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Prevention and Control of Severe Acute Respiratory Syndrome Coronavirus 2 Infection in the Peripheral Care Units of the Golfe Health District in Lomé, Togo

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Abstract

Introduction: The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) pandemic is a high-risk situation for healthcare providers. The objective of this study was to evaluate the prevention and control of severe acute respiratory syndrome coronavirus 2 infection during the medical consultation. **Methods:** This was a one-week cross-sectional observational study of healthcare providers of the medical consultation services in the peripheral care units (PCU) of the Golfe health district of Lomé. **Result:** Twenty out of 31 (64.5%) peripheral care units and 70 out of 128 (54.7%) medical consultation service providers were surveyed. Providers were 48.6% medical assistants, 30% state nurses, 12.9% physicians, and 64.3% did not receive any in-service training in infection prevention and control (IPC). Compliance with severe acute respiratory syndrome coronavirus 2 infection prevention and control measures was quite satisfactory with a percentage level of targets achieved of 71%. The preventive measures in place were adequate in terms of resource allocation and physical location organization interventions (85%), but were inconclusive in terms of administrative and organizational measures (58%), as well as in terms of proper use of personal protective equipment (72%), but were complied with by 47% of the providers and 97% of the patients. **Conclusion:** Adherence to infection prevention and control measures in peripheral care units remains insufficient in relation to the acceptable threshold of per-

formance set by the World Health Organization at 75%.

Keywords

IPC, SARS-CoV-2, Healthcare Providers, PCU, Togo

1. Introduction

The incidence of intra-hospital coronavirus infection by healthcare personnel is estimated at 29% in China, 19% in the United States, 14% in England and 9% in Italy [1]-[3].

As part of the response to coronavirus disease (COVID-19), health workers may be subjected to occupational hazards that expose them to risks of illness. To mitigate these dangers and protect the health, safety and well-being of health workers, it is necessary to put in place well-coordinated and comprehensive measures on infection prevention and control, health and safety at work [4].

Infection prevention and control measures are not yet fully implemented in health structures and only 16% of health facilities have reached a level of performance above 75% in terms of compliance with recommended standards [5].

In Togo, notwithstanding the efforts made to ensure the protection of health personnel in hospitals, the shortcomings in the application of infection prevention procedures and personal protective equipment are decried by the health sectors union which counted 55 cases of health workers contaminated with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) as a result of their profession over the period from January to August 2020 [6].

Faced with this worrying situation of high biological risk for hospital practitioners, we wondered about the organization, means and procedure to prevent and control SARS-CoV-2 infection during medical consultations in the peripheral care units (PCU) of the Golfe Health District of the Greater Lomé Health Region.

The main objective of the study was to evaluate in terms of organization, means, and procedures, the prevention and control of SARS-CoV-2 infection during medical consultations in the PCU of the Golfe health district of the Greater Lomé health region.

2. Materials and Method

2.1. Type and Setting of Study

This was a cross-sectional, observational and descriptive study on the SARS-CoV-2 infection prevention and control (IPC) during medical consultations in the PCU of the Golfe health district in the Greater Lomé health region conducted from July 28 to August 6, 2020. The Golfe Health District covers an area of 90 km^2 with an estimated population of 342,209 inhabitants and is subdivided into 7 health municipalities with numerous health facilities providing all levels of care in the health pyramid [7]. The district was selected by reasoned choice on the basis of its high

incidence rate of active cases of SARS-CoV-2 infection since the pandemic in Togo and the relatively large number of PCU; 31 in total.

2.2. Inclusion Criteria

The study included any health care provider involved in the medical consultation, as well as any patient who came for a medical consultation in a PCU in the Golfe Health District.

2.3. Technique and Tools for Data Collection

A questionnaire addressed to healthcare providers by direct interview and an observation grid were used for data collection. The observation grid focused on the infrastructure and equipment, the technical facilities of the PCU, the consultation room, and compliance with SARS-CoV-2 infection prevention practices during medical consultations.

2.4. Study Variables

The variables studied were as follows:

- The social and demographic profile of the providers (age, gender, qualification, seniority);
- Technical and engineering measures (infrastructure, equipment, inputs) of the IPC;
- Organizational and administrative measures (physical distancing, hand hygiene, taking temperatures upon admission, limiting visitors, disinfection of surfaces and equipment, positioning of patients, etc.);
- Wearing of personal protective equipment (complete gown, overcoat, gloves, visors, masks, cap…);
- Appreciation of provider satisfaction.

2.5. Conduct of the Survey

The enrollment of patients who came for consultation was done systematically as they presented themselves for consultation during the study period. The evaluation of SARS-CoV-2 infection prevention practices and measures during the consultation was carried out without the knowledge of providers through a silent and discreet observation.

2.6. Data Analysis

Data analysis was done using SPSS version 21 software. Pearson's Chi-square test was used for comparison of variables. The differences found were considered significant for a degree of freedom at 1 within a 95% confidence interval.

2.7. Criteria for Measuring Compliance with Infection Prevention and Control Measures

The Model for the Evaluation of IPC at the Health Care Facility was used. It in-

cludes three main components and 40 indicators. The modalities of the structural and procedural IPC variables explored were coded on the 0 and 1 rating scale. The "YES" rating corresponds to "1" and means that the information sought exists and complies with current standards; the "NO" rating corresponds to "0" and means that the information sought does not exist or exists but does not comply with current standards. A percentage YES score ≥ 75% was defined as satisfactory compliance; a percentage YES score between 50% and 75% was defined as unsatisfactory compliance; and a percentage YES score < 50% was assessed as unsatisfactory compliance. Any percentage score of "NO" is considered a lack of compliance generating a high risk of contamination [8].

2.8. Ethical and Deontological Aspects

The patients were reassured about the confidentiality and anonymity of the information that will be collected and we have obtained informed consent from them to participate in the study. A note explaining the objective and purpose of our study was attached to the questionnaire.

3. Results

Twenty of the 31 PCUs in the 7 municipalities of the Golfe Health District were surveyed, *i.e.* a coverage rate of 64.5%. Seventy healthcare providers of medical consultation services out of the 128 counted, *i.e.* a participation rate of 58.3%.

❖ **Socio-professional profile of care providers**

The mean age of the providers was 36 ± 6 years [26 - 56 years]. Their average length of service in their position was 6 ± 5 years. They were distributed as follows: nurses (n = 27), medical assistants (n = 34) and physicians (n = 9).

❖ **Organizational measures of the physical and engineering locations of the infection prevention and control**

Technical retrofits performed by peripheral care units in accordance with the infection prevention and control

Eighteen out of 20 PCUs surveyed had redesigned the work environment by implementing SARS-CoV-2 IPC equipment (Table 1).

Table 1. Distribution of peripheral care units according to infection prevention and control compliant amenities.

	YES		NO	
	Number	%	Number	%
hand washing device	20	100	0	0
Thermo flash	16	80	4	20
Patient sorting station	15	75	5	25
Isolation tent	14	70	6	30
Wall posters	20	100	0	0
Cumulative criteria	89	425	11	75
Average for all criteria	**18**	**85**	**2**	**15**

IPC resources made available to providers in the consultation rooms

Fifty-nine providers (84%) had IPC resources and inputs in the consultation rooms (Table 2).

Table 2. Distribution of providers according to the means of infection prevention and control made available to them during the consultation.

	YES		NO	
	Number	(%)	Number	(%)
Sink	67	95.7	3	4.3
Availability of water	68	97.1	2	2.9
Liquid soap	65	92.9	5	7.1
Hydro-alcoholic solution	63	90	7	10
Masks (FFP2 or surgical)	48	68.6	22	31.4
Gloves	54	77.1	16	22.9
Dustbin	68	97.1	2	2.9
Waste sorting bags	41	58.6	29	41.4
Functional air conditioning	55	78.6	15	21.4
Cumulative criteria	529	755.7	101	144.3
Average for all criteria	**59**	**84**	**11**	**16**

❖ Organizational and administrative measures of the infection prevention and control

Compliance with administrative measures relating to patients

Seventy-three percent of patients (n = 51) had complied with the administrative and organizational guidelines of IPC. 27% of the patients did not comply with the measures. The performance level was less than 75% (Table 3).

Table 3. Distribution of patients according to compliance with organizational and administrative measures of infection prevention and control.

	YES		NO	
	Number	(%)	Number	(%)
Wearing of mask	68	(97.1)	2	(2.9)
Hand washing	59	(84.3)	11	(15.7)
Taking the temperature of patients at the entrance	43	(61.4)	27	(38.6)
Limitation of the number of patients at the entrance	52	(74.3)	18	(25.7)
Respect for physical distance between patients	52	(74.3)	18	(25.7)
Patients positioned in profile to providers	31	(44.3)	39	(55.7)
Cumulative criteria	305	(435.7)	115	(164.3)
Average for all criteria	**51**	**(73)**	**19**	**(27)**

Severe acute respiratory syndrome coronavirus 2 infection prevention and

control training for providers.

Twenty-five healthcare providers have received infection prevention and control training for Severe acute respiratory syndrome coronavirus 2.

Overall compliance with barrier measures and infection prevention and control in peripheral care units.

On average, 54 providers (77.2%) had either washed their hands with soap and water or disinfected their hands with a hydro-alcoholic solution before and after contact with patients. Similarly 84.3% of patients (n = 59) washed their hands on admission. Overall or average hand hygiene compliance by providers and patients was 81% (n = 56 on average).

An average of 18 healthcare providers (25%) had disinfected critical contamination points.

Thirty-three providers (47%) had worn personal protective equipment (PPE) according to standards.

The overall IPC compliance performance level was 71% (Table 4).

Table 4. Distribution of compliance by infection prevention and control components.

	YES	NO
	Frequency	Frequency
Physical location and engineering measures	**84**	**16**
Technical and engineering measures by PCU	85	15
Technical resources during the consultation	84	16
Organizational and administrative measures	**58**	**42**
Compliance with physical distancing	64	36
Hand hygiene compliance (providers and patients*)	81	19
Disinfection of critical contamination points	25	75
Taking the temperature of patients at the entrance	61	39
Personal protective equipment	**72**	**28**
Wearing of PPE by providers	47	53
Wearing of PPE by patients	97	3
Cumulative criteria	214	86
Average for all criteria (Performance)	**71**	**29**

(*): 70 patients seen in consultation; (**): tensiometer cuff; stéthoscope; consultation room door handle; patient's seat; plancher; hall and consultation room; PCU: Peripheral Care Units; PPE: Personal Protective Equipment.

4. Discussion

4.1. Qualification and Professional Experience

In a study conducted in Ethiopia in 2013 on infection control knowledge, attitudes, and practices among health care workers, 51% were physicians and 49% were nurses [9]. The profile of health care professionals varies according to qualifications, spe-

cialization and country standards. In Togo, the doctor is responsible for medical consultations. However, by delegation of tasks, the medical assistants trained to compensate for the shortage of doctors are the first line care providers in the realization of the medical consultation at the PCU level according to health standards. They are assisted by state-qualified nurses, but also sometimes by auxiliary nurses [10].

4.2. Training of Providers on Infection Prevention and Control

The World Health Organization (WHO) in its guidelines on IPC program components in health care facilities, had emphasized on the training of health personnel, as knowledge of a directive that tells what to do without specifying how to proceed is not practical and may be difficult to apply, which does not guarantee compliance [11].

According to the Joint Occupational Health and Safety Association of the Social Affairs Sector [12] in Canada, the infection prevention program must include a component for training the institution's personnel so that each person has the required knowledge on infectious risks and the role they can play in preventing the transmission of infection in the performance of their duties. Adequate training of all staff is necessary for the acquisition of skills and allows the standardization of practices, as well as a better collective handling of the problem.

4.3. Physical Location and Engineering Organization Measures

The reorganization of the hospital environment and the availability of IPC resources and inputs were satisfactory.

The Group for the Evaluation of Hospital Hygiene Practices according to its practice audit on additional contact-droplet-air precautions in healthcare facilities [13] in France in 2015 had for these IPC measures, obtained a 95.2% rate achievement of objectives. 94.4% of healthcare facilities had patient sorting and isolation stations; 90.6% had a device for signaling and informing patients. Eighty-two percent of providers had resources for IPC. All personnel surveyed in France had gloves, hydro-alcoholic products, 87.3% had single-use gowns, and 98.4% had surgical masks. The organizational measures of the physical and engineering locations provide collective protection at all times and consist of the design and layout of the infrastructures according to the standards established for the prevention of infections in the healthcare environment, as well as the installation of technical equipment that meets the requirements in this area to ensure the safety of the locations against the transmission of micro-organisms. The technical measures taken by the Togolese government with the support of technical and financial partners have enabled all health care institutions to achieve a satisfactory level of compliance.

4.4. Hand Hygiene Compliance

The hand hygiene technique of hydro-alcoholic friction was the most practiced.

Compliance with hand hygiene was satisfactory for both techniques (hydro-alcoholic rubbing and hand washing). *Longembe et al.* in a study on hand hygiene compliance in general referral hospitals in the city of Kisangani in the Democratic Republic of Congo in 2020 found a fairly low global hand hygiene compliance rate of 39%, including 5% for hydroalcoholic hand rub. Non-compliance was almost the same among nurses (56%) and physicians (51%) [14]. In Burkina-Faso, in a study on the knowledge and practices of healthcare professionals on the infectious risk associated with healthcare, *Hien et al.* had reported 21.1% compliance of hand hygiene by washing and 5% for hydroalcoholic hand rubbing [15]. The hands of health care providers are in frequent contact with patients and the environment, making this part of the body at risk for contamination or likely to transfer of micro-organisms during health care services. In the context of SARS-CoV-2 infection, contaminated hands can transmit the virus to inanimate objects or surfaces, patients and staff. Regular hand hygiene is recognized as a fundamental means of preventing han-to-hand transmission of this infection. Although recommended by WHO for all providers in hospital facilities, as well as for visitors and families, its compliance often remains low in hospitals [8] [16]. In Togo in 2016, hand hygiene compliance was 12.6% [17]. The high rate of compliance obtained in our study could be explained by staff adherence to hydro-alcoholic hand rubbing, which is one of the strategies recommended by WHO to improve compliance with this practice considered as a major pillar of hand infection prevention [8].

4.5. Compliance with Disinfection of Critical Contamination Points

The disinfection of fomites by providers was not satisfactory. In Ethiopia in 2019, 34.6% of health personnel never disinfected their stethoscope [18]. While a study on the enduring value of the stethoscope in the COVID-19 era reported that only 8% of nurses cleaned their stethoscopes before or after use in the management of patients with COVID-19; stethoscopes contain bacteria with levels of contamination comparable to that of a caregiver's hand [19].

Samples taken from surfaces and equipment in hospitals have shown contamination in 40% [20] and growth of bacterial species [21].

The equipment indexed was the blood pressure cuff, stethoscope, visitor chairs, computer keyboard and mouse, doorbell switches and pushers, and door handles. Fomites are surfaces, materials or objects that are contaminated with a pathogenic microorganism and are likely to contaminate other objects or people, thus playing a role in the spread of a disease. Studies have evaluated the persistence of COVID-19 virus on different surfaces and its probable transmission through fomites [22].

4.6. Personal Protective Measures

Compliance with barrier measures (hand hygiene and wearing of personal protective equipment) is generally unsatisfactory due to negligence among healthcare personnel. After a good implementation with good compliance after barrier measures, we always observe weariness a few months later as noticed by *Fourquet*

[23]. The surgical mask was the most used PPE, although not all providers wore it during medical consultations.

The level of PPE compliance was therefore not optimal or total as observed in several studies [13] [15]. PPE is a device or means intended to be worn by a person in order to protect him against one or more risks likely to threaten his safety or health. Primarily worn in the workplace, PPE in the context of protection against SARS-CoV-2 in the hospitals includes gowns, aprons, over-gowns, gloves, surgical masks, goggles or visors, and headgear that must be worn properly.

4.7. Overall Compliance with Infection Prevention and Control

The overall level of compliance with IPC in its various components for all health facilities was 71% due to the health crisis. The satisfactory performance set at 75% by WHO could not be achieved because of the low compliance with administrative and organizational measures. According to WHO, IPC measures to prevent infections in health facilities are not yet fully implemented in many African countries and only 16% of the 30,000 health facilities on the continent had an evaluation score above 75% [24].

5. Limits

The small size of our whole population may result in a higher or lower estimate of frequencies depending on the small number of observations made, the relatively short time and the location of the survey in a single health district. Our presence in the consultation room during the observations may have modified the respondents' behaviors and responses, especially since they were informed. This sometimes led to a bias of prevarication or social desirability of the information collected. However, we believe that this original study on this issue in Togo constitutes a reliable data base that can guide future studies.

6. Conclusion

At the end of this work, it was found that compliance with IPC measures to limit the transmission and spread of SARS-CoV-2 during medical consultations was quite satisfactory. The preventive measures put in place were adequate in terms of resource allocation and organization of the physical locations, but were not very conclusive in terms of compliance with administrative and organizational measures, as well as in terms of the adequate use of PPE, especially among providers. Compliance with standard precautions was relatively low. It is important to undertake behavioral interventions because IPC is a long-term task that requires simultaneous, concerted, collective and individual actions for its application based on several technical, administrative and equipment protection approaches.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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