Factors Affecting Willingness to Report to Work During COVID-19 Pandemic among Health Care Workers in a Tertiary Government Hospital

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ABSTRACT

Background. Healthcare workers' (HCWs) willingness to report to work despite personal risk is a requisite for an effective pandemic response. At present, there are no local studies that have examined the factors affecting willingness to report to work during the COVID-19 pandemic.

Objective. To determine the factors associated with willingness to report to work during COVID-19 pandemic among healthcare workers in a tertiary government hospital.

Methods. This was a cross sectional study among the nursing staff (nursing attendants, nurses), doctors (residents, fellows), medical technologists, radiologic technologists, and respiratory technicians in a tertiary government hospital, who were employed from January 2021 to January 2022. Data was collected through an online questionnaire and was analyzed using SPSS.

Results. A total of 311 participants included in the study. The median age of the respondents was 34 (29-46) years old. More than a third of the workers were nurses (37%) followed by residents and fellows (34%), nursing attendants (19%), radiologic technologists, medical technologists, and respiratory technicians (10%). Over 4 out of 5 were assigned in a non-COVID area while 11% were assigned in the COVID area. The odds of willingness to report to work is 60% lower among males compared to females. On the other hand, the odds of willingness to report to work was 78% lower among nurses and 84% lower among residents and fellows compared to medical technologist, radiologic technologists, and respiratory therapists. The median rating of the staff on willingness to report to work was 80% (60-90), and 73% of respondents were willing to report to work during the entire COVID-19 pandemic.

Conclusion. Factors that were associated with willingness to report to work were female gender and occupation (radiologic technologists, medical technologists, respiratory technicians).

Keywords: willingness to report to work, healthcare workers, COVID-19

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INTRODUCTION

Health care workers (HCWs) have been at the forefront of the COVID-19 pandemic. Their willingness to report to work is a critical element for hospital preparedness and sustainability. It is a requisite to withstand immense challenges such as increasing capacity to handle surges, expanding bed capacities, infection control, and delay of non-emergent procedures.[1]

It is often expected that HCWs have the duty to report to work even when faced with personal risk. Society tends to have expectations from health care workers to carry with clinical duties at the expense of their rights. In a survey done in 2006 after the SARS epidemic, more than a quarter (28%) of HCWs answered that they were unlikely to respond to a

pandemic if asked to report for duty. Therefore, an effective response to a pandemic relies heavily on the willingness of the HCW to continue to work despite personal risk.[2]

HCWs' willingness to respond in a disease outbreak could be affected by the following: availability of personal protective equipment (PPE), vaccine, level of training, professional ethics, personal, family health, safety, and worker support systems. On the other hand, barriers to willingness to respond can be categorized as: perceived risk, interpersonal factors, job-level factors, and outbreak characteristics. It was found that fear of contracting the virus, concern for own safety and welfare of loved ones were among the most common reasons cited for failure of healthcare professionals to report for duty during a crisis.[3]

There are no local studies that have examined the factors affecting willingness to respond in a pandemic. Moreover, there are no studies that have explored the death of a family member due to COVID, and the number of times the HCW has been infected with this virus, in relation to their Willingness to Report to work (WTR). There is no data regarding socio-demographic factors such as financial status of the HCWs' family as well as the years in service at the hospital that may also contribute to the healthcare worker's willingness to respond.

OBJECTIVE

The objective of this study was to determine the factors associated with willingness to report to work during COVID-19 pandemic among healthcare workers in a tertiary government hospital. The specific objectives were:

1. To determine the sociodemographic factors (age, gender, profession, marital status, financial status, and number of years working in PGH) associated with the degree of willingness to report to work;
2. To determine the association of COVID infection and vaccination status with the degree of willingness to report to work;
3. To determine the personal factors (presence of children or elderlies in the family, death of a family member in the last year) associated with the degree of willingness to report to work; and
4. To determine the association of categories of employees and workspace with the degree of willingness to report to work.

METHODS

Study Design and Population

This was a cross sectional study, involving nursing staff (nursing attendants, nurses), doctors (residents, fellows), medical technologists, radiologic technologists and respiratory technicians employed from January 2021 to January 2022.

Nursing attendants, nurses, residents, fellows, medical technologists, radiologic technologists, and respiratory technicians aged 20 to 59 years old, employed at the tertiary hospital were included while medical students, interns, and volunteers were excluded in the study.

Study Setting and Period

This research was conducted in a tertiary government hospital in Manila, Philippines. Data collection was done for three months (August to October 2022).

Sample Size

The sample size was computed using the G*Power. The odds ratio used was based on a study titled "Assessing Public Health Department Employees' Willingness to Report to Work During an Influenza Pandemic" in 2009.[4] According to this, workers in the clinical services department with high-risk job duties were 1.31 times more likely to report during early pandemic than those from other departments. The computed sample size was 307 with power of analysis equal to 90%. This study accounted for possible non-response rate by adding 20% to the estimated sample size. The total sample size was 368.

Sampling Design

A list of nursing staff, doctors, medical technologists, radiologic technologists, and respiratory technicians, and their email addresses were requested from the departments.

Survey Tool and Data Collection

A structured questionnaire was developed in English based on the review of related literature. It was pilot tested among ten selected health care workers composed of five nursing staff and five doctors. Respondents were asked for difficult to understand questions, problems with question construction, or vague statements.

Letters addressed to the chairs of the departments where the health care workers belong to were sent to their offices. The letter contains the following: introduction of the researcher, objectives of the study, request for participation of the participants, and their email addresses.

An email was sent to the participants containing the link to the Google form. An informed consent stating the objectives of the research, voluntary participation, risk of the study, benefits, confidentiality clause, participant's rights, and responsibilities was presented. Health care workers answered the questionnaire once informed consent was obtained. The self- administered questionnaire took approximately 10-15 minutes. In case of no response, an email was sent to the participant three times at one-week intervals, before he/she was considered as a non-responder.

Data Analysis Plan

Data was analyzed using SPSS. Frequency and percentages were used for categorical variables, while mean and interquartile range were used for numerical data.

The primary outcomes were the association/relationship of sociodemographic factors (age, gender, marital status, financial status, and number of years working in the tertiary government hospital), clinical factors (number of COVID infection, presence of comorbidities, and vaccination status), personal factors (presence of children or elderlies in the family, death of a family member due to COVID), and work-related factors (categories of employees, workspace) with the level of willingness to report to work.

The secondary outcomes were the average level of willingness of healthcare workers (i.e., nursing staff, doctors, and medical technicians) to report to work and proportion of HCWs willing to work during the COVID-19 pandemic in a tertiary government hospital.

Multivariate binomial logistic regression was used to determine the association between patient characteristics and degree of willingness to report to work during the entire COVID-19 pandemic.

Ethical Considerations

The research proposal was reviewed and approved by the UP Manila Research Ethics Board (UPMREB).

RESULTS

There was a total of 311 participants included in the study (Table 1). The median age of the HCWs was 34 (29 - 46) years old, with a median of PhP 50,000 (PhP 30, 0000-PhP 80,000) monthly family income. Most respondents have been working for a median of 5 years (2.04 - 16.50) and the majority have been infected with COVID at least once (N=211).

The cut-off value of willing to report to work was set at 65%. The median rating of the staff on willingness to report to work was 80% (60 - 90), and 73% of respondents were willing to report to work during the entire COVID-19 pandemic.

Among the sociodemographic factors, only gender was significantly associated with willingness to report to work. The odds of willingness to report to work is 60% lower among males compared to females. Other factors such as age, civil status, monthly family income, years of service, and presence of comorbidities showed no association with willingness to report to work (Table 2).

Clinical factors such as vaccination status and number of times a HCW has been infected with COVID were also not associated with willingness to report to work.

Presence of children and elderly in the household, and death of a family member due to COVID showed no relationship with willingness to report to work.

Among the work-related factors, only the type of occupation showed significant association. The odds of willingness to report to work was 78% lower among nurses and 84% lower among residents and fellows compared to medical technologists, radiologic technologists, and respiratory therapists.

Table 1. Baseline Characteristics of Healthcare Workers who were Respondents and Employed from January 2021-January 2022

	N = 311 n (%)
Sociodemographic factors	
Gender	
Male	86 (27.65)
Female	225 (72.35)
Civil Status	
Married and Common Law/Live-in	129 (41.48)
Single, Divorced/Separated/Widowed	182 (58.52)
Presence of Comorbidities	149 (47.91)
Clinical factors	
COVID Infection	
Yes	211 (67.85)
None	100 (32.15)
Times infected with COVID	
1	152 (72.04)
2	48 (22.75)
3	11 (5.21)
Vaccination Status	
Fully vaccinated	303 (97.43)
Partially vaccinated	7 (2.25)
Unvaccinated	1 (0.32)
Personal factors	
Children among household family members	143 (45.98)
Elderly (age >60 years) among household family members	143 (45.98)
Household family member who died from COVID	12 (3.86)
Work-related factors	
Occupation	
Nurse	116 (37.30)
Residents and Fellows	107 (34.41)
Nursing attendant	58 (18.65)
Radiologic/ Medical/ Respiratory technician	30 (9.65)
Workspace	
COVID area	34 (10.93)
Non-COVID area	277 (89.07)

The area of assignment was not significantly associated with degree of willingness to report to work during the COVID-19 pandemic.

DISCUSSION

Gender and type of occupation showed significant association with willingness to report to work. Male healthcare workers were found to be less willing to report to work during the COVID-19 pandemic. On the other hand, nurses, residents, and fellows were less likely to be willing to report to work compared to radiologic technologists, medical technologists, and respiratory technicians.

Traditionally, females are socially responsible in managing household affairs that may hinder them from continuing their job in the face of a complex situation.[1,2] In previous

Table 2. Association of Factors with the Level of Willingness to Report to Work during the COVID-19 Pandemic among Healthcare Workers who were Respondents and Employed from January 2021 to January 2022

	Willing to report N = 226 n (%)	Not willing to report N = 85 n (%)	OR (95% CI)	*p*-value*
Sociodemographic factors				
Age *(in years)*	34 (30 - 46)	34 (30 - 46)	1.02 (0.96 - 1.08)	0.508
Gender				
Male	53 (23.45)	33 (38.82)	0.4 (0.21 - 0.75)	0.005
Female	173 (76.55)	52 (61.18)	Ref	
Civil Status				
Married and Common Law/Live-in	95 (42.04)	34 (40)	1.03 (0.49 - 2.14)	0.942
Single, Divorced/Separated/Widowed	131 (57.96)	51 (60)	Ref	
Estimated monthly family income (in '000 pesos)	50 (30 - 80)	50 (30 - 80)	1 (1 - 1)	0.451
Years worked in PGH	5 (2 - 16)	5 (2 - 16)	0.96 (0.91 - 1.02)	0.190
Presence of Comorbidities	104 (46.02)	45 (52.94)	0.88 (0.5 - 1.55)	0.651
Clinical factors				
Times infected with COVID				
Not infected yet	73 (32.3)	27 (31.76)	Ref	
1 time	108 (47.79)	44 (51.76)	1.02 (0.56 - 1.87)	0.941
2 times	39 (17.26)	9 (10.59)	1.35 (0.55 - 3.31)	0.506
3 times	6 (2.65)	5 (5.88)	0.68 (0.17 - 2.72)	0.583
Vaccination Status				
Fully vaccinated	222 (98.23)	81 (95.29)	3.78 (0.8 - 17.84)	0.093
Partially vaccinated / Unvaccinated	4 (1.77)	4 (4.71)	Ref	
Personal factors				
Children among household family members	103 (45.58)	40 (47.06)	0.79 (0.39 - 1.59)	0.507
Elderly (age >60) among household family members	100 (44.25)	43 (50.59)	0.66 (0.38 - 1.15)	0.145
Household family member who died	9 (3.98)	3 (3.53)	1.18 (0.29 - 4.88)	0.819
Work-related factors				
Occupation				
Nurse	83 (36.73)	33 (38.82)	0.22 (0.06 - 0.88)	0.032
Residents and Fellows	72 (31.86)	35 (41.18)	0.16 (0.04 - 0.63)	0.009
Nursing attendant	44 (19.47)	14 (16.47)	0.28 (0.06 - 1.23)	0.093
Radiologic/ Medical/ Respiratory technician	27 (11.95)	3 (3.53)	Ref	
Workspace				
COVID area	24 (10.62)	10 (11.76)	0.6 (0.24 - 1.49)	0.272
Non-COVID area	202 (89.38)	75 (88.24)	Ref	

**p-value was analyzed using multivariate binomial logistic regression*

studies, it has been observed that females were significantly less likely to work during a pandemic, and for most types of catastrophic events including a pandemic.[2,3] Other studies show that gender is not correlated with willingness to report to work.[5,6] However, this study found that males were less likely than females to be willing to report to work during the entire COVID pandemic. This is congruent with another study which has found that male gender was among the sociodemographic variables found to be strongly associated with unwillingness to report to work.[7]

Age was not found to be correlated with willingness to report to work, which complements the study of Balicer wherein age was not associated with the likelihood of reporting to work in influenza pandemic.[5] However, these findings are inconsistent with another study which found that as age increases, the likelihood of the healthcare workers' willingness to report at work also increases.[6] On the contrary, several studies have shown that younger age was correlated with increased willingness to report to work during a pandemic.[1,8]

It was hypothesized that those with fewer years of experience might not be able to meet the heavy demands of the job requirements and might have feelings of incompetency due to lack of experience in managing these cases. On the other hand, those with longer years of experience are likely to adapt more successfully and respond more effectively. This was compatible with another study wherein healthcare workers with fewer years of service were found to be more likely to leave their jobs.[9]

Ironically, in another study, having an experience of 6-10 years is an independent and significant predictor of unwillingness to report to work.[10] However, in this study, there

was no association between the number of years rendered in service and the willingness to report to work. This supports the study of Ogedegbe in 2012 which showed similar findings.[6]

A previous study showed that healthcare workers who are single were more likely to leave their jobs.[9] A possible explanation for this is that those who are single have a significantly lower perceived resilience compared to those who are in a relationship or married.[11] Moreover, another study showed that married staff reported higher job satisfaction compared to single counterparts amidst the pandemic.[12] A possible explanation for this is that those who are married have a higher likelihood of living with their partners compared to those who are in a relationship, especially in the context of the quarantine restrictions. Living with their partners is advantageous for married HCWs as they have a closer access to social support which is a protective factor for mental health especially during the pandemic.[13] However, these studies were inconsistent with the findings of this study wherein civil status was not significantly correlated with willingness to work.

Income was also not associated with willingness to report to work. This is reflective of previous literature which state that salary is not and is seldom the most important motivating factor.[14-17] On the contrary, health care workers from Pakistan and Mali ranked salary and good pay to be the first and second most important motivating factors.[18,19] However, literature shows that while financial incentives are considered important, it is not sufficient to improve HCW's performance nor prevent them from migrating from rural to urban areas.[19,20] Moreover, concentrating on financial incentives to motivate HCWs may even have a negative outcome. Employees may come to see financial rewards as more important than other forms of recognition such as appreciation by the community. They may also feel conflicted between their values and messages from the public about working for financial gain.[21]

Presence of comorbidities that increases susceptibility to infection and having vulnerable members like children and elderly in the household were cited in previous studies as barriers to willingness to report for duty.[1,3] However, this study showed no association between these factors and willingness to report to work.

Vaccination status was not associated with willingness to report to work. This is contrary to previous findings wherein vaccine was a facilitator of willingness to work and was even the most influential intervention to increase HCWs willingness.[2,22,23]

One study has found that first-line workers or those attending to COVID-19 patients were more willing to accept their work compared to other workers.[24] However, this study found no such association between area of assignment, i.e., COVID and non-COVID area, and willingness to report to work. A possible explanation for this is that there are large differences in the number of respondents from the COVID and non-COVID areas.

Interestingly, results show that nurses, residents, and fellows were less likely to be willing to report to work during the entire COVID-19 pandemic compared to radiologic technologists, medical technologists, and respiratory technicians. This is incongruent with previous studies which show that the type of profession is positively correlated with WTR. For example, physicians were more likely to report to work in a pandemic than nurses.[25] A plausible explanation for this is that radiologic technologists, medical technologists, and respiratory technicians have less patient interaction and are not directly involved in high-risk activities such as intubation and cardiopulmonary resuscitation. These high-risk activities can force HCWs to refrain from performing their duties during an outbreak.[26]

Number of times of COVID infection and death of a family member due to COVID-19 were also not associated with willingness to report to work. There are no studies that have explored these factors, or literature that would support these findings. Critical shortage of HCWs may happen at the peak of COVID-19 surge because of absenteeism due to illnesses concerning self and family, or unwillingness to report to work. In order to better prepare for the next pandemic, there should be estimates of willingness among HCWs and a good grasp of factors that influence it.[27-29] Overall, the result of this study is consistent with the findings of previous research wherein the majority of the HCWs (73%) is willing to report to work during the pandemic.[1,10]

This study revealed that gender and type of occupation are factors associated with willingness to report to work among HCWs in a tertiary government hospital. However, study limitations should be taken into consideration in interpreting the results. First, most of the participants of this study were assigned to non-COVID area, thus their perspective and reality concerning COVID-19 may have been different from those who have a higher risk of exposure. Second, some factors such as specialty of the physicians and daily working hours were not investigated with respect to willingness to report to work.

Future studies may explore other psychosocial and modifiable work-related factors not included in this study. Investigating the possible association of these factors may help in policy development in our institution and promote workforce stability.

CONCLUSION

Factors associated with willingness to report to work are female gender and occupation (radiologic technologists, medical technologists, respiratory technicians). On the contrary, other factors such as age, civil status, monthly family income, years of service, presence of comorbidities, number of COVID infections, vaccination status, presence of children or elderly in the household, death of a family member due to COVID, and workspace were not associated with willingness to report to work. Overall, identifying factors that affect

willingness to report to work can be used to create tailored interventions to support employees, and improve the response to the current and future pandemics.

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Statement of Authorship

Both authors certified fulfillment of ICMJE authorship criteria.

Author Disclosure

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REFERENCES

1. Rafi MA, Hasan MT, Azad DT, Alam SF, Podder V, Hossain S, et al. Willingness to work during initial lockdown due to COVID-19 pandemic: Study based on an online survey among physicians of Bangladesh. PLoS One. 2021 Feb 9;16(2):e0245885. doi: 10.1371/journal.pone.0245885. PMID: 33561180; PMCID: PMC7874948.
2. Damery S, Draper H, Wilson S, Greenfield S, Ives J, Parry J, et al. Healthcare workers' perceptions of the duty to work during an influenza pandemic. J Med Ethics. 2010 Jan;36(1):12-8. doi:10.1136/jme.2009.032821. PMID: 20026687.
3. Qureshi K, Gershon RRM, Sherman MF, Straub T, Gebbie E, McCollum M, et al. Health care workers' ability and willingness to report to duty during catastrophic disasters. J Urban Health. 2005 Sep;82(3):378-88. doi: 10.1093/jurban/jti086. PMID: 16000654; PMCID: PMC3456052.
4. Basta NE, Edwards SE, Schulte J. Assessing public health department employees' willingness to report to work during an influenza pandemic. J Public Health Manag Pract. 2009 Sep-Oct;15(5):375-83. doi: 10.1097/PHH.0b013e3181a391e2. PMID: 19704305.
5. Balicer RD, Omer SB, Barnett DJ, Everly GS Jr. Local public health workers' perceptions toward responding to an influenza pandemic. BMC Public Health. 2006;6:99. doi: 10.1186/1471-2458-6-99.
6. Ogedegbe C, Nyirenda T, Delmoro G, Yamin E, Feldman J. Health care workers and disaster preparedness: barriers to and facilitators of willingness to respond. Int J Emerg Med. 2012 Jun 20;5(1):29. doi:10.1186/1865-1380-5-29. PMID: 22716272; PMCID: PMC3407728.
7. Woyessa AH, Oluma A, Palanichamy T, Kebede B, Abdissa E, Labata BG, et al. Predictors of health-care workers' unwillingness to continue working during the peak of COVID-19 in Western Ethiopia: An extended parallel-process model study. Risk Manag Healthc Policy. 2021 Mar 17;14:1165-73. doi: 10.2147/RMHP.S288003. PMID: 33762859; PMCID: PMC7982702.
8. Park YS, Behrouz-Ghayebi L, Sury JJ. Do shared barriers when reporting to work during an influenza pandemic influence hospital workers' willingness to work? A multilevel framework. Disaster Med Public Health Prep. 2015 Apr9(2):175–85. doi: 10.1017/dmp.2015.4. PMID: 25882124.
9. Alnaeem MM, Hamdan-Mansour AM, Nashwan AJ, Abuatallah A, Al Hussami M. Healthcare providers' intention to leave their jobs during COVID-19 pandemic: A cross-sectional study. Health Sci Rep. 2022 Oct 4;5(6):e859. doi: 10.1002/hsr2.859. PMID: 36226321; PMCID: PMC9531873.
10. Zewudie A, Regasa T, Kebede O, Abebe L, Feyissa D, Ejata F, et al. Healthcare professionals' willingness and preparedness to work during COVID-19 in selected hospitals of Southwest Ethiopia. Risk Manag Healthc Policy. 2021 Feb 3;14:391- 404. doi: 10.2147/RMHP.S289343. PMID: 33568957; PMCID: PMC7868776.
11. Peng J, Wu WH, Doolan G, Choudhury N, Mehta P, Khatun A, et al. Marital status and gender differences as key determinants of COVID-19 impact on wellbeing, job satisfaction and resilience in health care workers and staff working in academia in the UK during the first wave of the pandemic. Front Public Health. 2022 Jun 27:10:928107. doi: 10.3389/fpubh.2022.928107. PMID: 35832284; PMCID: PMC9271694.
12. Thai TT, Le TAT, Truong LTT, Le NH, Huynh QNH, Nguyen TV, et al. Care for the carers: an evaluation of job satisfaction of community healthcare workers in charge of infectious disease prevention and control in Vietnam. Risk Manag Healthc Policy. 2021 Jul 6:14:2831-2839. doi: 10.2147/RMHP. S321314. PMID: 34262370; PMCID: PMC8274705.
13. Muller AE, Hafstad EV, Himmels JPW, Smedslund G, Flottorp S, Stensland SO, et al. The mental health impact of the covid-19 pandemic on healthcare workers, and interventions to help them: a rapid systematic review. Psychiatry Res. 2020 Nov:293:113441. doi: 10.1016/j.psychres.2020.113441. PMID: 32898840; PMCID: PMC7462563.
14. Gibson J, Ivancevich JM, Donnelly JH, Konopaske R. Organization: Behavior, structure and processes,14th ed. New York. NY: McGraw Hill international edition; 2012. p. 177.
15. D'Aunno TA, Fottler MD, O'Connor SJ. Motivating People. In: Shortell SM, Kaluzny AD, eds. Health care management: organization design, and behavior, 4th ed. Albany, NY: Delmar.; 2000. pp. 64-105.
16. Franco LM, Bennett S, Kanfer R, Stubblebine P. Determinants and consequences of health worker motivation in hospitals in Jordan and Georgia. Soc Sci Med. 2004 Jan;58(2):343-55. doi: 10.1016/s0277-9536(03)00203-x. PMID: 14604620.
17. Conant G, Kleiner BH. Human resource management in the health-care industry. Health Manpow Manage. 1998;24(2-3):114-8. doi: 10.1108/09552069810207079. PMID: 10346306.
18. Malik AA, Yamamoto SS, Souares A, Malik Z, Sauerborn R. Motivational determinants among physicians in Lahore, Pakistan. BMC Health Serv Res. 2010 Jul 9:10:201. doi: 10.1186/1472-6963-10-201. PMID: 20618962; PMCID: PMC2910698.
19. Dieleman M, Toonen J, Toure H, Martineau T. The match between motivation and performance management of health sector workers in Mali. Hum Resour Health. 2006 Feb 9:4:2. doi: 10.1186/1478-4491-4-2. PMID: 16469107; PMCID: PMC1402315.
20. Mathauer I, Imhoff I. Health worker motivation in Africa: the role of non-financial incentives and human resource management tools. Hum Resour Health. 2006 Aug 29:4:24. doi: 10.1186/1478-4491-4-24. PMID: 16939644; PMCID: PMC1592506.
21. Giacomini M, Hurley J, Lomas J, Bjhatia V, Goldsmith L. The Many Meanings of Money: A Health Policy Analysis Framework for Understanding Financial Incentives. Center for Health Economics and Policy Analysis Working Paper 96-6. Hamilton: McMaster University; 1996.

22. Valdez CD, Nichols TW. Motivating healthcare workers to work during a crisis: a literature review. J Manag Policy Pract. 2013;14(4):43-51.
23. Murray EJ, Mason M, Sparke V, Zimmerman PP. Factors influencing health care workers' willingness to respond to duty during infectious disease outbreaks and bioterrorist events: an integrative review. Prehosp Disaster Med. 2021 Jun;36(3):321-37. doi: 10.1017/S1049023X21000248. PMID: 33618789; PMCID: PMC7948100.
24. Jang Y, You M, Lee S, Lee W. Factors associated with the work intention of hospital workers in South Korea during the early stages of the COVID-19 outbreak. Disaster Med Public Health Prep. 2021 Jun;15(3):e23-e30. doi: 10.1017/dmp.2020.221. PMID: 32580818; PMCID: PMC7542316.
25. Irvin CB, Cindrich L, Patterson W, Southall A. Survey of hospital healthcare personnel response during a potential avian influenza pandemic: will they come to work? Prehosp Disaster Med. 2008 Jul-Aug;23(4):328-35. doi:10.1017/s1049023x00005963. PMID: 18935947.
26. Serrano-Ripoll MJ, Meneses-Echavez JF, Ricci-Cabello I, Fraile-Navarro D, Fiol-deRoque MA, Pastor-Moreno G, et al. Impact of viral epidemic outbreaks on mental health of healthcare workers: a rapid systematic review and meta-analysis. J Affect Disord. 2020 Dec 1;277:347-57. doi: 10.1016/j.jad.2020.08.034. PMID: 32861835; PMCID: PMC7443314.
27. World Health Organization. Special programme for research, training in tropical diseases. Epidemic, Pandemic Alert. Dengue: Guidelines for Diagnosis, Treatment, Prevention and Control [Internet]. World Health Organization; 2009:1–147. [cited 2022 Sep]. Available from: https://apps.who.int/iris/handle/10665/44188
28. Nap RE, Andriessen MPHM, Meessen NEL, van der Werf TS. Pandemic influenza and hospital resources. Emerg Infect Dis. 2007 Nov;13(11):1714-9. doi:10.3201/eid1311.070103. PMID: 18217556; PMCID: PMC3375786.
29. AlSaif HI, AlDhayan AZ, Alosaimi MM, Alanazi AZ, Alamri MN, Alshehri BA, et al. Willingness and self-perceived competence of final-year medical students to work as part of the healthcare workforce during the COVID-19 pandemic. Int J Gen Med. 2020 Sep 18;13:653-61. doi: 10.2147/IJGM.S272316. PMID: 32982382; PMCID: PMC7509315.