RESEARCH ARTICLE / ARAŞTIRMA

DOI: 10.4274/mjima.galenos.2023.2023.7
Mediterr J Infect Microb Antimicrob 2023;12:7
Erişim: http://dx.doi.org/10.4274/mjima.galenos.2023.2023.7

Opinions of Infectious Diseases and Clinical Microbiology Physicians on Hospital Pandemic Management and Factors Influencing Reading the Pandemic Influenza National Preparedness Plan

Enfeksiyon Hastalıkları ve Klinik Mikrobiyoloji Hekimlerinin Pandemik İnfluenza Ulusal Hazırlık Planını Okuma Durumları ve Hastane Pandemi Yönetimi Hakkındaki Görüşleri

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Abstract

Introduction: Infectious Diseases and Clinical Microbiology (IDCM) physicians have critical importance in terms of pandemic management in hospitals. There are recommendations for hospitals in the national pandemic preparedness plan, which was developed to limit the damage during pandemic periods. With this study, it was aimed to determine the reading status of IDCM physicians of the pandemic plan and the factors affecting it, and to learn their views on the application of the headings in the plan.
Materials and Methods: For this descriptive study, the opinions of physicians were collected with an electronic questionnaire for the periods of June 2020 and January 2021. Statistical analyses were conducted to determine the associated factors of physicians' reading of the pandemic plan.
Results: Of the 169 physicians participating in the study, 62.7% were women, with a mean age of 43.1±9.9 years, and nearly two-thirds of the physicians were working in a tertiary hospital. More than 70% of physicians read the pandemic preparedness plan. The rate of reading of the pandemic plan increased with the physician's time spent in IDCM practice [odds ratio (OR)=1.08, 95% confidence interval (CI)=1.01-1.16, p=0.037], and previous Coronavirus disease-2019 (COVID-19) experience (OR=3.10, 95% CI=1.00-9.58, p=0.050), and it decreased with the hand hygiene compliance of healthcare professional (OR=0.27, 95% CI=0.11-0.68, p=0.006) and the number of IDCM physicians working in the physician's hospital (OR=0.97, 95% CI=0.94-0.99, p=0.016).
Conclusion: Physicians' reading status of the national pandemic preparedness plan did not differ significantly between the periods. As the time spent in IDCM practice and their pandemic experience before COVID-19 increased, the status of reading the pandemic plan increased. As the compliance with hand hygiene among the health professionals working in the physicians' hospital and the number of IDCM physicians increased it decreased. Attention should be paid to the introduction of the pandemic plan to physicians with professional inexperience and no pandemic experience.
Keywords: Outbreak, 2019-nCoV, preparedness, plan, infectious diseases specialist

Öz

Giriş: Enfeksiyon Hastalıkları ve Klinik Mikrobiyoloji (EHKM) hekimleri hastanelerde pandemi yönetimi açısından kritik öneme sahiptir. Pandemi dönemlerindeki zararı sınırlandırmak üzere geliştirilen ulusal pandemi hazırlık planında hastanelere yönelik öneriler bulunmaktadır. Bu çalışma ile EHKM hekimlerinin ulusal pandemi hazırlık planını okuma durumları ve etkileyen faktörleri saptamak ve plandaki başlıkların uygulanması hakkındaki görüşlerinin öğrenilmesi hedeflenmiştir.

Cite this article as: Sertçelik A, Buzgan T. Opinions of Infectious Diseases and Clinical Microbiology Physicians on Hospital Pandemic Management and Factors Influencing Reading the Pandemic Influenza National Preparedness Plan. Mediterr J Infect Microb Antimicrob. 2023;12:7.

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Received/Geliş Tarihi: 23.01.2023 **Accepted/Kabul Tarihi:** 09.03.2023

Presented in: The preliminary findings of this study were presented as an oral presentation at the 9th International Academic Online Platform of Infectious Diseases and Clinical Microbiology Speciality Society of Turkey in 20-23 May 2021 (SS-055).

Published: 17.03.2023

Öz

Gereç ve Yöntem: Tanımlayıcı tipteki bu araştırma için hekimlerin sorgulanan görüşleri Haziran 2020 ve Ocak 2021 dönemleri için elektronik anket formu ile toplanmıştır. Hekimlerin ulusal pandemi hazırlık planını okuma durumları ile ilişkili faktörlerin belirlenmesi için istatistiksel analizler yapılmıştır.

Bulgular: Araştırmaya katılan 169 hekimin %62,7'si kadın olup, yaş ortalaması 43,1±9,9 yıldı ve hekimlerin yaklaşık üçte ikisi üçüncü basamak bir hastanede görev yapmaktaydı. Ulusal pandemi hazırlık planını hekimlerin %70'inden fazlası okumuş, hekimin EHKM hekimliğinde geçen süresi [odds oranı (OR)=1,08, %95 güven aralığı (GA)=1,01-1,16, p=0,037] ve Koronavirüs hastalığı-2019 (COVID-19) öncesinde salgın deneyimi olması (OR=3,10, %95 GA=1,00-9,58, p=0,050) ile pandemi planını okuma durumu artmıştı. Hekimin kurumunda görev yapan sağlık çalışanlarının el hijyenine uyumuyla (OR=0,27, %95 GA=0,11-0,68, p=0,006) ve hekimin kurumunda görev yapan EHKM hekim sayısı (OR=0,97, %95 GA=0,94-0,99, p=0,016) ile azalmıştı.

Sonuç: Hekimlerin ulusal pandemi hazırlık planını okuma durumları dönemler arasında anlamlı değişiklik göstermemiş ve EHKM hekimliğinde geçen süreleri ve COVID-19 öncesinde salgın deneyimlerinin olması ile ulusal pandemi hazırlık planını okuma durumları artmakta, hekimlerin kurumunda görev yapan sağlık çalışanlarının el hijyenine uyumu ve hekimlerin kurumunda görev yapan EHKM hekim sayısı ile azalmaktadır. Mesleki deneyimi az olan ve salgın deneyimi olmayan hekimlere pandemi hazırlık planının tanıtımı konusuna önem verilmelidir.

Anahtar Kelimeler: Salgın, 2019-nCoV, hazırlık, plan, enfeksiyon hastalıkları uzmanlığı

Introduction

Many pandemics have been encountered throughout history, and six pandemics have been identified, mostly due to influenza viruses, in modern times. Studies for the preparation of a Pandemic Influenza National Preparation Plan (PINPP) in our country started for the first time in 2004, and the plan was published in 2006. The H1N1 Influenza A pandemic, which was the last pandemic before the Coronavirus disease-2019 (COVID-19) pandemic, created a warning effect for the whole world about the importance of preparing for pandemics. In line with the recommendations of the World Health Organization and the European Center for Disease Prevention and Control, updating studies have started, and an updated version of the national pandemic preparedness plan was published in 2019. It was aimed to prepare plans at the provincial level and in health institutions in line with the principles in the national pandemic preparation plan[1]. While the plan development process was not completed at the provincial level and in secondary and tertiary health institutions throughout Turkey, the COVID-19 pandemic emerged, and the first steps were taken in accordance with the PINPP[2].

As stated in the national pandemic preparation plan, which was shaped by the influence of past experiences, Infectious Diseases and Clinical Microbiology (IDCM) physicians have important duties in pandemic management, especially in hospitals. Pandemic management in hospitals aims to protect health workers as well as patients and the continuity of health services[1].

Although updating the PINPP is an important step in preparation for the pandemic, it is more important that IDCM physicians, who are one of the most important interlocutors of the plan, read the plan and apply the topics mentioned in the plan in real life.

With this research, it is aimed to define the views of IDCM physicians about the realization of the recommendations in the national pandemic preparation plan and to determine the factors affecting the reading of the national pandemic plan.

Materials and Methods

The data of this descriptive observational epidemiological study were collected between 04.02.2021 and 03.05.2021 with a data collection form prepared for this study. The population of the research consisted of all IDCM physicians working in Turkey. No sample was chosen and it was aimed to reach the whole universe. The number of physicians currently working as IDCM physicians is not known, but as of the end of 2013, it was stated that there were 1289 IDCM specialists in the Health Education and Health Manpower Report in Turkey[3].

The data collection form was transferred to the electronic questionnaire, and the links of the electronic questionnaire were shared via the e-mail and instant messaging groups of the "Infectious Diseases And Clinical Microbiology Specialty Society of Turkey" and "The Turkish Society of Clinical Microbiology and Infectious Diseases", which have the highest number of members in the field of "IDCM". Two more reminders were made with an interval of one week. No information was collected that could reveal the identity of the participants.

Demographic information, professional and epidemic experiences of the participants, the name of the field if there was a higher education program completed in a field other than IDCM, and the pandemic experience before COVID-19 were questioned. The following data were collected both as of 01.06.2020 at the beginning of the pandemic and as of 04.01.2021, the first working day of 2021: The type of institution where the physician was working, the administrative position of the physician and whether the institution he/she was assigned as a pandemic hospital, the duration of working in the institution, the number

of IDCM physicians in the institution, the membership status of the Infection Control Committee and the institution's pandemic board, the status of reading the "PINPP", the status of reading the "Pandemic Influenza Provincial Preparation and Action Plan", the "Second and Third Level Health Institutions Pandemic Influenza Preparation and Action Plan", the status of taking part in the creation of the "Action Plan", and the status of reading the plan, the status of complying with the views of the physician on the planning of combating the pandemic, the status of receiving support from other branches in the COVID-19 patient management, the training status of the healthcare personnel in the healthcare institution at the beginning of the pandemic, accessibility to personal protective equipment (PPE), health worker's compliance with the use of PPE, hand hygiene and social distance rule, whether the risk assessment of the personnel in contact with the patient with COVID-19 was made appropriately, the unit that performed the risky contact assessment, whether flexible working was applied in the hospital where the physician worked, and the communication of the physician with the provincial/district health management department of the institution where the physician worked.

The age of the healthcare worker was calculated over the year of birth as of 2021. The data collected as "very good", "good", "moderate", "bad", "very bad" in the form of a five-point Likert scale were presented by combining them as "very good / good" and "moderate / bad / very bad". Data on reading national, provincial and health institution level pandemic plans and taking part in the creation of the pandemic plan in the health institution were presented separately in the descriptive tables, but the answers other than the status of reading the plan or taking part in the creation of the plan in pairwise comparisons and models were combined.

Within the scope of the research, the status of reading the "National Pandemic Influenza Preparation Plan" was evaluated as the dependent variable, and other variables were taken as the independent variable.

Statistical Analysis

Numbers and percentages were given for qualitative variables as descriptors. In order to determine the normal distribution of quantitative variables; 1) the coefficient of variation <20%, 2) the ratio of the skewness-kurtosis statistics to the standard errors $<z_{\%95/2}$, 3) the histogram, 4) the patterns in the detrended Q-Q plot, and 5) Kolmogorov-Smirnov test were taken into account. It was accepted that the variables satisfying three of these five criteria fit the normal distribution. However, descriptive statistics were presented as median and interquartile range or (1^{st} quartile-3^{rd} quartile) since there was no quantitative variable that fit the normal distribution.

The comparison of qualitative variables was made with the Pearson chi-square test unless otherwise stated. Fisher's exact test was used when the expected value was less than five and the number of cells exceeded 20% of the total number of cells. Comparisons of more than two groups were made with the Fisher-Freeman-Halton test.

In comparing the answers given between two dates, McNemar test was used for qualitative data and Wilcoxon test was used for quantitative data because of the interdependence of the groups.

Odds ratio (OR) and related 95% confidence interval (CI) calculations were made to determine the strength of the effect in studying the relationships. Since the quantitative variables did not comply with the normal distribution, the Mann Whitney-U test was used to compare the two groups, and the Kruskal-Wallis test was used to compare more than two groups. Variables with a p value less than 0.2 in pairwise comparisons were included in the binary logistic regression model created to determine the reading status of the PINPP, using the "Enter" method. Model fit was evaluated with the Hosmer-Lemeshow test, and the correlation matrix was evaluated in terms of multicollinearity problem.

No data imputation was implemented to cope with the missing data, and the analyses were completed on participants with full data. For all statistics, the type 1 margin of error was accepted as 0.05 (two-sided). Analyzes were made using the Statistical Package for the Social Sciences version 23 (IBM Corp, Armonk, New York, United States) package program.

The research was ethically approved by the Ankara City Hospital no. 1 Clinical Research Ethics Committee with the decision numbered 767 on 04.06.2020. The research was conducted in accordance with the ethical principles of the Declaration of Helsinki. Participants who accessed the data collection form online by clicking the link address, viewed the informed consent form. If they agreed to participate, they were able to access the data collection form.

Results

A total of 169 of the IDCM physicians answered the questions via e-survey. Among the physicians included in our study, 62.7% were women and the mean age was 43.1±9.9 years. As of January 2021, the median number of years in practice was 18.0 (9.0-25.0) and the median number of years as an IDCM physician was 13.0 (7.5-21.0). Those with previous experience of a pandemic accounted for 63.9% of the group. One IDCM specialist in June 2020 and one IDCM specialist in January 2021 reported that they were not actively working. The answers of participants who were not actively working were taken into account in the questions for actively working participants. As of June 2020, the

participant working as an occupational physician did not answer the questions about the hospital. Among the physicians who graduated from the Faculty of Medicine and received specialty training or specialised in the field of IDCM, who constituted the target population of this study, 11.2% of the participants were graduates of any undergraduate-pre-degree programme besides the Faculty of Medicine, or those who had a medical specialty, sub-specialty, master's or doctorate in any field besides IDCM specialisation. Five participants reported having completed "Health Management", "Management of Health Institutions" or "Hospital Management", three participants reported having completed "Business Administration", two participants each reported having completed "Immunology" and "Virology", and one participant each reported having completed "Forensic Medicine", "Anaesthesiology and Reanimation", "Epidemiology", "Philosophy", "Sociology", "Economics", "Theology" and "Justice Associate Degree" programmes. Three participants stated that they had completed two different programmes. The median working hours of the participating physicians in their institutions were 3.0 (1.0-7.0) and 3.25 (1.50-7.50) years for the periods of June 2020 and January 2021, respectively.

In the period of June 2020 and January 2021, median 7 (3-16, 17, respectively) of the IDCM physicians included in the study were working in the same branch in the institution where they worked. The institutional characteristics of the participating physicians, their duties, and their status of reading national, provincial, and hospital pandemic plans during June 2020 and January 2021 are given in Table 1. The status of the hospitals to which the participants were affiliated as pandemic hospitals increased in January 2021.

When the participating IDCM physicians were asked to evaluate how well their recommendations were followed during pandemic response planning in their institution, they were asked to give a score between "0-Not followed at all" and "10-Completely followed". Participants gave a median score of 7 for both periods, and the scores of compliance with the recommendations were not statistically different between the periods (Wilcoxon test p value=0.635).

As of June 2020, 69.5% of the physicians reported that all healthcare professionals working in their institutions had received training within the scope of pandemic preparedness, while 9.6% stated that some personnel independent of their unit, 13.2% stated that all personnel serving only COVID-19 patients, and 5.4% stated that some personnel serving only COVID-19 patients had received training. Of physicians 2.4% reported that no training was provided to staff in this context. Physicians' opinions on compliance with the measures taken against COVID-19 are presented in Table 2. Flexible working hours and problems with access to PPE decreased in January 2021.

As of June 2020 and January 2021, the status of reading the PINPP increased with previous pandemic experience, being a member of the Infection Control Committee and hospital pandemic board, age, professional experience, and decreased with the increase in the number of IDCM physicians working in

Table 1. Participants' characteristics of the affiliated institution, duties, and reading of national, provincial and hospital pandemic plans

	June 2020		January 2021		p value
	n	%	n	%	
Affiliated institution					1.00
Training and research hospitals	77	45.8	78	46.2	
University hospitals	40	23.8	38	22.3	
State hospitals	39	23.2	41	22.5	
Private hospitals	11	6.5	11	6.5	
Occupational clinics	1	0.6	-	-	
Institution's status of pandemic hospitals	142	85.0	157	92.9	**<0.001**
Managerial task	5	3.0	6	3.6	1.00
Being a member of the infection control committee	105	62.9	106	63.1	1.00
Being a member of the institutional pandemic board	105	62.9	106	63.1	0.84
Reading the Pandemic Influenza National Preparedness Plan	121	71.6	123	72.8	0.31
Existence of the Provincial Pandemic Preparedness Plan	114	68.3	112	66.7	0.34
Reading the Provincial Pandemic Preparedness Plan	94	82.5	84	75.0	**0.008**
Existence of the Hospital Pandemic Preparedness Plan	105	62.9	105	62.5	0.23
Reading the Hospital Pandemic Preparedness Plan	87	82.9	86	81.9	0.44
Contributing of the Hospital Pandemic Preparedness Plan	62	59.0	59	56.2	0.23

the institution. It was found that physicians who read the plan had significantly more communication with provincial health administrators (Tables 3 and 4).

In the binary logistic regression model investigating the factors associated with reading the PINPP, variables with a p value <0.20 in pairwise comparisons were included as presented in the Materials and Methods section. However, since age, length of time in practice, and length of time in the speciality of IDCM were correlated, "length of time in the speciality of IDCM" was selected for inclusion in the model. Although the p value of the physician's finding the hand hygiene of healthcare personnel significant for the January 2021 period was >0.20, it was included in the model in the June 2020 period because it was statistically significant in the model. Model fit was found to be good for both periods (Hosmer-Lemeshow test p value 0.053 and 0.19, respectively). The correlation matrix was analysed for multicollinearity. The model created for the period of June 2020 was completed over 163 observations. It was observed that the physician's reading of the national pandemic preparedness report was significantly associated with the physician's "very good / good" assessment of hand hygiene compliance of the staff in the institution where the physician worked (OR=0.37; 95% CI=0.15-0.91; p=0.029) (Table 5). The model for the January 2021 period was completed with 165 observations. While the physician's reading status of the PINPP increased statistically significantly with the time spent by the physician in IDCM and his / her experience of the pandemic before the COVID-19 pandemic, the physician's evaluation of the hand hygiene compliance of the healthcare workers in the hospital as "very good / good" and the IDCM in the institution where he/she worked decreased with the increase in the number of physicians (Table 5).

Discussion

Within the scope of the PINPP, which was updated in 2019 to increase preparedness for pandemics, measures to be taken in hospitals were set forth as part of national recommendations. The first steps taken against the COVID-19 pandemic, which emerged at the end of the same year and became a pandemic as of the first quarter of 2020, were also in line with this plan.

Table 2. Assessments of participated physicians on compliance with COVID-19 control measures in their hospitals

	June 2020		January 2021		p value
	n	%	n	%	
Supporting the management of the COVID-19 patients by other disciplines	142	85.0	151	89.9	0.12
Flexible work arrangement	121	72.5	60	35.7	**<0.001**
Contact with managers of hospitals					0.71
Very good / good	85	51.2	90	53.6	
Moderate / bad / very bad	81	48.8	78	46.4	
Contact with manager of provincial health manager					1.00
Very good / good	72	44.2	73	44.2	
Moderate / bad / very bad	91	55.8	92	55.8	
Compliance of the healthcare workers with hand hygiene					0.62
Very good / good	86	51.8	92	54.8	
Moderate / bad / very bad	80	48.2	76	45.2	
Compliance of the healthcare workers with social distance					0.22
Very good / good	46	27.7	40	23.8	
Moderate / bad / very bad	120	72.3	128	76.2	
Compliance of the healthcare workers with using PPEs					1.00
Very good / good	112	67.5	113	67.3	
Moderate / bad / very bad	54	32.5	55	32.7	
Trouble with accessibility of PPEs for healthcare workers					**<0.001**
Always / Often	71	42.5	33	19.6	
Never	96	57.5	135	80.4	
Assessment of risky contact of healthcare workers					0.17
Very good / good	102	61.4	96	57.1	
Moderate / bad / very bad	64	38.6	72	42.9	

PPE: Personal protective equipments, COVID-19: Coronavirus disease-2019

Table 3. Factors associated with participating physicians' reading of the Pandemic Influenza National Preparedness Plan (June 2020)

	Pandemic Influenza National Preparedness Plan			
	Reader n (%*)	**Non-reader n (%*)**	**OR (95% CI)**	**p value**
Male gender	47 (38.8)	16 (33.3)	1.27 (0.63-2.56)	0.50
Additional postgraduate programme	16 (13.2)	3 (6.3)	2.29 (0.63-8.23)	0.20
Previous outbreak experience	91 (75.2)	17 (35.4)	5.53 (2.69-11.38)	**<0.001**
Affiliated institution				0.20†
Training and research hospital (reference)	51 (42.1)	26 (55.3)	1.00	
University hospital	27 (22.3)	13 (27.7)	1.06 (0.47-2.39)	
State hospital	33 (27.3)	6 (12.8)	2.80 (1.04-7.54)	
Private hospital	9 (7.4)	2 (4.3)	2.29 (0.46-11.40)	
Occupational clinic	1 (0.8)	-	-	
Institution's status of pandemic hospitals	100 (83.3)	42 (89.4)	0.60 (0.21-1.69)	0.33
Managerial task	3 (2.5)	2 (4.3)	0.57 (0.09-3.53)	0.62†
Being a member of the Infection Control Committee	88 (73.3)	17 (36.2)	4.85 (2.36-10.00)	**<0.001**
Being a member of the institutional pandemic board	75 (62.5)	11 (23.4)	5.46 (2.53-11.77)	**<0.001**
Supporting the management of the COVID-19 patients by other disciplines	100 (83.3)	42 (89.4)	0.60 (0.21-1.69)	0.33
	Median (IQR)	**Median (IQR)**	**n**	
Age (years)	45 (15.5)	35 (11)	169	**<0.001**
Tenure at the hospital (years)	4.0 (7.0)	2.0 (3.5)	167	**0.037**
Number of IDCM physicians in the hospital	5 (10)	12 (17)	167	**0.001**
Score for complying with recommendations in pandemic management	7 (2)	7 (2)	165	0.33
	n (%*)	**n (%*)**	**OR (95% CI)**	
Personnel trained for COVID-19				**<0.001†**
All personnel (reference)	87 (72.5)	29 (61.7)	1.00	
Some personnel independent of working unit	14 (11.7)	2 (4.3)	2.33 (0.50-10.88)	
All personnel serving only COVID-19 patients	18 (15.0)	4 (8.5)	1.50 (0.47-4.79)	
Some personnel serving only COVID-19 patients	-	9 (19.1)	-	
No training provided	1 (0.8)	3 (6.4)	0.11 (0.01-1.11)	
Compliance of the healthcare workers with using PPEs				0.99
Very good / good	81 (67.5)	31 (67.4)	1.01 (0.49-2.08)	
Moderate / bad / very bad	39 (32.5)	15 (32.6)	1.00	
Compliance of the healthcare workers with hand hygiene				0.15
Very good / good	58 (48.3)	28 (60.9)	0.60 (0.30-1.20)	
Moderate / bad / very bad	62 (51.7)	18 (39.1)	1.00	
Compliance of the healthcare workers with social distance				0.77
Very good / good	34 (28.3)	12 (26.1)	1.12 (0.52-2.42)	
Moderate / bad / very bad	86 (71.7)	34 (73.9)	1.00	
Assessment of risky contact of healthcare workers				0.13
Very good / good	78 (65.0)	24 (52.2)	1.70 (0.85-3.39)	
Moderate / bad / very bad	42 (35.0)	22 (47.8)	1.00	
Flexible work arrangement	86 (71.7)	35 (74.5)	0.87 (0.40-1.87)	0.72
Contact with managers of hospitals				0.11
Very good / good	66 (55.0)	19 (41.3)	1.74 (0.87-3.46)	
Moderate / bad / very bad	54 (45.0)	27 (58.7)	1.00	

Table 3. Continued

	Pandemic Influenza National Preparedness Plan			
	Reader n (%*)	**Non-reader n (%*)**	**OR (95% CI)**	**p value**
Contact with manager of provincial health manager				**0.022**
Very good / good	59 (49.6)	13 (29.5)	2.35 (1.12-4.92)	
Moderate / bad / very bad	60 (50.4)	31 (70.5)	1.00	

*Column percentege, †Fisher's exact test p value.

OR: Odds ratio, CI: Confidence interval, IQR: Interquartile range, IDCM: Infectious Diseases and Clinical Microbiology, PPE: Personal protective equipments, COVID-19: Coronavirus disease-2019

Table 4. Factors associated with participating physicians' reading of the Pandemic Influenza National Preparedness Plan (January 2021)

	Pandemic Influenza National Preparedness Plan			
	Reader n (%*)	**Non-reader n (%*)**	**OR (95% CI)**	**p value**
Male gender	47 (38.2)	16 (34.8)	1.16 (0.57-2.35)	0.68
Additional postgraduate programme	16 (13.0)	3 (6.5)	2.14 (0.59-7.73)	0.24
Previous outbreak experience	91 (74.0)	17 (37.0)	4.85 (2.36-9.98)	**<0.001**
Affiliated institution				0.59
Training and research hospital (reference)	56 (45.5)	22 (48.9)	1.00	
University hospital	27 (22.0)	11 (24.4)	0.96 (0.41-2.27)	
State hospital	30 (24.4)	11 (24.4)	1.07 (0.46-2.50)	
Private hospital	10 (8.1)	1 (2.2)	3.93 (0.48-32.53)	
Occupational clinic	-	-	-	
Institution's status of pandemic hospitals	113 (91.9)	44 (97.8)	0.26 (0.03-2.07)	0.29†
Managerial task	4 (3.3)	2 (4.4)	0.72 (0.13-3.94)	0.66†
Being a member of the Infection Control Committee	89 (72.4)	17 (37.8)	4.31 (2.10-8.85)	**<0.001**
Being a member of the institutional pandemic board	76 (61.8)	13 (28.9)	3.98 (1.90-8.33)	**<0.001**
Supporting the management of the COVID-19 patients by other disciplines	109 (88.6)	42 (93.3)	0.56 (0.15-2.03)	0.56†
	Median (IQR)	**Median (IQR)**	**n**	
Age (years)	45 (15)	35 (12)	169	**<0.001**
Tenure at the medicine (years)	20.0 (15.0)	9.0 (11.8)	169	**<0.001**
Tenure at the IDCM (years)	16.0 (15.0)	7.0 (8.3)	169	**<0.001**
Tenure at the hospital (years)	4.0 (7.5)	3.0 (3.8)	168	**0.037**
Number of IDCM physicians in the hospital	6.0 (9.0)	14.0 (36.0)	168	**0.002**
Score for complying with recommendations in pandemic management	7.0 (3.0)	7.0 (2.0)	167	0.94
	n (%*)	**n (%*)**	**OR (95% CI)**	
Personnel trained for COVID-19				**<0.001†**
All personnel (reference)	88 (72.7)	28 (60.9)	1.00	
Some personnel independent of working unit	14 (11.6)	2 (4.3)	2.23 (0.48-10.40)	
All personnel serving only COVID-19 patients	18 (14.9)	4 (8.7)	1.43 (0.45-4.59)	
Some personnel serving only COVID-19 patients	-	9 (19.6)	-	
No training provided	1 (0.8)	3 (6.5)	0.11 (0.01-1.06)	
Compliance of the healthcare workers with using PPEs				0.64
Very good / good	84 (68.3)	29 (64.4)	1.19 (0.58-2.44)	
Moderate / bad / very bad	39 (31.7)	16 (35.6)	1.00	

Table 4. Continued

	Pandemic Influenza National Preparedness Plan			
	Reader n (%*)	Non-reader n (%*)	OR (95% CI)	p value
Compliance of the healthcare workers with hand hygiene				0.24
Very good / good	64 (52.0)	28 (62.2)	0.66 (0.33-1.33)	
Moderate / bad / very bad	59 (48.0)	17 (37.8)	1.00	
Compliance of the healthcare workers with social distance				0.91
Very good / good	29 (23.6)	11 (24.4)	0.95 (0.43-2.12)	
Moderate / bad / very bad	94 (76.4)	34 (75.6)	1.00	
Assessment of risky contact of healthcare workers				0.55
Very good / good	72 (58.5)	24 (53.3)	1.24 (0.62-2.46)	
Moderate / bad / very bad	51 (41.5)	21 (46.7)	1.00	
Flexible work arrangement	43 (35.0)	17 (37.8)	0.89 (0.44-1.80)	0.74
Contact with managers of hospitals				0.28
Very good / good	69 (56.1)	21 (46.7)	1.46 (0.74-2.90)	
Moderate / bad / very bad	54 (43.9)	24 (53.3)	1.00	
Contact with manager of provincial health manager				**0.031**
Very good / good	60 (49.2)	13 (30.2)	2.23 (1.06-4.69)	
Moderate / bad / very bad	62 (50.8)	30 (69.8)	1.00	

*Colunm percentage, †Fisher's exact test p value.

OR: Odds ratio, CI: Confidence interval, IQR: Interquartile range, IDCM: Infectious Diseases and Clinical Microbiology, PPE: Personal protective equipments, COVID-19: Coronavirus disease-2019

Table 5. Factors associated with participating physicians' reading of the Pandemic Influenza National Preparedness Plan via the binary logistic regression models

	June 2020*		January 2021†	
	OR (95% CI)	p value	OR (95% CI)	p value
Tenure at the IDCM (years)	1.07 (0.99-1.15)	0.099	1.08 (1.01-1.16)	**0.037**
Previous outbreak experience	2.61 (0.79-8.59)	0.12	3.10 (1.00-9.58)	**0.050**
Additional postgraduate programme	1.17 (0.23-5.98)	0.86	-	-
Compliance of the healthcare workers with hand hygiene	0.37 (0.15-0.91)	**0.029**	0.27 (0.11-0.68)	**0.006**
Assessment of risky contact of healthcare workers	1.16 (0.43-3.12)	0.77	-	-
Contact with managers of hospitals	0.60 (0.18-2.03)	0.41	-	-
Contact with manager of provincial health manager	2.10 (0.68-6.43)	0.20	1.62 (0.68-3.86)	0.27
Number of IDCM physicians in the hospital	0.98 (0.95-1.01)	0.16	0.97 (0.94-0.99)	**0.016**
Being a member of the Infection Control Committee	1.47 (0.47-4.62)	0.51	1.36 (0.44-4.20)	0.59
Being a member of the institutional pandemic board	1.78 (0.57-5.62)	0.32	1.18 (0.36-3.86)	0.78

*Analysis was completed on 163 participants; Hosmer-Lemeshow test p value=0.053; Nagelkerke R^2=0.37.

†Analysis was completed on 165 participants; Hosmer-Lemeshow test p value=0.19; Nagelkerke R^2=0.37.

OR: Odds ratio, CI: Confidence interval, IDCM: Infectious Diseases and Clinical Microbiology

It has been learned that approximately 70% of the participants of the research from the IDCM physicians, who were one of the most important components in the implementation of this plan, read the national pandemic preparation plan. When the factors related to the reading of the national pandemic preparedness plan of IDCM physicians were examined, it was found that it increased with the time spent in IDCM medicine for both periods, while it decreased with the compliance of the health personnel working in the hospital where the physician worked in the period of June 2020, and increased with the compliance with the social distance. As the number of IDCM physicians working in the institution for the January 2021 period increased, the rate of reading the national pandemic preparedness plan decreased.

The experience of working in the field of IDCM physicians participating in the research showed a right-skewed distribution. This might be related to the younger group's interest in the research, as well as the higher access to technology in this group. Since the number, gender and age distribution of all IDCM physicians in Turkey were not known, it could not be evaluated whether the gender and age distribution in the research group differed from the general distribution. The type of institutions of the physicians participating in the study was another situation of which compatibility with the general distribution was unknown. However, approximately two-thirds of the group consisted of physicians working in tertiary hospitals. While interpreting the results, it should be taken into account that physicians working in tertiary hospitals were more represented.

Regarding the assignment of the institutions where the IDCM physicians participating in the study work as a pandemic hospital, it is considered that the difference between the June 2020 and January 2021 periods is related to the course of the pandemic. While the number of new patients with COVID-19 in Turkey was 839 as of 01 June 2020, it was 9,877 as of 04 January 2021. As seen in the course of newly developing COVID-19 cases across Turkey, June 2020 represents the period when the first and smallest wave in Turkey is on the way to end, and January 2021 represents the end of the second wave, which lasts longer than the first wave and has a larger size[4].

About seven out of every 10 participating physicians read the national pandemic preparedness plan, only two more participants read the plan in the past seven months, when the pandemic continued to accelerate. Although new guides and legislative arrangements to be followed in the conditions of the pandemic emerged as an up-to-date resource, it was understood that there was no expected increase in interest in the national pandemic preparation plan. It was noteworthy that more than a quarter of the participating physicians serving in the field of IDCM did not read the plan, and even though they constituted a small group, they were not aware of the existence of such a plan. It is recommended to use different tools in announcing the updates to be made in the future and to study the effect on awareness. The fact that around 30% of the participants did not know whether a pandemic preparedness plan existed at both the provincial and hospital level indicated that awareness was worse than the level of knowing the national pandemic plan. More than three-quarters of the participants who knew that there were guides declared that they had read the guides. It was determined that 97.9% of those who read the provincial pandemic plan and 94.3% of those who read the hospital plan also read the national plan.

In a study in Norway in which a questionnaire was sent to 169 Emergency Services as part of the routine bi-annual data collection of the "Out of Hours Registry System" and all centers responded to the questionnaire, it was reported that 66.7% of centers had a pandemic plan before the COVID-19 pandemic[5]. Although it was not exactly comparable to the 2nd and 3rd level health institutions, which were the target of our study, it was observed that the awareness was lower. However, it should be kept in mind that IDCM physicians were the target in this study and there was an important group of physicians who did not know whether the plan existed or not.

There was no difference between the two periods in terms of having administrative duties, being a member of the Infection Control Committee, and being a member of the hospital pandemic board among the participating physicians. Considering the status of other areas that were effective in pandemic planning, it was seen that there was no significant change between periods. This indicated that there was a relatively stable course of pandemic management in hospitals, at least during the period from the beginning of the pandemic to the end of the second wave. Relatedly, it was determined that the scores of complying with the views of the physician by the hospital's management department on the planning of combating the pandemic were similar. It was remarkable that the median compliance score was seven out of ten according to the evaluation of the physicians.

Since the first period of the pandemic, a significant portion of IDCM physicians received support from other branches in the management of patients with COVID-19. Since the percentage of physicians who stated that they received support in the first period was high, the increase that developed over time, possibly due to the increase in the course of the pandemic, did not reach statistical significance. As of January 2021, 9 out of 10 IDCM physicians stated that they received the support of other branches in the management of patients with COVID-19. This support is considered to be very important in pandemic conditions that force the limits of health care services from time to time[6].

It is stated in various studies that there is an increase in compliance with hand hygiene, especially in the first period of the pandemic[7]. It was thought that the evaluation of hand hygiene compliance by healthcare professionals working in physicians' institutions as "very good / good" was consistent with the observation in the literature. The problem experienced in the supply of PPE at the beginning of the pandemic period all over the world was also experienced in our country[8]. In parallel with the developments in the world, there was a decrease in the percentage of physicians who had problems in the supply of PPEs "partially" or "completely" in the first period. While adequate supply of PPEs was an important step in the prevention of COVID-19, it was noteworthy that there was no significant difference in terms of compliance of healthcare workers. Nearly half of the physicians participating in the study evaluated the compliance of the healthcare professionals working in their institutions with the social distance rule as "moderate". According to the evaluation of the physicians, the social distance rule was the measure among non-pharmacological measures that the health personnel working in the institution showed least compliance in terms of COVID-19 measures. In a study by Çelebi et al.[9], in the period before vaccination activities against COVID-19, it was found that the development of COVID-19 in healthcare workers was significantly associated with the behavior of not complying with the social distance rule, not wearing a medical mask in the rest room, and consuming food and drink at a distance of less than one meter. It was observed that there were more inconsistencies regarding the use of PPE. Similarly, in a nested case-control study conducted at a university hospital in Ankara, nearly half of the healthcare professionals in both the case and control groups stated that they "always" followed the social distance rule[10].

In pandemic conditions, as foreseen in the national pandemic preparation plan, flexible working practices have been applied for reasons such as working from home for risky employees, working alternately, providing services with at least health workers, and preventing health workers from gathering together[1]. During the pandemic process, changes have been made in the flexible working practice. In health institutions, flexible working is applied more widely at the beginning of the pandemic. While there has been no problem in the maintenance of health services in our country in the first wave of the pandemic, the health workforce has remained insufficient from time to time in the continuation of health services in our country and in some countries such as Italy in the following period[6,11]. In parallel with the increase in need, it is considered that there may be a decrease in the practice of flexible working especially in the field of health care.

Physicians who stated that the risk assessment of the contacts of healthcare workers with COVID-19 was "very good" / "good" constituted almost two-thirds of the entire group. No difference was detected between the periods. The group that made the risk assessment most frequently was the IDCM physicians, who were the focus of our research, and the Infection Control Committee units they worked with. It was found that IDCM physicians had less support in this field in terms of sharing responsibilities in hospital pandemic management. After the IDCM physicians and the Infection Control Committee, the "Occupational Medicine" and "Occupational Diseases" outpatient clinics assumed the most responsibility for risk assessment of contacts. In our country, studies on risk factors have been carried out in centers where "Occupational Medicine" and "Occupational Diseases" outpatient clinics play a role in contact risk assessment[12,13]. No comparative study has been found in terms of risk assessment made by the IDCM-Infection Control Committee. However, it is considered to workload valuable in terms of sharing responsibilities and reducing the burden of IDCM.

Healthcare professionals are trained in the context of hospital infection control and occupational health and safety[14]. With the spread of the COVID-19 pandemic starting from the People's Republic of China, efforts have begun to renew the training of healthcare workers. Approximately 70% of the physicians who provided information within the scope of our research reported that training was provided to all personnel within the scope of preparation for pandemic as of June 1, 2020, which corresponded to the period when the first wave of the pandemic ended. Although it is not possible to provide training to all personnel in a short time, especially in large institutions, it is important for both hospital control and occupational health and safety that the training of healthcare personnel working in units that provide direct service to the patients with COVID-19 is renewed. Few physicians stated that "training was not provided" or "only some staff serving patients with COVID-19 were trained". In a study conducted in emergency primary services in Norway, the rate of providing education for the pandemic before the COVID-19 pandemic was reported as 4.2% (95% CI=1.1-7.3)[5]. Physicians who declared that no training was provided in this study were less than 5% of all physicians. While the situation in Norway represented the pre-pandemic period, education was questioned as of 01.06.2020 within the scope of this research. However, since there is a period of 3 months between studies, a clear comparison cannot be made.

In the national pandemic plan, it is aimed to improve communication with institutions and provincial/district health managers about pandemic management[1]. About half of the physicians participating in this study reported that their communication was "very good / good". There were no significant differences in terms of communication status between periods. According to the evaluations of the participating physicians, the goal of good communication with the managers specified in the

plan regarding pandemic management could not be achieved in terms of approximately half of the participating physicians since the beginning of the pandemic, and no improvement was achieved over time. Although the absence of an instrument and indicator that would allow objective evaluation was a disadvantage here, the perception of physicians was found to be important.

After the pairwise comparisons, the reading rate of the PINPP of the IDCM physicians participating in the research increased with the past experience of the pandemic, being member of the hospital Infection Control Committee and hospital pandemic board, age, and time spent as an IDCM physician. It was possible that the reading of the national pandemic plan might increase due to the additional responsibilities such as being a member of the Infection Control Committee and the board of management of the pandemic, and the awareness brought by the past pandemic experience, and it was possible that the behavior of reading the plan increased as the age and experience in the field increased. The probability of being a member of the Infection Control Committee and the board of management of the pandemic and experiencing an pandemic also increased with age. The time spent as an IDCM physician was included in the logistic regression model created to control this situation. Although being a member of the Infection Control Committee and the hospital pandemic board lost their significance after adjustment, it was found that the pandemic experience increased the reading behavior in the model made for the January 2021 period, regardless of the time the physician spent in the field.

In pairwise comparisons, as the time spent in IDCM medicine increased, the rate of reading the PINPP increased for both periods. Although the model seemed to have lost its statistical significance in the June 2020 period when the model was established, it was considered to have clinical significance because it was close to the statistical significance level and this association could be demonstrated in January 2021.

During the pairwise comparisons, it was determined that the reading of the national pandemic preparedness plan decreased with the increase in the number of IDCM physicians. This association continued for the period of January 2021 in the multivariate model created. Possibly, as the number of participants working in the institution in the field of IDCM increased, internal responsibilities could be shared more and some physicians might be uninterested in matters related to pandemic management.

In the PINPP, it was stated that communication with hospital and provincial / district administrators should be good as part of the fight against the pandemic. There was a positive association between reading the PINNP and having "very good / good" communication with the provincial / district administrators, but it lost its significance in the presence of other factors that might be related.

Although there was no statistically significant association, the physicians working in the institution "where no training was given to the personnel" read the national pandemic preparation plan less than the physicians working in the institution where "all personnel were trained". It was thought that the association could not be demonstrated due to the low number of physicians working in the institution, which did not provide any training to its personnel. Although it was not statistically significant, it was considered to be a practical finding.

It was not an expected result that there was an inverse association with the hand hygiene compliance of the healthcare professionals in the institution where the physician worked. The continuation of this association in both periods suggested that it might act as a proxy for a factor that was not questioned in the study, since the association continued despite the control of other confounding variables such as experience. This suggested that it might be acting as a proxy for a factor that was not questioned within the scope of the study, since the association continued despite the control of other confounding variables.

As far as is known, this research is the only research in which the roles of IDCM physicians are questioned during the COVID-19 pandemic period from the perspective of the national pandemic preparedness plan in Turkey. It is important to determine the factors affecting the reading of the national pandemic plan by IDCM physicians and to learn the views of physicians on pandemic management.

Study Limitations

Although the collection of data on this research was carried out at a time when the burden of the pandemic was partially reduced, it was carried out among the busy work schedule of physicians under pandemic conditions. In this case, it was thought that physicians who were more interested in this subject or with relatively less workload were represented more. The results could not be generalized to all IDCM physicians working in Turkey. The data collection process was not face-to-face, which was positive in order to avoid the bias in the form of "answering in the desired direction", but it brought with it the risks of not understanding the questions and answering them incorrectly. The fact that the evaluations were based on declaration, and the inability to obtain objective, measurement-based variables, especially in pandemic conditions, limited the reproducibility of the results. The objective definition of policy objectives was also important for determining the realization status of the objectives[15]. Since it was based on declaration, it was considered that the memory factor might be effective for both periods, with the findings in the June 2020 period in the foreground.

In terms of pandemic management, hospitals were required to make a planning related to "Pandemic Management" within the scope of "Hospital Disaster Plan" as a legal requirement before their responsibility to develop "Second and Third Level Health Institutions PINPP"[16]. It was thought that especially well-established health institutions could be better prepared in this regard. However, within the scope of this study, the contribution of previous studies could not be determined, since information about the "Hospital Disaster Plan" was not questioned.

Conclusion

As a result, three out of every ten IDCM physicians participating in the study did not read the PINPP. The status of reading the PINPP increased with the physician's time spent in IDCM medicine and the pandemic experience before COVID-19, and decreased with the hand hygiene compliance of the healthcare professionals working in the physician's institution and the number of IDCM physicians working in the physician's institution. It is recommended that the PINPP be announced in a way that focuses more on physicians with less experience in the field of IDCM (social media, online environments, etc.). It can be considered that experienced physicians and instructors share their experiences on the subject with physicians with little experience, and that a special program should be created to introduce the national pandemic preparedness plan to physicians who have started to work after the COVID-19 pandemic and have not yet experienced an pandemic. In large hospitals where the number of IDCM physicians is high, it is recommended to promote the national pandemic preparedness plan by targeting physicians other than those involved in hospital pandemic management.

Ethics

Ethics Committee Approval: The research was ethically approved by the Ankara City Hospital No. 1 Clinical Research Ethics Committee with the decision numbered 767 on 04.06.2020.

Informed Consent: Participants who accessed the data collection form online by clicking the link address, viewed the informed consent form.

Peer-review: Externally and internally peer-reviewed

Authorship Contributions

Concept: A.S., T.B., Design: A.S., T.B., Data Collection or Processing: A.S., Analysis or Interpretation: A.S., T.B., Literature Search: A.S., Writing: T.B.

Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: The authors declared that this study received no financial support.

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