

Operator Comfortability while Working with PPE Kits, Among the Dental Practitioners of Bangalore and Tumkur

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Abstract:-

➤ Aim:

To evaluate the operator comfortability, while working with PPE kits, among the dental professionals of Bangalore and Tumkur.

➤ Materials and Methods:

The survey was prepared on an online survey portal (Google Docs). A total of 385 participants were included in the study, practising dentistry in the geographic area of Bangalore and Tumkur. The link was circulated through social media and e-mail among the Dental Professionals of Bangalore and Tumkur via smart phones. The responses were recorded. The data was collected, coded and fed in the SPSS (IBM version 23) and statistically analysed.

➤ Results:

Regarding the comfortability, while working with PPE kits, 66.1% of the operators feel moderately comfortable, 22% of them feel uncomfortable and 11.9% of them feel very comfortable.

➤ Conclusion:

As evident by the results of the current survey, most of the dental practitioners are uncomfortable while working with the PPE kits. Hence, measures should be taken to improve on these grounds.

Keywords:- COVID 19, PPE Kits, Infectious Diseases, Dentistry.

I. INTRODUCTION

Dentistry is one of the specialties in health care that deals elaborately with body fluids like saliva, blood, and gingival crevicular fluid. Frequent exposure to infectious agents presents a major risk for dentists. Personal protective equipment helps guard against these infections. These equipments are designed in a way, such that they block the portal of entry of microbes during contact with such infected fluids¹

In late 2019 and early 2020, a new deadly disease called Coronavirus Disease 2019 (COVID19) has been reported from China and Southeast Asia and spread over the entire world in a short span of time. Owing to the nature of dental treatment, there's a production of aerosols and splatters, during the procedures, which may contain massive amounts of saliva or blood from patients and thus carry the risk of large-scale transmission of the virus.² Therefore, with the onset of COVID 19, need for the PPE kits has been enhanced more than ever.

One of the main disadvantages is the discomfort experienced, while operating with PPE kits. In addition to reduced tactile sensitivity and impaired visibility, users have also found verbal communication difficult while wearing the PPE.²

Therefore, the purpose of this study was to evaluate the operator comfortability, while working with PPE kits, among the dental professionals of Bangalore and Tumkur.

II. MATERIALS AND METHODS

The survey was prepared on an online survey portal (Google Docs). A total of 385 participants were included in the study, practising dentistry in the geographic area of Bangalore and Tumkur. The sample size was calculated using the Cochran formula, with the p value set at 0.5, confidence level at 0.95, Z value associated with confidence at 1.96, and absolute precision at 0.05. Substituting these values, a sample size of 385 participants was obtained. The survey was prepared on an online survey portal (Google Docs). The link was circulated through social media and e-mail among the Dental Professionals of Bangalore and Tumkur via smart phones. The survey included a total of 17 questions, divided in 3 sections:

- Personal characteristics (question 1-3)
- Operator comfortability (question 4-12)
- Operative hindrance (question 13-17)

The responses were recorded. The data was collected, coded and fed in the SPSS (IBM version 23) and statistically analysed.

III. RESULTS

A total of 385 responses were collected through web link. Their characteristics and a summary of their responses to the survey questions are listed in table no. 1,2 and 3.

Table 1 Personal Characteristics

S. No.	Personal Characteristics	Level	Percentage
1.	Gender	Male	46.5%
		Female	52.2%
		Prefer not to say	1.3%
2.	Age	18-21 years	9.8%
		22-25 years	36.9%
		26-30 years	35.1%
		Above 30 years	18.3%
3.	Profession	General dentist	53.7%
		Professional dentist	46.3%

Table 2 Operator Comfortability

S. No.	Operator Comfortability	Level	Percentage
4.	Which type of PPE do you use?	Disposable	62%
		Sterilisable/autoclavable	38%
5.	Which type do you feel, is more comfortable to operate with?	Disposable	70.5%
		Sterilisable	29.5%
6.	How comfortable do you feel, while working with PPE kits?	Very comfortable	11.9%
		Moderately comfortable	66.1%
		Uncomfortable	22%
7.	Which type of gloves do you use?	Latex gloves	70.4%
		Nitrile gloves	23.5%
		Heat resistant gloves	1.6%
		Plastic gloves	4.5%
8.	Which type of eye protective equipment do you use?	Face shield	66.1%
		Protective eyewear (goggles)	33.9%
9.	Which part of PPE kit makes you feel most uncomfortable?	Head covers	5.7%
		Eye protectors (goggles)	4.7%
		Face shields	6.3%
		Respirators	12.8%
		Gowns	4.2%
		Gloves	0%
		Shoe covers	1.6%
		All of the above	64.8%
10.	Does the PPE hamper your mobility?	Yes, always	52.9%
		No, never	3.9%
		Sometimes	43.2%
11.	Do you think available PPE gowns, fit you comfortably enough, to operate without restriction?	Yes	48.3%
		No	25.8%
		Maybe	25.8%
12.	Does the PPE kit make you feel breathless/suffocates you?	Yes	68.8%
		No	2.9%
		Sometimes	28.3%

Table 3 Operative Hinderance

S. No.	Operative Hinderance	Level	Percentage
13.	Does working with face shields, hamper visibility of operating field?	Yes	70.7%
		No	2.3%
		Sometimes	26.9%
14.	Do you face the issue of protective goggles getting fogged up?	Yes	76.9%
		No	3.4%
		Sometimes	19.7%
15.	Do you think operating time is increased, when using PPE?	Yes	72.5%
		No	3.4%
		Sometimes	24.2%
16.(a)	Does the use of PPE kits affect the quality of your work/manual dexterity	Yes	69.8%
		No	4.2%
		Sometimes	26%
16.(b)	If yes, to what extent does it affect	Mildly affected	13.9%
		Moderately affected	53.3%
		Severely affected	30.4%
		Not affected at all	2.4%
17.	While using PPE kit, do you think, it becomes difficult to have a proper communication with your patient	Yes	79.2%
		No	2.6%
		Sometimes	18.2%

Out of a total of 385 respondents, 46.5% were males, 52.2% were females and the remaining 1.3% preferred not to say (fig 1), and 9.8% of them, fell under the age group of 18-21 years, 36.9% under 22-25 years, 35.1% under 26-30 years and 18.3% were above 30 years of age (fig 2). 53.7% respondents were general dentists and 46.3% of them were specialist dentists (fig 3). When questioned regarding the type of PPE they use, 38% respondents reported the use of sterilisable/autoclavable PPE, whereas the other 62% use disposable PPE (fig 4). 70.5% respondents feel comfortable to work with disposable PPE kits, while 29.5% of them feel comfortable to work with the sterilisable/autoclavable ones (fig 5). Regarding the comfortability, while working with PPE kits, 66.1% of the operators feel moderately comfortable, 22% of them feel uncomfortable and 11.9% of them feel very comfortable (fig 6). 70.4% of respondents use latex gloves, 23.4% of them use nitrile gloves, 1.6% of them use heat resistant gloves and 4.7% of them use the plastic gloves (fig 7). Regarding the type of eye protective equipment, 66.1% operators, reported the use of face shields, and 33.9% of them use protective eyewear (goggles) (fig 8). When questioned regarding the part of the PPE that makes them feel the most uncomfortable, 64.8% of the respondents, feel uncomfortable with all of the parts of the PPE, 12.8% of them feel it's the respirator that makes them feel most uncomfortable, 6.3% of them feel it's the face shield, 5.7% feel it's the headcover, 4.7% feel it's the eye protectors, 4.2% of them feel it's the gown, and 1.6% feel it's the shoe cover (fig 9). 52.9% operators responded that the PPE always hampers their mobility while working, 43.2% of them responded, that the PPE hampers their mobility sometimes and 3.9% of them feel that the PPE never hampers their mobility while working (fig 10). 48.3% of the respondents think the available PPE gowns, fit them

comfortably enough to operate without restriction, whereas 25.8% of them felt it doesn't fit them well enough to operate without restriction and 25.8% of them were doubtful about the fit of the PPE (fig 11). When asked whether the PPE kit makes them feel breathless/suffocated, 68.8% of them responded yes, 28.3% responded sometimes and 3.9% of them responded with a no (fig 12). 70.7% of the operators face the issue of visibility of the operating field being hampered, while working with face shields, 26.9% of them feel it hampers the visibility sometimes and 2.3% of them don't face the issue of visibility being hampered by the use of face shields (fig 13). When questioned regarding the fogging up of the protective goggles, 76.9% of them face the issue of glasses getting fogged up, 19.7% of them face this issue sometimes and 2.3% do not face this issue (fig 14). 72.5% of respondents feel the operating time is increased, while using PPE, 24.2% of them feel it increases the operating time sometimes and 3.4% of them feel it doesn't affect the operating time (fig 15). 69.8% of operators felt that the PPE kits affect the quality of their work/manual dexterity, 26% of them felt, it affects sometimes and 3.4% of them felt it doesn't affect the manual dexterity (fig 16a), also, 53.3% of them responded that it moderately affects the manual dexterity, 30.4% of them, responded that manual dexterity is severely affected, 13.9% of them feel it's mildly affected and 2.4% of them felt it's not affected at all (fig 16b). Lastly, when questioned regarding the patient communication while working with PPE kits, 79.2% of them responded that the PPE kits do not enable them to have a proper communication with their patients, 18.2% of them responded that it affects the communication sometimes and 2.6% of them responded that it doesn't affect the communication at all (fig 17).

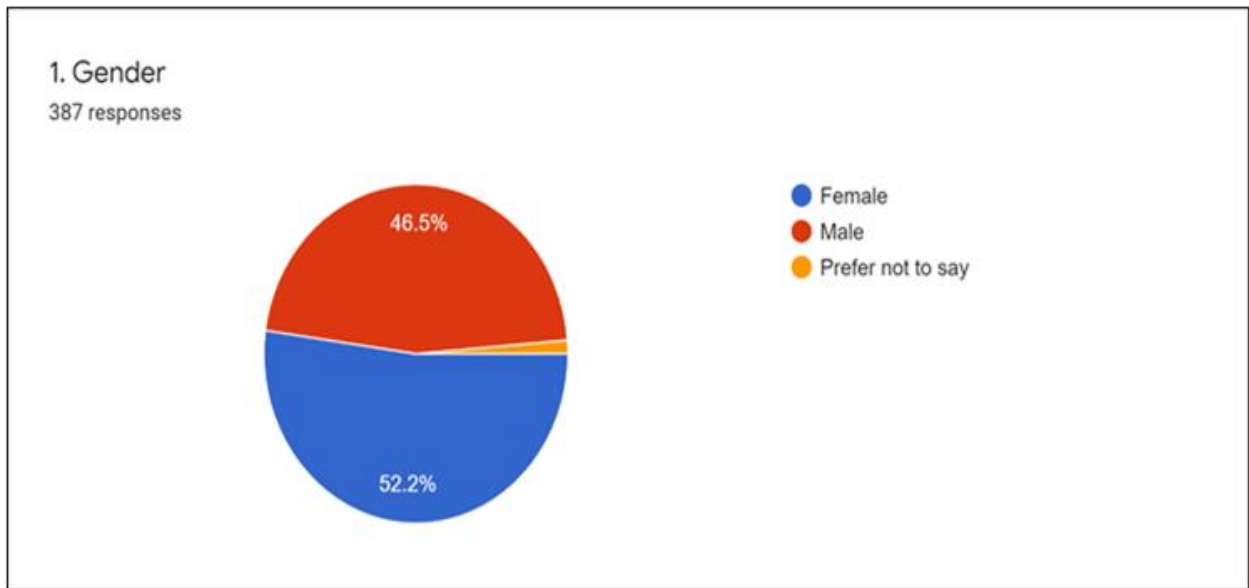


Fig 1 Gender

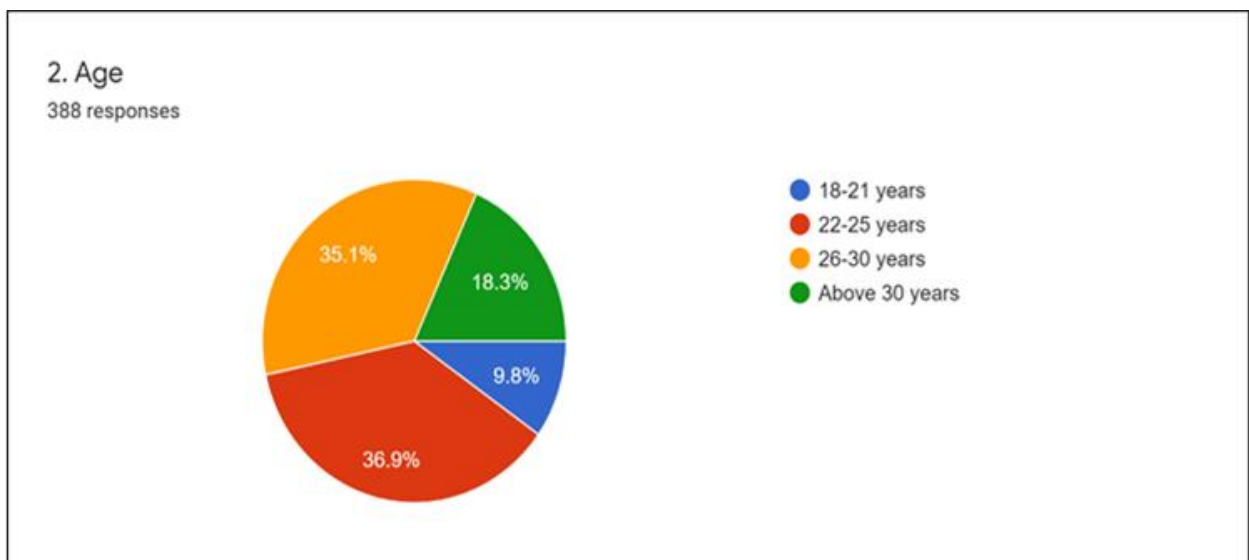


Fig 2 Age

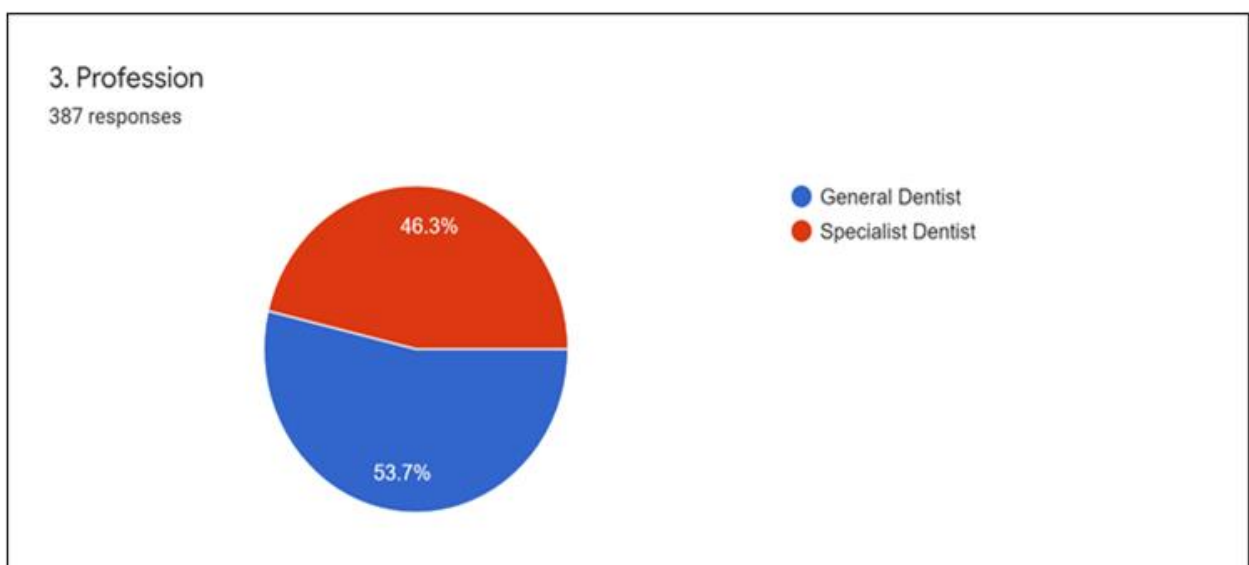


Fig 3 Profession

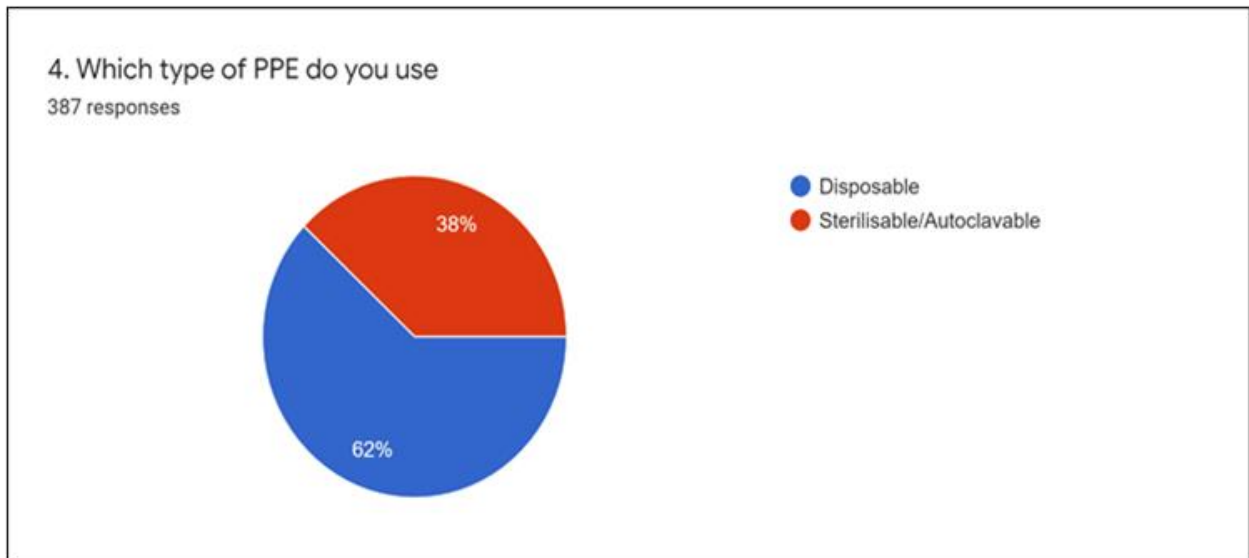


Fig 4 Wich type of PPE

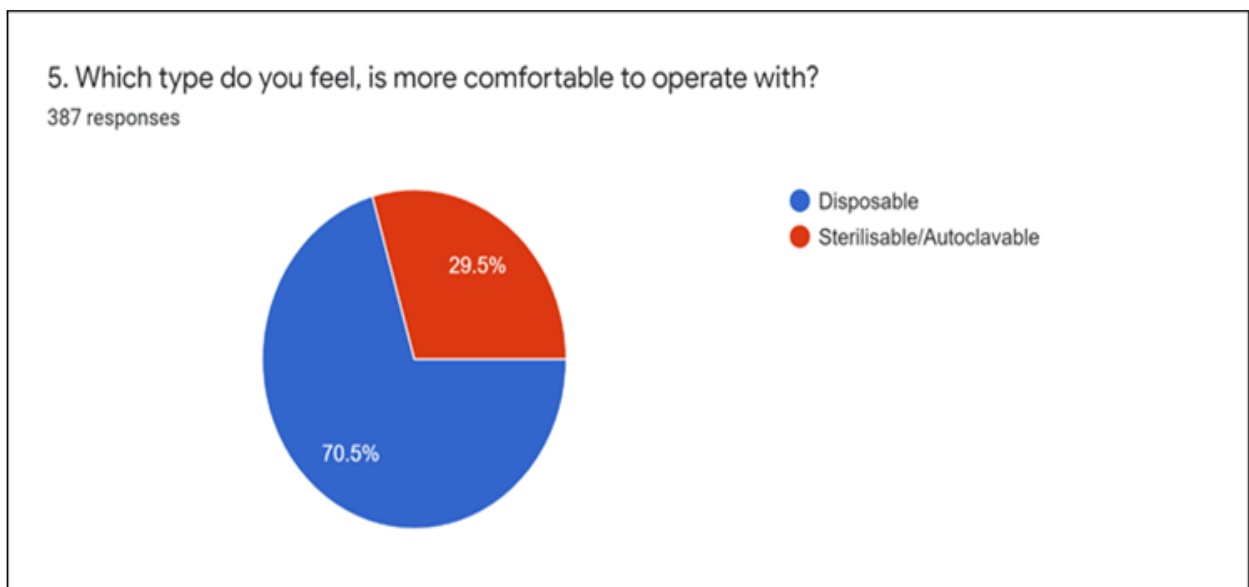


Fig 5 Which type do you feel, is more Comfortable to Operate

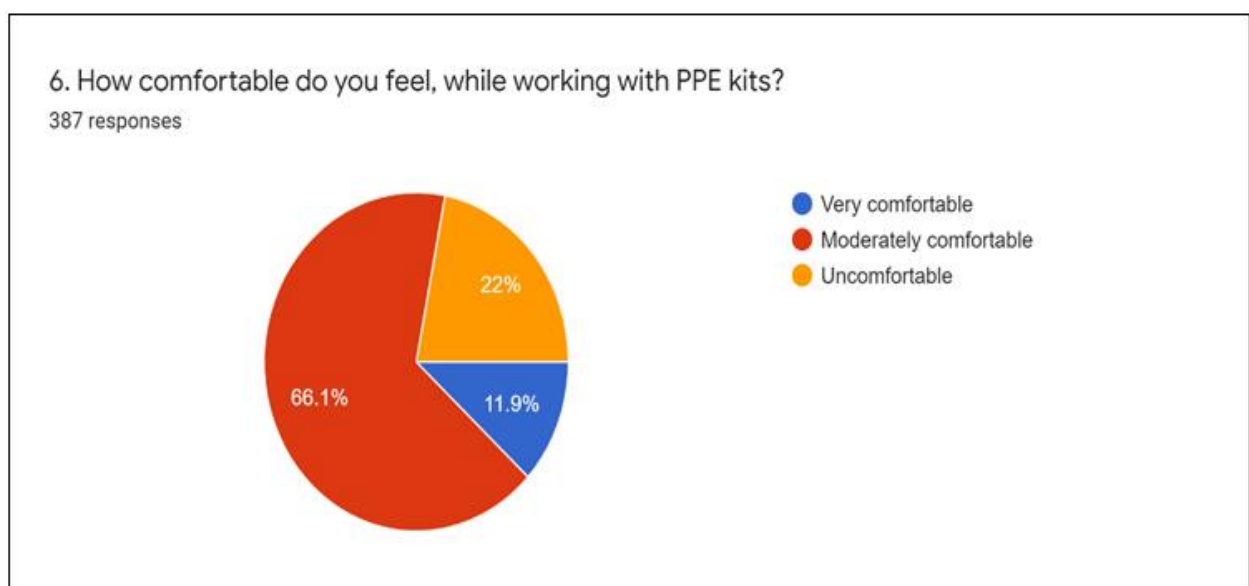


Fig 6 How Comfortable do you Feel, while Working with PPE Kits

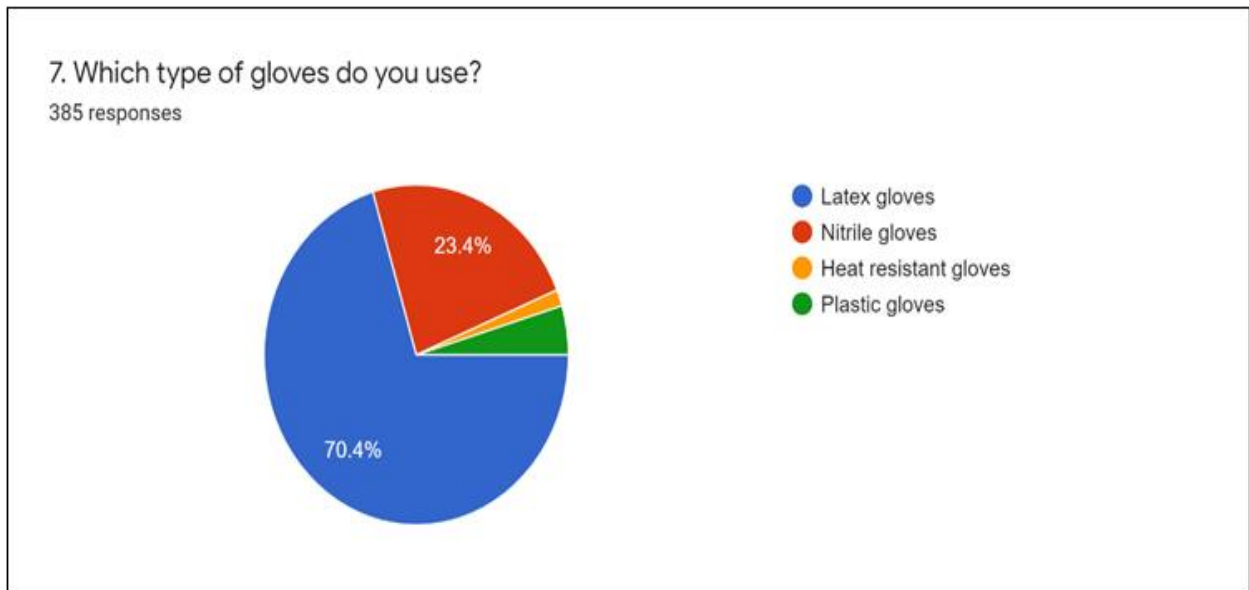


Fig 7 Which type of Gloves

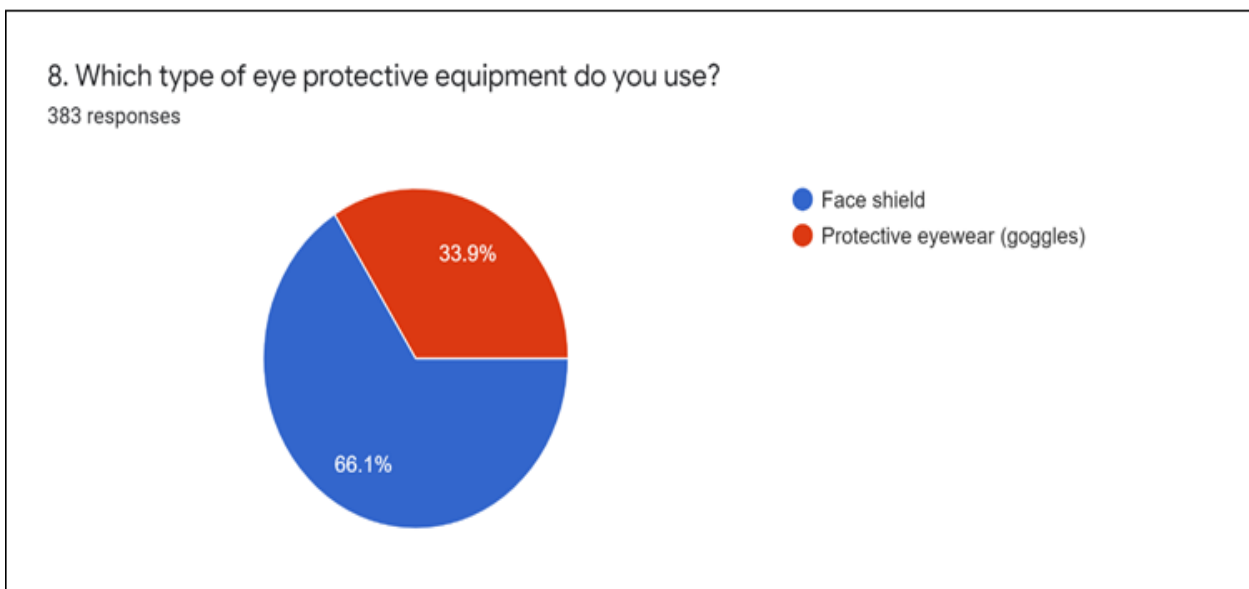


Fig 8 Which type of Eye Protective Equipment

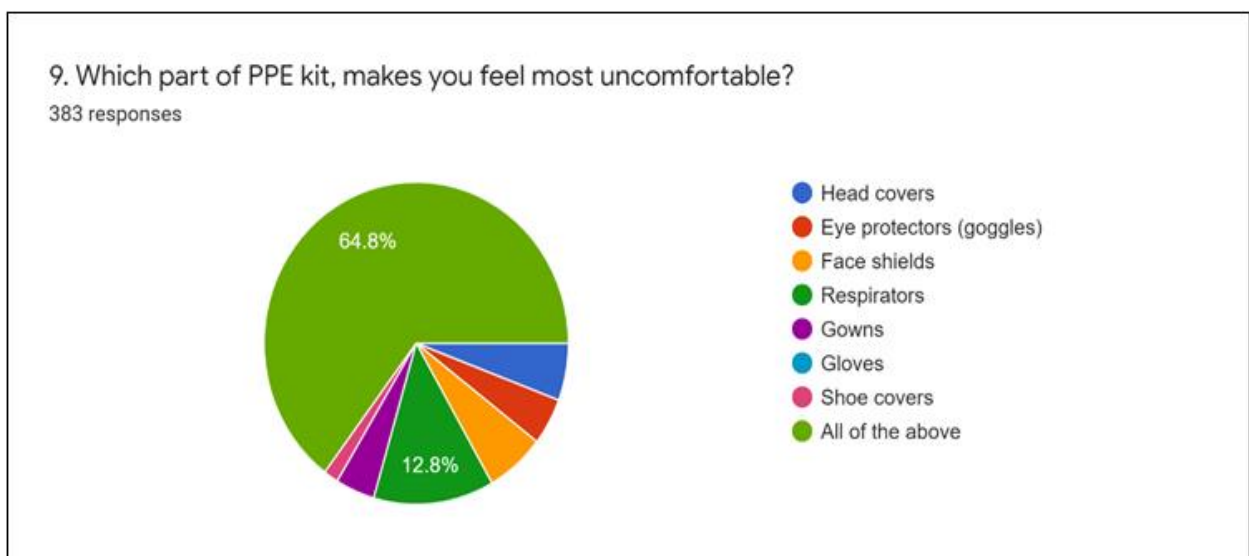


Fig 9 Which part of PPE Kit, Makes you Feel Most Uncomfortable

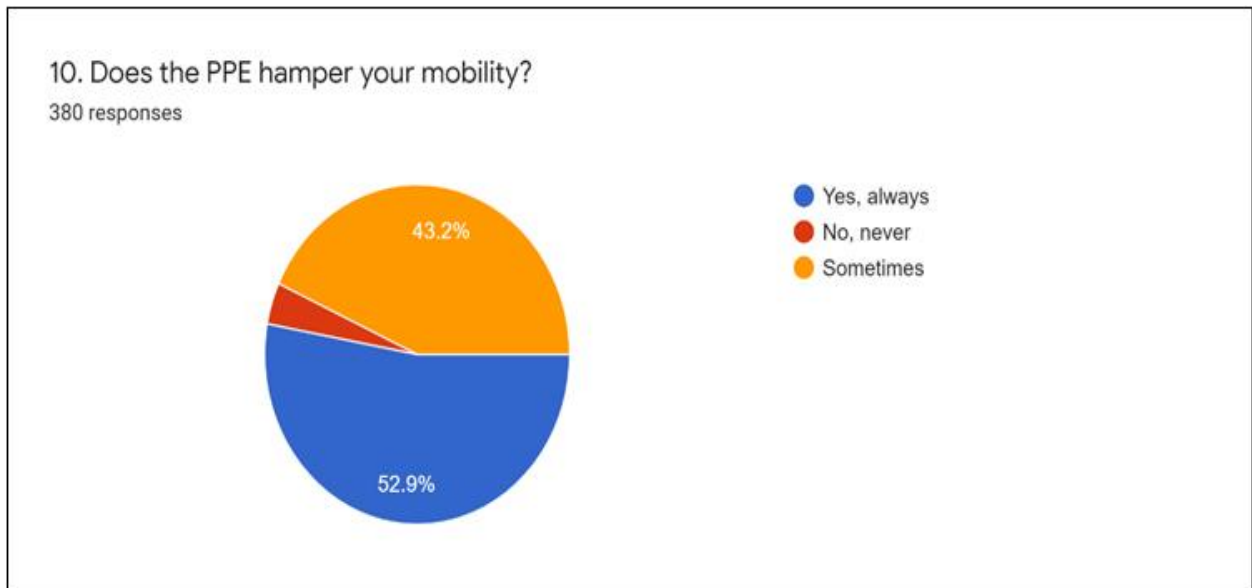


Fig 10 Does the PPE Hamper your Mobility

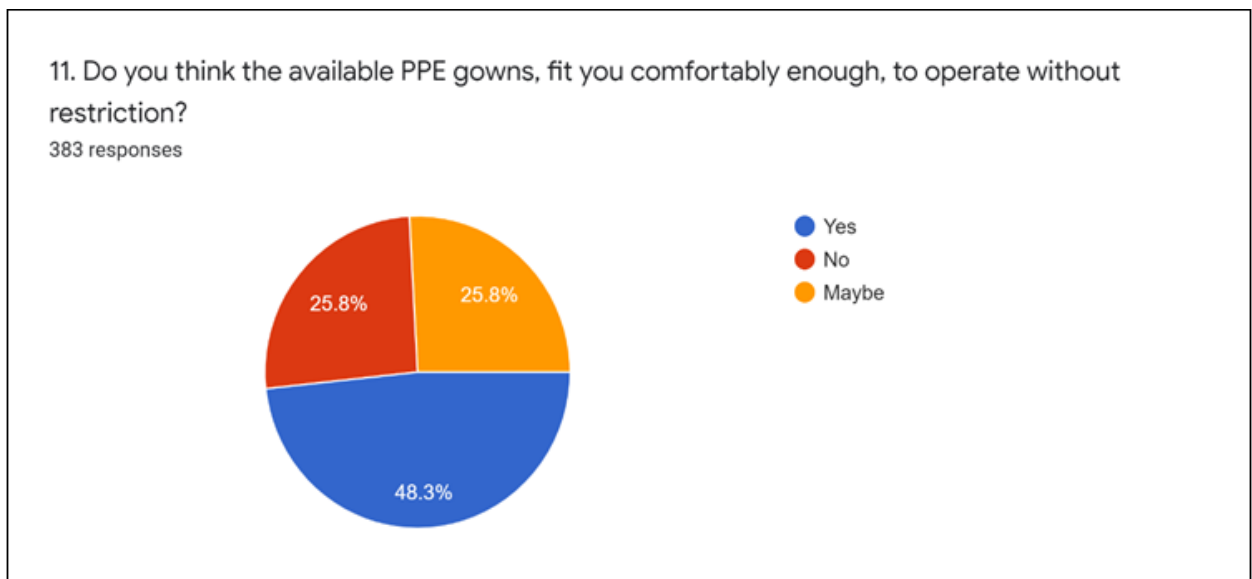


Fig 11 Do you Think the Available PPE Gowns, Fit you Comfortable Enough Without Restriction

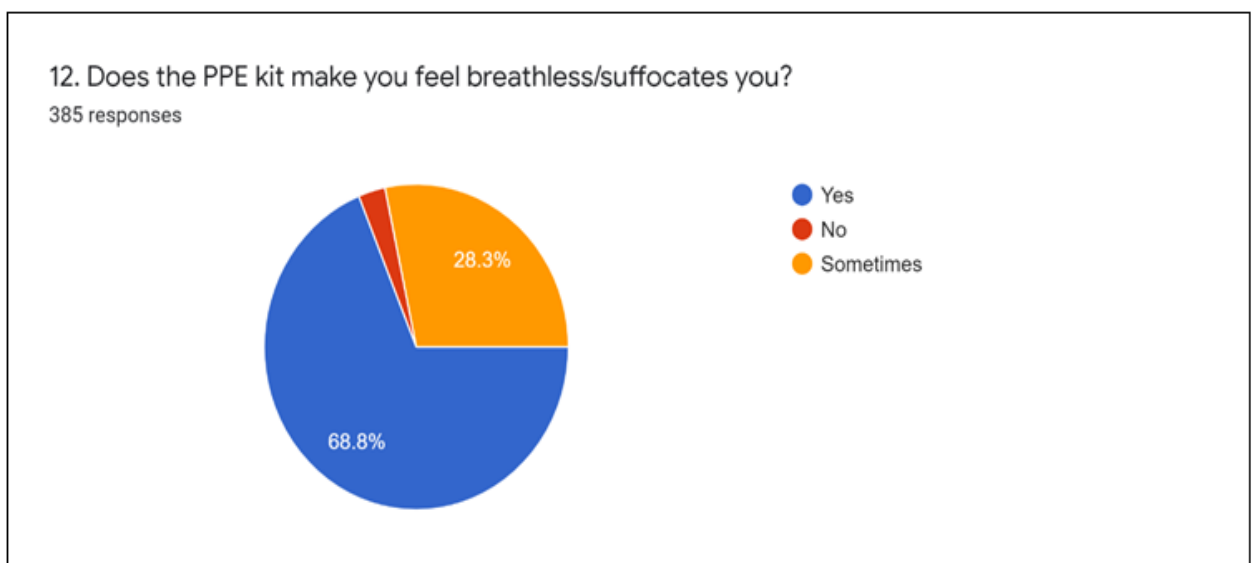


Fig 12 Does the PPE Kit Make you Feel Breathless/Suffocates you

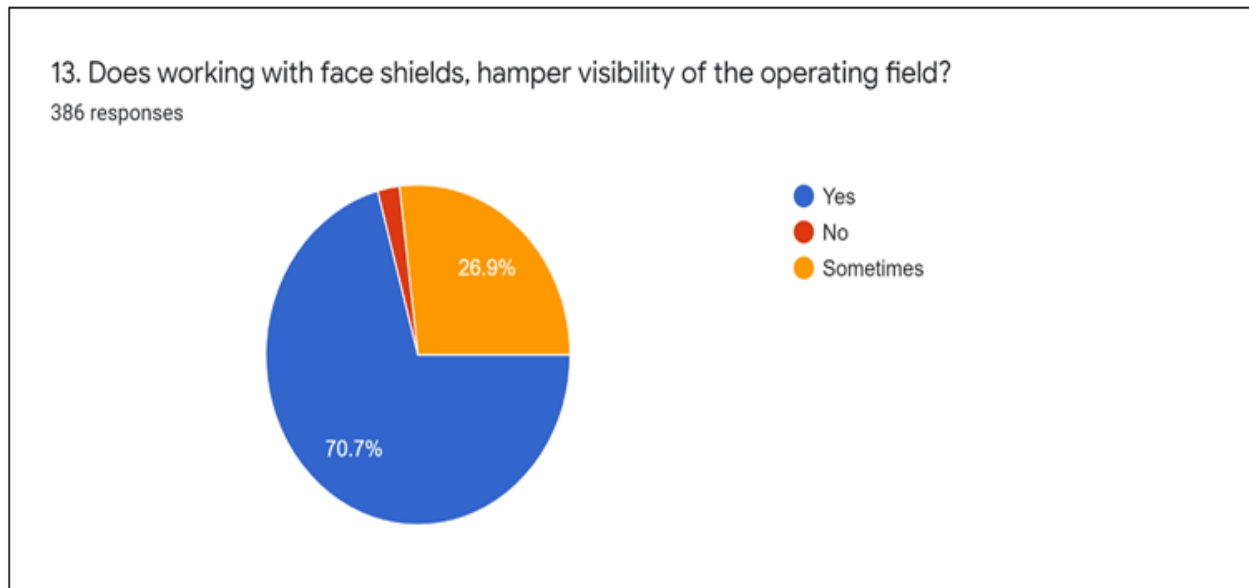


Fig 13 Does Working with Face Shields, Hamper Visibility of the Operating Field

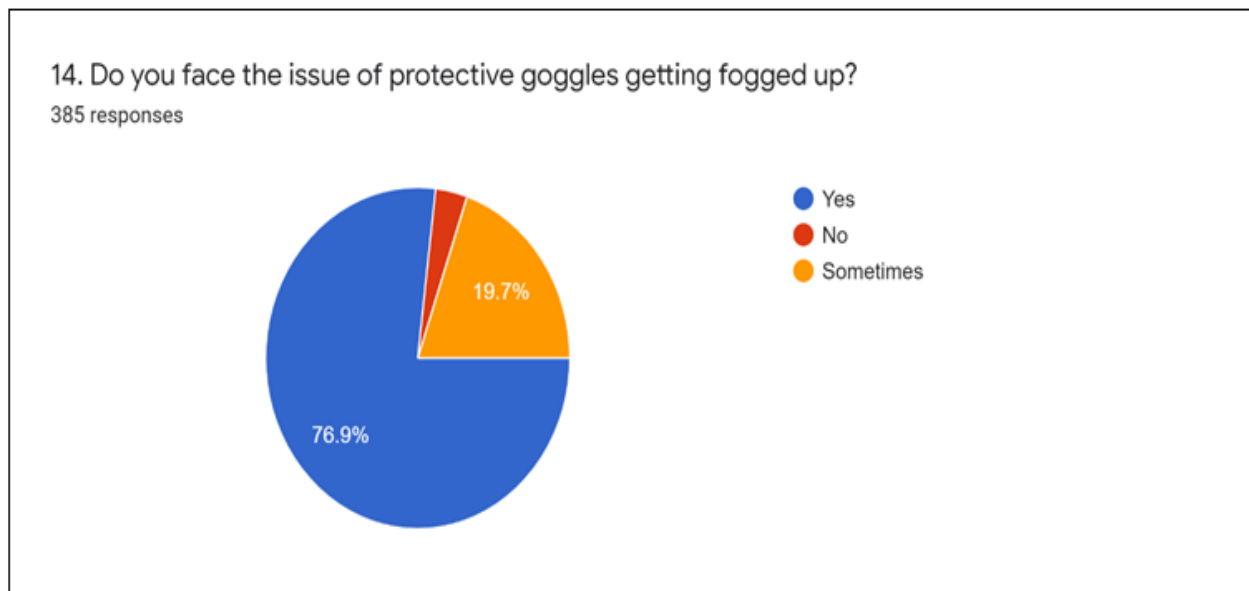


Fig 14 Do you Face the Issue of Protective Goggles Getting Fogged up

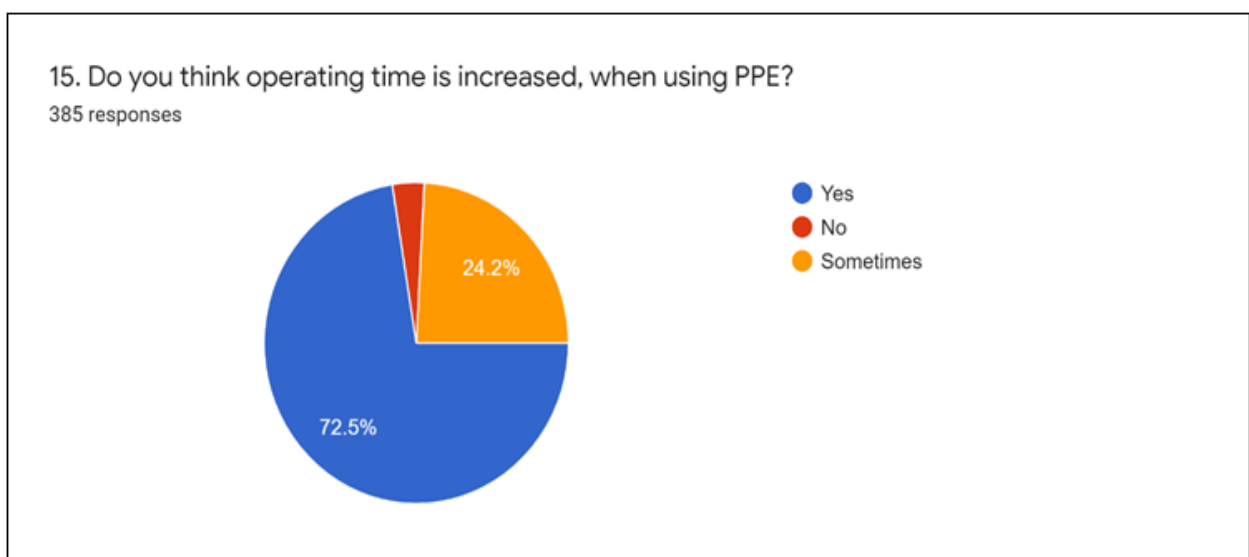


Fig 15 Do you Think Operating Time is Increased

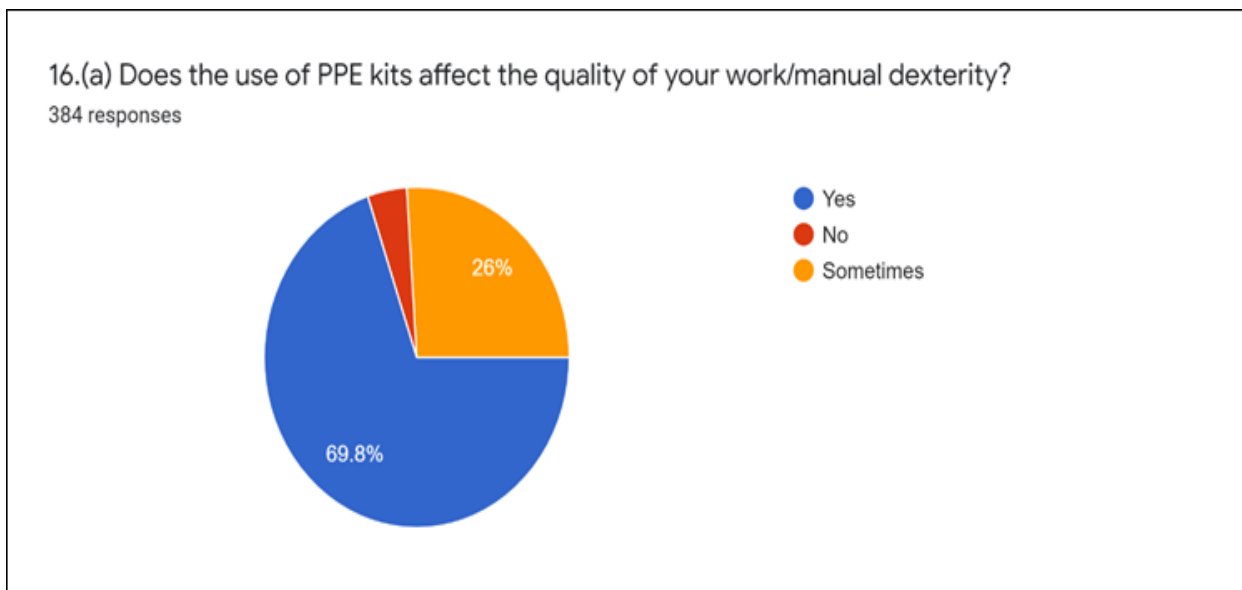


Fig 16 (a) Does the use of PPE Kits affect the Quality of your Work/Manual Dexterity

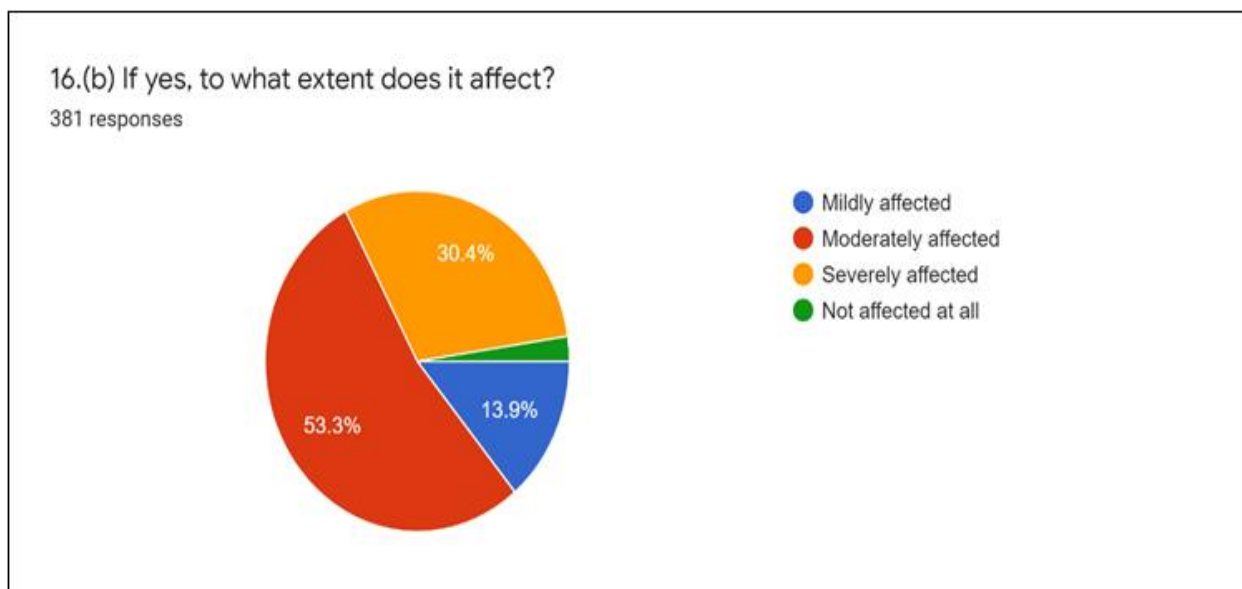


Fig 16 (b) If yes, to what Extent does it affect

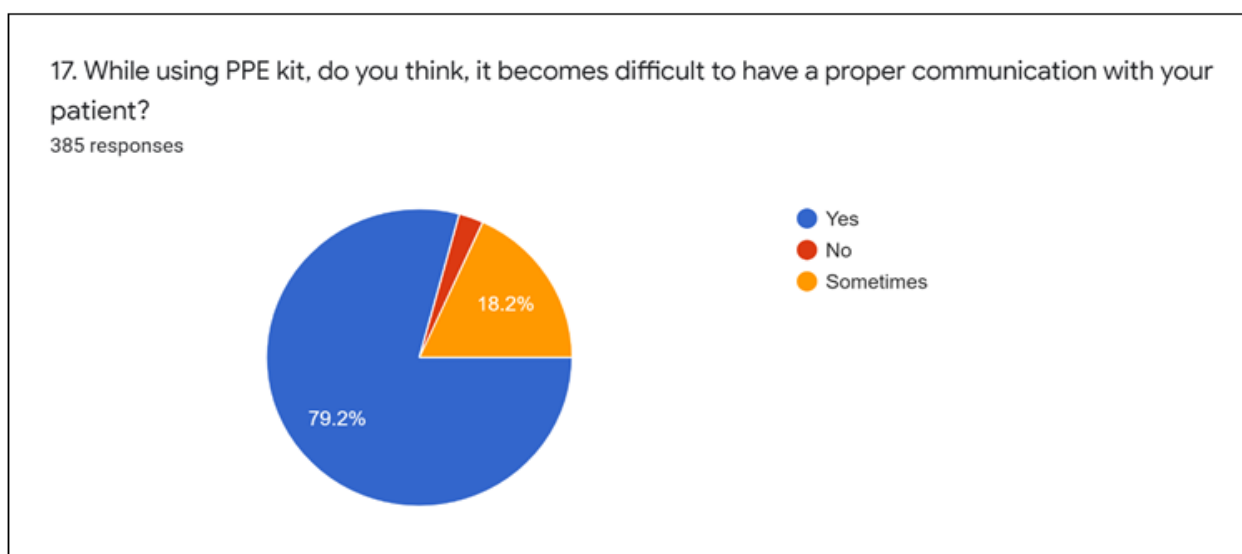


Fig 17 While using PPE Kit, do you Think, it becomes Difficult to have Proper Communication with your Patient

IV. DISCUSSION

PPE kits play a vital role, in preventing the spread of infectious diseases, from the patient to the dentist, and vice versa. They form a key barrier, providing protection against diseases like COVID-19, whose recent outbreak took a major toll on all the health care providers. Even though the role of PPE is quite important, it has been found to be uncomfortable at times to operate while working with PPE kits, especially for the dentists.

The current survey, therefore, was aimed at getting an insight into the operator comfortability while working with PPE kits, among the dentists based in Bangalore and Tumkur.

The results of our survey revealed that more than half of the participants (66.1%) feel moderately comfortable while working with PPE kits, suggesting that most of the operators feel some amount of discomfort while operating with PPE kits.

Although PPE kits provide a considerable amount of protection, against many transmissible respiratory infections, certain components of PPE kits, make the operators feel breathless, while working with them. The results of this survey, revealed a similar pattern, most of the participating dentists (68.8%), feel suffocated, working around with PPE kits, with respirators being the second leading cause for it. The respirator's high inspiratory or expiratory resistance or pressure levels can be endured by few operators, while others cannot. The hot, humid conditions inside respirators, are tolerable by some operators, whereas others cannot. Due to this variability, every operator must be treated as an individual and measures should be taken to improve on these grounds.³

Another important issue, that the survey highlights is the visibility. The face shields, used by many operators, while working, hamper the visualisation of minute structures in the oral cavity, thus affecting the visual ability of the operator. Along with this, the protective eyewear, also tends to get fogged up, while working, further deteriorating the visibility of the operating field. Our survey, highlighted a similar trend, around 76.9% of the participants face the issue of protective glasses getting fogged up and around 70.7% of them feel, the visibility being reduced while working with PPE kits.

The manual dexterity, seems to be a crucial aspect, underlined by the results of this survey. Dentistry, requires precision, and working with PPE kits, seems to shackle the dentists. The results of the present survey, state that around half of the practitioners (52.9%), face the issue of PPE kits, always hampering their mobility while operating. This could probably be associated with the lack of proper sizes of the PPE kits available in the Indian market. Additionally, around 69.8% responders, reported that their manual dexterity as well as the quality of work is affected while operating with PPE kits. Improper sizes of PPE, leads to

hinderance of movement and a loss of proper grasp of the instruments, leading to a deteriorated dexterity.

Patient education and motivation is an important aspect of dentistry, for maintaining the long-term treatment outcomes. And this is possible only through proper communication, which brings us to yet another obstacle faced by dentists while working with PPE kits. 79.2% of the respondents, revealed that the PPE kits do not enable them to have a proper communication with their patients. This is mostly attributed to difficulty in hearing and understanding the verbal commands, as also reported by other studies^{4,5}.

Owing to certain difficulties, faced by the dental practitioners, while operating with PPE kits, there's a constant need to improve on design and manufacturing of these kits in the Indian scenario. As the PPE kits are an important protective device for the dentists, their use can not be completely avoided, therefore the need of the hour is to qualitatively and quantitatively evaluate the difficulties faced by dental practitioners across the country and work on the improvement of these kits, to provide an ease of work for the dentists.⁴ Since, the survey was done within the dental practitioners situated in Bangalore and Tumkur, the results of this survey can not be generalised to the dentists all over the country. Therefore, there exists a need to conduct further nationwide surveys, investigating PPE, its usage and modifications in designs and biomaterials.

V. CONCLUSION

Within the limits of the present survey, it can be concluded that difficulties do exist with the use of currently available PPE kits, but their use cannot be completely avoided. As evident by the results of the current survey, most of the dental practitioners are uncomfortable while working with the PPE kits. Hence, measures should be taken to improve on these grounds.

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