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Analyzing Patients' Perceptions and Challenges Faced in the Use of Protective Devices/Approaches While Receiving Healthcare in COVID-19 Units in Bamenda Municipality, Cameroon

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Abstract

Background: The COVID-19 pandemic necessitated stringent infection control measures, including the use of personal protective equipment (PPE) and other protective approaches to mitigate transmission in healthcare settings. Patients admitted to COVID-19 units faced significant physical, psychological, and socio-cultural challenges in adhering to these measures, especially in resource-limited regions like Bamenda, Cameroon, where healthcare systems were already strained by socio-political crises. This study explored patients' perspectives on the use of protective devices and approaches, and the barriers encountered during care in COVID-19 units. **Methods:** A mixed research design was employed, involving 43 patients admitted to COVID-19 units in two public hospitals in Bamenda between January 2020 and January 2022. Data were collected via semi-structured interviews and focus group discussions, focusing on patients' experiences with PPE (e.g., masks, sanitizers, gowns) and protective protocols (e.g., isolation, hand hygiene). Thematic analysis was used to identify key challenges, including physical discomfort, psychological distress, and systemic inadequacies. **Findings:** The majority of patients (60.5%) consistently used face masks, while 55.1% reported never using gowns due to affordability and accessibility issues. Key challenges included: Physical discomfort: 69.8% experienced breathing difficulties; 46.5% faced communication

barriers; and 44.4% reported excessive heat from prolonged PPE use. Psychological distress: 81.4% cited feelings of isolation, and 72.1% reported inadequate nurse-patient interaction due to PPE; 75.6% reported insufficient PPE supply; and 64.4% noted reliance on untrained staff. Socio-demographic factors, such as age and education level, significantly influenced experiences ($p < 0.05$). **Conclusion:** Patients in COVID-19 units faced multifaceted challenges exacerbated by resource constraints and inadequate training. The study recommended: patient-centered PPE training to improve compliance and reduce discomfort; provision of subsidized PPE to mitigate financial barriers; and enhanced communication strategies (e.g., transparent masks) to address psychological distress. This study accentuates the need for adaptive, equitable interventions to improve patient experiences in pandemic settings, particularly in low-resource contexts.

Keywords

COVID-19, Personal Protective Equipment, Patient Challenges, Healthcare Barriers, Cameroon

1. Introduction

The novel coronavirus disease (COVID-19), caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) [1], emerged in December 2019 and rapidly escalated into a global pandemic, profoundly impacting healthcare systems worldwide. This virus posed unprecedented challenges to global healthcare systems, impacting both patients and healthcare workers (HCWs) [2]. In response, stringent infection prevention and control measures were introduced globally, including the widespread use of personal protective equipment (PPE) and other protective strategies. In the Americas, as of June 9, 2020, the United States reported 1,993,560 cases, Mexico 117,103, and Canada 95,699. South America reported 691,758 cases in Brazil, 196,515 in Peru, and 138,846 in Chile [3]. The African region's most affected countries included South Africa (50,879 cases), Nigeria (12,801), and Algeria (10,265). North America recorded the highest fatalities (110,220), with Mexico (13,699) and Canada (7800) following. Brazil reported the highest fatalities in South America (36,455), while in Africa, South Africa led with 1080 deaths [3].

Diseases with high transmissibility require strict infection control measures, including PPE use and other protective approaches, to mitigate their spread within healthcare settings [4]. In an effort to contain the spread of this infectious disease, the World Health Organization (WHO) issued guidelines which are a protective measure on the use of physical protective devices (masks, gowns, gloves) and the use of protective approaches, which are non-material infection prevention measures such as hand hygiene instructions, social distancing protocols, isolation practices, and limited physical contact strategies [4]. WHO emphasized their application

based on healthcare settings, the roles of personnel, and the nature of the activities performed [1]. Patients admitted to COVID-19 units faced unique challenges in adapting to these protective measures, which were vital for their safety and that of healthcare providers [5]. The implementation of PPE (masks, gowns, and face shields) and practices such as social distancing and hand hygiene protocols became central to care. These measures introduced physical, psychological, and logistical barriers that affected patient well-being in COVID-19 units [6] [7].

For patients in COVID-19 units, especially those critically ill, compliance with these unfamiliar and restrictive measures was required. For instance, wearing masks for extended periods could exacerbate respiratory distress in patients already struggling with breathing difficulties, while isolation protocols limit interactions with family and healthcare providers. These measures, while essential, disrupted the traditional patient-caregiver dynamic, creating a sense of alienation and discomfort [6]-[9].

The global scarcity of PPE during the early phases of the pandemic further compounded patient challenges [9]. In many regions, including sub-Saharan Africa, healthcare facilities faced critical shortages, forcing patients to navigate care environments with suboptimal protection. In Cameroon, especially in the conflict-affected North West Region, the rapid increase in COVID-19 cases strained the already fragile healthcare infrastructure, leading to inconsistent availability of protective devices. This scarcity heightened patients' vulnerability to infection and undermined trust in healthcare systems. Patients were often aware of the risks posed by inadequate PPE, which added a layer of psychological stress to their physical ailments [10]. The interplay between resource constraints and patient care accentuated the need for robust supply chains and equitable distribution of protective equipment [11].

Psychological burdens associated with protective measures were particularly pronounced among patients in COVID-19 units [12]. The strict measures contributed to feelings of loneliness, abandonment and disorientation [13]. Patients reported difficulties communicating with healthcare providers whose faces were obscured by PPE, hindering the establishment of rapport and trust [12]. Furthermore, the sensory deprivation caused by protective barriers, such as face shields and hoods, could disorient patients, particularly those with cognitive impairments or severe illness [14]. These psychological challenges were exacerbated by the fear of contracting or spreading the virus, creating a complex emotional landscape for patients navigating care [15].

Physical discomfort was another significant challenge for patients using protective devices. Masks and other PPE could cause skin irritation, pressure sores, and breathing difficulties, particularly for those with pre-existing respiratory conditions like patients with asthma or acute respiratory distress syndrome (ARDS) a common complication of COVID-19. These physical burdens were not only a barrier to effective care but also a source of distress that compounded patients' overall suffering [12]-[16].

The socio-cultural context also influenced care delivery in COVID-19. In settings like Bamenda and Cameroon, where a socio-political crisis has disrupted healthcare access, patients faced additional barriers to engaging with protective protocols. Cultural norms around physical touch and communal support clashed with social distancing mandates, creating tension for patients accustomed to family involvement in their care. Moreover, language barriers and low health literacy hindered patients' understanding of PPE requirements, leading to unintentional non-compliance.

Healthcare disparities were also pronounced. Marginalized groups in low-income settings or conflict zones were disproportionately affected by the pandemic due to limited access to quality care and protective resources [17]. In Bamenda, the ongoing socio-political crisis compounded these disparities with disrupted supply chains and overwhelmed healthcare facilities, limiting PPE availability. Patients from underserved communities often received care in under-resourced settings, where the lack of adequate protective measures heightened their risk of adverse outcomes. Addressing these inequities requires a concerted effort to prioritize vulnerable populations in pandemic response strategies [17] [18].

The role of healthcare providers in facilitating patients' use of protective devices cannot be overstated [19]. Nurses, in particular, were at the forefront of implementing PPE protocols, often under extreme pressure due to staffing shortages and high patient loads [19]. Their ability to educate and support patients in adhering to protective measures was critical, yet challenging, given the physical and emotional toll of their own PPE use [19]. Nurses reported difficulties in communicating effectively with patients while wearing PPE. It could impede their ability to provide reassurance and clear instructions. This dynamic underscores the interconnectedness of patient and provider experiences in navigating the challenges of protective measures [18] [19].

The rapid evolution of COVID-19 guidelines added another layer of complexity for patients. As scientific understanding of the virus improved, recommendations for PPE and protective approaches shifted, leading to confusion among patients and providers alike. In resource-constrained settings like Bamenda, keeping pace with these changes was particularly difficult. Healthcare facilities struggled to disseminate updated protocols. Patients often received inconsistent messaging about mask-wearing, isolation, and other measures, which could undermine their confidence in the care process. Ensuring clear, consistent communication is essential to fostering patient compliance and trust in evolving pandemic response strategies [20].

Cameroon reported its first confirmed case on March 6, 2020. By July 6, 2020, the country had recorded nearly 15,000 confirmed cases. As of March 26, 2021, the country had documented over 40,622 cases and more than 600 deaths [3]. Cameroon once had the highest weekly infection rate globally, as of May 12, 2020. In response, the government implemented a series of public health measures beginning with 13 actions announced by the Prime Minister on March 17, 2020.

Despite these efforts, the number of confirmed cases rose rapidly due to limited diagnostic capacity [3].

Cameroon's national COVID-19 response was coordinated through a centralized governance structure. The Prime Minister chaired an Inter-Ministerial Committee to monitor the pandemic. The Ministry of Public Health led implementation at the national level. Regional delegates and health district managers were responsible for local implementation, though many regions lacked adequate empowerment and resources [21].

This study explores the multifaceted challenges faced by patients using protective devices and approaches in COVID-19 units within Bamenda Municipality. This study aims to assess the physical, psychological, socio-cultural, and systemic barriers encountered by patients with the goal of informing the development of patient-centered interventions that enhance the efficacy of protective measures. Understanding these challenges is critical to improving care delivery in pandemic settings, particularly in regions grappling with concurrent crises.

2. Methodology

2.1. Study Design

This study employed a convergent mixed-methods design, integrating quantitative and qualitative approaches to fully explore patients' challenges in using protective devices and approaches in Bamenda COVID-19 units. The quantitative component used structured questionnaires and captured measurable data on patient perceptions, frequency of use, levels of compliance, and associated difficulties related to protective measures. The qualitative component, consisting of semi-structured interviews and focus group discussions (FGDs), enabled an in-depth exploration of patients' lived experiences, emotional responses, and cultural perceptions related to PPE and infection prevention protocols. This design was chosen because it allows for both quantifiable measurement and in-depth exploration, providing a more comprehensive understanding of patients' experiences than either method alone [22].

2.2. Study Setting

Research was conducted in two public hospitals in Bamenda, North West Region of Cameroon, within their designated COVID-19 isolation and treatment units. Bamenda was selected due to its significant burden of COVID-19 cases and disruptions from the socio-political crisis that affected healthcare delivery and exacerbated PPE shortages. These hospitals serve both urban and rural populations, providing a representative context of care in resource-constrained healthcare environments [23].

2.3. Study Population and Sampling

The study targeted adult patients (aged 18 years and above) admitted to COVID-19 units between January 2020 and January 2022 and exposed to PPE or infection

control protocols.

Purposive sampling was used to recruit 20 participants for the qualitative strand, ensuring diversity across age, gender, socioeconomic status, and illness severity. For the quantitative strand, systematic sampling was employed to administer structured questionnaires to an additional group of patients (n = 60) discharged. Sample sizes were determined to achieve data saturation qualitatively and sufficient statistical power quantitatively [24].

2.4. Inclusion and Exclusion Criteria

The study included adults aged 18 years and above admitted for a minimum of 48 hours, having experience with PPE or infection prevention control, able to communicate effectively in either English or French, and who provided written informed consent. Excluded from the study were those with cognitive impairments, unwillingness to consent, or those discharged from the COVID-19 unit for more than six months before data collection. These criteria were carefully established to ensure that participants were capable of offering relevant and reflective insights into the subject matter [23] [25].

2.5. Data Collection Methods

Data collection took place between June and August 2022 and employed a combination of three complementary methods to ensure a comprehensive understanding of participants' experiences.

First, structured questionnaires were administered to 60 patients. These were designed to collect quantitative data on the frequency of PPE use, perceived effectiveness, levels of discomfort, and challenges related to compliance. The questionnaire was developed based on guidelines from the World Health Organization (WHO) and incorporated validated pandemic-related measures.

Secondly, semi-structured interviews were conducted with 20 patients. Each lasted 30 to 45 minutes. They provided an opportunity to explore personal experiences with PPE and infection control practices in greater depth. These discussions focused on a range of challenges, including physical discomfort, psychological impact, and cultural factors influencing PPE use and adherence to protocols.

Lastly, two focus group discussions (FGDs) were organized, each comprising 6 to 8 participants. The FGDs aimed to capture shared experiences and community-level perspectives and coping strategies. An interview guide and FGD protocol developed based on existing literature and WHO recommendations was used. Sample questions included: "*Can you describe your experience wearing a face mask during your hospital stay*?" and "*What challenges did you encounter with isolation or social distancing measures*?" All sessions were audio-recorded with consent and conducted in English or French by trained researchers to ensure cultural and linguistic appropriateness [26] [27].

2.6. Data Collection Procedures

Participants were identified through hospital discharge records. Research assistants

contacted potential participants after discharge, explained the study purpose, and scheduled interviews/FGDs at the participant's convenience. Depending on safety and mobility, sessions were conducted in neutral community locations or virtually using secure platforms (e.g., Zoom). Informed consent was obtained prior to participation. Efforts were made to mitigate recall bias by restricting recruitment to those discharged within the preceding six months. Researchers maintained reflexive journals to document assumptions and enhance credibility [28] [29].

2.7. Data Analysis

Triangulation strategy was used to integrate both quantitative and qualitative findings.

Quantitative Data: Questionnaire responses were coded and analyzed using SPSS. Descriptive statistics (frequencies, percentages, means) were used to summarize trends in PPE use, levels of compliance, discomfort, and perceived challenges.

Qualitative Data: Interview and FGD recordings were transcribed verbatim. French transcripts were translated into English and reviewed for accuracy. Data were analyzed thematically using Braun and Clarke's (2006) six-phase approach. Coding was conducted independently by two researchers using NVivo software. Emergent codes were grouped into themes such as *physical discomfort*, *psychological distress*, and *cultural barriers*. Member checking with a subset of participants was employed to validate thematic interpretations and enhance trustworthiness [30]. The integration of data sets occurred during interpretation, where findings from the quantitative and qualitative strands were compared and contrasted to draw meaningful conclusions [25].

Ethical Considerations: Ethical approval was obtained from the Institutional Review Board (IRB) of the University of Bamenda and the Regional Delegation of Public Health, North West Region. Participants were informed of their rights, including the freedom to withdraw at any stage without repercussions. Pseudonyms were assigned to ensure confidentiality, and all data were securely stored on password-protected servers. Audio recordings and transcripts will be destroyed five years after project completion. A distress protocol, including referrals for psychological support, was implemented for participants exhibiting signs of emotional distress during data collection [31] [32].

Trustworthiness and Rigor

The study adhered to Lincoln and Guba's (1985) [33] criteria for qualitative rigor:

- **Credibility**: Achieved through triangulation of data, member checking, and prolonged engagement.
- **Transferability**: Detailed contextual descriptions of participants and study settings.
- **Dependability**: An audit trail documents research decisions and coding processes.

- **Confirmability**: Peer debriefing, reflexive journaling, and external validation of analysis [31].

3. Results

1) Patients on the Use of Protective Devices/Approaches and Challenges Faced During Care in a COVID-19 Unit.

The paper investigated the views of the patients on the use of protective devices/approaches and the challenges faced during care in a COVID-19 unit. The results are presented in four sections: views on the uses, approaches, challenges faced, and coping strategies developed by patients.

2) Demographic Characteristics of Patients

A total of 43 patients were admitted to the COVID-19 unit in the Bamenda Regional Hospital and Mbingo Baptist Hospital between January and February 2022. They were all issued questionnaires and a few were interviewed.

3) Demographic variables for patients (N = 43)

In Table 1, demographic variables for patients showed that there were more male patients 27(62.8%) than female patients (37.2%). More than three quarters of the patients were Christians 37(86.0%). Also, most patients were aged 21 - 30 years (27.9%), 72.1% were married, 65.1% were low-income earners, and 48.9% had attained the primary level of education.

Table 1. Demographic variables for patients (N = 43).

Gender	Frequency	Percentage
Male	27	62.8%
Female	16	37.2%
Religion		
Christian	37	86.0%
Muslim	6	14.0%
Age		
21 - 30	12	27.9%
31 - 40	10	23.3%
41 - 50	11	25.6%
51 - 60	10	23.3%
Marital status		
Married	31	72.1%
Single	12	27.9%
Income level		
Low (10,000 - 100,000 fcfa)	28	65.1%
Average (101,000 - 150,000 fcfa)	12	27.9%
High (151,000 - 250,000 fcfa)	3	07.0%
Level of education		
Primary	21	48.9%
Secondary	14	32.6%
Tertiary	8	18.6%

Continued

Facility		
Bamenda Regional Hospital	31	72.1%
Mbingo Baptist Hospital	12	27.9%

4) Patients' View on the Use of Protective Devices

Table 2 showed patients' views on the use of protective devices. The current study found that 39.5% of patients who used medical masks in COVID-19 units were at the primary level of education, with 34.9% at the secondary level and 25.6% at the tertiary level. Also, 32.6% of patients who used protective devices everywhere in the unit were at the primary level. There was no statistically significant difference between patients' level of education and the protective devices used.

Table 2. Patients' views on the use of protective devices.

Protective equipment used in COVID-19 units	Primary	Secondary	Tertiary
Medical Mask	39.5%	34.9%	25.6%
Hand Sanitizer	23.3%	23.3%	23.3%
Gown	2.3%	0.0%	4.7%
Where protective approaches are often used in the COVID-19 unit			
At an inpatient facility where preliminary screening is done involving direct contact	0.0%	2.3%	2.3%
Admitted directly into the ward, providing direct care	11.6%	11.6%	9.3%
In a separate area for people with signs and symptoms	4.7%	4.7%	2.3%
Everywhere in the unit	32.6%	32.6%	14.0%

5) Frequency of protective device use

Figure 1 shows the frequency of protective device use as reported by the study participants. We found that more than 60.5% always used masks, 36.8% used hand sanitizer sometimes, while 55.1% never used gowns. There existed a statistically significant difference between patients' level of education and frequency of use of PPE, such as tertiary education being associated with more frequent hand sanitizer use (p-value = 0.036).

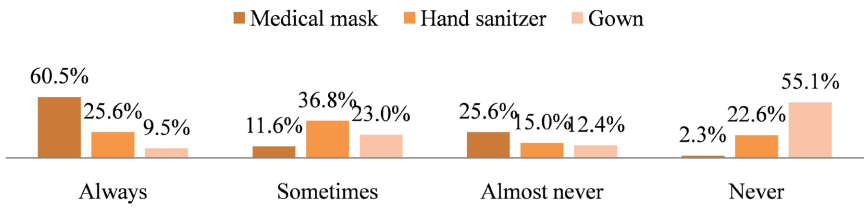

Figure 1. Frequency of protective device use by patients.

6) Source of Protective Equipment Use by Patients

In Figure 2, a study on the source of protective equipment use by patients found

that less than 15% of study participants who had attained tertiary education obtained (bought) their PPE from the hospital, compared to 27.9% of those who had attained primary education. However, our study found a significant association (0.077) between the level of education and the source of PPE.

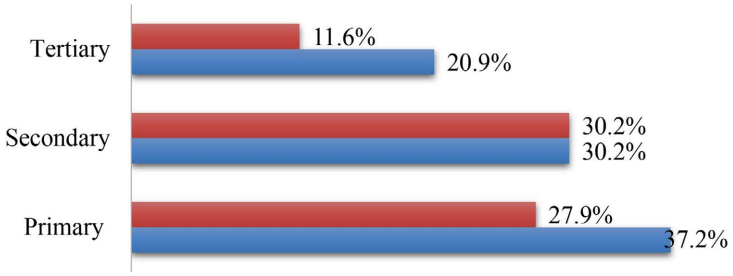

Figure 2. Source of protective equipment use by patients.

7) Physical Discomfort Experienced

With respect to physical discomfort experienced by the study participant with the use of protective equipment, we observed that more than two thirds (69.8%) of participants who experienced discomfort reported difficulty in breathing, while 46.5%, 44.4%, 9.3%, and 4.7% reported experiencing communication difficulties, body heat, pressure injuries, and general malaise, respectively.

8) Association between Patients' Physical Discomfort and Socio-Demographic Variables

Table 3 on the association between some patients' physical discomfort and socio-demographic variables reveals no statistically significant association ($P > 0.05$) between gender, religion, marital status, and level of education with some of the discomfort reported by patients. However, a significant association ($P = 0.011$) was observed between age and body heat, with a higher proportion (37.2%) of participants aged 21 - 40 years experiencing body heat compared to 30.2% aged 41 - 60 years.

Table 3. Association between some patients' physical discomfort and socio-demographic variables.

Physical discomforts Experienced in the use of protective equipment	Breathing difficulties		Communication difficulties		Pressure injuries		Body heat	
	Yes	No	Yes	No	Yes	No	Yes	No
Gender								
Male	39.5%	23.3%	25.6%	20.9%	58.1%	4.7%	34.9%	27.9%
Female	30.2%	7.0%	20.9%	16.3%	32.6%	4.7%	20.9%	16.3%
P-Value	0.207		0.324		0.578		0.968	
Religion								
Christian	58.1%	27.9%	60.0%	40.0%	76.7%	9.3%	51.2%	34.9%
Muslim	11.6%	16.3%	7.0%	7.0%	14.0%	0.0%	9.3%	4.7%
P-Value	0.435		0.853		0.398		0.232	

Continued

Age								
21 - 40	39.5%	11.6%	20.9%	30.3%	46.5%	4.7%	37.2%	14.0%
41 - 60	23.3%	6.7%	20.9%	18.7%	37.3%	2.3%	30.2%	9.3%
61+	7.0%	2.3%	4.7%	4.7%	7.0%	2.3%	0.0%	9.3%
P-Value	0.209		0.863		0.358		0.011	
Marital Status								
Married	46.5%	20.0%	30.2%	60.5%	60.5%	7.0%	32.6%	34.9%
Single	42.2%	23.2%	16.3%	16.3%	30.2%	2.3%	11.6%	20.9%
P-Value	0.406		0.550		0.968		0.419	
Level of Education								
Secondary	51.1%	23.3%	37.2%	37.2%	67.5%	7.0%	41.9%	32.6%
Tertiary	18.6%	7.0%	16.3%	9.3%	23.3%	2.3%	11.6%	14.0%
P-Value	0.113		0.691		0.884		0.948	

Interview results on views on the use of protective devices show that some patients put on masks, hand sanitizers, and gowns. Some were bought by them and some were given by the hospital, but only once in a while. Some did not use them when people were not around or when stepping out of the ward. In terms of frequency of device use, some patients used them every day and always, while some did so only sometimes.

9) Patients' View on the Use of Protective Approaches

This section presents results on the views of patients on the protective approaches used. Looking at patients' views on period, method, reason, first reaction, feelings, and frequency in the use of protective approaches. With respect to the patient's views on the period to use PPE, most (67.4%) reported it should be used when going out of the ward. Also, for the method of PPE use, 83.7% reported putting on a mask to cover the nose and mouth. Again, the least cited reason for PPE use was that they were instructed to do so (69.8%). In addition, 97.7% reported denial when using the approach, while 65.1% used the approach only sometimes. Finally, 88.4% scarcely used the approach. One patient stated, "*I only wore the mask when I saw the nurses coming in. It was too hot otherwise.*" Another shared, "*I didn't use the hand sanitizer regularly because it dried my hands and there was nobody to explain how often I should use it.*"

Therefore, we found a significant association (P = 0.000, 0.002, 0.032) between the protective approach and method, first reaction, and frequency of use.

Figure 3 on reasons for patients' forgetfulness to use protective approaches reveals that 83.7%, 81.4%, and 55.8% reported pain of the illness/helplessness, psychological trauma, and physical trauma, respectively. A statistically significant difference existed between patients' level of education and helplessness (P-value = 0.045).

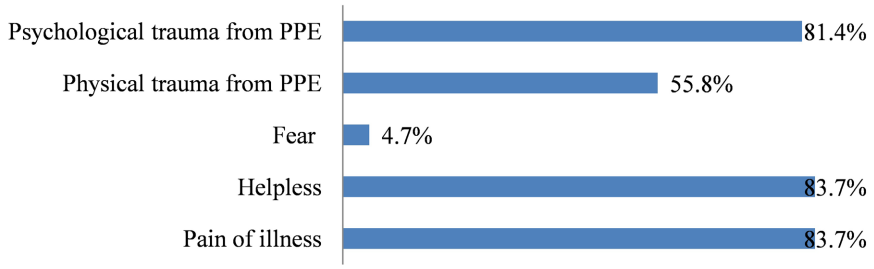

Figure 3. Reasons reported by patients for forgetfulness in using protective approaches.

Figure 4 According to patients' reports on reasons for remembering to use protective approaches, they cited that they were strictly ordered to do so (83.7%); others cited the information received on the benefits of PPE (76.7%); and 55.8% of them said it was due to the fear of infecting others.

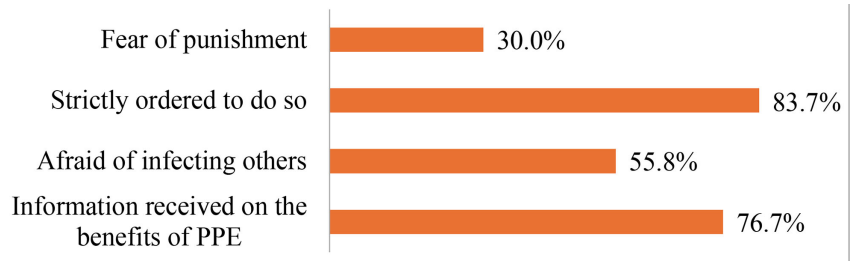

Figure 4. Reasons for patients' remembrance to use protective approaches.

Figure 5 on perceptions of patients on nurses working in COVID-19 Units showed that 72.1% of patients experienced an inadequate nurse/patient relationship, 58.1% experienced insufficient reassurance or support during care, 48.8% experienced a respectful and caring relationship from nurses, meanwhile 44.2% experienced nurses looking exhausted and tired.

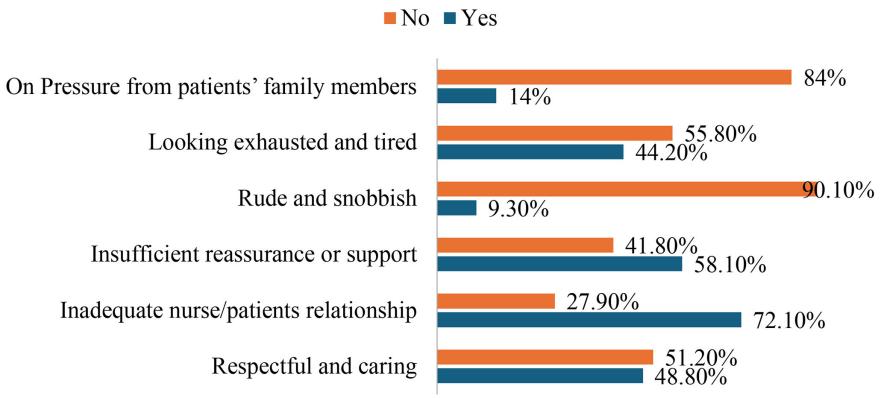

Figure 5. Perceptions of patients on nurses working in COVID-19 Units.

Figure 6 showed that 75.6% of patients reported inadequate supervision and inadequate supply of protective equipment, while 64.4% reported the employment of voluntary untrained workers.

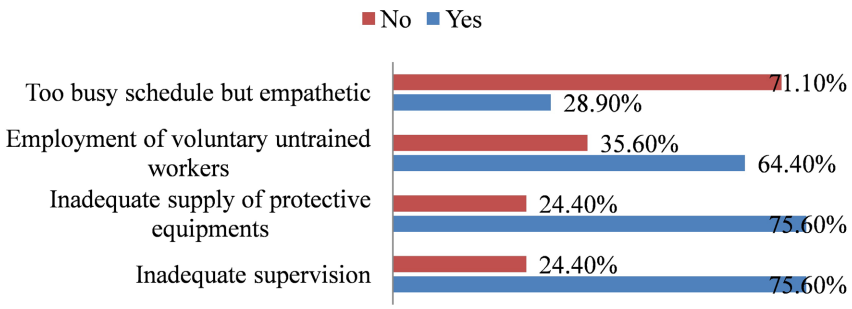

Figure 6. Perception of patients of health managers in charge of COVID-19 units.

Interview results on views regarding the use of protective approaches show that some patients complain about using them in the way they thought was best for them; they had received no instruction on the proper use of masks, hand sanitizers, or gowns. Some bought the devices, and some were given them by the hospital, but only occasionally. Some did not use them when people were not around or when stepping out of the ward. In terms of frequency of device use, some patients used them every day and always, while some did so only sometimes. Some protective approaches used by patients included putting on one pair of pyjamas, handwashing before and after touching certain things, and wearing a face mask to avoid spreading diseases.

10) Challenges faced in the use of protective devices in the COVID-19 units

This section presents results on the challenges patients face with the use of protective devices in the COVID-19 unit.

11) Challenges with protective devices used in the unit COVID-19 N = 43

According to **Table 4** on challenges in the use of protective devices in the Covid-19 units, 40.5% of patients with a tertiary level of education pointed to gown affordability as a challenge, 34.9% of those in the secondary level identified face mask usability, while 30.2% of those at the primary level identified face mask usability. There was a statistically significant difference between the level of education of patients and challenges faced in the availability, affordability, and usability of protective devices such as face masks, gowns, and hand sanitizer (p-value = 0.015). There was also statistical significance between patients' level of education and physical trauma of the body after long hours of use (p-value = 0.016), and the challenge of feeling too hot in the gown (p-value = 0.009). Therefore, the level of education has an effect on the use of protective devices, physical trauma of the body, and experiencing excessive heat in the gown.

Concerning **Figure 7**, on patients' views on physical or adverse effects on the utilization of protective devices, 81.4% of patients identified difficulty in breathing from prolonged use of surgical masks, 51.2% identified extreme sweating, while 48.8% pointed to dry mouth.

Again, according to physical challenges due to the use of hand sanitizer and gowns, 62.8% of patients identified dryness of hands, while 23.8% pointed to perspiration due to the use of gowns/overalls. A significant relation existed between

patients' views on adverse effects on the use of Gowns/Overalls and perspiration (p-value = 0.009) together with excessive sweating (0.009). This means that adverse effect has a significant relationship with perspiration and excessive sweating. One participant expressed, "*They told us to isolate but didn't show us how. I shared food with another patient just to feel human.*"

Table 4. Challenges of protective devices used in the unit COVID-19.

Protective devices	Primary	Secondary	Tertiary
Face mask availability	9.3%	0.0%	11.6%
Face mask usability	30.2%	34.9%	14.0%
P-Chi-square (χ^2)	9.714		0.046
Hand sanitizer acceptability	2.3%	4.7%	0.0%
Hand sanitizer affordability	18.6%	11.6%	9.3%
Hand sanitizer availability	9.3%	2.3%	9.3%
Hand sanitizer usability	9.0%	17.0%	6,6%
Gown affordability	4.7%	5.0%	40.5%
Gown availability	10.0%	21.0%	18.8%
P-Chi-square (χ^2)		12.320 0.015	
Challenges during care			
Physical trauma of the body due to long hours of use.	39.5%	34.9%	25.6%
P-Chi-square (χ^2)		8.322 0.016	
Feeling too hot in the gown.	39.5%	34.9%	25.6
P-Chi-square (χ^2)		9.382 0.009	
Inability to communicate easily with nurses during care	39.6%	34.9%	25.6%
Feeling of isolation	39.5%	34.9%	25.6%

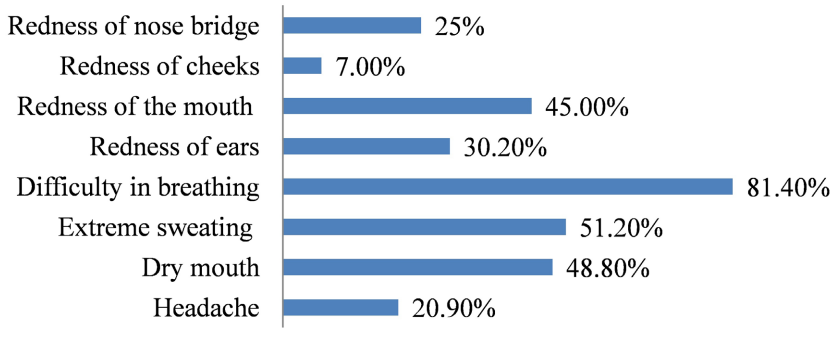

Figure 7. Challenges from prolonged use of surgical masks.

12) Strategies to cope with shortages of protective devices

This section presents results on the strategies patients have adopted to cope

with shortages in protective devices in the COVID-19 unit in **Table 4**. Interview results aimed at finding out reasons for patients' low use of protective devices. Patients confessed that they had challenges when putting on protective devices for long periods of time. These included too much heat, difficulties breathing, general discomfort, pain in the ears, excessive sweating, physical trauma, and difficulties in communicating with nurses. In their words, a patient said, "I also feel heat when sun is up to put the face mask." Another patient said, "I had a physical trauma for putting." This shows that as much as patients love protective devices, physical challenges hinder them from putting them on.

Coming to strategies to cope with shortages of protective devices, we found that 72.1% of patients proposed reusing the same PPE for more than 12 hours a day, 65.1% proposed using the same mask for more than 12 hours a day, while 46.5% proposed use of personally made masks. Furthermore, 75.0% suggested the promotion of simple etiquettes ranging from cough protocol, social distancing, and hand-washing decorum, 72.1% suggested familiarity of the patients with the use of PPE. Meanwhile, 69.0% suggested provision of an environment where nurses' lives would not be endangered. A statistically significant association existed between patients' views on strategies to cope with shortages and the suggestion on overreliance and overcrowding avoidance (P-value = 0.0100), and the suggestion on provision of an environment where nurses' lives would not be endangered.

4. Discussion of Results

The study found that the majority of the patients who make use of face masks are primary school leavers (39.5%), while (60.5%) reported always wearing face masks, as opposed to 36.8% who seldom use hand sanitizers and (55.1%) who had never used gowns. These patterns denote recognition of the importance of PPE for COVID-19 prevention, though overall use remained limited.

In a study aimed at exploring the patient experience of inpatient care during the COVID-19 pandemic, an electronic questionnaire was designed and distributed to inpatients treated at a large University Hospital over a 6-week period. Results demonstrated that patients believe PPE is important to protect both patients and staff and does not negatively impact care [34]. This aligns with the findings and suggests that patients must be encouraged to regularly use PPEs like face masks and hand sanitizers, both in hospital and public settings.

The study also shows that most patients, irrespective of their educational levels, purchased their own PPEs. This practice reflects inadequate provision by health facilities and limited supervision or training. Some of these patients either willingly ignore or are untrained to perform their duties according [34]. According to nursing standards, nurses are trained and authorized to supervise and teach PPE use to patients, support staff, and to be involved in research [5]. This aligns with Caring Theory (CUEN), which emphasizes treating individuals as dignified coequal participants rather than passive recipients of care In crises, this theory enables healthcare workers to recognize people, not as objects of care, but as co-equal

participants in the delivery of efficient service in a caring environment from moment-to-moment as a language of nursing [35]. Patients with respiratory symptoms who are required to attend for emergency treatment should wear a facemask/covering, if tolerated, or be offered one on arrival [36]. Therefore, to foster the effectiveness of PPE requires educating and training patients in proper PPE use and ensuring PPEs are intermittently provided, like facemasks and hand sanitizers, to discourage the prolonged reuse or reliance on homemade masks.

Physical discomfort was common. (69.8%) experienced breathing difficulties, communication difficulty (46.5%), and body heat (44.4%). This is related to a study carried out in 2020 in Iran to investigate the factors affecting the use of PPE from the perspective of nurses caring for COVID-19 patients. By implication, patients shy away from wearing PPE due to the perceived challenges surrounding their use, such as breathing difficulty, dry hands, and extreme sweating, among others. It could also be inferred that some of the patients are not well informed about the appropriate way of using the PPE devices [35]. Patients may have to be provided with PPEs and trained on proper fitting of the facemask, exacerbating breathing and physical trauma. While demographic variables showed no significant associations with most discomforts, age was significantly associated with overheating ($p = 0.011$), suggesting that younger and middle-aged adults were more prone to heat-related distress [37].

Regarding protective approaches, more than half (67.4%) of the patients admitted using PPE when exiting the ward, and 83.7% put on a mask when necessary. Regular use of hand sanitizer was 65.1%, and regular hand-washing with soap and water was 62.8%. The majority of patients use these devices for infection prevention (88.4%), while some are compelled by the hospital management to do so (69.8%). As such, many of these patients feel exhausted (81.4%), but most of them (65.1%) frequently use these PPEs.

From the results, most of these patients demonstrated awareness of PPE protocols such as hand hygiene and mask fitting, especially amidst people. Comments like *"I wash my hands before and after touching certain things*" and "*I put it down when am alone but when someone is entering the room, I put it on*" *illustrate this knowledge.* Although there is little evidence on knowledge of the required procedure for the use of PPEs, most of the patients had basic information.

These experiences are similar to those of nurses in an article titled: Reflections on the lived experience of working with limited PPE during the COVID-19 crisis. It describes the varied intense emotions the nurses experienced during the early weeks of the pandemic, encompassing eight subthemes: *scared and afraid, sense of isolation, anger, betrayal, overwhelmed and exhausted, grief, helpless at a loss, and denial. Other themes include: self-care,* '*hoping for the best,*' *and* '*I feel lucky*'. Before putting on the mask, wash your hands for at least 20 seconds with soap and water, or rub your hands thoroughly with alcohol-based hand sanitizer. Check for defects in the face mask, such as tears or broken loops. Position the color side of the mask outward, and if present, make sure the metallic strip is at the top of the

mask and positioned against the bridge of your nose. Once the mask is positioned securely, there are certain precautions to keep in mind to ensure you do not transfer pathogens to your face or hands. It is important to remove the face mask correctly to ensure you do not transfer any germs to your hands or face. You also have to make sure you discard the mask safely [38].

The study found that most patients ignored some of these protective approaches for the following reasons: 83.7% said they were strictly ordered to do so, 76.7% mentioned the nature of information they received on the benefits of PPE (76.7%), while [55.8%] was due to fear of infecting others (55.8%). Most patients reported experiencing an inadequate nurse/patient relationship (72.1%) and insufficient reassurance or support during care (58.1%). Patients also reported inadequate supervision or supply of protective equipment (75.6%), and the employment of voluntary untrained workers (64.4%).

Some patients either consciously neglect or lack the training to properly carry out their responsibilities. According to Watson's Theory of Human Caring and the Caritas Processes, nurses must nurture their own spirits and practice kindness toward themselves. It becomes the inspiration behind all their actions, which naturally extends into their personal lives and enhances the care they provide to patients.

To align with Watson's Theory of Human Caring, it is essential for nurses to engage in self-care and self-love, as these practices enhance their overall performance [36]. The findings of this study reveal that in conflict-affected, resource-limited regions, traditional support systems are significantly compromised. In such settings, the use of PPE and limited interpersonal interactions hinders the effective expression of the Caritas Processes. This highlights the urgent need to adapt caring frameworks to better suit crisis environments.

There was a statistically significant difference between patients' level of education and the challenges faced with protective devices (p-value = 0.015), as well as physical trauma (p-value = 0.016), and feeling too hot in the gown (p-value = 0.009). These challenges include, among others, gown affordability (40.5%) and face mask usability (34.9%), breathing difficulties (81.4%) after prolonged use of surgical masks, extreme sweating (51.2%), dry mouth (48.8%), and dryness of hands (62.8%) due to the use of hand sanitizer and perspiration from the use of gowns/overalls. A significant relation existed between patients' views on adverse effects of PPE and perspiration (p-value = 0.009), together with excessive sweating (p-value = 0.009).

The findings of this study highlighted that perceived barriers such as discomfort, cost, and lack of instruction outweigh perceived susceptibility and benefits for many patients. Therefore, in very low-resource settings, the model's predictions may not hold unless systemic and educational support is first addressed.

Challenges related to protective devices, such as discomfort from masks or the affordability of gowns, and communication barriers, often led to poor adherence or misuse. In contrast, challenges linked to protective approaches like isolation or

hygiene protocols centered on a lack of guidance, cultural resistance, and psychological distress. Understanding how these domains interact is vital to designing more holistic, patient-centered interventions. Studies also found that when individuals had a high level of perception of susceptibility to an epidemic, were convinced of the severity of the epidemic, were sure that protective behavior was very effective, and perceived the cost of adopting protective behavior as lower, they were more likely to voluntarily adopt forms of protective behavior [37] [38].

Regarding coping strategies, patients suggested overcrowding reduction ($p = 0.010$), ensuring healthcare worker safety (69.0%), reuse of PPE for extended periods (72.1%), and homemade masks (46.5%). They also supported simple infection control etiquette, cough protocol, distancing, and hand-washing (75.0%) and adequate training on the use of PPE. These suggestions reflect practical adaptations that address shortages. This is evidently clear from the fact that we have to avoid touching the face, especially the eyes, nose, and mouth; and keep a distance of at least two meters from people who cough or sneeze [39]. Low-cost interventions, water supplies for hand washing and thorough hand wash decorum instead of using hand sanitizer, and physical distancing in overcrowded primary healthcare clinics [40].

The study found that more than half of the c health managers confirmed that they procured PPEs like medical masks (66.7%), hand sanitizer (40.0%), gloves, and aprons (33.3%). Also, up to 70% of health managers pointed out that they carry out procurement when finances are available, 65.0% during shortages, and 50.0% during increased demand. This implies that there is a correspondence between the types of PPEs used by patients and the ones purchased by health managers in these hospitals. In essence, they make use of the PPEs as supplied by their management. According to Jean Watson's caring theory, despite the challenges faced by nurses in the use of the protective devices and approach, the process of loving-kindness still stands a good chance of explaining the bond that is supposed to exist between a nurse and patient during care and the health managers that purchase and supply the materials being used.

Moreover, in line with the result, health managers in the case of the COVID-19 pandemic disseminate protective devices. They function in the procurement and supply of protective devices in the COVID-19 units, as well as training and supervision on the use of the devices [41]. The current global stockpile of PPE was insufficient, particularly for medical masks and respirators; the supply of gowns soon became insufficient as well (a). Also, many health facilities in Cameroon are faced with serious challenges in the procurement and supply of the pre-isolation and isolation centers with protective devices [38]. It may be resolved that health managers must continue the procurement of regularly used PPEs like facemasks, hand sanitizers, gloves, and the almost unprocured ones like hair covers, for complete dressing. They should work closely with the Ministry of Public Health to request other unavailable PPEs like gowns and hoes.

5. Conclusions

This study investigated the views of the patients on the use of protective de-

vices/approaches and challenges faced during care in a COVID-19 unit.

We concluded that three-quarters of the patients admitted used protective devices when going out of the ward, and the most common was the face mask, followed by the regular use of hand sanitizer and frequent hand-washing with soap and water.

In a similar manner, patients in the Bamenda health district were determined not to spread the infection by using different devices, although a significant proportion reported being compelled by the management of these hospitals to do so.

Among the patients, the rate of use of PPE was quite low, 30% dominated by the use of medical masks, hand sanitizer, and gown wearing, and about 35% reported using these devices only in the hospital. These point to a low rate of PPE use among patients, especially when a significant proportion indicated being compelled to use them.

There was much evidence that the approaches adopted by patients in the use of PPEs do not conform to the required method. There was evidence of a lack of knowledge regarding the appropriate approach to use with PPEs.

Patients faced myriad challenges related to the use of PPE, and top among the list was difficulty in breathing, communication difficulties, pressure injuries, and body heat reported by many; the patients reported general malaise from the use of PPE. Examining the confounders to the use among patients, the study revealed that the use of protective approaches was statistically significant with regular use of hand sanitizer, with feeling lucky, and feeling overwhelmed.

Also, there was a statistically significant difference between the level of education of patients and challenges faced with protective devices, and also a statistically significant difference between patients' level of education and physical trauma of the body due to long hours of use (p-value = 0.016), and the challenge of feeling too hot in the gown (p-value = 0.009). There was a statistically significant association between patients' views on strategies to cope with shortages and the suggestion of overreliance and overcrowding avoidance (p-value = 0.0100), and the suggestion of provision of an environment where patients/nurses' lives will not be endangered.

The implication of the findings of this study from the adaptive model is that there is a great need to educate nurses and patients on how to use PPE and its importance in achieving over 90% usage. District hospitals should source reusable PPE devices, design a system that improves relationships between nurses on how to interact with patients, and also fully promote the Theory of Self-Care Deficit, where self-care is the individual's ability to perform actions for his/her benefit.

6. Recommendations

To address the multifaceted challenges faced by patients in using protective devices and approaches during care in COVID-19 units, particularly in resource-constrained settings like Bamenda, Cameroon, are proposed as follows:

1) Patient Education: Implement structured, multilingual training on correct PPE use and address concerns such as discomfort.

2) PPE Provision: Offer free or subsidized PPE to prevent reuse and reduce financial barriers, collaborating with local manufacturers.

3) Communication Enhancement: Use non-verbal cues, assistive tools, and empathetic communication to improve interactions despite PPE barriers.

4) PPE Comfort: Use ergonomic, lightweight, and breathable PPE designs, and engage tailors and suppliers to improve fit and comfort.

5) Monitoring Systems: Establish PPE control areas with technology and inventory management to ensure proper use and stock availability, along with hygiene stations.

Conflicts of Interest

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

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