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Awareness and Preparedness of Hospital Staff against Novel Coronavirus (COVID-2019): A Global Survey

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I. Background

The recent outbreak of respiratory illness caused by a novel coronavirus (named “COVID-2019”) has gained attention globally and has been recognized as a serious public health threat by US Centers for Disease Control and Prevention (CDC). The first case was detected in Wuhan City, Hubei Province, China and since then, the disease has spread rapidly (1). As of February 28, 2020, the World Health Organization (WHO) declared that the outbreak of COVID-2019 as a Public Health Emergency of International Concern (PHEIC) with 62 countries now reporting 85,176 confirmed cases (79,250 of which have been in mainland China) and 2,919 deaths to date (2).

Coronaviruses are a large family of enveloped RNA viruses found in a broad range of animals including camels, cattle, cats, and bats. In relatively rare events, vectors can transmit coronaviruses to humans with continued circulation resulting from human-to-human exposure. Examples include severe acute respiratory syndrome coronavirus (SARS-CoV), Middle East Respiratory Syndrome Coronavirus (MERS-CoV), COVID-2019, like MERS-CoV, and SARS-CoV, all of them have originated in bats (3). Initially, 2019-nCov patients were shown to have some link to large seafood and live animal market in Wuhan, China, suggesting animal-to-person transmission. However, an increasing number of cases appear to have resulted from human-to-human contact as growing numbers of patients have not been exposed to animal markets (1).

The COVID-2019 is the third coronavirus emerging in the human population in the past two decades, preceded by the SARS-CoV outbreak in 2002 and the MERS-CoV outbreak in 2012. This has put global health institutions on alert. Organizations such as the CDC and WHO have developed preparedness and prevention checklist of 2019-nCoV infection to be used by public and healthcare professionals (1,4,5). At present, no antiviral medication or vaccine is available for 2019-nCoV infection and infected patients are managed with supportive care (1).

Within each country, specific locations or services might be the focal point of the outbreak. Although healthcare is provided outside hospitals (such as emergency clinics, nursing homes, community health centers), hospital-based professionals remain the group at extremely high risk of exposure to the infections and may acquire or transmit them accordingly. However, information about the health systems and health professionals’ preparedness for combating the 2019-nCoV is not known. Therefore, their awareness and preparedness in managing the 2019-nCoV infection are important to

prevent the further spread of the disease. Our study will be conducted to assess the preparedness of healthcare personnel against the 2019-nCoV outbreak and how well they respond in an outbreak.

II. Objective of the survey:

This is a multicenter multinational survey aiming to assess the level of preparedness of hospital staff and practices regarding COVID-2019 all over the world and their preparedness to deal with the outbreak. It will also measure the level of awareness of hospital staff about the crisis and how will they react to limit and prevent further transmission.

III. Research question:

- What is the level of preparedness of hospitals regarding COVID-2019?
- What is the level of awareness of hospital staff regarding COVID-2019?

IV. Methodology:

- A. Study design:** Cross-sectional study.
- B. Time period:** February to March 2020 with follow up in February 2021 (optional).
- C. Study Settings:** Any hospital in the world that can adhere to this protocol to conduct the survey as approved by its Institutional Review Board (IRB) or Ethics Committee (EC). Each hospital will have local collaborators.
- D. Study population:** Healthcare providers in the hospitals including physicians, nurses, pharmacists, and others. We will enroll staff members who are or will be handling suspected cases in settings such as Emergency Department Intensive Care Unit, Outpatient Department, Infectious Disease Clinic, Respiratory Disease Clinic, or any department designed to treat 2019-nCoV patients. We will exclude participants who cannot communicate in the vernacular of the translated questionnaire. We will also exclude staff who are on leave on the day of the survey.
- E. Sample size calculation:** The survey will be conducted in a convenient selection of global hospitals. There will be no restriction on the number of hospitals per country or the number of participants per hospital. However, only data from countries with at least 5 hospitals and hospitals with at least 10 participants will be included for analysis.
- F. Study instrument and questionnaire design process:** The survey was carried out using a structured questionnaire adapted from the CDC checklist (6) and the previous questionnaire on the Zika outbreak (7-12). The questionnaire included questions about demographic, personal medical aspects, and preparedness. There are different types of questions in the questionnaire

including (Yes/No) questions, open-ended questions, and multiple-choice questions as well. The original questionnaire was developed in English and the study team members are responsible for its translation into their native languages. A Pretest of the questionnaire by 5 native speakers will also be conducted for the translated version.

G. Validation of questionnaire: The questionnaire will be carefully revised by a panel of healthcare professionals that includes one WHO consultant, three epidemiologists, five physicians, and ten medical students; three members are native English speakers. The questionnaire will be further validated by a pilot survey of 30 international students and health workers. This validation aims to evaluate the time needed to complete the questionnaire and assure that all the questions and sections of the questionnaire are phrased clearly and appropriately for comprehension and to avoid bias that might otherwise. Forward and reverse translation of the questionnaire to local languages will be performed, followed by a pre-test of the questionnaire.

H. Survey conduct: To gather information about the hospital staff preparedness in the participants' countries, we developed an online questionnaire using **SurveyMonkey©** that limits one-time participation per unique IP address. However, participants can choose to use hard copies prepared by the local collaborators for each hospital. One-year follow up will be conducted in February 2021 (optional for local site) to assess the persistent alert and preparedness.

I. Coordination and participating sites of the survey:

Local site collaborators: Two or three collaborators are required for each local site hospital and will be required to register centrally for updates to perform patient identification and data collection accurately. The survey questionnaire is anonymous and participant identification numbers will be used rather than any personal identifiers.

Local collaborators will be specifically responsible for:

1. Obtaining local audit, special exemption, or research approval (IRB / EC approval).
2. Listing all departments that are or will handle the patients (Emergency Department Intensive Care Unit, Outpatient Department, Infectious Disease Clinic, Respiratory Disease Clinic, or any department designed to treat COVID-2019 patients).
3. Reporting the number of doctors, nurses, other health workers of each department. If there are only a few staff in a particular department, the collaborators will assign that department as “others”.

4. Preparing the hard print of the survey questionnaire provided by our coordinator.
5. Distributing the questionnaire to the head of the department and collect it within one day, report the number of doctors, nurses, other workers of each department that is available on that day.
6. Scanning all collected questionnaires and sending a zip file to the corresponding coordinator via email using Google folder or via email.
7. Keeping all the hard copies of the collected questionnaires for at least five years and protecting the information inside those copies.

The site collaborators are fully responsible for the accuracy and any misconduct of research. Data cannot be published without prior written permission from Dr. Nguyen Tien Huy. Local collaborators may request permission to publish in a local journal after the main publication. A one-year follow up will be compared to assess the persistent alert.

Project coordinators: Each coordinator is responsible for 3-5 hospital sites and:

1. Recruiting 3-5 local site hospitals.
2. Supporting translation of the questionnaire (both forward and reverse translations) to the local language and conduct a pre-test with the questionnaire.
3. Assisting and communicate between the project management team and local collaborators.
4. Checking evidence of action and quality of the data scanning provided by the collaborators

Project managing team:

1. Writing the protocol and developing the questionnaire
2. Recruiting coordinators and follow all of their steps
3. Importing data in an online forum and collect them in spreadsheets to prepare them for the coding process.
4. Analyzing data and writing a report.

Data management: The collected data will be organized by Google Sheets and collected in an Excel spreadsheet. The survey will be completely anonymous. Hard copies of questionnaires will be scanned and uploaded to a Google drive encrypted by a password. Only the management team will be able to access all data. Data entered into Google Sheets will be quality-checked by a researcher to ensure accuracy.

V. Data analysis:

Every respondent will be given an overall score for awareness and preparedness where the pre-determined correct answers will be given a score of '2' in case of knowledge questions, '1' in case of other questions, while wrong answers will be scored '0'. Descriptive statistics will be performed and variations among different international health settings will be assessed by stratifying countries with participating centers into tertiles according to the Human Development Index (HDI) (14). The HDI is "a summary measure of average achievement in key dimensions of human development: a long and healthy life, being knowledgeable and have a decent standard of living" (15). Differences between HDI tertiles were tested with the Pearson Chi² test for categorical variables and with the Kruskal-Wallis test for continuous variables.

Moreover, a hierarchical logistic regression multivariate analysis will be used to adjust the influence of HDI on awareness and preparedness scores for different confounding variables. Model coefficients will be presented as odds ratio (OR) and 95% confidence intervals. All analyses will be done using the R Foundation Statistical Program version 3.6.3.

VI. Ethical approval:

Plan for getting informed consent and protecting confidentiality: All the respondents of the survey will fill a written informed consent embedded on the first page of the questionnaire. If the participant answers "YES" to the first question of the form, he/she automatically agrees to participate and will begin the survey. By using the skip-logic survey method, users who disagree with the informed consent question will be conducted to the end of the survey. No respondent is forced to participate in the survey and their participation is based on their agreement that can be withdrawn at any time.

Autonomy: All participants have the right to leave a specific question unanswered or withdraw from the survey any time if they feel uncomfortable answering any question. In addition, no one even the research team will know individual answers to this questionnaire.

Confidentiality and data retention: All data are anonymous and are not able to identify the participants. The hard copies of the collected questionnaires will be kept by the local collaborators for at least five years with protecting the information inside those copies. The collected electronic data will remain confidential and only authorized team members will have access to it. In addition, data will be completely encrypted and coded for use mainly in statistical analysis using computer software.

Risks and benefits for the participants: Data collected from this survey will play an important role in future reaction to fatal virus outbreaks. It will be used by a variety of researchers from different countries to improve the preparedness of different hospitals to outbreaks. This will play a crucial role in early management and prevention of viral outbreak to other areas. It will also play an important role in decreasing the response time to emergency cases at the hospital. We confirm that there are no risks associated with participating in this survey. Any unexpected risks that may occur during the survey will be immediately explained to both participants and the ethical committee. The responses collected from this survey are confidential and will not be revealed under any condition. In addition, the survey will be completely anonymous regarding participant and hospital names. Responses collected from this will be reported as collective combined data.

VII. Time table

Time	List of activities
31/01/2020 - 02/02/2020	<ul style="list-style-type: none"> • Establish the research team • Develop the survey questionnaire • Develop the survey protocol
03/02/2020 - 15/02/2020	<ul style="list-style-type: none"> • Revise the protocol, questionnaire (pretest and post-test) • IRB approval by Nagasaki University • Recruit coordinators and collaborator
06/02/2020 – 03/03/2020	<ul style="list-style-type: none"> • Translate questionnaire to local language • IRB approval by local hospitals
16/02/2020– 06/03/2020	<ul style="list-style-type: none"> • Conduct the survey, import data
06/03/2020– 28/03/2020	<ul style="list-style-type: none"> • Data analysis and report
06/02/2021– 28/03/2021	<ul style="list-style-type: none"> • 1 year follow up.

VIII. Financial support

Self-supported at each site.

IX. Authorship

Each author needs to fulfill the criteria listed in this protocol, qualify as a co-author in the publication.

The task must be finished before the deadline shown in the Time Table (Item VII). All authors will be listed as a group of collaborators as described in previous work (Figure 1) (16). In addition, the author's contributions will be also recorded as presented in Fig 2 of the previous publication (16). All data cannot be published without permission from Dr. Nguyen Tien Huy. Local collaborators may request permission to publish in a local journal after the main publication.

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Surgical site infection after gastrointestinal surgery in high-income, middle-income, and low-income countries: a prospective, international, multicentre cohort study.

GlobalSurg Collaborative.

 **Collaborators (1816)**

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Figure 1. Authorship recognition



Contributors

Collaborating members are listed together with their roles in the [appendix](#). The writing group contributed to study design, data analysis, data interpretation, and the writing and review of the final report: Aneel Bhangu, Adesoji O Ademuyiwa, Maria Lorena Aguilera, Philip Alexander, Sara W Al-Saqqa, Giuliano Borda-Luque, Ainhoa Costas-Chavarri, Thomas M Drake, Faustin Ntirenganya, J Edward Fitzgerald, Stuart J Fergusson, James Glasbey, J C Allen Ingabire, Lawani Ismail, Hosni Khairy Salem, Anyomih Theophilus Teddy Kojo, Marie Carmela Lapitan, Richard Lilford, Andre L Mihaljevic, Dion Morton, Alphonse Zeta Mutabazi, Dmitri Nepogodiev, Adewale O Adisa, Riinu Ots, Francesco Pata, Thomas Pinkney, Tomas Poškus, Ahmad Uzair Qureshi, Antonio Ramos-De la Medina, Sarah Rayne, Catherine A Shaw, Sebastian Shu, Richard Spence, Neil Smart, Stephen Tabiri, Ewen M Harrison. Aneel Bhangu and Ewen M Harrison are study guarantors.

Figure 2. Author contribution

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