Innovative Journal of Medical and Health Science
Received 28 June 2023|| Revised 22 July 2023 | Accepted 02 Aug 2023 | Published Online 16 Aug 2023

DOI: https://doi.org/10.52845/IJMHS/2023/13-08-1
Inno J of Med Health Sci 13 (08), 2102-2109 (2023)

ORIGINAL RESEARCH

IISSN (P))2589-9341 || ((O) 2277-4939 IF:1.6.6

Knowledge, Attitude and Practices of Health Care Professionals Regarding Vaccination against Influenza and SARS- Cov-2 in Greece

[1]Petroula Stamataki, [2]Maria Kagialari, [3]Georgios Kagialaris, [4]Efthymia Grigoraki, [5]Evagelia Angelopoulou, [6]Effrosyni Mantzara, [7]Glykeria Memekidou

[1]RN, MSc, PhD, Head Nurse of Infection Prevention and Control, Naval Hospital of Athens

[2]RN, MSc, Internal Medicine, Naval Hospital of Athens

[3]RN, MSc, ECCP, 401 General Military Hospital of Athens

[4]RN, MSc (c), Head Nurse of Outpatient Clinic and Covid -19 Vaccination Centre, Thoracic Diseases General Hospital Sotiria

[5]RN, MSc, Head Nurse of ER, Naval Hospital of Athens

[6]RN, MSc, ICU, Naval Hospital of Athens
[7]RN, MSc, PhD(c), Oncology Nurse, Naval Hospital of Athens

Abstract:
Knowledge, Attitude and Practices of Health Care Professionals Regarding Vaccination against Influenza and SARS- Cov-2 in Greece
Background:
The seasonal influenza is a usual respiratory infection, caused by influenza viruses and the only protection against it, is the annual vaccination. The newly emerged Covid-19 infection is also a respiratory infection that has plagued health care systems for over the past three years and resulted in the mandatory vaccination of Health Care Professionals in most countries worldwide.
Methods:
The aim of the present study was to assess the impact of the SARS-CoV-2 pandemic on the seasonal influenza vaccination attitudes in HCWs, in three Hospitals in Athens and to identify the knowledge, stance and practice of HCWs about those two respiratory diseases.
A total of 289 health care professionals (33.9% physicians, 35.3% nurses and 30.8% nurse assistants) in three public hospitals completed a 32-question survey from June to December 2022. The mean age of the participants was 43.13±10.16 years and their mean years of experience were 16.32±11.043.
All data were coded accordingly and analyzed using the Statistical Package for Social Science (SPSS 20.0).
Results:
A total of 21.1% of the HCWs identified themselves to belong in high-risk groups and 18% lived in the same house with a vulnerable person. However, only 54.3% were vaccinated against seasonal influenza, whereas almost all were vaccinated against Covid-19. Their main source of information was through their workplace and nearly 20% of the participants reported that they gathered information from web pages, social media and blogs. Vaccination against seasonal influenza is considered by 20.4% to be a preventive measure against spreading Covid-19, however it cannot protect them against Covid-19 according to 68.2%. Finally, less than half of the study participants agree that vaccination against SARS-CoV-2 should remain mandatory for all HCWs.
Conclusions:
The findings of the study may indicate that the Covid-19 pandemic had a positive impact on influenza vaccination; however influenza vaccination coverage is still low among Greek healthcare workers. This requires further investigation and may be dealt with the development of appropriate educational programs for HCWs.
Keywords: Influenza, SARS-CoV-2, COVID-19, knowledge, attitude, practice, KAP, healthcare professionals, vaccination, Greece

1 | INTRODUCTION

The seasonal influenza is a usual respiratory infection, caused by influenza viruses.[1] It is considered as a major respiratory infection that may result in high morbidity and mortality, especially for elderly people, and prolonged period of hospitalization. The World Health Organization (WHO), announced that up to 20% of the global population may be infected with influenza each season.[2]

It is estimated that seasonal influenza may result in 290.000-650.000 deaths worldwide every year.[3,4] This assessment was reinforced by the findings of a 2019 study, that estimated 99.000-200.000 deaths from lower respiratory tract infections directly caused by influenza.5 A research study summing the respiratory mortality rates from 31 countries representing 5 WHO regions during 2002-2011, estimated an average of 389.000 (range of uncertainty 294.000-518.000) respiratory deaths, associated with influenza each year globally during the study period, representing the 2% of all annual respiratory deaths.4 Most of these deaths (67%) were of older people, of 65 years old and more.[4]

According to the European Centre for Disease Prevention and Control (ECDC) across the WHO European Region, during the week 25/2022, 138.352 detections had been reported (a rise of over 5.000 since week 20/2022) as a result of extended late season influenza activity. The majority of them (98%) were type A viruses, with A(H3N2) (92%) dominating over A(H1N1) pdm09 (8%), and 2% type B of which only 125 were ascribed to a lineage, with all but two being B/Victoria.[6] This represents a large increase in detections compared to 2020-2021 season as a result of the emergence of SARS-CoV-2.[6]

The only protection against seasonal flu is the annual vaccination, since the seasonal flu vaccine is modified accordingly every year in order to include the most common strains in the upcoming flu season.[7] However the vaccination coverage of older European citizens ranged from 2.0% to 72.8% (median 47.1%) in 2016–17 in 19 members, and among European HealthCare Workers (HCWs) ranged from 15.6% to 63.2% (median 30.2%) in 12 European countries.[8]

Influenza vaccination coverage of the total Greek population was 32.5% in 2013– 2014 and 56.6% among the elderly in 2018.

Corresponding Author: Petroula Stamataki
RN, MSc, PhD, Head Nurse of Infection Prevention and Control, Naval Hospital of Athens

Only 18% of HCWs in acute care hospitals and 34.6% in primary healthcare centers were vaccinated for seasonal influenza in 2016–2017.[9]

The newest respiratory infection is caused by SARS-CoV-2. The well known Covid-19 infection is an infectious disease that has plagued health care systems for over the past three years and the extent in which the global population was infected or sickened by Covid-19, is beyond all reason. Numerous control measures have been used to slow down the progress of the pandemic worldwide. However on 3rd of March 2023 the global cumulative incidence reached 675.726.981 reported cases and 6.875.555 deaths due to Covid-19. The total number of vaccine doses administered, according to Johns Hopkins University and Medicine were 13.332.694.621.[10]

The aim of the present study was to assess the impact of the SARS-CoV-2 pandemic on the seasonal influenza vaccination attitudes in HCWs, in three Hospitals in Athens and to identify the knowledge, stance and practice of HCWs about those two respiratory diseases.

2 | METHODS

Sample and Setting:

A 32-question survey was conducted, using self-completed questionnaire with a section for general information and basic demographic characteristics of study participants and a second section with closed responses for personal characteristics and the assessment and evaluation of health workers' knowledge, attitudes and practices regarding influenza and SARS-Cov-2.

A total of three public hospitals were selected; two military hospitals (naval and army hospitals) and one hospital dedicated to Covid-19 patients. Health care professionals (doctors, nurses and nurse assistants) were asked to complete and return to the researchers the self-completed questionnaire from June to December 2022. All participants provided written consent. Confidentiality and anonymity were maintained. Participants were health care professionals working at the hospitals for at least one year. Students and administrative staff were excluded from the study. In total 330 questionnaires were distributed and 289 questionnaires were completed, (105 from the covid hospital and 184 from the military hospitals), refusal rate was approximately 12.4% (no information for the potential reasons for health care workers' refusal to participate was available). The protocol and questionnaire were approved by the Ethics Committees of participating hospitals.

Instruments and procedure:

The questionnaire was developed by the authors in accordance with questionnaires that have been used in previous studies assessing similar questions.

The questionnaire was checked and validated for content and relevance by the authors. Internal consistency of the study questionnaire was assessed by Cronbach's alpha (total value 0.757).

The questionnaire was pretested on 30 health care professionals and these questionnaires were excluded from the study. The questions were modified accordingly. It consisted of 9 questions of personal information and 23 questions addressing knowledge, attitude and practice regarding influenza and Covid -19 vaccination. The questions were answered by the 3-point Likert scale (agree, undecided, disagree).

Data analysis:

Statistical analysis was performed using programs available in the SPSS statistical package (SPSS 20.0, Chicago, USA). All data were coded, validated and analysed. The results were presented as frequencies in percentages (%), mean and median. Any value below 0,05 was considered statistically significant.

3 | RESULTS

Table 1 shows the sociodemografic characteristics of the study group. A total of 289 healthcare workers participated in the study (111 male/177 female/1 missing value). The mean age was 43.13±10.160 years and ranged from 20 to 67 years old. The mean years of experience were 16.32±11.043 years and ranged from 1 to 38 years. Of the study participants 63.7% (n=184) were working at military hospitals, more specifically, 32.2% (n=93) at Naval hospital of Athens, 31.5% (n=91) at 401 General Army Hospital of Athens and 36.3% (n=105) at a hospital that during the pandemic was dedicated to Covid-19 patients. The study group was divided in three groups and consisted of 33.9% physicians (n=98), 35.3% nurses (n=102) and 30.8% nurse assistants (n=89). Of the study participants 29.8% (n=86) had postgraduate degree, 34.6 (n=100) had graduated from university departments, 9.3% (n=27) from technological institutes (colleges), 23.9% (n=69) from 2 year postsecondary education and 2.4% (n=7) from secondary education.

Table 1 Socio-demographic Characteristics of the Study Group

	N	%
Sex		
Female	177	61.2
Male	111	38.4
Missing Values	1	0.3
Marital Status		
Single	115	39.8
Married	174	60.2
Hospital		
Naval Hospital of Athens	93	32.2
Thoracic Diseases General Hospital "Sotiria"	105	36.3
401 General Military Hospital of Athens	91	31.50
Profession		
Physician	98	33.9
Nurse	102	35.3
Nurse assistant	89	30.80
Education		
Secondary education	7	2.4
2 year post secondary	69	23.90
Technological	27	9.3
University	100	34.6
Postgraduate	86	29.8
Work Place		
Internal Medicine Department	79	27.3
Surgical Department	37	12.8
Outpatient Clinic	33	11.4
ICU	22	7.6
ER	23	8
Anesthesiology department	23	8
Surgery	20	6.9
Cardiology department	17	5.9
Catheterisation laboratory	8	2.8
Central Sterilization Department	8	2.8
Day Clinic	8	2.8
Other	11	3.8

The first set of questions depicted the personal characteristics of the participants as shown in Table 2. A total of 21.1% (n=61) of the health workers identified themselves to belong in high-risk groups and 18% (n=52) lived in the same house with a vulnerable person. Only 54.3% (n=157) were vaccinated against seasonal influenza, whereas 98.3% (n=284) were vaccinated against Covid-19.

The vast majority of the Covid-19 vaccinated health workers, 87.9% (n=254) were vaccinated with the Pfizer vaccine, 82.7% (n=239) were vaccinated or planned to become vaccinated with the booster dose. Only 7.6% (n=22) of the sample were hired during the pandemic.

Table 2 Personal Characteristics of the Study Group

Question	YES	%	NO	%	I DO NOT KNOW	%
Belong in a high risk group	61	21.1	223	77.2	5	1.7
Live in the same house with a vulnerable person	52	18	236	81.7	1	0.3
Vaccinated against Seasonal Influenza	157	54.3	132	45.7		
Vaccinated against Covid-19	284	98.3	5	1.7		
Booster dose	239	82.7	50	17.3		
Working before the pandemic	267	92.4	22	7.6		

The second set of questions aimed to reveal the participants' stance, knowledge and attitude towards Covid-19 and seasonal influenza vaccination. The results are shown in Table 3. Interestingly, the main source of information for 53.3% (n=154) of the sample was through their workplace (infection control nurse, physicians, health professionals), while 19.7% (n=57) reported that they used information from the official webpage of the Ministry of Health and exactly the same number, 19.7% (n=57) that they gathered information from web pages, social media and blogs, 5.9% (n=17) trusted television, radio and newspapers and finally 1.4% (n=4) was informed by family members and friends. A total of 28.7% (n=83) answered that the symptoms of COVID-19 are similar to those of seasonal influenza, 57.1% (n=165) believe that SARS-COV-2 virus is more dangerous than H1N1 virus, however only 14.5% (n=42) consider SARS-COV-2 virus to be much more contagious than H1N1 virus. Comparing prevention of Covid-19 and seasonal influenza, 64.7% (n=187) of the sample believe that Covid-19 infection can be prevented and 65.4% (n=189) believe the same for Seasonal influenza infection. A total of 76.8% (n=222) identified Covid-19 as a severe disease. In contrast, only 42.9% (n=124) believe influenza to be a serious disease. Comparing the possibility of a new epidemic, 57.8% (n=167) believe that a new Covid-19 epidemic is possible while only 49.1% (n=142) believe that a new H1N1 epidemic is possible. Comparing the mortality of the two diseases, 31.8% (n=92) identified Covid-19 as a fatal disease, while 11.4% (n=33) considered seasonal influenza to be a fatal disease.

Only 27.7% (n=80) answered that Covid-19 infection will be eradicated if a large proportion of the population becomes infected, however 49.1% (n=142) answered that Covid-19 infection will be eradicated if a large proportion of the population becomes vaccinated against Covid-19 and 14.5% (n=42) answered that Covid-19 infection will be eradicated if a large proportion of the population becomes vaccinated against seasonal influenza. Surprisingly, 20.4% (n=59) consider vaccination against seasonal influenza to be a preventive measure against spreading Covid-19.

Less than half of the study participants, 41.5% (n=120) agree that vaccination against SARS-CoV-2 should remain mandatory for all health care professionals, and 33.2% (n=96) believe that vaccination for all health care professionals against seasonal influenza should become mandatory. In addition, 62.3% (n=180) believe that especially if healthcare professionals treat high risk patients, they should be vaccinated against SARS-CoV-2 versus 51.9% (n=150) that believe that they should be vaccinated against influenza for the same reason. If healthcare professionals suffer from a chronic disease, 73.4% (n=212) believe that they should be vaccinated against SARS-CoV-2 and 69.6% (n=201) against influenza. However, 33.9% (n= 98) believe that covid-19 vaccine and 17.3% (n=50) that influenza vaccine may have severe side effects.

The majority of the study participants, 68.2% (n=197) answered that the vaccine against influenza cannot protect them against Covid-19 and 68.9% (n=199) answered that the vaccine against Covid-19 cannot protect them against influenza. Only 3.5% (n=10) believe that if they are vaccinated against influenza it is not necessary to get vaccinated against Covid-19. Finally, 5.9% (n=17) believe that if they are vaccinated against Covid-19 it is not necessary to get vaccinated against influenza.

Table 3**:** Stance, knowledge and attitude towards Covid-19 and seasonal influenza vaccination of the Study Group

Question	**DISAGREE**	**%**	**UNDICIDED**	**%**	**AGREE**	**%**
Similar symptoms Covid-19 and Seasonal Influenza	121	41.9	85	29.4	83	28.7
SARS-COV-2 virus is more fatal than H1N1 virus	38	13.1	86	29.8	165	57.1
SARS-COV-2 virus is much more contagious than H1N1 virus	155	53.6	92	31.8	42	14.5
Covid-19 infection can be prevented	39	13.5	63	21.8	187	64.7
Seasonal flu can be prevented	30	10.4	70	24.2	189	65.4
Covid-19 is a severe disease	7	2.4	60	20.8	222	76.8
Seasonal fluis a severe disease	58	20.1	107	37	124	42.9
Covid-19 infection will be eradicated if a large proportion of the population becomes infected	88	30.4	121	41.8	80	27.7
Anew Covid-19 epidemic is possible	31	10.7	91	31.5	167	57.8
Anew H1N1epidemic is possible	49	17	98	33.9	142	49.1
Covid-19 is a fatal disease	63	21.8	134	46.3	92	31.8
Seasonal flu is a fatal disease	118	40.8	138	47.8	33	11.4
Covid-19 infection will be eradicated if a large proportion of the population becomes vaccinated against Covid-19	57	19.7	90	31.1	142	49.1
Covid-19 infection will be eradicated if a large proportion of the population becomes vaccinated against Seasonal influenza	169	58.5	78	27	42	14.5
Vaccination against seasonal influenza is a preventive measure against spreading Covid-19.	176	60.9	54	18.6	59	20.4
Vaccination against SARS-CoV-2 should remain mandatory for all healthcare professionals	110	38.1	59	20.4	120	41.5
Vaccination against seasonal influenza should become mandatory for all healthcare professionals	122	42.2	71	24.6	96	33.2
Healthcare professionals that treat high risk patients should be vaccinated against SARS-CoV-2	56	19.4	53	18.3	180	62.3
Healthcare professionals that treat high risk patients should be vaccinated against Seasonal Influenza	69	23.9	70	24.2	150	51.9

Healthcare professionals with chronic disease should be vaccinated against SARS-CoV-2	28	9.7	49	17	212	73.4
Healthcare professionals with chronic disease should be vaccinated against Seasonal Influenza	32	11.1	56	19.3	201	69.6
COVID-19 vaccine may have severe side effects.	61	21	130	44.9	98	33.9
Seasonal Influenza vaccine may have severe side effects.	107	37	132	45.6	50	17.3
Seasonal influenza vaccine is protective against COVID-19	197	68.2	76	26.3	16	5.5
COVID-19 vaccine is protective against Seasonal Influenza	199	68.9	75	25.9	15	5.2
If vaccinated against influenza it is not necessary to get vaccinated against Covid-19	243	84.1	36	12.5	10	3.5
If vaccinated against Covid-19 it is not necessary to get vaccinated against influenza	227	78.5	45	15.6	17	5.9

4 | DISCUSSION

It should be noted that almost all HCWs reported that they were vaccinated against Covid-19, since it was mandatory for HCWs to be vaccinated against Covid-19, when the study took place. An interesting finding is that it seems that the Covid-19 pandemic has had a positive impact on influenza vaccine acceptance and the vaccine coverage for seasonal influenza has increased, considering that in 2016–2017 only 18% of HCWs in acute care hospitals and 34.6% in primary healthcare centers were vaccinated for seasonal influenza.[9] More specifically, 63.3% (n=62) of physicians, 54.9% (n=56) of nurses and 43.8% (n=39) of nurse assistants were vaccinated against seasonal influenza. This finding is also in line with a study in Italy that described opinions and attitudes of the general population towards influenza vaccination and the Covid-19 pandemic[11] and a recent online survey conducted across six countries (United States, Canada, Israel, Japan, Spain and Switzerland) among caregivers of children aged 1–19 years.[12]

The majority of the respondents relied on formal sources of information about Covid-19, however one fifth of the study participants searched the internet and the social media for information. Social media usage increases in periods of crisis because it provides a rapid way to share information. On the other hand, they have been accused of spreading misinformation on sensitive topics, fake news and conspiracy theories and may even be a threat to society.[13] A systematic review that analyzed the phenomenon of fake news in healthcare, concluded that it was possible to result in psychological disorders and panic, fear, depression, and fatigue.[14] According to a study among UK residents, informational reliance on social media is positively associated with vaccine hesitancy.[15] It seems that it is important to inform health professionals to be aware of the potential hazards of social media platforms and choose to use the ones that follow some basic guidelines when sharing information on social networks.[16]

A systematic review compared the mutual shared upper respiratory tract and influenza-like symptoms of Covid-19 infection, SARS-COV-2, seasonal-influenza and common cold. It seems that Covid-19 could be divided into 4 types depending on the patient's symptoms. The first and mildest type resembles common cold, the second moderate type imitates influenza, while the severe third type and the critical fourth type resemble SARS-COV-2.[17] In our study less than one third of the participants responded that the symptoms of Covid-19 are similar to those of seasonal influenza, consider Covid-19 a severe

disease and the majority believes that SARS-COV-2 virus is more dangerous than H1N1 virus. It is possible that healthcare professionals have this perception, because of their own experience as hospitals treat Covid-19 patients that are in moderate, severe and critical stage.

As expected, the proportion of participants of the study that believes Covid-19 and influenza can be prevented is similar, 64.7% and 65.4% respectively, and slightly higher than the proportion of vaccinated against seasonal influenza 54.3% (Covid-19 vaccination was as mentioned mandatory). It is particularly worrisome that despite the availability and the variety of seasonal influenza vaccines the vaccination coverage is still relatively low among healthcare workers. Moreover, vaccination is considered to be critical in addition to any other measures, to minimize the viral reservoir in the population.[17] It seems that it is crucial for policymakers to develop tailored flu and Covid-19 educational programs for HCWs' vaccination, in order to increase vaccination coverage.

An important issue that needs to be addressed is the stance of health professionals against obligatory vaccination. While all responders were vaccinated against Covid-19 and more than half for seasonal influenza, the majority does not agree with mandatory vaccination of healthcare workers neither for Covid-19 nor for seasonal influenza. It may seem a contradictory finding, since most participants believe that vaccination is needed to protect a vulnerable person (either healthcare worker or patient), more than half of the participants believe that a new Covid-19 epidemic is possible and almost half of the responders answered that Covid-19 infection will be eradicated if a large proportion of the population becomes vaccinated. The results obtained in the present study have several similar traits to a previous study, conducted prior to Covid-19 compulsory vaccination.[19] Furthermore; mandatory vaccination is a debated practice worldwide. A systematic review of opinions that included 28 opinion and viewpoint articles (12 pro-mandatory, 13 neutral and three against mandatory vaccination) highlighted the ethical dilemmas, moral questions and legal issues that were raised by the mandate of vaccination against Covid-19.[20] The review concluded that collaboration is needed, professional bodies should have an active supportive and informative role and that both rights of healthcare workers and public should be taken into account when forming a policy.

5 | LIMITATIONS

Generalizations of the results presented herein should be made cautiously, as the current study was conducted in a limited geographic area with a small sample size. Additionally, the use of self-reporting questionnaire may have allowed participants to answer inaccurately.

6 | CONCLUSION

It seems that Covid-19 pandemic has a positive impact on influenza vaccination; however influenza vaccination coverage is still low among Greek healthcare workers. Policymakers should identify potential reasons for vaccination hesitancy and refusal and with the collaboration of professional bodies should develop tailored educational programs for health care personnel.

7 | REFERENCES

[1]. Pleschka S, Overview of influenza viruses. In: Richt J,Webby RJ, eds. Swine Influenza. Springer; 2013:1-20.Current Topics in Microbiology and Immunology; vol 370.doi:10.1007/82_2012_272

[2]. WHO, 2017. Global Influenza Programme, Accessed at: https://www.who.int/teams/global-influenza-programme/surveillance-and-monitoring/burden-of-disease

[3]. Lu PJ, O'Halloran A, Ding H, Greby SM, Williams WW. Current status and uptake of influenza vaccination over time among senior adults in the United States. Hum Vaccin Immunother. 2015;11(12):2849-2851. doi:10.1080/21645515.2015.1075108

[4]. Paget J, Spreeuwenberg P, Charu V, Taylor RJ, Iuliano AD, Bresee J, Simonsen L, Viboud C; Global Seasonal Influenza-associated Mortality Collaborator Network and GLaMOR Collaborating Teams*. Global mortality associated with seasonal influenza epidemics: New burden estimates and predictors from the GLaMOR Project. J Glob Health. 2019 Dec;9(2):020421. doi: 10.7189/jogh.09.020421. PMID: 31673337; PMCID: PMC6815659.

[5]. Li L, Liu Y, Wu P, Peng Z, Wang X, Chen T, Wong JYT, Yang J, Bond HS, Wang L, Lau YC, Zheng J, Feng S, Qin Y, Fang VJ, Jiang H, Lau EHY, Liu S, Qi J, Zhang J, Yang J, He Y, Zhou M, Cowling BJ, Feng L, Yu H. Influenza-

associated excess respiratory mortality in China, 2010-15: a population-based study. Lancet Public Health. 2019 Sep;4(9):e473-e481. doi: 10.1016/S2468-2667(19)30163-X. PMID: 31493844; PMCID: PMC8736690.

[6]. European Centre for Disease Prevention and Control. Influenza virus characterization - Summary Europe, June 2022. Accessed at: https://www.ecdc.europa.eu/en/publications-data/influenza-virus-characterization-summary-europe-june-2022

[7]. Ferdinands JM, Patel MM, Foppa IM, Fry AM. Influenza Vaccine Effectiveness. Clin Infect Dis. 2019 Jun 18;69(1):190-191. doi: 10.1093/cid/ciy1084. PMID: 30561533.

[8]. European Centre for Disease Prevention and Control. Seasonal influenza vaccination and antiviral use in EU/EEA Member states, 2018. Accessed at: https://www.ecdc.europa.eu/sites/default/files/documents/seasonal-influenza-antiviral-use-2018.pdf

[9]. Kopsidas I, Chorianopoulou E, Kourkouni E, Triantafyllou C, Molocha NM, Koniordou M, Maistreli S, Tsopela CG, Maroudi-Manta S, Filippou D, Zaoutis TE, Kourlaba G. COVID-19 pandemic impact on seasonal flu vaccination: A cross-sectional study. Pneumon 2021;34(2):8

[10]. COVID-19 Map - Johns Hopkins Coronavirus Resource Center, Accessed at: https://coronavirus.jhu.edu/map.html

[11]. Domnich A, Cambiaggi M, Vasco A, Maraniello L, Ansaldi F, Baldo V, Bonanni P, Calabrò GE, Costantino C, de Waure C, Gabutti G, Restivo V, Rizzo C, Vitale F, Grassi R. Attitudes and Beliefs on Influenza Vaccination during the COVID-19 Pandemic: Results from a Representative Italian Survey. *Vaccines*. 2020; 8(4):711. https://doi.org/10.3390/vaccines8040711

[12]. Goldman R D, McGregor S, Marneni S R, Katsuta T, Griffiths M A, Hall J E, Seiler M, Klein E J, Cotanda C P, Gelernter R, Hoeffe J, Davis A L, Gualco G, Mater A, Manzano S, Thompson GC, Ahmed S, Ali S, Brown J C, Yue E L (2021). Willingness to Vaccinate Children against Influenza after the Coronavirus Disease 2019 Pandemic. *The Journal of Pediatrics*, *228*, 87-93.e2. https://doi.org/10.1016/j.jpeds.2020.08.005

[13]. Venegas-Vera AV, Colbert GB, Lerma EV. Positive and negative impact of social media in the COVID-19 era. Rev Cardiovasc Med. 2020 Dec 30;21(4):561-564. doi: 10.31083/j.rcm.2020.04.195. PMID: 33388000.

[14]. Rocha YM, de Moura GA, Desidério GA, de Oliveira CH, Lourenço FD, de Figueiredo Nicolete LD. The impact of fake news on social media and its influence on health during the COVID-19 pandemic: a systematic review. Z Gesundh Wiss. 2021 Oct 9:1-10. doi: 10.1007/s10389-021-01658-z. Epub ahead of print. PMID: 34660175; PMCID: PMC8502082.

[15]. Allington D, McAndrew S, Moxham-Hall V, Duffy B (2023). Coronavirus conspiracy suspicions, general vaccine attitudes, trust and coronavirus information source as predictors of vaccine hesitancy among UK residents during the COVID-19 pandemic. *Psychological Medicine, 53*(1), 236-247. doi:10.1017/S0033291721001434.

[16]. González-Padilla DA, Tortolero-Blanco L. Social media influence in the COVID-19 Pandemic. Int braz j urol [Internet]. 2020Jul;46:120–4. Available from: https://doi.org/10.1590/S1677-5538.IBJU.2020.S121

[17]. Czubak J, Stolarczyk K, Orzeł A, Frączek M, Zatoński T. Comparison of the clinical differences between COVID-19, SARS, influenza, and the common cold: A systematic literature review. Adv Clin Exp Med. 2021;30(1):109–114. doi:10.17219/acem/129573

[18]. Solomon DA, Sherman AC, Kanjilal S. Influenza in the COVID-19 Era. *JAMA.* 2020;324(13):1342–1343. doi:10.1001/jama.2020.14661

[19]. Kagialari M, Memekidou G, Stamataki P, Mantzara E, et al. Knowledge, Attitude and Practices of Health Care Professionals Regarding SARS-Cov-2 During the Pandemic in Greece. A Comparison between Covid and General Hospitals. Geron & Geriat Stud 8(4). GGS. 000691. 2023. DOI: 10.31031/GGS.2023.08.000691

[20]. Maneze D, Salamonson Y, Grollman M, Montayre J, Ramjan L. Mandatory COVID-19 vaccination for healthcare workers: A discussion paper. Int J Nurs Stud. 2023 Feb;138:104389. doi: 10.1016/j.ijnurstu.2022.104389. Epub 2022 Nov 9. PMID: 36462385; PMCID: PMC9709452