Availability and Use of Personal Protective Equipment among Healthcare Professionals during COVID-19, Addis Ababa, Ethiopia

Purpose

- This policy briefing reports the major findings from a hospital-based survey conducted from 9th to 26th June 2020 to assess the availability and use of personal protective equipment (PPE) among 1,134 healthcare professionals practicing in six public hospitals in Addis Ababa, Ethiopia. The brief also offers recommendations based on the findings to improve the availability and use of PPEs during the current COVID-19 pandemic. The preparation of this policy brief was led by Addis Ababa University College of Health Sciences (see contact details on the last page).

Key findings

- Although the self-reported availability and use of many PPEs relatively improved during the COVID-19, an overall critical shortage of PPEs was reported in all study hospitals.
- Gloves and gowns were reported as the most frequently available and used PPEs in the routine care of patients before and during the COVID-19 pandemic, but no significant difference was observed in their availability and use before and during COVID-19.
- The self-reported availability and use of surgical facemasks significantly increased during the COVID-19.
- The self-reported use of N95 only increased from 9% to 21% before and during COVID-19, respectively.
- The majority (77%) of the participants stated that their hospital did not have adequate PPEs to keep them safe from infection of coronavirus.
- Almost 72% of the respondents were dissatisfied with the current availability of PPEs in their hospital.
- Only 35% of the healthcare professionals agreed about the availability of the correct PPEs in their hospital, as recommended by WHO, for managing suspected/confirmed COVID-19 patients.
- Only 38% of the study participants stated that they received any training in PPEs since COVID-19 pandemic.
- More than half (53%) of the respondents felt that they were unprepared to manage COVID-19 patients.
- About 88% of the participants worried about themselves due to the risk of becoming infected with coronavirus.
- Nine in 10 (91%) of the healthcare professionals worried about the potential risk of infection to their family and loved ones or others due to their clinical role in the hospital.

Policy recommendations

Given the above findings, we offer the following specific recommendations for policymakers:

- Preventing the risks of COVID-19 among healthcare workers through providing proper and adequate PPEs should be strengthened and needs to be a top priority for MoH and the Government.
- The MoH should ensure adequate availability and proper use of PPE within hospitals and other health facilities, so that the recommended PPEs will be available when needed.
- The MoH should implement various strategies to mobilize more resources to maintain the continuous supply of PPEs in order to mitigate the risk of COVID-19 among healthcare professionals.
- Healthcare workers, both in hospitals and other health facilities, must be trained on how to properly use PPEs, including proper donning and doffing procedures.
- The use of PPEs as per the WHO’s recommended guidelines should be maximized by the hospitals.
- Local manufacturing companies or organizations should be supported and strengthened to produce PPEs.
Background
The coronavirus disease 2019 (COVID-19) pandemic has caused over 28 million confirmed cases and more than 900,000 deaths worldwide as of 10th September 20201. As of 11th September 2020, Ethiopia has confirmed 63,367 COVID-19 cases, 986 deaths, and 24,024 recoveries from 1,122,659 tests performed to date. Healthcare professionals are at the frontline in the fight against COVID-19 and are at a substantially increased risk of becoming infected with the virus due to their clinical role in the health facilities and could potentially contribute to the transmission2. Risks of healthcare professional’s infection from the virus can be minimized by applying standard precautions within health facilities, primarily with the use of personal protective equipment (PPE)3,4. However, healthcare professionals have limited access to appropriate PPE to protect their health in many healthcare settings. The consequences have been particularly severe in low income countries including Ethiopia5. The number of COVID-19 cases is rising in Ethiopia and the shortages in PPE remain a major concern. The purpose of this study was to assess the availability and use of PPE among healthcare professionals practicing in Addis Ababa during the earlier stages of the COVID-19 pandemic.

Methods
A cross-sectional study was conducted from 9th to 26th June 2020 at public hospitals in Addis Ababa city administration, three months after the first confirmed COVID-19 case in Ethiopia in March 2020. Of the 12 government hospitals in the city, the following six were purposively selected based on the number of health work forces: Tikur Anbessa Specialized Hospital (TASH), Zewditu Memorial Hospital (ZMH), Ghandi Memorial Hospital (GMH), Menelik II Hospital (MH), Yekatit 12 Hospital Medical College (YHMC) and St. Paul Hospital Millennium Medical College (SPHMMC). The study population included all categories of health workers practicing in the selected hospitals at the time of the survey. Data were collected using a paper-based self-administered questionnaire. Of 1,228 healthcare professionals approached, 1146 completed questionnaires and 1,134 (92.3%) were used for final analysis. Ethical clearance was obtained from the IRB of the College of Health Sciences at Addis Ababa University. All participants gave their informed consent.

Main findings
Availability and use of PPE before and during COVID-19
During the COVID-19 pandemic, the frequent availability of most PPE as reported by the study participants has improved, for example, the frequent availability of surgical facemask and N95 respirator has increased from 59.3% and 12.6% before the pandemic to 82.6% and 24.2% after the pandemic, respectively. Gloves and gowns were reported as the most frequently available and used PPEs in the routine care of patients before and after the COVID-19 pandemic. This study found a major variation among the hospitals with regard to the frequently available PPEs before and during COVID-19. Even simple hand sanitizer was in short supply in some hospitals as reported by some respondents. The self-reported availability of gloves before and during COVID-19 was >90%, and statistically not significant for any of the hospitals. The availability of gowns for all study hospitals was >60% before and during the COVID-19, with no significant increase during the COVID-19. However, the availability of facemask and N95 respirator showed a statistically significant increase during COVID-19 as compared to the pre-COVID-19 (P<0.001).

Table 1 presents the self-reported frequently used PPE by healthcare professionals before and during COVID-19. The use of N95 respirator by all healthcare professionals has increased from 9.1% before the pandemic to 21.2% after the pandemic (P<0.001). The use of surgical facemask has also increased from 47.2% before the pandemic to 85.7% during the pandemic (P<0.001). Similarly, the use of eye protection (goggles and face shield) has increased from 11.6% before the pandemic to 22.4% during the pandemic, but only a steady increase was observed in the use of hair covers during the pandemic as compared with the time before COVID-19. The use of gloves by all healthcare professionals was above 90%, while the reported use by other healthcare workers before and after COVID-19 was relatively lower than others, despite showing some improvement during COVID-19. Likewise, the self-reported use of gowns remained not statistically significant before and after COVID-19, whereas the use rate remained less than 80% for the different categories of healthcare professionals. The use of surgical facemasks increased from 37% to 93% for interns before and after COVID-19, respectively. The self-reported use of N95 respirator was the highest for physicians than other even before (16%) and after (23%) COVID-19, while the least use of N95 respirator was
reported by interns. Overall, the self-reported use of N95 respirator was lower than other PPE except the use of hair cover. Although there was an increase in the self-reported use of hair cover during COVID-19, its use was generally very low and the difference was not statistically significant regarding its use by the different categories of healthcare professionals.

Table 1: Self-reported frequently used PPE by healthcare professionals before and during COVID-19

<table>
<thead>
<tr>
<th>PPE use by professional category before and during COVID-19</th>
<th>Frequently used PPE, %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Glove</td>
</tr>
<tr>
<td>Use by physician (n=252)</td>
<td></td>
</tr>
<tr>
<td>Before</td>
<td>94.0</td>
</tr>
<tr>
<td>During</td>
<td>94.8</td>
</tr>
<tr>
<td>P-value</td>
<td>0.697</td>
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<tr>
<td>Use by intern (n=123)</td>
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<tr>
<td>Before</td>
<td>91.1</td>
</tr>
<tr>
<td>During</td>
<td>92.7</td>
</tr>
<tr>
<td>P-value</td>
<td>0.641</td>
</tr>
<tr>
<td>Use by nurse (n=453)</td>
<td></td>
</tr>
<tr>
<td>Before</td>
<td>92.3</td>
</tr>
<tr>
<td>During</td>
<td>91.8</td>
</tr>
<tr>
<td>P-value</td>
<td>0.806</td>
</tr>
<tr>
<td>Use by midwife (n=117)</td>
<td></td>
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<tr>
<td>Before</td>
<td>95.7</td>
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<tr>
<td>During</td>
<td>94.0</td>
</tr>
<tr>
<td>P-value</td>
<td>0.553</td>
</tr>
<tr>
<td>Use by others (n=189)*</td>
<td></td>
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<tr>
<td>Before</td>
<td>81.5</td>
</tr>
<tr>
<td>During</td>
<td>86.2</td>
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<tr>
<td>P-value</td>
<td>0.208</td>
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<tr>
<td>Use by all categories (n=1,134)</td>
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<tr>
<td>Before</td>
<td>91.1</td>
</tr>
<tr>
<td>During</td>
<td>91.9</td>
</tr>
<tr>
<td>P-value</td>
<td>0.498</td>
</tr>
</tbody>
</table>

*Other: Includes anesthetist, pharmacist, health officer, lab technologist and radiographer.

With regard to the types of PPE used during their last interaction with a patient, the majority of the healthcare professionals reported the use of gloves (91.2%), gowns (72.4%), and facemasks (86.8%), with about 24%, 19% and 18% reporting N95 respirator, eye protection and hair dresses, respectively (Fig. 1).
**Preparedness to tackle COVID-19**

This study assessed the level of preparedness of healthcare professionals to provide direct clinical care to COVID-19 patients. Only 5.2% and 32.8% of the participants felt they were completely prepared or somewhat prepared to provide direct clinical care to COVID-19 patients, respectively. The majority of healthcare professionals (52.6%) reported that they were not prepared to manage COVID-19 patients. The level of preparedness was relatively higher among participants at GMH (55.2%), ZMH (48.7%) and SPHMMC (48.3%). Only 38.3% of the participants stated that they received any training in PPE since the COVID-19 pandemic, and the remaining majority (61.7%) reported that they didn’t receive any training related to PPE. About 36% of the respondents received training in the cleaning and disinfection procedures of PPE during the current COVID-19 pandemic. Nearly three in 10 (31%) respondents reported that they ever provided direct clinical care to suspected or confirmed COVID-19 patients, with more than one-third of the respondents from SPHMMC (42.1%), MH (38.2%) and TASH (34.8%).

**Shortage of PPE**

The study investigated the respondent’s opinion about the adequate availability of PPE in their hospital, as recommended by WHO, when managing suspected or confirmed COVID-19 patients. About 28% and 27% of all the respondents disagreed or strongly disagreed, respectively, about the availability of the correct PPE in their hospital, as recommended by WHO, for managing suspected/confirmed COVID-19 patients. It is only about one-third of the respondents who agreed or strongly agreed about the availability of PPEs in their hospital for managing COVID-19 patients as recommended by WHO. The majority (77%) of the participants perceived that the PPE currently available to them at their hospital was inadequate to keep them safe from infection when managing suspected or confirmed COVID-19 patients. Overall, more than half of the different healthcare professional categories reported that they disagreed or strongly disagreed about the statement on the availability of correct PPE in the hospital for managing COVID-19 patients as per the WHO recommendation, ranging from about 51% by physicians and 66% by interns. About 54% and 17.5% of the respondents reported that they were unsatisfied or somewhat unsatisfied with the availability of PPE, respectively. The overwhelming majority of interns (76.8%), physicians (72.3%) and nurses (72.9%) were unsatisfied with the current availability of PPE in the study hospitals. Only 10% of the respondents expressed their opinion that they were satisfied or somewhat satisfied with the current availability of PPEs at their hospitals.

**Risk perceptions of COVID-19**

The healthcare professionals were asked their worries about the potential risks of becoming infected with COVID-19 or the potential risks to their families and loved ones due to their clinical role in the hospital setting during the current COVID-19 pandemic. About 38% and 50% of all respondents perceived that they were generally worried or extremely worried about themselves, respectively, due to the potential risk of becoming infected with coronavirus by their clinical role in the hospital setting these days, with only 12% perceived that they were neutral or not worried about the risk of being infected with the virus. Majorities of the respondents (64.3%) were extremely worried about the potential risk of infection to their family and loved ones, and the remaining 26.6% were generally worried. Only 3.8% of the respondents were not worried about their family and loved ones.

**Respondents’ suggestions to improve PPE availability and prevention of COVID-19**

The survey included open-ended questions for free-text responses to enable the respondents to freely suggest or recommend anything they wished on ‘things that could be done by the Government or their hospital to improve the availability of PPE and ‘measures to be taken to address the COVID-19 pandemic’.

**Suggestions to improve the availability of PPE**

- Frontline healthcare workers should be protected by supplying proper and adequate PPE to protect them from COVID-19
- Priority should be given for healthcare workers at risk of COVID-19 due to their role in managing suspected or confirmed COVID-19 patients.
- Proper and adequate PPEs should be available for all healthcare workers in the healthcare facility settings both at COVID-19 and non-COVID-19 centers
● All patients are considered to be suspected COVID-19 cases and healthcare workers managing them should get access to appropriate PPEs
● Improve availability of N95 respirator at least one per health worker per week
● The availability of surgical masks is even inadequate and they should be adequately supplied
● Ensure the continuous supply of PPEs for all healthcare facilities to maintain sustainability
● Improve fair distribution and appropriate use of PPE by healthcare workers by minimizing misuse of PPE
● Provide proper training for healthcare workers on IPC and correct use of PPE
● Ensure the quality of PPE as recommended by WHO
● Healthcare workers are at high risk for contracting COVID-19 and transmitting it to their patients and families, and proper and adequate PPE should be available to them.
● There should be proper guide to regularly dispose used PPE
● Hospitals should give priority for caring their health workers about COVID-19 and give the necessary support
● Support and collaborate with local manufacturers to produce proper PPE, and
● Government must allocate sufficient resources to avail proper and adequate PPE to the healthcare workers.

Suggestions to address COVID-19 pandemic
● Healthcare workers should be financially and psychologically supported
● Provide risk allowance and adequate incentives for healthcare workers
● Health insurance and housing for healthcare workers should be available
● Healthcare workers should be regularly tested for COVID-19 and emergency testing centers should be started for quick test results
● Pregnant and lactating female health workers should get adequate PPE and stay at home if possible
● Provide transport and separate place for living for frontline health workers
● Adequate and easily accessible COVID-19 testing capacity should be available in all areas
● All hospitals should conduct testing of COVID-19 before admitting any patient
● Only COVID-19 symptomatic patients should be admitted and the asymptomatic patients should self-isolate at home or other isolation centers.
● Health facilities particularly hospitals are overcrowded and physical distancing should be adhered strictly
● People should properly use facemasks, avoid mass gatherings, practice proper physical distancing, use sanitizers and wash hands frequently, and
● Mass testing should be launched to control the spread of the virus in the community.

Conclusions
In the absence of a vaccine or other effective therapy, healthcare professionals remain at a substantially increased risk of becoming infected with COVID-19. Despite being at high risk of exposure with limited access to PPE, the healthcare workers have committed to fight against this catastrophic disease. The current findings underscore the critical concerns of healthcare professionals from different professional categories across hospitals and revealed an overall critical shortage of PPE to protect themselves from COVID-19 while practicing routine clinical activities in hospitals. An overwhelming majority of the study participants was highly worried about being exposed to COVID-19, infecting their patients and taking the infection home to their family and loved ones. In view of all the circumstances, the healthcare professionals in the six hospitals were highly dissatisfied with the current availability and use of PPE, and reported the urgent need for the government to alleviate this critical shortage as soon as possible. Finally, the healthcare workers requested adequate training in the proper use of PPE as well as on COVID-19.

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