An Online Survey of Healthcare Professionals in the COVID-19 Pandemic in the UK: *Perceptions of Risk Factors*

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ABSTRACT

To explore the emerging concerns of COVID-19 related issues amongst health care workers, members of a range of healthcare organisations, governmental agencies, and the media, an online self-administered survey of healthcare workers was undertaken by the British Association of Physicians of Indian Origin in April 2020.
Results
The respondents were predominantly hospital doctors (67%), aged between 40-60 years (72%) and from Black, Asian, and Minority Ethnicity (BAME) backgrounds in the UK (86%). Thirty percent of respondents had one or more health comorbidities. Over 78% reported either lack of, or inappropriate personal protective equipment (PPE) for their role and 68% of respondents felt that they were unable to comply with or that it was impractical to adhere to social distancing at work (including commuting). At the time of the survey, 18.5% of respondents reported having a confirmed or suspected diagnosis of COVID-19. In multivariate analysis, inability to self-isolate and having a BAME background emerged as independent risk (OR 1.45) for COVID-19 when adjusted for confounding factors.
Conclusions
These results add to the emerging concerns expressed internationally on the observation that BAME ethnicity appears to have a higher risk of developing COVID-19. This is the first study that adjusted work-related factors (inability to maintain social distancing and inadequate PPE) and comorbidities. Our work supports the imperative for designing and conducting urgent larger studies to understand this risk and plan appropriate mitigation of the risks to health care workers

INTRODUCTION

We are living in unprecedented times and in the midst of a pandemic that has changed our world in many ways. While the interdependency can cause rapid global spread of a pandemic, it can also offer opportunities for equally rapid collaborations and exchange of vital information. The data from Italy, Spain and France has led to a significant increase in mortality figures, when compared with initial reports from Wuhan, China. Equally concerning were the reports emerging of healthcare workers succumbing to the virus having contracted it whilst on duty [1]. This has led to an understandable concern regarding the effectiveness of PPE provided to HCWs. Another demographic trend observed in data emerging from intensive care units in the UK and USA is a higher number of Black, Asian and Minority Ethnic (BAME) patients dying of COVID-19 [2- 4]. This highlights the importance of studying the potential causes leading to this outcome, so that factors to mitigate this risk can be instituted early in preventive strategies and treatment options.

Early reports from the UK media of healthcare workers succumbing to this illness were almost exclusively from BAME communities. Hence, increased demands to the UK government to report on ethnicity of those that are affected and dying [5].Combining this with other early indicators that obesity (in the USA), increased prevalence of hypertension, cardiovascular and renal disease in the BAME populations in the west may be the underlying cause of the observed increased risk [6].

The British Association of Physicians of Indian Origin (BAPIO) is a national, voluntary, membership organisation set up originally to represent and support the cause of doctors from the Indian subcontinent. In recent years, BAPIO has expanded its remit to provide the same degree of representation to all healthcare professionals in a multi-professional environment and has worked closely with other similar organisations. BAPIO, through its various arms, has extensive experience of working with national regulatory bodies, academic institutions and royal colleges across the spectrum. BAPIO executive set out broad terms of reference for its Research & Innovation Forum (BRIF), which through active engagement and serious debate with members and collaborators from the scientific community, embarked on designing specific studies to answer the questions.

This survey was designed to explore the prevalence of COVID-19 among HCWs, their access to suitable PPE and their ability to maintain social distancing at work, while commuting to-and-from work and for self-isolating when necessary.

Rationale:

The extent and impact of the COVID-19 pandemic is evolving with over 2.5 million people infected so far and over 170,000 deaths reported worldwide [7] Observations in captive populations such as cruise-liners [8] [9] [10]. shows that SARS-CoV-2 spreads rapidly and often through proximity to asymptomatic cases/carers. Therefore, public health scientists across most affected countries worldwide have identified "social distancing", ''staying at home'' and frequent handwashing as the strongly recommended measures to contain the spread of the disease. HCW represent a group that have to do exactly the opposite by commuting (often using public transport), caring for patients with proven or suspected COVID-19 and interacting for several hours at a time in close proximity with colleagues among whom there will undoubtedly be asymptomatic carriers of the disease.

Data from Italy shows about 20% frontline HCW became infected and many have lost their lives [1]. Media reports in the U.K. have highlighted the concerns of many frontline HCW regarding well documented deaths [5] [11] [12]. A recent survey by the British Medical Association highlighted concerns amongst respondents of the perceived lack of personal protective equipment (PPE) for frontline HCW [13]. There is concern amongst HCW about the increased risk of acquiring SARS-CoV-2 infection while at work.

The emerging signal of increased risk and poorer outcomes requires further exploration[3] [4] [6]. Current evidence from a scan of emerging data and focus groups [2] suggests that age (over 60 years), comorbidities (such as cardiovascular, kidney disease and diabetes), male sex, and BAME background may be risk factors for increased COVID-19 associated mortality. There is lack of data that establishes BAME ethnicity as an independent risk factor over and above medical, demographic and social/ cultural factors.

The aim of this survey is to explore the personal experiences and perspectives from HCWs on the risk of COVID-19 and antecedent demographic, geographical and professional factors in relation to this risk.

METHODS

Participants:
The survey was open to all HCWs in the U.K. in electronic format only. The questionnaire was shared via social media (twitter, Facebook, WhatsApp and personal social network) and emails were sent to all HCWs on the BAPIO contact database. The survey introduction stated the purpose and intention to disseminate the results through publication in SUSHRUTA *Journal of Health Policy & Opinions* and the individuals' responses are completely anonymous. A total of 2003 responses were received.

Questionnaire:
The questionnaire was developed by the members of the BRIF, with further discussions with members of the BAPIO Think Tank which has 65 active members from a range of healthcare specialties, thus forming stakeholder involvement in designing the survey. The five key focus areas for data collections were:

1. Demographics including age, ethnicity and co-morbidities

2. COVID-19 status – confirmed, suspected or none

3. Occupational factors – geographical distribution, profession, work area

4. Preventive Measures -

   - Personal protection equipment – availability and appropriateness
   - Social distancing - while at work and commuting to-and-from work
   - Self-isolating and personal safety

5. Likelihood of COVID19

Administration of the questionnaire:
The questionnaire was administered online using Google forms and a full version is available in the appendix to this paper. The questionnaire received responses from 14.04.20 to

21.04.20 07:30H UK summertime. The questionnaire has 11 questions, with a range of options from a single answer to multiple options depending on the subject matter.

Statistical Analysis

The raw data (in .CSV format) was checked, missing items resolved and analysed independently by two primary investigators. The results were checked for consistency and inferences discussed and agreed with all authors. In addition to descriptive statistics of the population of respondents, the survey results were analysed using non-parametric tests, univariate analysis and regression analysis (Bivariate logistical regression) using SPSS software v26 (*IBM Inc, USA*). The primary outcome measure was a self-reported diagnosis (confirmed by viral PCR swab testing) and / or clinical suspicion based on NHS guidance for self-isolation due to classical symptoms.

RESULTS
1. Demographics

Majority of respondents were aged between 40-60 years (Figure 1), hospital doctors (Figure 2), and from BAME communities (Figure 3). Further distribution of individual ethnic groups amongst the respondents is given in table 1, showing a majority of South Asians. There was an even representation from all parts of the U.K. (Figure 4). Nearly a third of respondents reported one or more comorbidities which were relevant to the NHS vulnerable disease-group guidance (Figure 5).

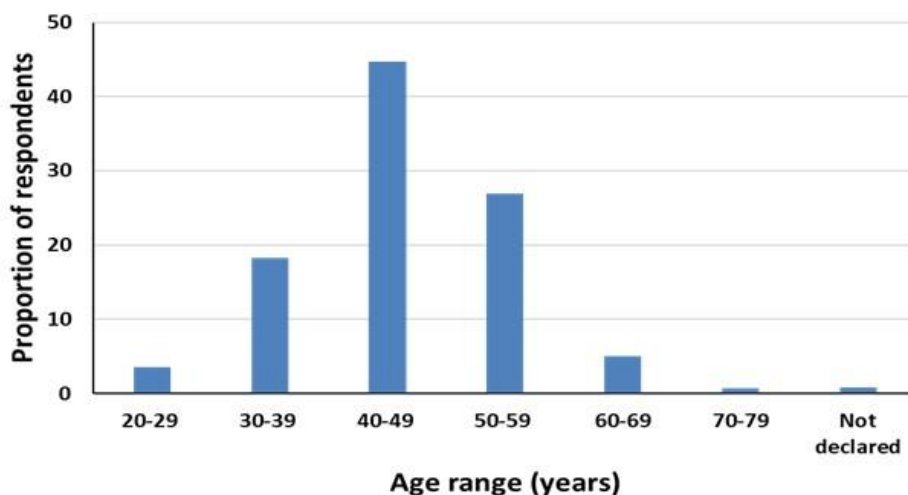Figure 1: Histogram showing age range of respondents

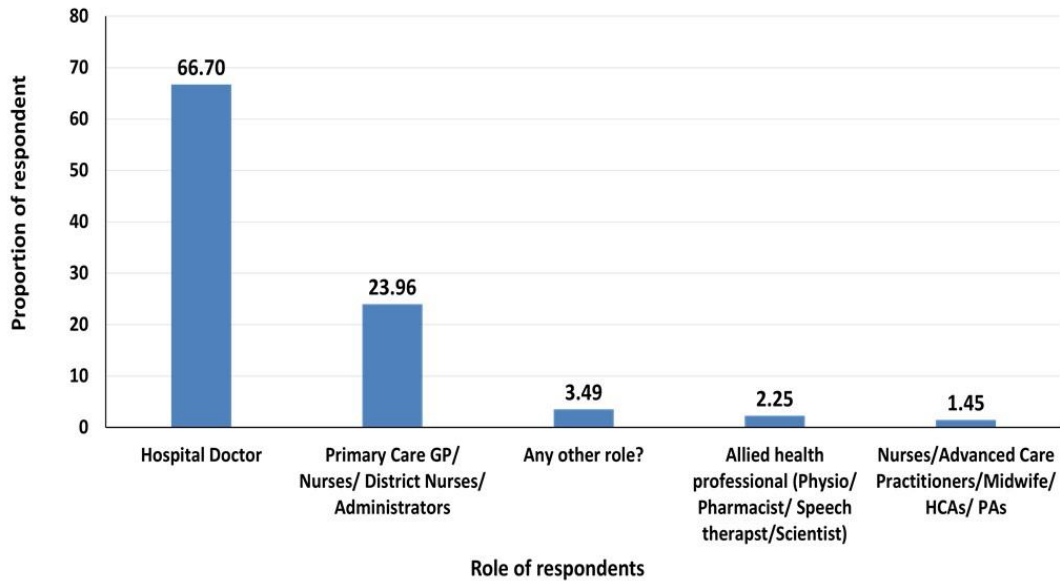Figure 2: Histogram showing the professions of the respondents

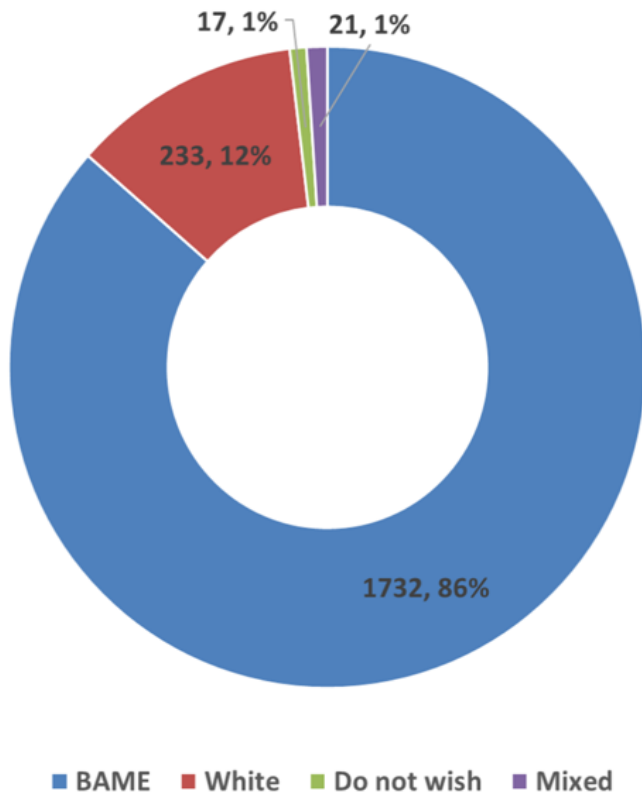Figure 3. Pie chart showing the ethnicity of the respondents

Table 1: Detailed distribution of ethnicity of respondents

Ethnicity	Number	Proportion
South Asian- Indian /Pakistani/Bangladeshi/Other	1516	75.69
Caucasian (British/Irish Traveller/Any other White)	233	11.63
Black/ African/ Afro-Caribbean/ African- American	137	6.84
Arab/ Middle-eastern/ North African	45	2.25
Mixed	21	1.05
Chinese/ SE Asian	19	0.95
Do not wish to declare	17	0.85
Any other ethnicity	15	0.75

Figure 4:Histogram showing the geographical distribution of respondents

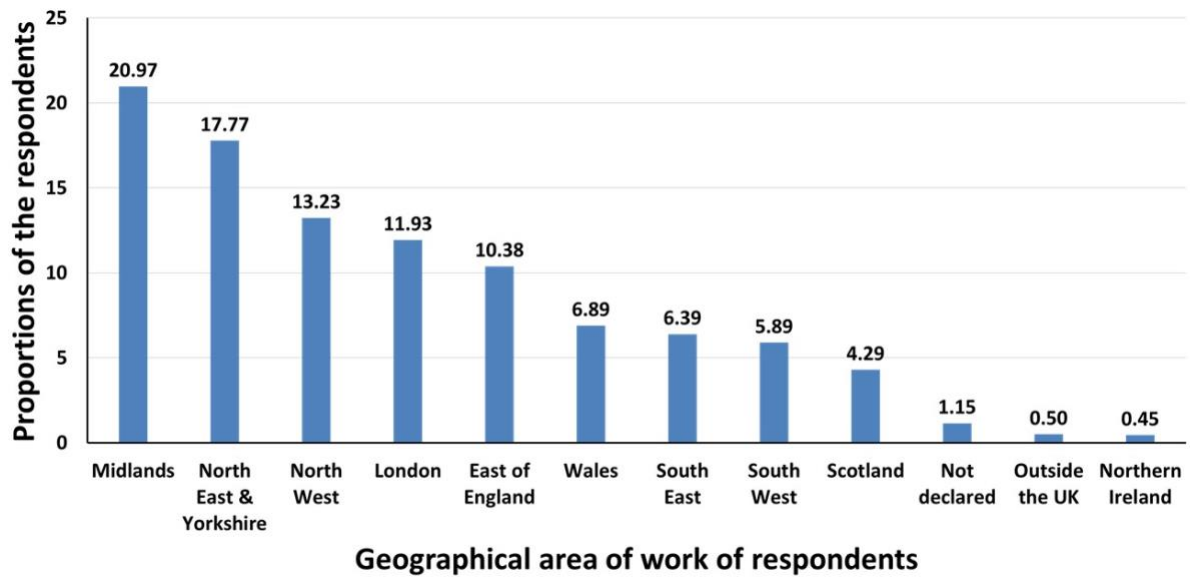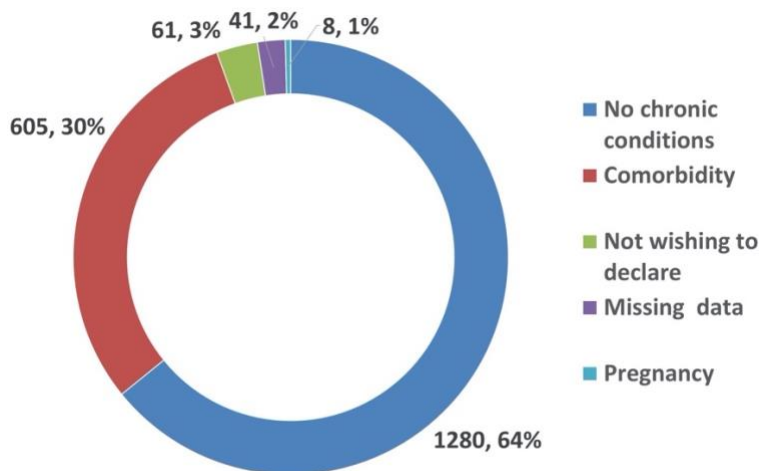
Figure 5: Pie chart showing the reported cumulative co-morbidities

2. COVID-19 status

Prevalence

· Case definition was based on respondents who reported having a confirmed (Viral swab PCR) or self-isolating with COVID-19 related symptoms (as per PHE description). There were 79 (3.94%) confirmed and 297 (14.83%) suspected COVID-19 cases, an overall proportion of 19% of the survey population. A range of sources of potential exposures were reported (See Figure 6 and Figure 7).

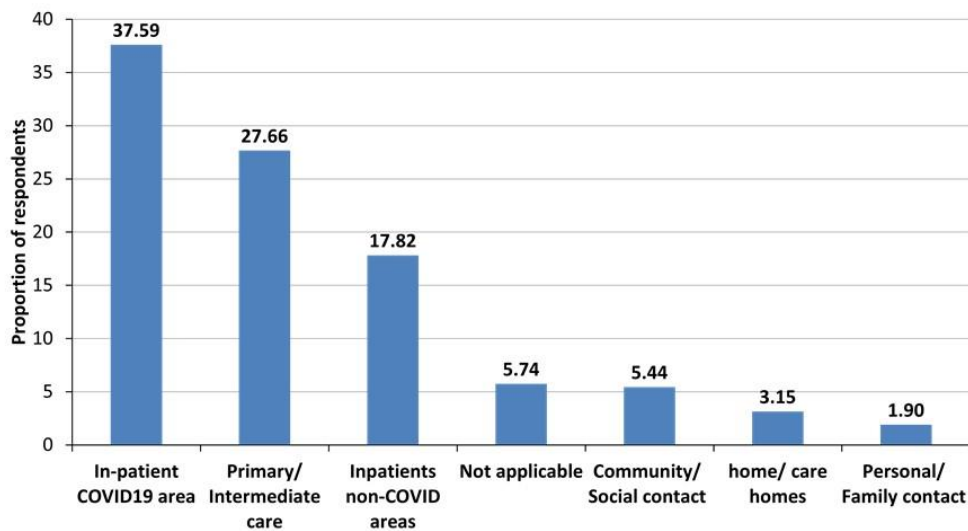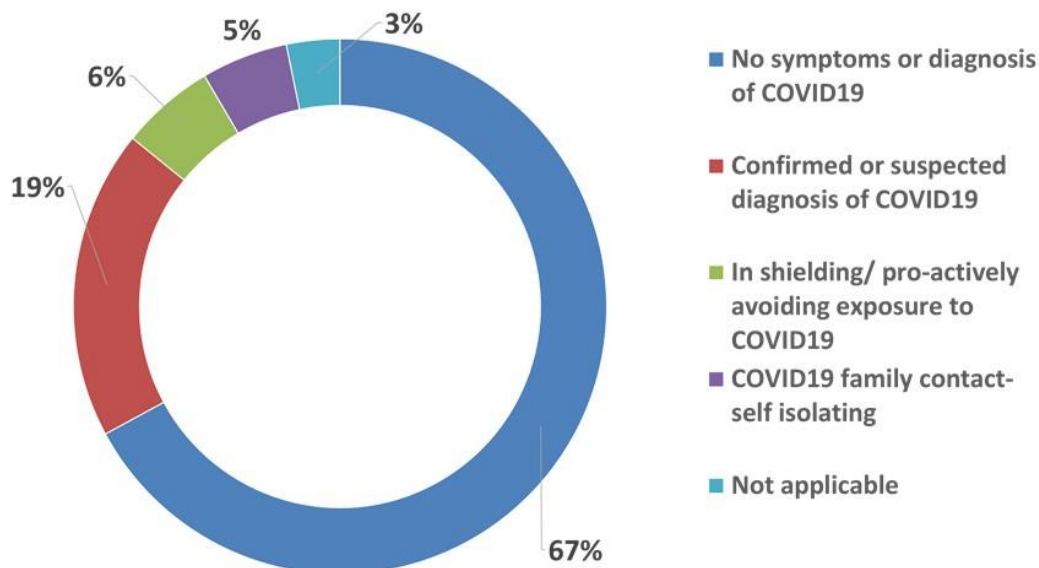Figure 6: Histogram showing clinical work area for respondents

Figure 7: Pie chart showing COVID-19 status for respondents

3. Occupational Risks

Analysis of the respondent's professional group, clinical area of work or NHS region were not found to be significant factors in the risk of having COVID19.

4. Preventive Measures

The survey responses were classified to be 'no issues' or appropriate PPE and 'issues' including inappropriate, restricted/ short supply or being reprimanded. Using this classification, we found that 78% of respondents reported not having adequate or appropriate PPE for their roles. The responses to the individual answer options are given in Table 2. Access to PPE did not show any significant correlation or likelihood to having a diagnosis of COVID19 in our survey.

Table 2: PPE availability and appropriateness

Personal Protection Equipment		
	Frequency	Percent
Having PPE as per PHE recommendations	402	20.1
Having access but not as per PHE guidance	512	25.6
PPE being in short supply/ restricted	650	32.5
PPE being inappropriate for clinical role	262	13.1
Not having access to PPE	80	4.0
Being reprimanded for wearing/ wanting PPE	64	3.2
Total	2003	98.4
Missing	33	

Social Distancing

Table 3: Social distancing compliance

Social Distancing at Work		
	Frequency	Percent
Able to comply	519	26.2
Not able to comply fully	673	34
Cannot comply during commuting	65	3.3
Not practical to comply at work	625	31.6
Working away from patient contact	96	4.9
Missing	25	1.2
Total	2003	100.0

We asked respondents if the PPE supply and social distancing was adequate and appropriate and if not the possible issues (see Table 3, Figure 8 and Figure 9 respectively).

Figure 8: Pie chart showing respondents reporting appropriate vs non-appropriate/restricted PPE availability
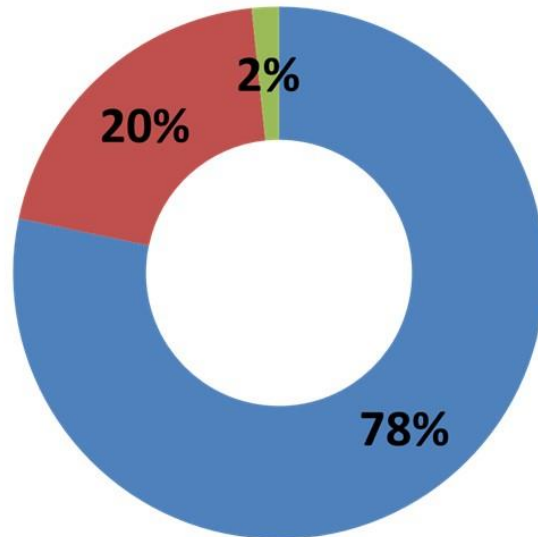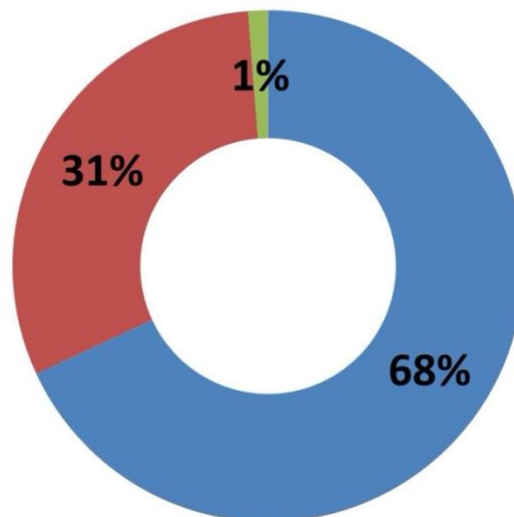

Figure 9: Pie chart showing respondents ability to comply with Social Distancing guidance

Self-Isolating (Vulnerable Staff)

Respondents were asked whether they were able to self-isolate due to a personal health reason or living with a family member. Figure 10, gives the proportions of respondents who reported (1) being in self-isolation due to a personal or family member being at risk (7.5%), (2) working in non-patient facing roles (5.6%), (3) not able to self-isolate despite known risk(21.9%), (4) have been offered to self-isolate but chosen not to (2.4%) and (5) not applicable (63%).

Figure 10: Showing respondents and their self-isolating status (see text for categories 1-5)
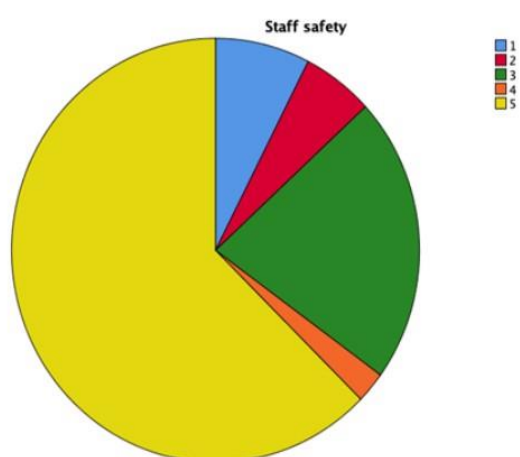
5. Multi-variant analysis of developing suspected or confirmed COVID19

A binary logistic regression model (Log likelihood 1902.648a, Cox & Snell R Square 0.009) after adjusting comorbidities, PPE and social distancing showed that BAME ethnicity and inability to self-isolate (or choosing not to) were independently associated with increased risk of COVID-19 (confirmed or suspected) (See Table 4).

Table 4: Binary logistic regression analysis

Variables	Odds Ratio	95% Confidence Intervals	P value
Inability to comply with social distancing	0.86	0.7-1.1	Ns
Inappropriate/ limited/ no PPE	0.95	0.8-1.2	Ns
Presence of comorbidities	1.21	0.9-1.7	Ns
Reporting to be BAME	1.43	1.0-2.0	0.03
Inability to comply with self-isolating	1.62	1.2- 2.2	0.001

Ns = not significant

DISCUSSION

This survey was the first step towards exploring the spectrum of COVID19 related problems reported amongst healthcare workers in the UK and to help decide the key scientific questions to address and the areas to prioritise for future research. This data is exploratory in nature and although there are important trends emerging, this will need to be taken in the context of a self-administered, anonymised, online survey.

What do the results indicate?

Firstly, it answers the fundamental question that being an HCW from a BAME community makes it 1.5 times more likely that one will acquire COVID-19. The confounding factors of age, regional spread of risk and facilities, co-existing co-morbidities, working in high risk settings are not shown to be significant in explaining this risk, at least in analysis of the results of this survey. Based on a range of rapid analysis of emerging data from the USA and UK, it is clear that there appears to be a differential spectrum of disease in BAME communities.

What is unclear at present are the reasons that may explain this observation. There is speculation about several clinical, social, economic, cultural and even religious factors that may contribute to a higher risk scenario. Unlike the population of Wuhan district in China, the population amongst the BAME communities in UK and USA remains hugely heterogenous. In the UK, HCWs come from several ethnic groups originating at different points in time from countries across the globe. Every social, cultural, clinical, educational and religious factors are bound to be widely variable. How would it be possible then to define and explore factors contributing to the observed high risk of COVID-19 in such a diverse group? Then hypothetically, it may also be possible that the rich commonality of experience as a BAME HCW in UK NHS, may have an over-riding contribution to the observed risk, far greater perhaps than the inherent factors based on origin. This in the context of this survey, is speculation and will need to be explored through well-designed and funded studies amongst HCWs.

The second area of anxiety and concern is in relation to PPE. Our results indicate that a vast majority of respondents' report having inappropriate PPE for clinical risk, of PPE being in short supply, being restricted in being able to use PPE or being reprimanded for using PPE. This is self-reported and may be subject to a different interpretation of the PHE, UK government and NHS guidance on the appropriateness of PPE for different clinical situations. Having said that, it is important to recognise the rising tide of professional opinion shared in professional groups, reinforced by surveys conducted by medical royal colleges and other professional associations which indicate that there is substance in this finding. Our data suggests an alarming majority of respondents report inadequate or inappropriate PPE. The report from a small proportion of respondents (n=64) of being reprimanded is a cause for further concern. Given the background of institutional racism, bullying, harassment, microaggressions and differential treatment of HCWs from certain minority and migrant groups, this finding is especially very worrying [14].

The third area of interest relates to the concept of social distancing guidance from the NHS and Public Health England for all. It is true that in most clinical areas, teams have to work in

close quarters to provide care to patients. While, in an intensive care unit setting, this is provided by HCWs wearing PPE throughout the entire shift, this is not practical or possible in other less intense areas. There is thus a dichotomy in how individuals respond to the social distancing guidance. There is also a learned helplessness amongst staff on the inevitability of asymptomatic transmission between staff working in close quarters. In fact, the high prevalence of COVID-19 amongst staff seen in our survey and reported from Italy, Spain and France tells a similar story. It is unclear whether HCWs acquire infection while treating/ caring for patients or while working/ resting in close proximity to colleagues remains to be established. Our survey is not designed or powered to answer this question. However, our regression analysis indicates that for this population, it is unlikely that PPE or inability to comply with social distancing would have contributed to increased risk of COVID-19. Hence, more research is needed to decide what PPE is appropriate in each clinical risk scenarios.

Finally, the question of self-isolation for HCWs with personal health risk, living with a vulnerable family member or having to forego self-isolation in the interest of one's employment as well as for selfless service. Our results indicate that over 1/5 HCWs were unable to self-isolate despite the risk, hence exposing them to a higher risk of COVID19. Inability to self-isolate or choosing not to, appears to be a significant risk factor for COVID-19. Accepting the weakness of a self-reported questionnaire, this is a worrying trend and perhaps requires further exploration with occupational health experts and human resources departments.

There are inevitably several limitations to the interpretation and conclusions one can draw from this data. Primarily, there is a possibility of a selection bias. By its nature of distribution i.e via BAPIO members and their associates connected through wide social networks, it is inevitable that the majority of respondents would be from a BAME or predominantly South Asian origin. The proportion of respondents reporting on their COVID-19 diagnosis or suspected diagnosis is also based on the recall bias of respondents. The survey did not use registration number or institutional email for verification in the interests of speed and breadth of data collection. This is in consonance with usual practice for online or telephone distant surveys of professionals where self-reporting of status is relied on. The researchers have no reason to believe that a respondent would have any reason to falsify their representations. The second safeguard was that the survey was sent via BAPIO membership database and encrypted social networks to verified recipients. The data distribution amongst professional groups, regional spread, age group and clinical sectors broadly represents the BAPIO membership and associates. Hence, although not a representation of the whole healthcare workforce in the UK, it does represent the BAPIO membership footprint.

CONCLUSIONS
As far as we are aware, this is the first substantial survey of BAME healthcare workers, primarily doctors working across primary and secondary care in the UK. It is evident from this sample that adequate protection, or rather lack of it, is a major concern amongst them, and is more prevalent than has been previously reported. The survey demonstrates that there is a high risk of infection from COVID-19 in healthcare settings, and yet our respondents put themselves in harm's way from a sense of duty. A significant number (15%) were self-isolating on suspicion of having the virus, adding to the evidence that the lack of testing might have

hampered their return to work. Our respondents were unable to comply with social distancing at the workplace, but they did not appear to be overly concerned about this. Finally, this survey adds significant weight to the argument that ethnicity may be an independent risk factor and further research is needed urgently to understand this risk and prevent further unnecessary deaths from understanding who is vulnerable and who isn't.

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APPENDIX

Survey questions

COVID19 5min Survey for Healthcare Professionals

British Association of Physicians of Indian Origin is conducting an online survey of all healthcare workers including its members to estimate (a) the availability and appropriateness of personal protection equipment in different healthcare settings, (b) staff who are off-work and have been off-work due to suspected COVID19, (c) availability of staff testing (d) social distancing at work and finally (e) safety of vulnerable staff members during redeployment. The anonymised data will be analysed and results published in Sushruta.net and form policy for BAPIO Executive committee in representing its membership as well as healthcare workers from appropriate BAME backgrounds.

Your personal details will not be collected or stored. BAPIO takes personal data security with utmost seriousness and complies with GDPR regulations. For any queries please email admin@bapio.co.uk

1. Please confirm your role in healthcare ?

Column 1

Hospital Doctor
Nurses/Advanced Care Practitioners/Midwife/ HCAs/ PAs
Primary Care GP/ Nurses/ District Nurses/ Administrators
Allied health professional (Physio/ Pharmacist/ Speech therapst/Scientist)
Managers/Estates/ Food/Portering/Administration
intermediate Care/ Nursing Homes/ Carers
Any other role?

2. Please confirm your healthcare sector

Column 1

Secondary or tertiary care facility
Primary care (GP Practice)
intermediate/ Nursing/ Care Homes
Academic institution with no direct patient care
Remote working with no colleague or patient care

3. Please confirm your geographical sector (NHSE/I mapped regions)

Column 2

London
East of England
Midlands
North East & Yorkshire
North West
South East
South West

Scotland

Wales

Northern Ireland

Outside the UK

4. Please confirm your circumstances in relation to COVID19

Column 1

Acute care of COVID19 patients in ED/Inpatients/ICU

Inpatients on non-COVID wards

Primary/ Intermediate care / review of COVID19 patients or suspected

Contact with COVID19 patients at home/ care homes

Personal/ Family contact with COVID19

Community/ Social contact through daily activities

Not applicable

5. Your COVID19 status at any time

1

Confirmed diagnosis of COVID19 from swab test

Suspected COVID19/ self-isolating

COVID19 family contact- self isolating

No symptoms or diagnosis of COVID19

In shielding/ pro-actively avoiding exposure to COVID19

Not applicable

6. Availability of appropriate Personal Protection for your role based on PHE guidance

Column 1

PPE has always been available and appropriate

PPE has been always available but not always appropriate for my role

PPE has been in short supply/ restricted

PPE has been inappropriate for my role

No PPE available for my role (at any time during this pandemic)

I have been restricted/ reprimanded from wearing PPE

7. Social distancing (SD) at work (not including patient contact with PPE) or during commuting based on PHE guidance of 2m

1

I am able to comply fully with SD guidance

I am not able to comply fully with SD guidance

I cannot fully comply with SD guidance during commuting

It is not practical to expect to comply with SD at work

I am working away from direct patient contact due to health/ family reason

8. Safety of vulnerable staff at heightened risk from exposure to COVID19 (see PHE/ NHS guidance on at risk groups)

| |
| Column 1 |
| I am in self-isolation due to my health/ family risk |
| I am in non-patient facing duties due to my health/ family risks |
| I am not able to self-isolate or avoid COVID19 exposure in spite of my personal/ family risk |
| I have been offered but chosen not to avoid COVID19 exposure risk |
| Not applicable |

9. Your age group

Column 1
20-29 years
30-39 years
40-49 years
50-59 years
60-69 years
70-79 years
>79 years

10. Ethnicity appears to have a relationship to susceptibility and outcomes in COVID19 *

Choose

Caucasian (British/Irish Traveller/Any other White)

Black/ African/ Afro-Caribbean/ African- American

South Asian- Indian /Pakistani/Bangladeshi/Other

Arab/ Middle-eastern/ North African

Chinese/ SE Asian

Any other ethnicity

Mixed

Do not wish to declare

11. Co-morbidities

Column 1
No chronic conditions
Hypertension
Diabetes
Chronic kidney disease
Asthma/ COPD/ Chronic lung disease
Heart disease
Cerebrovascular disease
Mental Health conditions (any)
Pregnancy
Not wishing to declare

Submit