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The Attitude of Dentists Towards COVID-19 Vaccination in Turkey: A Survey Study

Türkiye'de Diş Hekimlerinin COVID-19 Aşısına Yönelik Tutumu: Bir Anket Çalışması

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ABSTRACT Objective: Coronavirus disease-2019 (COVID-19) was announced as a global epidemic by the World Health Organization in March 2020. The vaccination program against the epidemic in Turkey started on January 13, 2021. Dentists can easily be exposed to viral spread due to their working conditions. However, the uncertainties in the course of the epidemic and the combination of social trends suggest that hesitation will increase against COVID-19 vaccines. We aimed to determine COVID-19 vaccine acceptance rate in dentists. **Material and Methods:** A new survey was created for dentists after the COVID-19 vaccination program. For the survey, 11 questions about COVID-19 were determined. The survey was conducted between April 1 and April 15, 2021. **Results:** Of the 467 individuals participating in the study, 293 (63.0%) were female and 172 (37.0%) were male. Among respondents, 421 (90.1%) subjects were vaccinated, 46 (9.9%) subjects refused to be vaccinated for some reasons. No statistically significant relationship was found between vaccination and age (p=0.138) and gender (p=0.322). It seems that there is no relationship between the vaccination status of the physicians and the place they work. **Conslusion:** Our study shows that dentists in Turkey participate heavily in vaccination. In order to prevent health services from interrupting and to control the epidemic, campaigns and programs should be made to inform the public.

Keywords: COVID-19; dentists; prevention and control; vaccination; viral vaccines

ÖZET Amaç: Koronavirüs hastalığı-2019 [coronavirus disease-2019 (COVID-19)], Mart 2020 yılında Dünya Sağlık Örgütü tarafından küresel bir salgın olarak ilan edildi. Türkiye'de salgına karşı aşılama programı 13 Ocak 2021 tarihinde başladı. Diş hekimleri, çalışma koşulları nedeniyle kolaylıkla viral yayılıma maruz kalabilirler. Ancak salgının seyrindeki belirsizlikler ve toplumsal eğilimlerin bir araya gelmesi, COVID-19 aşılarına karşı tereddütlerin artacağını gösteriyor. Bu çalışmada, diş hekimlerinde COVID-19 aşısı kabul oranını belirlemeyi amaçladık. **Gereç ve Yöntemler:** COVID-19 aşılama programının ardından, diş hekimleri için yeni bir anket oluşturuldu. Anket için COVID-19 ile ilgili 11 soru belirlendi. Anket 1 Nisan-15 Nisan 2021 tarihleri arasında gerçekleştirilmiştir. **Bulgular:** Çalışmaya katılan 467 kişiden; 293'ü (%63,0) kadın, 172'si (%37,0) erkek idi. Ankete katılanların 421'i (%90,1) aşılanmış, 46'sı (%9,9) bazı nedenlerle aşı olmayı reddetmiştir. Aşı ile yaş (p=0,138) ve cinsiyet (p=0,322) arasında istatistiksel olarak anlamlı bir ilişki bulunamadı. Hekimlerin aşı durumları ile çalıştıkları yer arasında bir ilişki olmadığı görülmektedir. **Sonuç:** Çalışmamız, Türkiye'de diş hekimlerinin aşı çalışmalarına yoğun olarak katıldığını göstermektedir. Sağlık hizmetlerinin kesintiye uğramaması ve salgının kontrol altına alınması için kamuoyunu bilgilendirmeye yönelik kampanyalar ve programlar yapılmalıdır.

Anahtar Kelimeler: COVID-19; diş hekimleri; önleme ve kontrol; aşılama; viral aşılar

Coronavirus disease-2019 (COVID-19) is "severe acute respiratory syndrome (SARS)" caused by the SARS-coronavirus-2 (SARS-CoV-2) virus. COVID-19 was first seen in Wuhan, People's Republic of China, in December 2019 and rapidly caused an epidemic around the world.[1] COVID-19 was announced as a global epidemic by the World Health Organization (WHO) in March 2020.[2] This disease has affected a large number of people. As of October 2021, 243 million cases and over 4.9 million deaths have been reported worldwide by WHO. In Turkey, it is seen that there are 7.7 million cases and more than 68 thousand deaths.[2]

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Vaccination is an effective approach to prevent infection and reduce the mortality rate of many infectious diseases.[3] The vaccination program against the epidemic in Turkey started on January 13, 2021. In the program, which includes healthcare professionals in priority groups, 9 million people have been vaccinated so far (04.05.2021).[4] Dentists are in the group of healthcare professionals who may be most easily exposed to viral spread due to their working conditions.[5] In addition, dentists took part in metropolitan cities in the filiation studies carried out in order to keep the epidemic under control in Turkey. For this reason, the measures taken by dentists to protect against the virus (use of protective equipment, measures taken regarding the working environment, vaccination) gain importance. The nature of the working conditions of dentists has been defined as a stressful profession that places more stress than other professions. In addition, work-related factors account for more than half of the dentist's overall stress.[6]

It is known that the SARS-CoV-2 virus survives for up to a few days in environments with suitable temperature, surface and humidity.[2] Health institutions located in regions affected by COVID-19 have taken various measures to reduce the risk of transmission. The WHO, the American Dental Association, and the Centers for Disease Prevention and Control have published guidelines for dentists to prevent the spread of the disease.[7-9]

An effective antiviral treatment for COVID-19 has not been developed. Therefore, individual and social vaccination is more important in order to prevent the morbidity and mortality of the disease. However, the uncertainties in the course of the epidemic and the combination of social trends suggest that hesitation will increase against COVID-19 vaccines.[10-12] Awareness of the rejection status against COVID-19 vaccines is essential for public health and combating the pandemic.

The purpose of this study is to reveal the views of dentists in Turkey about COVID-19 vaccination, to understand the frequency of rejecting COVID-19 vaccination and to have an idea about the working environment of dentists after vaccination.

MATERIAL AND METHODS

This study protocol was carried out in accordance with the Declaration of Helsinki principles and was approved by the Karamanoğlu Mehmetbey University Faculty of Medicine Non-interventional Clinical Research Ethics Committee (decision no: 02-2021/07, decision date: 20.04.2021).

A new survey was created for dentists after the COVID-19 vaccination program. For the survey, 3 questions asking demographic information (age, gender, place of work) and 8 questions about COVID-19 were determined. In order to determine the questions, up-to-date guidelines on COVID-19 were used.[9,13] Two questions were asked to understand the COVID-19 exposure and vaccination status of the volunteers participating in the survey. For volunteers who did not participate in vaccination, the reasons for not being vaccinated were questioned in a different question. In order to understand the working conditions of dentists after the COVID-19 vaccination program, questions were asked about the measures taken by the institutions they work in and the use of personal protective equipment. For this reason, a scoring was made that evaluates the personal protective equipment that dentists should use in high-risk working conditions, suggested by Melo et al.[14] In order to measure the use of protective equipment, the participants were asked to mark the equipment they use among 7 protective equipment (gloves, mask, FFP2/FFP3 mask, goggles/visors, bonnet, boxer/overalls, doctor's uniform). A scoring system with a score of 1 was used for each item marked. The measures taken by the institutions were scored in terms of timing, adequacy and effectiveness. A 5-point scoring system was used to evaluate each title. A visual scale of 10 units was used to measure the stress levels of the volunteers. (1=no stress, 10=extreme stress)

These questions were sent to 5 dentists (2 general dentists, 1 prosthetic dentist, 2 oral and maxillofacial surgeons) for pretesting. After the examination, it was decided to add 1 more question to the questionnaire. No questions were asked about the private information (e-mail, telephone number, etc.) of the participants in the survey. Google Forms application

was used to create the survey and apply it to the participants.

In order to reach the dentists who will participate in the study, groups for dentists in social networks such as WhatsApp (Meta, Inc. California, USA), Instagram (Meta, Inc. California, USA) and Facebook (Meta, Inc. California, USA) were used. A total of 475 dentists participated in the survey. Eight answers, for which not all questions were answered, were excluded. The survey was conducted between April 1 and April 15, 2021. The number of volunteer dentists surveyed was higher than the number of volunteers required for this study.

Written informed consent was obtained from the patient.

STATISTICAL ANALYSIS

In this study, the data obtained from 467 participants were evaluated using the SPSS 21.0 package (IBM Inc. New York, USA) program and RStudio (Public-Benefit Corp. Boston, USA). The frequency and percentage distributions of demographic data are given. The mean±standard deviation, standard error of mean, median, 25th percentile and 75th percentile values are given to decriptive the continuous variable.

In order to determine whether the test to be applied is parametric or non-parametric, Kolmogorov-Smirnov test of normality and Levene test for homogeneity of variances were applied. When examining the difference between 2 independent groups, Mann-Whitney U test and Kruskal-Wallis test was used to examine the difference between more than 2 independent groups. Bonferroni correction was used for the groups in which a difference was determined as a result of the Kruskal-Wallis test. In addition, the chi-square test was applied to examine the relationship between categorical variables. The significance level was taken as 0.050 in all analyzes.

As a result of the power analysis performed through the G-Power (Heinrich Heine Uni. Düsseldorf, Germany) program; If the significance level is α=0.050, the power (1-β) value is 0.950 and the effect size value is 0.300 (medium value), the minimum observation value that should be taken is 310. In the study, the total number of observations was taken as 467 in order to reach higher power values.

RESULTS

Of the 467 individuals participating in the study, 293 (63.0%) were female and 172 (37.0%) were male. When the age distribution is examined, 198 (42.4%) in the age range of 22-29, 126 (27.0%) in the age range 30-39, 78 (16.7%) in the age range 40-44, 62 (13.3%) in the age range 50-64, and 65 years old and above is 3 (0.6%). Of the participants, 165 (35.6%) are working in private clinics, 36 (7.8%) in filiation, 177 (38.1%) in oral and dental health centers (ODHC), 77 (16.6%) in faculties of dentistry, and 9 (1.9%) participants are not working due to the epidemic.

Of the 467 individuals, 76 (16.3%) had COVID-19 once, 2 (0.4%) had COVID-19 twice, and 387 (83.2%) people did not have COVID-19. In addition, 421 (90.1%) subjects were vaccinated, 46 (9.9%) subjects refused to be vaccinated for some reasons (Table 1).

Descriptive statistics on protective equipment score, stress level, timely precaution, adequate precaution and effective prcaution scores are presented in Table 2. On Table 2, the mean protective equipment score was 5.936±1.326, the average stress level was 6.812±2.405, the mean of the timely prevention score was 2.989±1.320, the mean of the adequate precaution score was 2.863±1.266, and the mean effective precaution score was 2.803±0.241 (Table 2).

The vaccination status of the participants did not statistically significantly affect the use of protective equipment (p=0.429) and the mean stress level (p=0.237). Also, no statistically significant relationship was found between vaccination and age (p=0.138) and gender (p=0.322) (Table 3).

It seems that there is no relationship between the vaccination status of the physicians and the place they work. The mean protective equipment score showed a statistically significant difference according to the job position (p<0.001) and in terms of the use of protective equipment, the precautions taken in dentistry faculties are more sufficient. The average stress level showed a statistically significant difference according to the job position (p<0.001) and physicians working in ODHC had the highest stress level, and physicians working at private clinics had relatively

TABLE 1: Frequency and percentage distributions for demographic variables.

Variable	n	%
Sex		
Female	293	63.0
Male	172	37.0
Age		
22-29	198	42.4
30-39	126	27.0
40-44	78	16.7
50-64	62	13.3
65 and older	3	0.6
Working at		
Private clinic	165	35.6
Filiation	36	7.8
Oral and dental health center	177	38.1
Faculty of dentistry	77	16.6
Does not work due to the epidemic	9	1.9
Have you had COVID-19?		
Yes	76	16.3
No	387	83.2
Twice	2	0.4
Have you been vaccinated?		
Yes	421	90.1
No	46	9.9
Total	**467**	**100.0**
What is your reason for not being vaccinated?		
Due to pregnancy/breastfeeding	12	26.1
I do not trust to be vaccinated	9	19.6
I had an antibody measurement. I have antibodies	6	13.0
I do not trust the Sinovac (Kexing Bioproducts Co. Beijing, China) vaccine	5	10.9
I already had COVID-19	4	8.7
I am afraid of vaccine interactions (I am allergic)	4	8.7
I am afraid of vaccination due to systemic diseases	1	2.2
For religious/personal reasons	1	2.2
I didn't have time	1	2.2
I think our priority is to protect ourselves	1	2.2
Because I do not know the effects of the vaccine in the long term.	1	2.2
I do not think the vaccine will be effective due to mutations	1	2.2
Total	**46**	**100.0**

the lowest stress levels. In evaluating the timing of the measures taken, there is a statistically significant difference between healthcare institutions ($p<0.001$) and dentistry faculties and private clinics are more effective in timing the measures taken, adequacy and effectiveness (Table 4).

According to institutions, no statistically significant relationship was found between COVID-19 contamination ($p=0.175$), vaccination ($p=0.568$), use of equipment after vaccination ($p=0.800$). A statistically significant relationship was found between the post-vaccination work intensity according to institutions ($p<0.001$). Dentists working in ODHC stated that they pay more attention after vaccination ($p=0.030$) (Table 4).

DISCUSSION

In this survey study, it was aimed to understand the approaches of dentists working in Turkey to the vaccine and the changes in their working routines after COVID-19 vaccination. When the participants of the study are evaluated according to their gender, it is understood that women participate more in the survey. This situation is similar to other survey studies conducted with dentists about COVID-19.[15,16] The reason why women participated more in our study may be that women show more interest in health-related issues.[17] In addition, the age range of the participants in our study constitutes the highest percentage in the range of 22-29. This situation is in parallel with the demographic characteristics of Benli's study.[16]

Vaccination started in Turkey on January 13, 2021. The drug named CoronaVac (Sinovac Life Sciences, Beijing, China) was used for vaccination. In the phase 2 study conducted by Zhang et al., it is ensured that the antibody level of CoronaVac reaches a sufficient level and provides protection on the 28th

TABLE 2: Some descriptive statistics for variables.

	Protective equipment score	Stress level	Timing of measures	Adequacy of measures	Effectiveness of measures
Mean	5.396	6.812	2.989	2.863	2.803
Median	6	7	3	3	3
Standard deviation	1.326	2.405	1.320	1.266	1.241
Minimum	0	1	1	1	1
Maximum	7	10	5	5	5

TABLE 3: Analysis results regarding vaccination.

	Vacinated (n=421)	Unvaccinated (n=26)	p value
Protective equipment score			
Mean±SD	5.418±1.313	5.195±1.439	0.429[1]
Standard error	0.064	0.212	
Median	6	5.5	
25th percentile	5	4.75	
75th percentile	7	6	
Stress level			
Mean±SD	6.852±2.396	6.444±2.482	0.237[1]
Standard error	0.116	0.370	
Median	7	6	
25th percentile	5	5	
75th percentile	9	9	
Age			
22-29	174 (87.9%)	24 (12.1%)	0.138[2]
30-39	111 (88.1%)	15 (11.9%)	
40-49	76 (97.4%)	2 (2.6%)	
50-64	57 (91.9%)	5 (8.1%)	
65 and above	3 (100.0%)	0 (0.0%)	
Sex			
Female	261 (89.1%)	32 (10.9%)	0.332[2]
Male	158 (91.9%)	14 (8.1%)	

SD: Standard deviation; 1Mann-Whitney U; [2]Chi-square.

day.[18] In our study, the questionnaires were delivered to physicians between April 1, 2021 and April 15, 2021, targeting the dates when the antibody level reached the sufficient level of protection.

Although the characteristics of vaccination such as effectiveness, protection time, side effects are not yet clear, it is seen that 90.1% of the participants in our study were vaccinated. In a study conducted by Dai with 20,000 participants in 27 countries around the world, it is seen that 74% thought to be vaccinated, and this rate was around 70% for Turkey.[19] The rate of vaccination in our study is well above this. The reason for this may be that our survey study is for health professionals. As far as we know, there are few studies examining the attitude of healthcare professionals to getting COVID-19 vaccination. In previous studies for medical doctors, it was seen that they intend to vaccinate 67.8% in Greece (February 2020) and 92.1% in France (March July 2020).[20,21] In the study conducted in China (February March 2020), it was reported that 40.7% of nurses, and 64.7% of the study in France (March July 2020) were warm to vaccination.[13,21] In another study conducted in Canada (October 2020), the rate of those considering vaccination was determined as 95.6% among doctors, 73.7% among nurses and 78.8% among other healthcare professionals.[22] Contrary to popular belief, healthcare professionals' attitudes towards vaccination may not always be positive. The attitude of the vaccine may differ according to their working positions. Our study is the first study investigating the attitude of dentists to COVID-19 vaccination. In addition to saliva, aerosols also play an important role in SARS-CoV-2 contamination.[23] The reason for the high rate of vaccination in dentists may be that they work under high risk of contamination due to the nature of their working conditions.

Published reports on the prevention and control of COVID-19 highlight the uncertainty regarding the role of droplets and aerosols in SARS-CoV-2 transmission.[24] For this reason, personal protective equipment to be used by healthcare workers should include

TABLE 4: Analysis results regarding working places.

	Private clinic (n=165)	Filiation (n=36)	ODHC (n=177)	Faculty of dentistry (n=77)	p value
Protective equipment score	A	A	A	B	**<0.001**[1]
Mean±SD	5.363±1.273	4.777±1.675	5.348±1.272	6.026±0.986	
Standard error	0.099	0.279	0.096	0.112	
Median	5	5	5	6	
25th percentile	4	4	4	5	
75 percentile	6	6	6	7	
Stress level	A	B, C	C	A, B	**<0.001**[1]
Mean±SD	5.884±2.334	7.057±2.543	7.611±2.348	6.779±1.990	
Standard error	0.182	0.429	0.177	0.226	
Median	6	8	8	7	
25th percentile	4	5	7	5	
75th percentile	8	9	9	8	
Timing	A	A, B	B	A	**<0.001**[1]
Mean±SD	3.412±1.239	2.777±1.267	2.548±1.289	3.116±1.235	
Standard error	0.096	0.211	0.097	0.1407	
Median	4	3	3	3	
25th percentile	3	2	1	2	
75th percentile	4	4	3	4	
Adequacy	A	A, B	B	A	**<0.001**[1]
Mean±SD	3.333±1.255	2.722±1.209	2.365±1.2000.0	3.000±1.051	
Standard error	0.097	0.201	97	0.119	
Median	3	3	2	3	
25th percentile	3	1.25	1	2	
75th percentile	4	4	3	4	
Effectiveness	A	A, B	B	A	**<0.001**[1]
Mean±SD	3.284±1.238	2.750±0.996	2.314±1.193	2.883±1.025	
Standard error	0.096	0.166	0.090	0.116	
Median	3	3	2	3	
25th percentile	2.5	2	1	2	
75th percentile	4	3	3	4	

continue...→

TABLE 4: Analysis results regarding working places (continued).

	Private clinic (n=165)	Filiation (n=36)	ODHC (n=177)	Faculty of dentistry (n=77)	p value
Have you had COVID-19?					
Yes	22 (29.7%)	8 (10.8%)	35 (47.3%)	9 (12.2%)	0.175[2]
No	142 (37.7%)	28 (7.4%)	139 (36.9%)	68 (18.0%)	
Have you been vaccinated?					
Yes	148 (36.2%)	30 (7.3%)	161 (39.4%)	70 (17.1%)	0.568[2]
No	17 (37.0%)	6 (13.0%)	16 (34.8%)	7 (15.2%)	
Post-vaccination working intensity*					
Not changed	128 (40.6%)	28 (8.9%)	108 (34.3%)	51 (16.2%)	**<0.001[2]**
I work more	16 (19.0%)	0 (0.0%)	50 (59.5%)	18 (21.4%)	
I work less	3 (30.0%)	2 (20.0%)	4 (40.0%)	1 (10.0%)	
Post-vaccination equipment use*					
Not changed	134 (36.2%)	28 (7.6%)	142 (39.2%)	63 (17.0%)	0.800[2]
I use more	4 (33.3%)	0 (0.0%)	7 (58.3%)	1 (8.3%)	
I use less	9 (33.3%)	2 (7.4%)	10 (37.0%)	6 (22.2%)	
Post-vaccination measures *					
Not changed	127 (38.0%)	25 (7.5%)	131 (39.2%)	51 (15.3%)	**0.030[2]**
I pay more attention	2 (18.2%)	0 (0.0%)	8 (72.7%)	1 (9.1%)	
I pay less attention	16 (27.1%)	4 (6.8%)	21 (35.6%)	18 (30.5%)	

[1]Kruskal-Wallis test; [2]Chi-square; *It was calculated on only those who were vaccinated; ODHC: Oral and dental health centers; SD: Standard deviation. Different letters at same line shows the significant difference, Timing: Timing of precaution against risk of contagion. Adequacy: Adequation of precaution against risk of contagion. Effectiveness: Effectiveness of precaution against risk of contagion.

protection for the head, eyes, hands, body and feet, paying particular attention to respiratory protection.[25] According to our study, it is seen that the personal protective equipment usage scores of those working in dentistry faculties are higher than those working in other health institutions.

On the other hand, the vaccination status of dentists does not change the level of using personal protective equipment.

The dentists participating in our study work in different institutions. These are private clinics, dentistry faculties, public ODHC, and filiation teams struggling with epidemics. When the measures taken by different institutions during the epidemic are evaluated, it is seen that private clinics are more successful than others in terms of timing, effectiveness and efficiency. The reason for this may be that public institutions were temporarily closed during the epidemic and the majority of the public received oral and dental health services from private institutions. Because most of the private health institutions continued to serve during the epidemic and had to follow the current recommendations constantly.[26]

A 10-unit visual scale was used to measure the stress level of the dentists participating in the study. When the results are examined, it is seen that vaccination has no statistically significant effect on the stress level. However, when the stress levels of the participants are evaluated according to their work place, it is seen that

those working in private clinics have a lower level of stress. In the study carried out by Dikilitaş and Karaaslan, COVID-19 knowledge level of dentists working in private and public institutions in Turkey was evaluated. According to this study, it was observed that those working in private clinics did not have sufficient knowledge.[27] In another study, it was observed that the education level was lower in those working in private clinics and the stress level was higher in those working in public institutions.[15] In addition, it is known that during the epidemic process, the anxiety levels of healthcare workers increase due to the risk of disease transmission, overworking, mental dilemmas, and often working outside the hospital conditions they are accustomed to.[28] The relationship between the decrease in the level of stress as the level of knowledge about COVID-19 decreases should be evaluated in future studies.

This study has some limitations. First, a very small number of dentists were included in the study. Studies with more participants are needed. Secondly, this study consists of self-administered questions and it is not known whether the responses accurately reflect the real-world reactions of the participants. Third, the questions in this study may be insufficient to measure knowledge and behavior. A more comprehensive study with more questions is needed.

In this study, one of the most stated reason for not vaccinating was seen to be not trusting the vaccine. The study conducted by Zürcher et al. with 1,168 participants showed that 92.0% of the participants had doubts about the vaccine for the same reason. However, the opponents of vaccines in general for personal reason among healthcare professionals is at a low rate (3.0%). This result is also consistent with this study (2.0%).[29] In this study, the most cited reasons for vaccine rejection were pregnancy/breastfeeding. This result consisted with the study of Sutton et al. In that sudy among health care worker women, the highest rate of rejection of vaccination is seen at group of pregnant women.[30]

CONCLUSION

Our study shows that dentists in Turkey participate heavily in vaccination. Vaccination of healthcare workers in the priority group will be an incentive for other people to be vaccinated. In addition, it will prevent infection during their duties and will allow them to continue health services without interruption. In order to prevent health services from interrupting and to control the epidemic, campaigns and programs should be made to inform the public.

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Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

Idea/Concept: *Doğan Ilgaz Kaya, Mehmet Gökberkkaan Demirel;* ***Design:*** *Doğan Ilgaz Kaya;* ***Control/Supervision:*** *Mehmet Gökberkkaan Demirel;* ***Data Collection and/or Processing:*** *Doğan Ilgaz Kaya, Mehmet Gökberkkaan Demirel;* ***Analysis and/or Interpretation:*** *Mehmet Gökberkkaan Demirel;* ***Literature Review:*** *Doğan Ilgaz Kaya;* ***Writing the Article:*** *Doğan Ilgaz Kaya;* ***Critical Review:*** *Mehmet Gökberkkaan Demirel;* ***References and Fundings:*** *Doğan Ilgaz Kaya.*

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