TANZANIA MEDICAL JOURNAL
Abeid et al. TMJ V 36 No. 3. September 2025

Original Research Open Access

Health Care Provider Perspectives on the Treatment of Patients with COVID-19 During the First Wave at the Aga Khan Hospital in Dar es Salaam, Tanzania: A Qualitative Study

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Abstract

Background

The COVID-19 pandemic, as characterised by the World Health Organization, led to the widespread use of various treatment regimens, including off-label and herbal medications. However, in resource-limited settings, healthcare providers face additional challenges, such as psychological and infrastructural, which may affect patient care. Understanding the perspectives of these frontline providers can offer insights into the clinical benefits of these treatment approaches and inform strategies for pandemic preparedness.

Methods

A phenomenological qualitative study using Focus Group Discussions was employed with 24 health care providers caring for patients with COVID-19. An FGD guide was utilised to extract in-depth data. Topics covered were challenges and fears associated with treatment of COVID-19, views on off-label drug use and herbal treatment, and providers' experiences of patient management. FGDs were transcribed verbatim and deductive thematic analysis was used to develop meaningful themes.

Findings

Provider perspectives were summarised into 3 themes. First, negative emotional responses, especially in the first wave, consisted of fear and anxiety caused by working in the COVID-19 Unit, perceived risk of getting infected and concern for patients and their relatives. Second, COVID-19 health care delivery was multidisciplinary and consisted of rapidly evolving treatment protocols, symptomatic and supportive care. Third, we found several patient-related challenges which included stress, and community responses towards COVID-19.

Conclusion

Health care providers perceived fear and anxiety as initial responses. Flexibility and multidisciplinary team involvement played a great role in ensuring patient care as well as provider wellness. Therefore, important policy measures such as mental health support for providers, multidisciplinary team training and collaboration, clear risk communication and standardized protocols, and community engagement measures should be kept in place to ensure pandemic preparedness to help providers carry out their duties.

Keywords: *COVID-19, Health care providers, Perspectives, Challenges, Treatment.*

Introduction

The World Health Organisation characterised coronavirus disease 2019 (COVID-19) as a pandemic on 11th March 2020 (1). The first case of COVID-19 in Tanzania was reported on 16th March 2020 (2). The World Health Organization recorded 29,306 confirmed cases and 737 deaths in Tanzania between January 2020 and December 2021(3). Health systems have since transformed to manage COVID-19 patients, and vaccines are now being rolled out to prevent severe cases (4,5). A Chinese study highlighted COVID-19's higher infectivity compared to other SARS outbreaks (6), emphasizing its widespread impact on human interactions, communities, and economies globally.

Several measures have been implemented to manage COVID-19 patients, including off-label medications like remdesivir and herbal treatments such as Artemisia annual (6,7). Off-label prescribing is crucial for managing new conditions but may lead to drug shortages for chronic illnesses (6,8). Careful use of off-label and herbal medicines is essential to prevent shortages and complications (9,10).

Managing COVID-19 required adequate personnel, personal protective equipment (PPE), equipped isolation centres, and alternative drugs (11). Both healthcare providers and patients faced numerous challenges (12). A Danish study on ICU care on prolonged ventilator support for COVID-19 patients, highlighted the need for adequate human resources for practices like prone positioning to improve oxygenation (13,14). Limited resources posed significant challenges to providers (12).

The Tanzanian Ministry of Health developed case management guidelines for different levels of health facilities (9). Despite these guidelines, fear and challenges among healthcare providers in resource-limited settings remain significant issues (15). Frontline providers' emotional and physical well-being, often neglected, is crucial. A South African study revealed that healthcare providers experienced emotional and physical exhaustion, fear of infection, and challenges in patient recovery (12).

WHO estimates that between 80,000 and 180,000 healthcare professionals may have died from COVID-19 globally between January 2020 and May 2021, with a median of 115,500 deaths (5). Tanzania lacks official statistics on COVID-19-related healthcare worker mortality, but South Africa reported at least 1,300 healthcare worker deaths by September 2021 (16). Limited qualitative data exists on providers' experiences in Tanzania, though some blogs provide insights (15). The objective of this study was to explore the perspectives of frontline healthcare providers at the Aga Khan Hospital, Dar es Salaam on the management of COVID-19, particularly focusing on the challenges faced, their emotional responses, and their

experiences with off-label and herbal treatments. By understanding these perspectives, the study seeks to inform future policy strategies for regulating off-label practices and improving pandemic preparedness, particularly in resource-limited settings.

Methods

Study design

A phenomenological qualitative design was employed to explore the lived experiences of healthcare providers involved in the care of patients with COVID-19. This approach, as outlined by Creswell, is suitable for understanding how individuals make sense of a phenomenon in this case, caring for patients during an emerging pandemic (18).

We used constructivist theory as a basis for our research acknowledging the construction of reality by individuals as a means of making sense in a situation with high levels of insecurity and incomplete information caused by a new potentially deadly virus.

Study setting

The study was conducted at Aga Khan Hospital, a private tertiary hospital in Dar-es-Salaam, designated by Tanzania's Ministry of Health as a COVID-19 care center. The hospital, with a 170-bed capacity, provided specialized care using advanced technology and highly skilled staff. Two wards with 50 beds were allocated for COVID-19 patients, and staff from various departments were pooled to manage the overwhelming number of cases. Suspected patients were triaged in the Emergency Department for either home isolation or hospital admission based on disease severity.

Study participants and sampling strategy

We used purposive sampling to select participants who were directly involved in the care of patients with COVID-19 during the first wave. A total of 24 HCPs, including physiotherapists, nurses, physicians, radiologists, a lab scientist, and a dietician, participated in this study. The purposive sampling strategy used was as described by Ames et al., based on the appropriate selection of a sample with knowledge of the population, its elements, and the purpose of the study (20).

Majority HCPs involved in care of COVID-19 patients were approached and asked if they were interested in participating in FGDs. The study was initially introduced to the in-charges of different hospital sections, who thereafter contacted eligible participants about their

availability, then participants' schedules were aligned with group discussion times to facilitate participation.

Inclusion criteria included having worked in a COVID-19 designated ward for at least eight weeks and being available during the data collection period. Eligible participants were identified through departmental rosters and invited by section in-charges to ensure diversity across professional cadres and levels of experience. Focused group discussions continued until saturation point, defined as the point at which linking thoughts of two successive focus groups revealed no newer information (19). Table 1 presents the demographic and professional characteristics of the participants included in the study.

Table 1: Participant characteristics

Variable	Values	N=24
Gender	Female	11
	Male	13
Age (years)	20-29	11
	30-39	8
	40-49	4
	Above 50	1
Duration of work in COVID-19 Unit prior the FGD (weeks)	8-12	8
	13-16	10
	17-20	6
Cadres	Physicians	13
	Nurses	5
	Physiotherapists	2
	Radiologists	2
	Lab scientist	1
	Dietitian	1

N=number of participants

Ethical considerations

Ethical clearance was obtained from the Aga Khan University Ethical Research Committee (Ref.: AKU/2020/0159/fb). Participants provided written informed consent to publish their responses. They were assured that participation was voluntary and would not affect their work. Information about the study was given one week before the focus groups to allow time for

questions and concerns. After reflection, participants were approached again and, if they agreed, were given the time, date, and location of the focus group. Upon arrival, participants were reminded of the study's aim, procedures, and voluntary nature, and written consent was obtained. Participants were informed that recalling stressful events might evoke psychological reactions. They were assured that researchers would provide counselling and referrals if needed during an FGD.

Data collection

Focus group discussions (FGD) were used to explore fear and challenges the HCPs faced in the treatment of COVID-19. This approach was considered a suitable method for data collection as it allowed interactions between participants and provided the possibility of obtaining multiple views and perceptions of the subject. A topic guide (Appendix I) was used to collect data. All FGDs were carried out in English after individual consent of all participants. All FGDs were done face to face and were conducted by the principal investigator and co-investigators who are experienced in qualitative research. To ensure confidentiality and privacy all FGDs were conducted in an isolated and quiet room on site at the Aga Khan hospital, Dar es Salaam while following infection control practices. The FGDs lasted for about 45 minutes to 1 hour, and all were audio-recorded, and field notes were taken. A total of five FGDs involving 4 to 6 participants were conducted. The participants in the 5 FGD were grouped in such a way to ensure a balanced mix in terms of gender, age, and cadre. The FGDs were held during working hours, and participants were not provided any incentives; refreshments were provided. The data was collected between November 24, 2020, and January 13, 2021.

Data analysis

The audio-recorded discussions were transcribed verbatim, and the transcripts kept safely in a password secured hard drive. Each discussion was given a unique identifier and the names of the participating persons did not appear on the transcribed material. The field notes taken had the same identifier as the transcripts and neither names nor dates appeared in the notes. Transcripts were not brought back to the participants for logistic reasons, but frequent summaries were used during the FGDs to ensure that participants' discussions were adequately captured. Reflexive thematic analysis by Braun and Clarke was used to analyse the data [21]. Deductive coding was done where the PI and co-investigators read the transcribed texts multiple times, emerging themes were identified which were subsequently

condensed and coded. Reflexive thematic analysis allows conclusions to be made based on the data collected and these conclusions are grouped into specific themes, this allows for a systematic interpretation after review of data [22]. A search and review of themes and sub-themes from the codes were done to determine any similarities and differences. The themes were defined and named and finally described in the final analysis. Frequent discussions involving all co-authors happened as the analysis process progressed. This helped capture varying perspectives of the emerging themes through peer check.

Findings

Three main themes emerged from the data: negative emotional responses of the health care personnel, challenges in COVID-19 health care delivery, and patient-related challenges. For each major theme we present a variety of perspectives (sub-themes) that were expressed during the FGDs along with 1-3 quotes from the accounts of the participants to illustrate that sub-theme. There are a total of twelve sub-themes. Themes are presented in order of the highest coding frequency. The first had 8 codes, the second theme had 7 codes, and the third theme had 6 codes, for a total of 21 codes.

Negative emotional responses of the health care personnel

Fear of being infected and infecting loved ones

Fear of infecting family and friends was one of the reasons for their distress. A number of HCPs avoided contact with their family members due to the risk of being an asymptomatic carrier. At the end of work hours some participants reported not returning home through prolonged stay at the hospital, renting new places, or moving their families to the countryside as they believed that transmission risk will be low. Providers who lived with young children or elderly parents described greater fear as they were worried about the immune status of these aged populations. Talking about this issue one participant said,

> *"My fear at that point was my mom and my children… I had to send them away...I remained home alone trying to isolate myself" (female, medical doctor).*

Another participant who had family members with comorbid said.

> *I always felt like COVID is not really my problem but going back home to mom who was diabetic and my grandma with cardiac disease… living in the same house… COVID is not going to affect me that much. Even if it does, I will just get the mild symptoms, but if they get infected, it's going to be a lot worse... I think that is my biggest*

fear, the fact that you were in the hospital, you know, you're taking it (COVID-19) home with you" (male, medical doctor).

Stigma between health care providers

Another theme in the FGDs was avoidance of HCPs and departments that were termed a high risk such as the emergency department, isolation ward, and the ICU. HCPs who worked at COVID wards also expressed limiting their interactions with other colleagues in order to avoid transmission amongst the staff. There was also stigmatisation between HCPs especially when they suspected a colleague had contracted COVID-19. The extract below shows the view of one of the participants.

"I once heard about a colleague who intubated (a patient) that colleague then had to isolate for 14 days… when they came back my fear led me to avoid getting close to them or even touching them" (female, nurse).

Psychological stress of having to deliver bad news

Another issue that caused great distress and fear amongst participants was having to deliver negative information to families or relatives. A variety of perspectives were expressed, one being that some HCPs found it hard to reassure family members who were anxious to know about the patient's condition in the wards. This brought great distress mostly among senior doctors who were the ones primarily responsible to deliver daily patient progress information to family members. One senior doctor said;

"The moment we finish our ward rounds and come out of the glass doors, we find seven, to nine groups of five individuals at least scattered to pounce on us waiting for feedback... while delivering bad news we had to manage the anxiety and expectations of not only the patient themselves but also the relatives" (male, medical doctor).

Another participant describing the same issue said;

"From the high mortality rates that they heard from the news, approaching the family members was very difficult. Most of them psychologically had given up, most of them thought that their loved ones were going to die" (male, medical doctor).

Fear of working in the COVID-19 Units

Due to the sudden nature of the outbreak the HCPs from the ICU, emergency departments, and others were deployed from other departments and had to enter the negative pressure units. This meant that HCPs in these units were at increased risk of exposure to COVID-19

and would have to work long shifts and wear PPEs for an extended time. Whilst a minority mentioned that they had previous experience with working in negative pressure units, the majority described this as their first experience which caused fear because even though the rooms were designed to control aerosolization, they felt at the mercy of a technology they were not used to. One participant commented.

> *"Going into the patient's room was very challenging. I always thought about the possibility of inhaling the air that's in here, I believed that if I inhale it, I'll probably die" (female, nurse).*

Another participant expressing the same sentiments said,

> *"Even when you are walking with your mask on, you feel like there's penetration of the virus happening through it" (male, physiotherapist).*

The comment below shows the view of another nurse.

> *"I expressed a lot of my concerns to the maintenance staff who did the installation of the negative pressure rooms, constantly asking them to confirm for me if the negative pressure works, and how do I know if it's really negative pressure. I wanted to know this because I didn't want to die" (female, nurse)*

Distress from wearing of personal protective equipment (PPE)

Working in the dedicated units for COVID-19 confirmed and suspected cases required having to wear a lot of PPES often for the entire duration of a shift. This was reported to bring a lot of distress especially due to restrictions in movement and some felt that they were suffocated with the equipment. The process of donning and doffing of the PPE was reported to bring a lot of stress to some participants especially in the setting of an emergency where staff had to quickly put on PPE before entering a patient's room which brought a feeling of inadequate protection. Expressing these views one of the participants stated.

> *"It wasn't easy… for you to get into the rooms, you had to put on a lot of PPEs and sometimes the goggles, formed a lot of mist you couldn't see properly, you felt very hot, and that brought a lot of restrictions, but you had to wear them to get in. So, it wasn't smooth" (female, medical doctor).*

Another participant reiterated,

> *"In fact, sometimes we end up having rashes and dermatitis from this equipment… we were having rashes on our faces and pain because of the masks" (female, medical doctor).*

A feeling of helplessness

HCPs created a high level of collaborative decision-making on patient care, mutual respect among cadres, and a sense that everyone's contribution was recognized. However, at an individual level, some participants stated that they often felt that they could do nothing to save their patients' lives. In the light of these remarks, one colleague explained.

> *"When my patient died, I felt that it was because I didn't give enough empathy and care... In the initial phase, we all feared COVID so much that we were walking on eggshells" (female, nurse).*

Another participant regrettably stated,

> *"The patients got worse and eventually passed away… during my shift there was always a code blue… nurses screaming everywhere but nothing much can be done" (male, nurse).*

Recounting their experience, one participant said,

> *"The first patient under my care died ...he was in great respiratory distress... I stayed up with them all night… I will never forget that moment" (female, nurse).*

Flexibility

Increasing patient numbers caused additional strain to a setting where resources were already limited, flexibility was noted to be of a high importance. HCPs noted that having to adapt to the new status quo such as having to strictly follow new infection prevention guidelines and adhering to new institutional policies. Gaining the patients' trust was said to require being flexible to change as well as being calm under pressure. Talking about this observation one participant stated.

> *"If you panic, patients notice… and because patients have all this trust in us... I had no choice, I had to be very strong" (female, nurse).*

Describing the same phenomena, another participant added,

> *"Ultimately, I think we built up the confidence and as patients started getting better, we could see the difference that with less anxiety levels, things were workable. But so, I think eventually things kind of smoothed out. A lot of the fear went away" (male, medical doctor).*

Also, about this issue, a participant noted,

> *"So now there's much more confidence. People have understood how to sanitise, how to care for these patients" (female, medical doctor).*

Challenges in COVID-19 health care delivery.

Evolving guidelines and treatment protocols

There was limited clinical knowledge on COVID-19 thus protocols kept changing as more rigorous evidence with time. This presented unique challenges to the teams delivering care as often they had to keep up to speed with new recommendations. One of the residents who was in charge of patient management in the isolation unit stated.

> *"I am not sure about the time...things are moving very fast... We started and stopped using hydroxychloroquine in less than a month then moved to... We follow what studies say, but before we see the outcomes ourselves, we change protocols... we have used several drugs so far" (female, medical doctor).*

Talking about these developments, one of the specialists said.

> *"We had a committee of specialists who were involved… especially the critical care team, internal medicine and Infectious disease team...according to the available information... we would discuss what we can endorse into our protocol" (male, medical doctor).*

Symptomatic treatment/supportive care

A lot of effort was directed towards targeting the signs and symptoms that patients presented with. The main targets of supportive care were to relieve respiratory distress, prevent secondary infections, and complications. Most participants noted that an involvement of an interdisciplinary team allowed holistic care. Stating their perspective one participant said.

> *"An important factor in the treatment set up was supportive care such as physiotherapy such as proning patients... That process was very hard because sometimes a patient is oxygen bound, but we manoeuvred every way possible" (male, physiotherapist).*

Reflecting on the same phenomenon, a participant explained,

> *"In terms of diet therapy, we had less challenges for patients who were tube feeding in terms of meeting protein and calorie goals... but for those who were taking orally, main challenges were loss of appetite and altered tastes… So, at the end of the day, you find they're not able to reach their target in terms of calories" (female, dietician).*

Outpatient management challenges

In order to limit the number of patients visiting the outpatient departments the hospital adopted a teleconsultation strategy to allow access to health care services. This method was kept in place to allow continuity of care for patients who had been discharged from the hospital. Due to the challenges that telemedicine presented such as unreliable internet connection and patients who

needed more in-depth assessment the outpatient department still continued to run the daily clinics. Clinicians in the outpatient department reported spending a significant amount of time reassuring and educating patients in order to address fears that were due to misinformation. Recounting on this information, one participant stated.

> *"Another issue was the patient's knowledge about COVID-19. We often encounter patients who have wrong information… that they got from a newspaper or from the community" (male, radiologist).*

Contributing to this observation one participant explained,

> *"So, one of the biggest roles of an outpatient doctor was to educate or to make the patient understand what is COVID-19… how it is transmitted... because it was an unknown condition to the doctors and to the community" (male, medical doctor).*

Patient-related challenges

Managing distress in patients with COVID-19

Due to the nature of the pandemic and isolation protocols patients were allowed to come in direct contact with their relatives through virtual communication. The participants described this as a great cause of distress for the patients. Another source of anxiety was patients' fears of developing complications or succumbing to death. This led to symptoms of depression and anxiety. Describing these observations, one participant said.

> *"Most patients believed if admitted because of COVID-19... it's as if you have given them a death sentence...some patients got worse not because of the disease process, but because of that fear that they had" (female, medical doctor).*

Stating the influence of patient counselling, one participant said,

> *"We noticed how anxious patients are and decided to get the psychologist to talk to them... Because the psychologist we have was also an elderly man… he started doing the video consultations with them and there was a lot of improvement" (male, medical doctor).*

Community response and perceptions towards COVID-19

Most of the participants agreed that COVID-19 public precautions had been sub optimally applied. This was due to either COVID-19 denial or a misunderstanding on the contagious nature of the disease and its management. There were no mandatory nationwide lockdowns, although citizens were advised to avoid unnecessary travel and gatherings. Some participants described the public practice of using traditional remedies for COVID-19 treatment. Even

though most traditional medications are safe to use, there is still debate about their efficacy in the scientific community. According to the available literature, as many as 80% of people in poor nations rely on herbal medicine as their main source of healthcare (29). Speaking about this issue one participant said,

> *"We saw a lot of herbal interventions from the community… some of the patients who were coming for admission in the hospital also came with herbal concoctions that they had gotten from traditional healers" (female, dietician).*

Another participant added,

> *"We have not studied the herbs objectively. I guess that's why we're still a little resistant to herbal drugs in society, but some individuals use it and still have medical care, so if they get better, was it the herbal or the hospital medication that saved the patient?... herbal studies might assist. As of now, it's hard to declare herbal medicine as beneficial and will aid people" (female, medical doctor).*

One HCP who contributed to this observation stated,

> *"I don't think there's anything wrong with using herbal medication… It is a science on its own. The only reason why we as medical personnel have an issue… is because we don't know the right amount and mechanism of action" (male, lab scientist).*

Discussion

This study set out with the intention to explore the experiences of health care workers who provided care for admitted patients with COVID-19 at a private tertiary hospital in urban Tanzania. To the best of our knowledge, this is one among the first studies to explore the experiences of providers during the COVID-19 pandemic in Tanzania especially in the first wave of the pandemic. Findings from this study can be used to design support structures for HCP as part of a pandemic preparedness strategy.

The findings observed in this study confirm those of other research that explored the experiences of health care workers in the time of COVID-19 in South Africa, Saudi Arabia and India. The fear of getting infected was mentioned as a major stressor with the fear of infecting loved ones as a second which is consistent with the findings of other studies (12,15,23). Living with a family member with a chronic illness or children was reported to bring a high level of fear as described by similar studies exploring COVID-19 related fears among health care workers (2)]. Hence, important measures should be kept in place to ensure caretaker's mental

health by providing sufficient resources to overcome their fears which will allow them to carry out their duties responding to the COVID-19 pandemic.

Strict infection control practices were followed throughout working in the wards which required wearing of PPE at all times. For most participants having to wear PPE brought major distress similar to other studies (12,25,26,31). This was especially true for nurses and Registered Medical Officers who had to work long duty shifts. Prolonged PPE use was reported to bring physical stress, mainly, facemask related injuries such as bruises and dermatitis as well as communication barriers such as accurate perception of expressions or voices (25,31). Therefore, guidance on effective PPE uses as well as approval of appropriate PPE together with an organised system of reporting adverse effects and establishing a mechanism to address this is essential in ensuring provider's safety and comfort during patient care.

Consistent with other studies (6,27,32), our study highlights that in the initial stages of the pandemic most challenges in patient care were due to rapidly evolving guidelines. Frontline health care providers stated that this influenced decision making and brought great disputes during patient communication. HCPs agreed that since everyone was on a learning curve these types of experiences were bound to happen. In addition to having a protocol in place even before an influx of patients who tested positive for COVID-19 (9), clear communication on treatment regimen changes based on new evidence helped to mitigate these challenges.

Herbal therapies for the management of COVID-19 were observed to bring concerns about safety and efficacy similar to findings from other studies (10). In the Tanzania context traditional medicine has a social-cultural value mainly to availability and affordability of herbal remedies (6). Providers described one herbal remedy that was endorsed by the National Institute for Medical Research (NIMR) [28]. Major concerns that prevailed involved regulated use and side effects monitoring which posed a challenge as patients continued to use hospital based modern medicine simultaneously. Steam inhalation was also stated to be one among the traditional medicine practices used in households for prevention of respiratory symptoms. Participants agreed that these unregulated practices might have negative consequences.

COVID-19 was an emerging infectious disease with no approved treatments at the time the data was collected. Currently, there are two treatments approved by the FDA: Veklury (Remdesivir) and Oluminant (Bariticitinib) (33). Off-label drug use was described by our participants, similar to that which has been reported for Ebola virus disease (29). Multiple local as well as international guidelines described medicines that can be used to treat symptoms caused by COVID-19 (5). Off-label use of drugs may have caused challenges in monitoring response to treatment and worsen patient outcomes.

Strengths and limitations

Previous similar research was mostly retrospective. This study was conducted during the time that participants were presently involved in care for patients with COVID-19 which limited recall bias. The moderators were experienced and trained in leading FGDs and ensured participants had a proportionate speaking time.

This study gathered experiences of different health cadres (doctors, nurses, physiotherapist, lab technicians, and a dietician). These heterogeneous groups allowed diverse perspectives to be explored different from previous studies. These heterogeneous groups however may have limited group interactions in comparison to homogeneous groups, thus also posing a possible limitation.

One of the potential limitations of this study was that some of the researchers were from the same institution which may be a cause of desirability bias. However, in FGDs with senior consultants, this was solved by engaging a third-party investigator.

The Tanzanian context of the COVID-19 response was unique at the time of the research because the authorities had temporarily halted COVID-19 research output despite putting in place scientifically sound public health measures such as masking, good hand hygiene, and social distancing, and this contextual variation may limit the transferability of the study findings. However, a proper amount of reporting was made, and all government regulations were followed. That being said, the study's goal was met with zero political interference. We also note that the former government at the time recognized the worldwide scope of the COVID-19 outbreak and the need for concerted action to combat it (34).

Despite having a diverse sample, the composition of cadres was uneven; doctors (n=13) distributed as medical officers, residents and consultants, nurses (n=5), physiotherapist (n=2), radiologist (n=2), lab scientist (n=1), dietician (n=1). However, the study was not specifically designed to compare experiences between the different cadres.

Conclusion

Using a qualitative research approach, this study highlighted the challenges encountered by health care workers at the Aga Khan Hospital in Tanzania while caring for patients with COVID-19 during the first wave of the pandemic. Our research showed that fear and caution seemed especially widespread in the earliest stages of the pandemic. Providing care was challenging because of the constant need to adapt to new procedures and guidelines. With time, more evidence and stronger guidelines led to an increase in health care providers' ability to cope and confidence in their decisions.

Recommendations

This study underscores the need for timely staff training, well-defined patient care systems, and adequate resources, including suitable isolation spaces and essential medical supplies, to enhance epidemic response. It emphasizes the importance of mental health support, effective PPE usage guidelines, and leadership that fosters clear communication and innovation. Strengthening regulations on herbal therapies and conducting rigorous research on off-label drug use are also crucial. These findings can inform policy strategies for improving healthcare system preparedness, including community engagement, caregiver support, and standardized protocols to better manage future pandemics.

Declarations

Acknowledgments

Authors would like to thank the study participants, the staff at the Aga Khan Hospital in Dar es Salaam, and all individuals who supported and helped them during the conduct of this study.

Authors contributions

MA, EP, BK, GN, AK, CM, SS, ME, SK, and DR planned and initiated the study. MA, RU, EP and BK performed analytical planning and conducted the data collection and data analysis. BK, MA and GN prepared the manuscript. All authors contributed to the refinement and approval of the final manuscript. All authors agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

References

1. Archived: WHO Timeline - COVID-19 [Internet]. Who.int. 2021 [cited 23 September 2021]. Available from: https://www.who.int/news-room/detail/27-04-2020-who-timelinecovid-19.
2. Tarimo C, Wu J. The first confirmed case of COVID-19 in Tanzania: recommendations based on lessons learned from China. Tropical Medicine and Health [Internet]. 2020 [cited 23 September 2021];48(1). Available from: https://tropmedhealth.biomedcentral.com/articles/10.1186/s41182-020-00214-x#citeas
3. United Republic of Tanzania: WHO Coronavirus Disease (COVID-19) Dashboard with Vaccination Data [Internet]. Covid19.who.int. 2022 [cited 1 January 2022]. Available from: https://covid19.who.int/region/afro/country/tz.

4. Mathieu E, Ritchie H, Ortiz-Ospina E, Roser M, Hasell J, Appel C et al. A global database of COVID-19 vaccinations. Nature Human Behaviour. 2021;5(7):947-953.
5. Health and Care Worker Deaths during COVID-19 [Internet]. Who.int. 2022 [cited 1 January 2022]. Available from: https://www.who.int/news/item/20-10-2021-health-and-care-worker-deaths-during-covid-19
6. Jean S, Lee P, Hsueh P. Treatment options for COVID-19: The reality and challenges. Journal of Microbiology, Immunology and Infection. 2020;53(3):436-443.
7. WHO supports scientifically-proven traditional medicine [Internet]. WHO | Regional Office for Africa. 2021. Available from: https://www.afro.who.int/news/who-supports-scientifically-proven-traditional-medicine?gclid=Cj0KCQjwz4z3BRCgARIsAES_OVfVc7nq-A9Vr_tnwH6va0R9r0TJqJQWRyfbNyWG2fV7PskaskckHAwaAgcIEALw_wcB
8. Pal R, Bhadada S. COVID-19 and non-communicable diseases. Postgraduate Medical Journal. 2020;96(1137):429-430.
9. Coronavirus Disease 2019 (Covid-19) Treatment Guidelines. The United Republic of Tanzania Ministry of Health, Community Development, Gender, Elderly And Children; 2021.
10. Yang Y. Use of herbal drugs to treat COVID-19 should be with caution. The Lancet. 2020;395(10238):1689-1690.
11. Algorithm for COVID-19 triage and referral: patient triage and referral for resource-limited settings during community transmission [Internet]. Apps.who.int. 2021 [cited 28 September 2021]. Available from: https://apps.who.int/iris/handle/10665/331915
12. Nxumalo CT, Mchunu GG. A qualitative study to explore primary health care practitioners' perceptions and understanding regarding the COVID-19 pandemic in KwaZulu-Natal, South Africa. African Journal of Primary Health Care & Family Medicine. 2021;13(1).
13. Ugeskriftet.dk [Internet]. [cited 2020 Jun 12]. Available from: https://ugeskriftet.dk/dmj/initial-experiences-patients-covid-19-ventilatory-support-denmark.
14. Telias I, Katira B, Brochard L. Is the Prone Position Helpful During Spontaneous Breathing in Patients with COVID-19. JAMA. 2020;323(22):2265.
15. Masalu J. Tanzania: Vacuum of evidence in medical management of COVID-19 [Internet]. MedicoPressTZ. 2021 [cited 3 January 2022]. Available from:

https://medicopress.media/medico-research/tanzania-vacuum-of-evidence-in-medical-management-of-covid-19/

16. National Covid-19 Daily Report - NICD [Internet]. NICD. 2022 [cited 2 January 2022]. Available from: https://www.nicd.ac.za/diseases-a-z-index/disease-index-covid-19/surveillance-reports/national-covid-19-daily-report/
17. Sahoo S, Mehra A, Suri V, Malhotra P, Yaddanapudi L, Dutt Puri G et al. Lived experiences of the corona survivors (patients admitted in COVID wards): A narrative real-life documented summary of internalized guilt, shame, stigma, anger. Asian Journal of Psychiatry. 2020; 53:102187.
18. Creswell JW, Poth CN. *Qualitative inquiry and research design: Choosing among five approaches*. 4th ed. Thousand Oaks, CA: SAGE Publications; 2018.
19. Malterud K. Fokusgrupper som forskningsmetode for medisin og helsefag. [Focus groups as a research method in the health sciences]. Oslo: Universitetsforlaget; 2012.
20. Ames H, Glenton C, Lewin S. Purposive sampling in a qualitative evidence synthesis: a worked example from a synthesis on parental perceptions of vaccination communication. BMC Medical Research Methodology. 2019;19(1).
21. Braun V, Clarke V. Reflecting on reflexive thematic analysis. Qualitative Research in Sport, Exercise and Health. 2019;11(4):589-597.
22. Nowell L, Norris J, White D, Moules N. Thematic Analysis. International Journal of Qualitative Methods. 2017;16(1):160940691773384
23. Rathnayake S, Dasanayake D, Maithreepala SD, Ekanayake R, Basnayake PL (2021) Nurses' perspectives of taking care of patients with Coronavirus disease 2019: A phenomenological study. PLoS ONE 16(9): e0257064. https://doi.org/10.1371/journal.pone.0257064
24. Mohsin S, Agwan M, Shaikh S, Alsuwaydani Z, AlSuwaydani S. COVID-19: Fear and Anxiety among Healthcare Workers in Saudi Arabia. A Cross-Sectional Study. INQUIRY: The Journal of Health Care Organization, Provision, and Financing. 2021; 58:004695802110252.
25. Grundmann F, Epstude K, Scheibe S. Face masks reduce emotion-recognition accuracy and perceived closeness. PLOS ONE. 2021;16(4): e0249792.
26. Galehdar N, Kamran A, Toulabi T, Heydari H. Exploring nurses' experiences of psychological distress during care of patients with COVID-19: a qualitative study. BMC Psychiatry. 2020;20(1).

27. Saperstein Y, Ong S, Al-Bermani T, Park J, Saperstein Y, Olayinka J et al. COVID-19 Guidelines Changing Faster than the Virus: Implications of a Clinical Decision Support App. International Journal of Clinical Research & Trials. 2020;5(2).
28. Richey L, Gissel L, Kweka O, Bærendtsen P, Kragelund P, Hambati H et al. South-South humanitarianism: The case of Covid-organics in Tanzania. World Development. 2021; 141:105375.
29. Burton T. Disputes Emerge on African Ebola Drug Trials [Internet]. WSJ. 2021 [cited 27 October 2021]. Available from: https://www.wsj.com/articles/disputes-emerge-on-african-ebola-drug-trials-1431471041
30. Dapar MLG, Demayo CG. Folk Medical Uses of Lunas Lunasia Amara Blanco By The Manobo People, Traditional Healers And Residents Of Agusan Del Sur, Philippines. SciInt(Lahore). 2017;29(4):823–6.
31. 30. Benjamin A, Sultan A, Yousif M, Moussa A, Abdo EF, Kayandabila J, et al. Qualitative Healthcare Worker Survey: Retrospective cross-sectional case study on COVID-19 in the African context. Annals of Medicine and Surgery. 2022; 79:103918.
32. Ilesanmi OS, Afolabi AA, Akande A, Raji T, Mohammed A. Infection prevention and control during COVID-19 pandemic: Realities from health care workers in a North Central State in Nigeria. Epidemiology and Infection. 2021;149.
33. Parums DV. Editorial: Current Status of Oral Antiviral Drug Treatments for SARS-CoV-2 Infection in Non-Hospitalized Patients. Med Sci Monit. 2022 Jan 1;28:e935952. doi: 10.12659/MSM.935952. PMID: 34972812; PMCID: PMC8729033. https://pubmed.ncbi.nlm.nih.gov/34972812/
34. Mfinanga SG, Mnyambwa NP, Minja DT, Ntinginya NE, Ngadaya E, Makani J, et al. Tanzania's position on the COVID-19 pandemic [Internet]. The Lancet. Elsevier; 2021. Available from: https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(21)00678-4/fulltext