Adherence to Personal Protective Equipment Guidelines During the COVID-19 Pandemic: A Worldwide Survey Study

Editor

While a multitude of Personal Protective Equipment (PPE) guidelines have been published since the start of the COVID-19 crisis, adherence has remained variable. We fielded an international survey-based study to rapidly collect data on PPE usage by healthcare professionals (HCP) with the aim of comparing adherence to published guidelines across regions and countries.

This study was approved by the review board at Brigham and Women's Hospital. An online survey was designed using REDCap (Vanderbilt University, Tennessee, US) and made available in seven languages: English, Chinese, German, Greek, Italian, Japanese, and Spanish and distributed to HCPs.

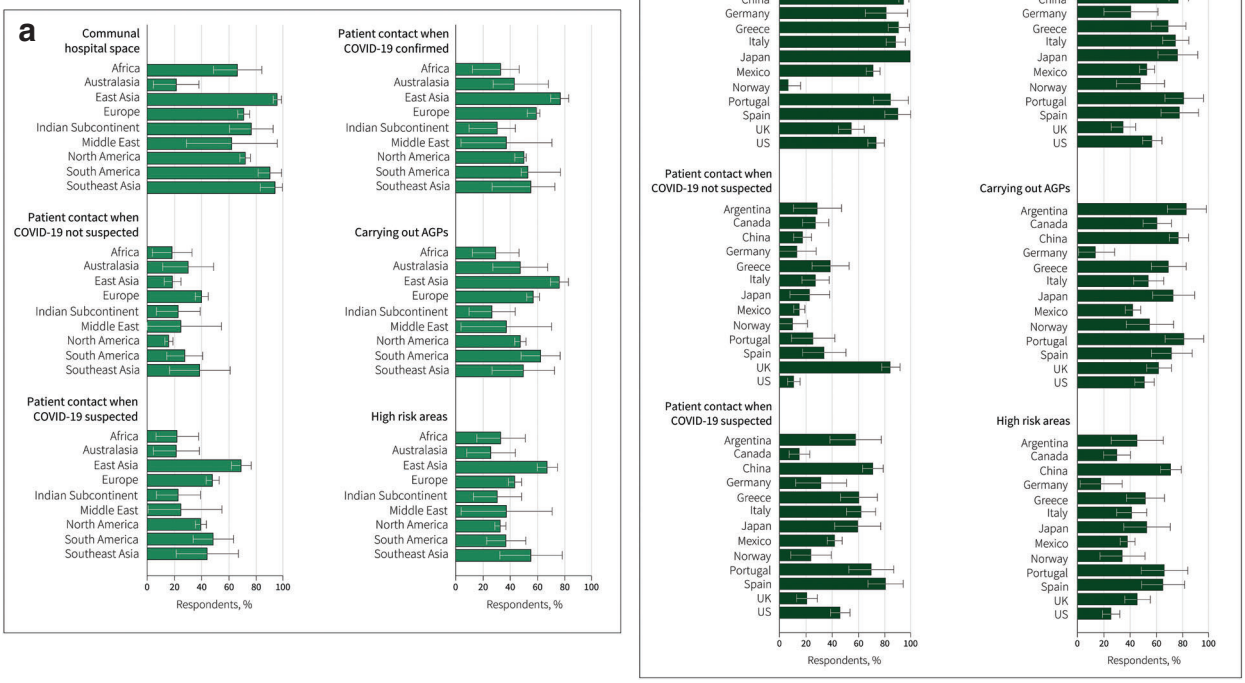
Based on official guidelines an optimum PPE combination was determined for six settings: Communal hospital space – facemask/respirator[1]; Patient contact when COVID-19 not suspected – facemask/respirator, gloves, apron/isolation gown[2]; Patient contact when COVID-19 suspected or confirmed – respirator, gloves, eye protection, apron/isolation gown[3,4]; Carrying out AGPs and high risk areas – respirator, gloves, eye protection, and isolation gown/apron, booties, and hairnet[2].

Proportions were calculated per region and country using Prism (GraphPad, California, US). Adherence was determined by comparing the proportion of respondents who selected the proper PPE to our optimum standard.

From April 17 to June 17, 2020, 1255 surveys were completed. Responses came from nine geographic regions (*Fig. 1a*). 13 of 80 countries had enough responses (>20) to be included in the country-specific analysis (*Fig. 1b*). Respondents included physicians (43·8%), nurses (29·6%), midwives (19·8%), paramedics (3·8%) and technicians (3·1%).

Of all regions, East Asia showed the highest adherence in communal hospital spaces (96·1%), patient contact when COVID-19 suspected (69·5%) or confirmed (72·3%), carrying out AGPs (76·6%) and high-risk areas (67·5%). Lowest adherence was shown by Australasia in communal hospital spaces (21·7%), patient contact when COVID-19 suspected (21·7%), and high risk areas (26·1%), and the Indian Subcontinent in patient contact with confirmed cases (30·8%) and carrying out AGPs (26·9%). North America (16·1%) showed the lowest adherence in patient contact when COVID-19 not suspected.

Fig. 1 Adherence to optimum PPE guidelines by region (a) and by country (b)



At the country level, Japan (100%) showed the highest adherence in communal hospital spaces. Highest adherence was mostly noted in European countries (UK, 85%, patient contact when COVID-19 not suspected; Spain, 81·3%, patient contact when COVID-19 suspected; Portugal, 81·5%, patient contact with confirmed cases). Exceptions, were Argentina (83·3%) when carrying out AGPs and China (71·5%) in high-risk areas. Lowest adherence was noted in Norway in communal hospital spaces (6·9%) and patient contact when COVID-19 not suspected (10·3%), and Germany when carrying out AGPs (13·6%) and in high risk areas (18·2%). Finally, Canada showed the lowest adherence during patient contact when COVID-19 is suspected (15·2%) or confirmed (26·6%).

Protection of frontline HCPs through adequate PPE has remained a key concern throughout the crisis. Although the selected guidelines were based on the best evidence available, adherence varied greatly. East Asia consistently showed high adherence in all scenarios, while among the countries represented, the US showed low adherence when treating patients not suspected to have COVID-19. With a high proportion of asymptomatic carriers such non-adherence must be mitigated.

The reasons for this variability are multifactorial, including PPE shortages disproportionately affecting countries, forcing healthcare institutions to resort to alternative approaches, such as decontamination and re-use. Frequent guideline modifications by public health organizations, such as the WHO,[5] as well as individual hospital administrations, make it difficult for HCPs to remain up-to-date with rapidly evolving recommendations.

Use of PPE aims to prevent viral transmission from patients to HCPs and vice versa. Further research into the reasons underlying adherence variability is urgently needed to pinpoint strategies for maximizing adherence and improving the safety of HCPs.

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