

The Impact of Using Personal Protective Equipment on the Decisions and Performance of Healthcare Practitioners

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Abstract: During the pandemic conditions, in order to reduce exposure to risks that can result in serious illnesses or infections at work, personal protection equipment is worn. These illnesses and injuries could be brought on by exposure to workplace risks such as chemical, radioactive, physical, electrical, or mechanical ones. These personal protective devices must be made in a way that is both safe to use and reliable to maintain. It needs to be snug, promoting worker utilization. In this study, we primarily examined the perceptions and experiences of healthcare practitioners at the Specialized Dental Center in Hafar Al-Batin regarding the use of personal protective equipment (PPE). While we did not extensively explore the long-term impact of prolonged PPE use on practitioners' performance, we did uncover several noteworthy findings. This study underscores the importance of further research to objectively assess the long-term effects of prolonged PPE use on healthcare practitioners' performance. Additionally, it highlights the need for ongoing efforts to enhance the design and usability of personal protective equipment, particularly during extended epidemics. The study adopted a descriptive approach, incorporating a questionnaire and a review of relevant literature and resources from both Arab and international university libraries, alongside the insights of participants from the Specialized Dental Center in Hafar Al-Batin. **Aim:** Assess the long-term effects of prolonged PPE use on healthcare practitioners' performance. Additionally, it highlights the need for ongoing efforts to enhance the design and usability of personal protective equipment, particularly during extended epidemics. **Material and Methods:** Members of the Office of Director of Dentistry in Hafar Al-Batin visited Hafar Al-Batin, a specialized dental center and conducted an electronic-based survey. All the health practitioners working in the dental center were asked to fill a questionnaire. The questionnaire elicited information regarding personal details, knowledge, approach and awareness towards PPE and perceptions and experiences regarding the use of personal protective equipment (PPE). While we did not extensively explore the long-term impact of prolonged PPE use on practitioners' performance. A total of 57 responses were collected, and their results analyzed. **Results:** The sample consisted of 57 healthcare personnel at the Specialized Dental Center in Hafar Al-Batin, Saudi Arabia. Among them, 56.1% were males, and 43.9% were females. Their ages ranged from 20 to 55 years, with the majority falling between 25 and 39 years (74.9%). The distribution of positions among them was as follows: dental assistants (31.6%), dental hygienists (24.6%), resident doctors (19.3%), and oral health and dental health professionals (10.5%). Other positions accounted for less than (10%). This study highlights the inadequate knowledge among healthcare practitioners regarding personal protective equipment (PPE). Despite weak knowledge, the study revealed a positive and reassuring attitude, beliefs, and commitment among healthcare practitioners toward PPE. However, the use of PPE had a negative impact on healthcare practitioners' overall comfort, including visibility and visual field issues, as well as communication with colleagues and patients. Fortunately, clinical skills and decision-making remained largely unaffected. **Conclusion:** This study sheds light on the insufficient knowledge among healthcare practitioners regarding personal protective equipment (PPE). Despite this knowledge gap, healthcare practitioners displayed a positive and reassuring attitude, beliefs, and commitment toward PPE. However, the use of PPE had negative implications for the overall comfort of healthcare practitioners, leading to visibility and visual field issues, as well as difficulties in communication with colleagues and patients. Fortunately, the impact on clinical skills and decision-making was minimal. To address these challenges and obstacles, it is crucial to enhance the quality of protective suits by employing lightweight and well-fitting designs. Furthermore, the integration of PPE with cooling and ventilation mechanisms can be advantageous. Visibility issues can be mitigated through the utilization of anti-fog masks and anti-glare accessories. Additionally, electronic devices like wireless headphones can help overcome communication difficulties.

Keywords: COVID 19, healthcare practitioners, personal protective equipment, PPE

1. Introduction

In March 2020, the WHO declared COVID-19, resulting from SARS-CoV-2, an endemic. Considering that Saudi Arabia has carried out strategies to decrease preparedness, especially in healthcare. The Ministry of Health reported the primary COVID-19 case in March 2020 and established specialized protocols. Healthcare practitioners had been

required to put on PPE continuously, regardless of patient reputation, to shield each practitioner and sufferers. Workshops skilled healthcare workers in contamination control and PPE use, with ongoing protocol revisions.¹

Healthcare practitioners are crucial to healthcare offerings and have to be covered from occupational risks. Occupational fitness and safety applications need to be

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bigger for all workers, patients, site visitors, and the community. Providing and mandating PPE use in healthcare is essential to prevent infection and occupational incidents. Complete PPE insurance gives higher protection.²

The healthcare sector poses precise challenges due to numerous employees, complicated roles, and stressful conditions, including infectious disease risks. Healthcare establishments mitigate these demanding situations by using supplying PPE and education. This complements healthcare people's behavior and overall performance, improving place of job safety and average healthcare group performance.³

In Hafar Al-Batin, a specialized dental center operates with an extended shift system, and studies show varying compliance with PPE usage among healthcare practitioners. Compliance is crucial for preventing infections and workplace contamination.

While some studies discuss the drawbacks of prolonged PPE use, such as psychological impact like headaches and anxiety, few have specifically addressed its impact on healthcare practitioners' performance. Further research is needed to comprehensively evaluate these effects. Moreover, improving PPE, especially during prolonged pandemics, should be a priority.

2. Material and Methods

Primary sources were used for data collection, represented by the questionnaire. A ready-made questionnaire was obtained from a researcher affiliated with the University of Benin in Nigeria after corresponding with and obtaining their approval, with additional items added. The internal consistency method, which demonstrates the relationship between the items and the study's scale, was tested. The

instrument achieved a reliability coefficient using Cronbach's alpha of 0.82, with correlation coefficients ranging from 0.66 to 0.34, all statistically significant at a level of less than 0.01. These results confirm that the scale possesses excellent psychometric properties, allowing for its use with confidence and trust in the obtained results.

The study was conducted on healthcare practitioners at the Specialized Dental Center in Hafar Al-Batin.

Spatial Boundaries: Specialized Dental Center in Hafar Al-Batin.

Temporal Boundaries: The study's timeline encompassed the period during which the fieldwork was conducted, including the distribution of the questionnaire, data retrieval, and obtaining results, ranging from late second quarter 2023.

Human Boundaries: The questionnaire was distributed to healthcare practitioners at the Specialized Dental Center in Hafar Al-Batin.

3. Results

The sample consisted of 57 healthcare personnel at the Specialized Dental Center in Hafar Al-Batin, Saudi Arabia. Among them, 56.1% were males, and 43.9% were females. Their ages ranged from 20 to 55 years, with the majority falling between 25 and 39 years (74.9%). The distribution of positions among them was as follows: dental assistants (31.6%), dental hygienists (24.6%), resident doctors (19.3%), and oral health and dental health professionals (10.5%). Other positions accounted for less than (10 %).

First: General knowledge of healthy practitioners towards personal protection equipment:-

Table 1

Statistical significance	Chi-square	Percentages	Duplicate	Questionnaire	
0.000	35.52	89.5	51	Yes	Have you heard of personal protective equipment before?
		10.5	6	No	
0.000	35.52	89.5	51	Yes	Do you know what personal protective equipment is?
		10.5	6	May be	
0.001	16.05	24.6	14	1-2	How many types of personal protective equipment do you know?
		21.1	12	3-4	
		45.6	26	5-8	
		8.8	5	More than 8	
0.000	42.30	1.8	1	two	How many levels of protection do I have to use personal protective equipment?
		10.5	6	Three	
		29.8	17	Four	
		57.9	33	Other	
0.000	32.44	87.7	50	Yes	Do you know what personal equipment is used for?
		12.3	7	May be	
0.000	71.16	86.0	49	Yes	Do you know if medical gloves protect you from all kinds of pathogens?
		8.8	5	May be	
		5.3	3	No	
* Statistically D at (0.05) ** D statistically at (0.01) ***Statistically D at (0.001)					

Second: Training on personal protection means:

Table 2

Statistical significance	Chi-square	Percentages	Duplicate	Questionnaire	
< 0.001	27.59	86.0	49	Yes	Have you received training in the use of personal protective equipment?
		14.0	8	No	
< 0.001	14.00	26.3	15	less than three months ago	How long has this been training?
		17.5	10	three to six months ago	
		56.1	32	more than six months ago	
0.000	73.42	56.1	32	On-the-job training	How did you train?
		22.8	13	Training through social media platforms	
		8.8	5	Personal (self-training)	
		7.0	4	Study Lectures	
		3.5	2	Distance Training	
		7.0	4	Study Lectures	
		1.8	1	Other	

Third: Different aspects of a health practitioner's performance while using personal protective equipment:

Table 3

Chi-square	Percentages	Duplicate	Questionnaire	
<0.0001*	71.9	41	Yes	Do you feel comfortable wearing personal protective equipment?
	19.3	11	Sometimes	
	8.77	5	No	
<0.0001*	47.2	27	Blurry vision (glasses)	Do you suffer from quality vision while wearing personal protective equipment?
	26.3	15	Affected field of vision and blurry vision	
	7.02	4	Affected field of view	
	14.04	8	Sometimes	
	5.26	3	No effect	
<0.0001*	59.7	34	Yes	Do you have communication problems while wearing personal protective equipment?
	22.8	13	Sometimes	
	17.5	10	No	
<0.0001*	26.32	15	Yes	Do you have problems handling tools while wearing personal protective equipment?
	12.28	7	Sometimes	
	60.5	35	No	
0.495	29.8	17	Yes	Do you have touch problems while wearing personal protective equipment?
	31.6	18	Sometimes	
	38.6	22	No	
<0.0001*	8.77	5	Yes	Do you have problems making decisions while wearing personal protective equipment?
	17.5	10	Sometimes	
	73.68	42	No	
<0.0001*	0	0	Reduce	Post-procedure complications while wearing personal protective equipment?
	91.23	52	No change	
	8.77	5	Increases	

4. Discussion

Health practitioners' knowledge, behavior and opinions are of paramount importance to prevent and successfully contain work environment risks.

Table 1:

The study revealed a decline in the healthcare practitioners' knowledge of the standard criteria related to personal protective equipment (PPE). It was found that 45.6% of the sample mentioned that there are 5 to 8 types of PPE, with statistical significance (p=0.001). Only 30% were aware of the number of protection levels associated with PPE. This result is consistent with previous studies in the field, such as Adoimi et al. (2020), which showed a decrease in healthcare practitioners' knowledge of the standard criteria related to PPE, as well as Wang et al. (2020) and Aqou et al. (2016).

The overall low knowledge among healthcare practitioners

regarding personal protective equipment increases their susceptibility to infection in the workplace, turning them into potential carriers of diseases and epidemics that pose a risk to them, their patients, and the community as a whole.

Table 2 :

The results showed that 86% of healthcare practitioners received training on the use of personal protective equipment (PPE). However, 56% of these healthcare practitioners received training more than six months ago, and the training was not through specialized programs; instead, it occurred during their regular work. This indicates a deficiency in the training aspect for healthcare practitioners regarding the use and knowledge of personal protective equipment (PPE). This deficiency may explain the overall low knowledge among healthcare practitioners about PPE and increases the likelihood of their exposure to infections in the workplace.

Table 3 :

In this part of the study, various aspects related to the prolonged use of personal protective equipment (PPE) by healthcare practitioners during the COVID-19 pandemic were explored, including their performance and decision-making. This section of the questionnaire aimed to understand the different factors that could impact the performance of healthcare practitioners, both technical and non-technical skills, as well as decision-making.

The results revealed a significant negative impact of wearing PPE on non-technical skills:

- Regarding the performance of healthcare practitioners, a large number of participants reported a negative effect on their overall comfort (91.2%, $P < 0.0001$).
- Their vision was affected, either by fogging or visual field impairment (94.56%, $P < 0.0001$).
- Communication with colleagues or patients was also negatively affected (82.5%, $P < 0.0001$).

However, technical skills and decision-making were not significantly affected by the use of PPE:

- Handling of tools was not significantly affected by wearing PPE (60.5%, $P < 0.0001$), and no statistically significant differences were observed in tactile movements.
- Similarly, the decision-making process was not significantly affected by wearing PPE (73.68%, $P < 0.0001$).

Nevertheless, some participants expressed a preference for conservative treatments over surgical interventions, harm reduction procedures over definitive procedures, or postponing all non-emergency procedures. Additionally, 91.23% of participants reported no significant changes in postoperative complications when performing surgical or therapeutic interventions while wearing PPE.

5. Conclusion

This study sheds light on the insufficient knowledge among healthcare practitioners regarding personal protective equipment (PPE). Despite this knowledge gap, healthcare practitioners displayed a positive and reassuring attitude, beliefs, and commitment toward PPE.

However, the use of PPE had negative implications for the overall comfort of healthcare practitioners, leading to visibility and visual field issues, as well as difficulties in communication with colleagues and patients. Fortunately, the impact on clinical skills and decision-making was minimal.

To address these challenges and obstacles, it is crucial to enhance the quality of protective suits by employing lightweight and well-fitting designs. Furthermore, the integration of PPE with cooling and ventilation mechanisms can be advantageous. Visibility issues can be mitigated through the utilization of anti-fog masks and anti-glare accessories. Additionally, electronic devices like wireless headphones can help overcome communication difficulties.

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