.
- 2. T.C.S.B. Covid-19 Aşısı Bilgilendirme Platformu 2021 [cited 14.11.2021]. Available from URL: https://covid19asi.saglik.gov.tr/.
- European Academy of Teachers in General Practice (Network within WONCA Europe). The European definition of general practice/ family medicine. Available from URL: https://www.woncaeurope.org/file/3b13bee8-5891-455e-a4cb-a670d7bfdca2/Definition%20 EURACTshort%20version%20revised%202011.pdf.
- 4. WHO. Infodemic 2020 [cited 20.06.2021]. Available from URL: https://www.who.int/health-topics/infodemic#tab=tab_1.
- 5. American Medical Association. Physician COVID-19 Vaccination Study (Final Report). EISAMR 2021 June [cited 4.01.2022]. Available from URL: https://www.ama-assn.org/system/files/2021-06/physician-vaccination-study-topline-report.pdf.
- Eniola K, Sykes J. Four reasons for COVID-19 vaccine hesitancy among health care workers, and ways to counter them. Quick Tips, A Blog from FPM Journal 27 April 2021 [cited 4.01.2022]. Available from URL: https://www.aafp.org/journals/fpm/blogs/inpractice/ entry/countering_vaccine_hesitancy.html.
- Tagliamento M, Agostinetto E, Bruzzone M, et al. Mortality in adult patients with solid or hematological malignancies and SARS-CoV-2 infection with a specific focus on lung and breast malignancies: a systematic review and meta-analysis. *Crit Rev Oncol Hematol* 2021; 103365.

- 8. Monin L, Laing AG, Muñoz-Ruiz M, et al. Safety and immunogenicity of one versus two doses of the COVID-19 vaccine BNT162b2 for patients with cancer: interim analysis of a prospective observational study. *Lancet Oncol* 2021; 22(6): 765–778.
- 9. WHO. Interim recommendations for use of the inactivated COVID-19 vaccine, CoronaVac, developed by Sinovac: interim guidance, 24 May 2021. Available from URL: https://apps.who.int/iris/handle/10665/341454.
- 10. Zhang Y, Zeng G, Pan H, et al. Safety, tolerability, and immunogenicity of an inactivated SARS-CoV-2 vaccine in healthy adults aged 18–59 years: a randomised, double-blind, placebo-controlled, phase 1/2 clinical trial. *Lancet Infect Dis* 2021; 21(2): 181–192.
- 11. Geisen UM, Berner DK, Tran F, et al. Immunogenicity and safety of anti-SARS-CoV-2 mRNA vaccines in patients with chronic inflammatory conditions and immunosuppressive therapy in a monocentric cohort. *Ann Rheum Dis* 2021; 80: 1306–1311.
- 12. Perl SH, Uzan-Yulzari A, Klainer H, et al. SARS-CoV-2 Specific Antibodies in Breast Milk After COVID-19 Vaccination of Breastfeeding Women. JAMA 2021; 325(19): 2013–2014, doi: 10.1001/jama.2021.5782.
- 13. CDC. COVID-19 Vaccines While Pregnant or Breastfeeding 2021 [cited 18.06.2021]. Available from URL: https://www.cdc.gov/ coronavirus/2019-ncov/vaccines/recommendations/pregnancy.html.
- 14. Shimabukuro TT, Kim SY, Myers TR, et al. Preliminary findings of mRNA Covid-19 vaccine safety in pregnant persons. *N Engl J Med* 2021; 385: 1535–1536.
- 15. Yin F, Wu Z, Xia X, et al. Unfolding the determinants of COVID-19 vaccine acceptance in China. J Med Internet Res 2021; 23(1): e26089.
- 16. Chirumbolo S. Vaccination hesitancy and the "myth" on mRNA-based vaccines in Italy in the COVID-19 era: Does urgency meet major safety criteria? *J Med Virol* 2021; 93(7): 4049–4053.
- 17. Polack FP, Thomas SJ, Kitchin N, et al. Safety and efficacy of the BNT162b2 mRNA Covid-19 vaccine. N Engl J Med 2020; 383(27): 2603–2615.
- 18. Jara A, Undurraga EA, González C, et al. Effectiveness of an Inactivated SARS-CoV-2 Vaccine in Chile. N Engl J Med 2021; 385: 875–884.
- 19. Kim JH, Marks F, Clemens JD. Looking beyond COVID-19 vaccine phase 3 trials. Nat Med 2021; 27(2): 205–211.
- 20. Tanriover MD, Doğanay HL, Akova M, et al. Efficacy and safety of an inactivated whole-virion SARS-CoV-2 vaccine (CoronaVac): interim results of a double-blind, randomised, placebo-controlled, phase 3 trial in Turkey. *Lancet* 2021; 17; 398(10296): 213–222.
- 21. FDA. Emergency use authorization (EUA) of the Pfizer-Biontech COVID-19 vaccine to prevent coronavirus disease 2019 (COVID-19) in individuals 12 years age and older. Silver Spring (MS): Food and Drug Administration; 2019.
- 22. Shaw RH, Stuart A, Greenland M, et al. Heterologous prime-boost COVID-19 vaccination: initial reactogenicity data. *Lancet* 2021; 397(10289): 2043–2046.
- 23. Taquet M, Husain M, Geddes JR, et al. Cerebral venous thrombosis: a retrospective cohort study of 513,284 confirmed COVID-19 cases and a comparison with 489,871 people receiving a COVID-19 mRNA vaccine. *EClinicalMedicine* 2021; 39: 101061.
- 24. Greinacher A, Thiele T, Warkentin TE, et al. Thrombotic thrombocytopenia after ChAdOx1 nCov-19 vaccination. N Engl J Med 2021; 384(22): 2092–2101.
- MacNeil JR, Su JR, Broder KR, et al. Updated recommendations from the advisory committee on immunization practices for use of the Janssen (Johnson & Johnson) COVID-19 vaccine after reports of thrombosis with thrombocytopenia syndrome among vaccine recipients, United States, April 2021. MMWR 2021; 70(17): 651–656.
- 26. Furer V, Eviatar T, Zisman D, et al. Immunogenicity and safety of the BNT162b2 mRNA COVID-19 vaccine in adult patients with autoimmune inflammatory rheumatic diseases and in the general population: a multicentre study. *Ann Rheum Dis* 2021; 80: 1330–1338.
- 27. Yağmur H. Aile Hekimliği asistanlarının COVID-19 pandemisi döneminde influena, pnömokok ve COVID-19 aşıları hakkında bilgi, tutum ve davranışlarının değerlendirilmesi [dissertation]. Ankara: University of Health Sciences Ankara Health Application and Research Center; 2021.
- 28. Di Gennaro F, Murri R, Segala FV, et al. Attitudes towards Anti-SARS-CoV2 vaccination among healthcare workers: Results from a national survey in Italy. Viruses 2021; 13(3): 371.
- 29. Civelek B, Yazici O, Ozdemir N, et al. Attitudes of physicians towards COVID-19 vaccines and reasons of vaccine hesitancy in Turkey. Int J Clin 2021: e14399.
- 30. Wang J, Jing R, Lai X, et al. Acceptance of COVID-19 Vaccination during the COVID-19 Pandemic in China. Vaccines 2020; 8(3): 482.
- 31. Kaplan AK, Sahin MK, Parildar H, et al. The willingness to accept the COVID-19 vaccine and affecting factors among healthcare professionals: a cross-sectional study in Turkey. Int J Clin 2021; e14226.
- 32. Adalı T, Koyuncu Y, Türkyılmaz AS. Surveys in Covid-19 and Post Covid-19 Days. Ankara: Hacettepe University Institute of Population Studies and the United Nations Population Fund Turkey Country Office, 2021 [cited 14.11.2021] Available from URL: https://turkey. unfpa.org/en/publications/surveys-covid-19-and-post-covid-19-days.

Tables: 4 Figures: 2 References: 32

Received: 15.11.2021 Reviewed: 24.11.2021 Accepted: 10.01.2022

Address for correspondence: Hüsna Sarıca Çevik, MD Çankaya District Health Directorate Hacettepe Mah. Talatpaşa Blv. No: 44 Altındağ Ankara Turkey Tel.: +90 5547390727 E-mail: saricahusna@gmail.com