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Supply and Human Resource-Related Factors in COVID-19 Preparedness within Dental Facilities in Nairobi County, Kenya

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Abstract

Dental care health professionals are among the highly impact groups because of the nature of their work. Dental professionals must have adequate resources, including appropriate protective procedures to minimize and prevent disease spread. Supplies and human resources ensure dental facilities have the necessary personal protective equipment (PPE) to provide safe oral care and staffing adequacy to support patients' care needs. Following the border lockdown, the disrupted global supply chain created a global shortage of reagents, PPEs, and testing kits. In Kenya, inadequate expertise among staff, delayed disbursements, and biased priorities affected preparedness levels to deal with COVID-19. This study aimed to determine the supplies and human resource-related factors affecting preparedness in COVID-19 pandemic management among dental facilities in Nairobi County, Kenya. The study was an analytical cross-sectional study targeting dental care professionals from the 257 public, private, and faith-based dental facilities in Nairobi County. Data from 183 facilities was obtained with 21.3% categorized as "fully prepared" for the COVID-19 pandemic. Over 90% of the dental facilities had temperature measuring tools, 96.7% had sanitizers and alcohol rubs, 96.2% had handwashing points with soap and running water available, 100% had face masks and gloves, 80.9% had gowns, 86.9% had goggles or face shield, and 97.3% had disinfectant. The number of staff in the dental facilities was between 4 and 14 team members, with 44.8% having 0-5 health workers. Seventy-six percent of the facilities had IPC guidelines, 81.4% had staff training on IPC protocols related to COVID-19 emergency preparedness, and 90.7% did additional cleaning or sanitization of work areas and

offices. In conclusion, most dental facilities in Nairobi County were only fully prepared to deal with the COVID-19 pandemic. There were gaps in the availability of supplies and human resources to support the pandemic as none of the supplies-related or human resource-related factors were fully available. Only PPE inventory as a supplies-related factor had a significant association with COVID-19 preparedness.

Keywords

COVID-19, Preparedness, Supplies, Human Resources, Kenya

1. Introduction

The coronavirus disease 2019 (COVID-19) has significantly impacted healthcare professionals since it was declared a pandemic in 2020. Dental care health professionals are among the highly impacted groups because of the nature of their work [1]. According to the United States Agency for Occupational Safety and Health Administration, dental professionals are at high risk of COVID-19 because of working in the patient's mouth, a proximity that increases exposure to exhaled aerosols with SARS-COV-2 virus infection [2]. Dental professionals must have adequate resources, including appropriate protective procedures to minimize and prevent disease spread. Supplies ensure dental facilities have the necessary personal protective equipment (PPE) to provide safe oral care [3]. Human resources ensure staffing adequacy to support patients' care needs without fatigue, exhaustion, and burnout [4]. Resource availability, in the form of supplies and the human factor, depends on disaster management preparedness levels. Recent research in Ethiopia showed low preparedness for the COVID-19 pandemic, with 26.1% of the studied dental facilities categorized as prepared while 73.9% have work to do [5]. Poorly prepared dental facilities had challenging working environments, considering the fear and stigmatization of contracting COVID-19. A 2020 study found that 32.1% of dental professionals developed fear and anxiety for working with inadequate PPEs at the start of the pandemic [6]. In Kenya, the risk of COVID-19 spreading in dental practices was recognized by the Kenya Dental Association, in collaboration with the Ministry of Health, which suspended dental care and limited emergencies to level 5 and 6 facilities [7]. A significant reason for the suspension was inadequate facility preparedness to provide safe dental care without COVID-19 spread.

In support, 2020 research by Otieno *et al.* found gaps in adherence to Infection Prevention and Control (IPC) measures in dental care settings in Kenya, with 42.3% of the facilities using a rubber dam (RD) isolation for aerosol-generating procedures [7]. Many factors, including limited resources, contributed to the lack of COVID-19 preparedness in dental settings. PPEs are not readily available due to the high demand arising from the pandemic and the disruption of the global supply chain. According to Morales-Contreras *et al.*, 22.6% of the surveyed dental

facilities reported difficulties in purchasing PPEs [8]. The American Dental Association in 2020 identified challenges in human resources within dental facilities, including inadequate workforce and a poorly trained and misplaced workforce to deal with the pandemic [9].

Furthermore, following the border lockdown, the disrupted global supply chain created a global shortage of reagents, PPEs, and testing kits [10]. In Kenya, inadequate expertise among staff, delayed disbursements, and biased priorities affected preparedness levels to deal with COVID-19. Therefore, this study aimed to determine the supplies and human resource-related factors affecting preparedness in COVID-19 pandemic management among dental facilities in Nairobi County, Kenya.

2. Methods

2.1. Study Design

This is an analytical cross-sectional study. It targeted dental healthcare facilities in Nairobi County, Kenya. The study period was from June 2022 to November 2023.

2.2. Study Area

The study was conducted in Nairobi County, Kenya. It's the capital county of Kenya, with 257 public and private dental facilities. Nairobi County is targeted because it has the highest COVID-19 prevalence and the most significant number of dental care providers in Kenya. Rural and other urban areas in Kenya were excluded because of the logistical and resource constraints. Nairobi County provides a unique infrastructural, demographic, and healthcare delivery system that significantly differs from other areas. The area also presented distinct challenges and opportunities in terms of COVID-19 management that may not be generalizable to rural or other areas in Kenya.

2.3. Study Population

The study targeted dental care professionals from public, private, and faith-based dental facilities in Nairobi County. Specifically, the researchers targeted dental care providers from level II, III, IV, V, and VI facilities, including dentists, dental assistants, and community oral health officers.

2.4. Sampling

A census method was used to sample the study participants. During the study period, Nairobi County had 257 dental facilities, and the heads or persons holding equivalent positions were recruited. These personnel completed the study questionnaire described below.

2.5. Data Collection Tool

The researchers developed a semi-structured questionnaire to collect data. The

questionnaire had three sections: collecting facility details, supplies-related factors, and human resource-related factors affecting COVID-19 preparedness. The last two sections had questions that needed a "yes" or "no" response. Supply-related factors targeted were the availability of PPEs, availability of running water, proximity of handwashing points, COVID-19 screening supplies, patient decongestion strategies, well-ventilated dental service rooms, and availability of ambulance services. Human resource-related factors included staff, cadres in the facility, training on IPC and emergency response, and emergency response teams. The tool was pretested using 10 dental facilities in Kiambu County that are neighbors in Nairobi with high internal consistency. The Cronbach's alpha of 0.86 showed that the tool is sufficiently reliable (see supplementary material).

2.6. Data Collection

The data collection process began with recruiting representatives from the dental facilities with sufficient knowledge of the study topic. The primary researcher physically visited each setting to recruit the facility heads. Those willing to participate filled out a consent form. Through a research assistant, the primary researcher will assist with data collection by sending online copies of the study tool through a link to the KoboToolBox, a data collection, management, and analysis software. They were requested to install the Kobo Collect android application to access, fill, and submit the questionnaire, after which they could uninstall the app. Based on the pilot test, it took approximately 15 minutes to fill out the questionnaire.

2.7. Data Analysis

Data was extracted from the KoboToolBox as an Excel file. It was organized, cleaned, and exported into Statistical Package for the Social Sciences (SPSS) version 29 for analysis. To describe the facility characteristics and the supply and human resource factors, frequency, and percentage were used for categorical data, while mean and standard deviation were used for continuous data. The association between supply and human resource factors and COVID-19 preparedness was determined using Chi-Square tests for proportions and multivariate logistic regression. Statistical significance was set at standard $\alpha = 0.05$. The results were presented in tables.

3. Results

Of the 257 targeted dental facility heads, 182 (70.8%) were included in the study. Such a response rate could potentially introduce non-response bias. However, 24 facilities were excluded because they had incomplete questionnaire responses. The remaining 51 were private facilities affiliated with other facilities included in the study. The included and excluded facilities are broadly similar, reducing the risk of non-response bias.

3.1. Facility Characteristics

Of the 182 facilities included in the study, 56.0% were privately owned, and 37.2% were level III dental facilities. Fifty percent of the facilities had been in operation for more than ten years, 61.2% were part of a department in a major hospital, and 74.9% had a 250 monthly patient attendance (Table 1).

Table 1. Facility characteristics.

	Sociodemographic	Frequency	%
Type of Facility	Mission/Faith-based	6	3.3
	Private	106	56.0
	Public	74	40.7
Facility level	Level 2	37	20.8
	Level 3	40	22.5
	Level 4	43	24.2
	Level 5	39	21.9
	Level 6	19	10.7
Operation duration	2 - 5 years	36	19.8
	5 - 10 years	28	15.4
	Below 2 years	11	6.0
	Over 10 years	107	58.8
Presence of other departments	No	65	35.7
	Yes	117	64.3
Patient volume per month	0 - 250	137	74.9
	251 - 500	35	19.1
	>500	10	6.0

3.2. COVID-19 Preparedness Scores

Of the 183 facilities, 72.7% scored in the "work to do" category based on the ReadyScore readiness rating system, while 21.3% were categorized as "ready". Six percent were categorized as "not ready". The median readiness score was 63.3% (Table 2).

3.3. Supply-Related Factors for COVID-19 Preparedness

Over 90% of the dental facilities had temperature measuring tools, 96.7% had sanitizers and alcohol rubs, 96.2% had handwashing points with soap and running water available, 100% had face masks and gloves, 80.9% had gowns, 86.9% had goggles or face shield, and 97.3% had disinfectant. However, they did poorly on

other factors such as PPE inventory, diagnostic ambulatory, and isolation service access and availability (Table 3).

Table 2. Facility's pandemic preparedness percentage scores.

Variables	Facility readiness score		
	Categories	Frequency	%
ReadyScore classification	Not ready	11	6.0
	Work to do	133	72.7
	Ready	39	21.3

a. Mean = 64.516, Median = 63.300, Variance = 299.311, range = 73.5.

Table 3. Supplies-related factors in pandemic preparedness.

Supply-Related Indicators	No (%)	Yes (%)
Temperature measurement	17 (9.2)	165 (90.7)
COVID-19 screening protocol	48 (26.8)	131 (73.1)
Hand sanitizer/Alcohol rubs	4 (2.2)	178 (97.8)
Handwashing	7 (3.9)	174 (96.1)
Facemasks	1 (0.6)	180 (99.4)
N95 masks	64 (36.6)	111 (63.4)
Gloves	1 (0.7)	150 (99.3)
Gowns	27 (15.2)	151 (84.8)
Waterproof apron	67 (36.8)	112 (61.5)
Goggles or face shield	25 (13.7)	157 (86.3)
Vacuum aspiration machine	85 (47.2)	95 (52.8)
Disinfectant	5 (2.8)	176 (97.2)
Inventory of PPE (last 1 month)	84 (46.2)	97 (53.6)
Inventory of PPE (last 7 days)	132 (72.5)	50 (27.5)
Access to diagnostic services	69 (37.9)	113 (62.1)
Access to isolation facilities	89 (48.9)	93 (51.1)
Access to ambulance services	65 (35.7)	117 (64.3)
Displayed COVID-19 prevention protocol	52 (28.6)	130 (71.4)

3.4. Human Resource-Related Factors for COVID-19 Preparedness

The number of staff in the dental facilities was between 4 and 14 team members, with 44.8% having 0 - 5 health workers (Table 4). Seventy-six percent of the facil-

ities had IPC guidelines, 81.4% had staff training on IPC protocols related to COVID-19 emergency preparedness, and 90.7% did additional cleaning or sanitization of work areas and offices. About 80% had reduced work meetings, 75.4% had limited hospital visitors, 91.8% had their staff access to vaccination, and 87.4% had ventilated rooms for physical examination of the patients. About 50% had no infection control committee, 51.4% had no emergency response team, 53.6% had no training on the IPC focal person, and 48.6% had no IPC focal person (Table 5).

Table 4. Staffing levels in dental facilities.

Variables	Facility readiness score		
	Categories	Frequency	%
Staff numbers	0 - 5 Staff members	82	44.8
	6 - 10 Staff members	75	41.0
	11 - 15 Staff members	26	14.2

Table 5. Human resource factors in pandemic preparedness.

Human Resource-Related Indicator	No (%)	Yes (%)
Staff adequacy for emergencies	76 (41.8)	106 (58.2)
The facility has IPC guidelines	36 (20.0)	144 (80.0)
IPC supply chain manager identified	63 (34.8)	118 (65.2)
IPC protocols training (COVID-19 preparedness)	25 (13.7)	157 (86.3)
Training to recognize COVID symptoms	58 (32.2)	122 (67.8)
Infection control committee	81 (44.8)	100 (55.2)
Emergency response team	79 (43.9)	101 (56.1)
IPC focal person	78 (43.3)	102 (56.7)
Training of IPC focal person	94 (51.6)	88 (48.4)
HCW has IPC focal person contact	90 (49.7)	91 (50.3)
Focal person has contact of COVID-19 teams	55 (30.9)	123 (69.1)
Additional cleaning/sanitization	19 (10.5)	162 (89.5)
Reduced work meeting frequency	32 (17.8)	148 (82.2)
Limited visitors to the facility	45 (24.7)	134 (74.9)
Social distancing at work	49 (27.4)	130 (72.9)
Telehealth sessions in meetings	84 (46.9)	95 (53.1)
Flexible leave planning	52 (29.2)	126 (70.8)
Staff COVID-19 vaccination access	14 (7.8)	166 (92.2)

Continued

Ventilated rooms available	20 (11.2)	159 (88.8)
Physical barrier at registration	87 (48.3)	93 (51.1)
Private area for respiratory syndrome patients	58 (32.2)	122 (67.8)
Dedicated entry person for patient order	72 (40.4)	106 (59.6)

3.5. Factors Associated with Pandemic Preparedness Scores

Having performed an inventory of PPE supplies in the last seven days was statistically significantly associated with COVID-19 preparedness (t (180) = 2.259, p = 0.025). Interestingly, dental facilities indicated that they had performed a PPE supplies inventory seven days before the pandemic as a 59.88% preparedness score compared to 66.31% of facilities that had not performed the PPE inventory in the last seven days. All the other supplies-related factors were not significantly associated with pandemic preparedness (Table 6). No human resources-related factors were significantly associated with pandemic preparedness (Table 7).

Table 6. Supplies-related factors associated with pandemic preparedness scores.

Supplies-Related factors	Group	% preparedness score	t-value (degree of freedom)	p-value
Temperature measurement	No	63.75	−0.199 (180)	0.843
	Yes	64.63		
COVID-19 screening protocol	No	66.80	1.054 (177)	0.293
	Yes	63.70		
Hand sanitizer/Alcohol rubs	No	70.43	0.685 (180)	0.494
	Yes	64.41		
Handwashing	No	65.31	0.140 (179)	0.889
	Yes	64.38		
Facemasks	No	71.40	0.400 (179)	0.690
	Yes	64.42		
N95 masks	No	66.11	0.927 (173)	0.355
	Yes	63.56		
Gloves	No	71.40	0.402 (149)	0.688
	Yes	64.61		
Gowns	No	69.09	1.558 (176)	0.121
	Yes	63.51		
Waterproof apron	No	64.89	0.353 (177)	0.724
	Yes	63.94		

Continued

Goggles or face shield	No	62.69	−0.574 (180)	0.567
	Yes	64.84		
Vacuum aspiration machine	No	63.94	−0.437 (178)	0.662
	Yes	65.07		
Disinfectant	No	73.88	1.218 (179)	0.225
	Yes	64.29		
Inventory of PPE (last 1 month	No	66.40	1.442 (179)	0.151
	Yes	62.70		
Inventory of PPE (last 7 days)	No	66.31	2.259 (180)	0.025
	Yes	59.88		
Access to diagnostic services	No	66.40	1.127 (180)	0.261
	Yes	63.41		
Access to isolation facilities	No	64.34	−0.154 (180)	0.877
	Yes	64.74		
Access to ambulance services	No	63.64	−0.524 (180)	0.601
	Yes	65.05		
Displayed COVID-19 prevention protocol	No	67.12	1.268 (180)	0.207
	Yes	63.52		

Table 7. Human resource-related factors associated with pandemic preparedness scores.

Human Resource-Related Factors	Group	% preparedness score	t-value (degree of freedom)	p-value
Staff adequacy for emergencies	No	63.29	−0.825 (180)	0.410
	Yes	65.44		
The facility has IPC guidelines	No	64.00	−0.228 (178)	0.820
	Yes	64.74		
IPC supply chain manager identified	No	65.27	0.338 (179)	0.736
	Yes	64.36		
IPC protocols training (COVID-19 preparedness)	No	64.74	0.342 (106)	0.733
	Yes	63.34		
Training to recognize COVID symptoms	No	62.80	−0.778 (178)	0.437
	Yes	64.94		
Infection control committee	No	64.22	−0.135 (179)	0.893
	Yes	64.57		

Continued

Emergency response team	No	65.74	0.918 (178)	0.360
	Yes	63.35		
IPC focal person	No	63.87	−0.461 (178)	0.645
	Yes	65.07		
Training of IPC focal person	No	63.85	−0.559 (180)	0.577
	Yes	65.29		
HCW has IPC focal person contact	No	66.01	1.033 (179)	0.303
	Yes	63.36		
Focal person has contact of COVID-19 teams	No	65.68	0.615 (176)	0.539
	Yes	63.95		
Additional cleaning/sanitization	No	61.56	−0.785 (179)	0.433
	Yes	64.88		
Reduced work meeting frequency	No	64.54	0.051 (178)	0.959
	Yes	64.37		
Limited visitors to the facility	No	67.66	1.432 (177)	0.154
	Yes	63.39		
Social distancing at work	No	63.90	−0.257 (177)	0.789
	Yes	64.65		
Telehealth sessions in meetings	No	62.03	−1.813 (177)	0.072
	Yes	66.70		
Flexible leave planning	No	63.74	−0.301 (176)	0.764
	Yes	64.61		
Staff COVID-19 vaccination access	No	61.53	−0.644 (178)	0.521
	Yes	64.64		
Ventilated rooms available	No	64.59	0.053 (177)	0.958
	Yes	64.37		
Physical barrier at registration	No	64.34	−0.127 (178)	0.899
	Yes	64.67		
Private area for respiratory syndrome patients	No	62.77	−0.869 (178)	0.386
	Yes	65.18		
Dedicated entry person for patient order	No	67.06	1.565 (176)	0.119
	Yes	62.94		

4. Discussion

This study assessed the supplies and human resource-related factors associated with COVID-19 pandemic preparedness among Nairobi County, Kenya dental facilities. It was conducted on the premise that COVID-19 increased healthcare challenges, including supplies and human resources limitations due to mitigation measures associated with COVID-19. Research underpins the importance of having supplies and human resources to combat disasters and pandemics such as COVID-19. This section discusses the study findings and how they compare with existing literature.

4.1. Pandemic Preparedness

The study findings showed that only about a fifth of the dental facilities were fully prepared after scoring over 80% on the preparedness test. Most dental facilities were categorized as "work to do," meaning they had to improve their pandemic preparedness. These findings align with Mwine *et al*. (2023), who, in a Ugandan study, found that the dental facilities scored between 27% to 51% on the ReadyScore for pandemic preparedness, with a median score for all facilities at 39%. These results indicated that almost all dental facilities scored less than average on pandemic preparedness. Similarly, Ayele *et al*., reported that 26.1% of the facilities in Ethiopia were fully ready for the pandemic, having scored over 80% in the readiness score while Chaudhary *et al*., found that fewer than 50% of oral healthcare workers felt their facilities were well prepared for the COVID-19 pandemic [5] [11].

While the regional comparison offers instructive insight, the differences in preparedness scores could be attributed to the distinct healthcare infrastructures in the three countries. In Kenya, devolution creates devolved health systems with varied preparedness across counties because of differing administrative capacities, budget allocation, and supply chains. The Ugandan health system is more centralized apply uniform policies that limit facility autonomy, affecting preparedness outcomes. Ethiopia has more pronounced shortages of medical supplies and human resources, hence the lowest readiness score. Regardless of the differences in healthcare infrastructures, it's clear that regional pandemic preparedness remains low. It is important to expand on supplies and human resources factors associated with pandemic preparedness.

4.2. Supplies Related Factors to Pandemic Preparedness

Personal protective equipment (PPE) IS integral to COVID-19 infection prevention. Protecting healthcare providers was pivotal in the COVID-19 emergency response, considering the increased risk of contact with patients suspected or confirmed to have the COVID-19 disease. However, irrespective of the evidenced benefits of PPEs, there were shortages of PPE, misuse, and general confusion on using the different available supplies and resources to support the response to the pandemic [12].

Our study that all surveyed dental facilities had access to face masks and gloves as basic protective supplies with 100 percent availability. These findings contrast Ayele *et al*.'s findings from Ethiopia where 78.3% and 73.9% of the facilities had face masks and non-sterile gloves, respectively [5]. However, consistent with Ayele *et al*., facilities had shortages of other essential supplies for infection prevention, such as face shields and goggles, alcohol-based hand rubs, soap, disinfectants, and gowns was evident [5]. While the notable difference in the availability of critical supplies between our study and Ayele *et al*. [5] could be attributed to the study period (2023 vs 2020) and the study settings (dental facilities vs general health facilities), they also reflect the context challenges specific to Nairobi. Despite being the capital and the center of healthcare in Kenya, Nairobi has a fragmented procurement system and less streamlined funding systems attributed to corruption and inefficiency allegations related to resource management. There are procurement delays and limited supply chains that hinder timely access to PPEs during emergencies.

COVID-19 screening for patients presenting at dental facilities helps detect symptoms of suspected infection. The WHO and Kenya Ministry of Health provide screening protocols for all healthcare settings. In our study, only about two-thirds of the dental facilities assessed had a COVID-19 screening protocol, with about 90% having temperature measurement equipment. The findings align with those of Widyarman *et al*., who reported that 96% of the respondents checked their patients' temperature before dental services [13]. They differ from Wahdan *et al*., who found that only 57.6% of dental health workers in Palestine measured temperature using a thermometer during COVID-19 [14].

The findings also revealed that having performed an inventory of PPE supplies in the last seven days was statistically significantly associated with COVID-19 preparedness. However, it's the dental facilities that indicated that they had not performed a PPE supplies inventory seven days that had a higher preparedness score (66.31%) than those that had performed the PPE inventory on the last seven days (59.88%). It is unclear why this association was found, and there is limited research on the relationship between PPE inventory assessment and pandemic preparedness to support or refute the findings. However, potential reasons to explain the inverse relationship include proactive stockpiling and reactive management approaches. On the one hand, facilities may have high preparedness scores despite not conducting recent inventories because they actively stockpile or have well-established and robust supply chains that reduce the need to frequently take inventories. The facilities might have excellent protocols that support forecasting, ensuring sufficient PPE reserves in cases of emergencies. On the other hand, facilities with lower preparedness scores despite regularly conducting PPE inventories may be using a reactive management approach where taking inventory is a necessity to frequently monitor stocks due to a history of limited supplies and unreliable procurement methods. As such, frequent PPE inventory could be attributed to unstable supply chains rather than a pandemic preparedness marker. Further studies are needed to expand the literature.

4.3. Human Resource-Related Factors in Pandemic Preparedness

Human resources are health care professionals sustaining the system in response to emergencies. The COVID-19 pandemic significantly strained healthcare professionals regarding COVID-19-related morbidity and mortality. Healthcare workers, being the frontline responders to the pandemic, were at the highest risk of COVID-19 infection. Like previous outbreaks, the COVID-19 pandemic tested the healthcare system's preparedness, resilience, and leadership in handling the disease [15].

Our study findings showed that nearly half of the dental facilities indicated adequate staff adequacy to handle COVID-19 emergencies. However, the workload and number of procedures carried out by dental facilities significantly reduced during the pandemic [2]. It was beyond this study's scope to evaluate if any layoff was influenced by reduced procedures and subsequent financial challenges that would cause almost half of the dental facilities to report inadequate staff to allow flexibility in times of emergency.

The capacity of the healthcare staff to handle the pandemic was crucial, and training is an essential aspect of managing the disease by ensuring adherence to screening, diagnosis, management, and prevention guidelines provided by the WHO. Since COVID-19 infection was highly transmissible, adherence to infection prevention control measures was crucial in reducing the disease burden. In our study, over two-thirds of the dental facilities had IPC guidelines, with less than average having an infection control committee and an emergency response team. This aligns with the Ethiopian study, where 78.3% of dental facilities had a COVID-19 focal person and an emergency response committee [5]. The minor difference between the proportion in our study and that of Ayele *et al.* could be attributed to the different study methodologies, such as the study site (entire health facilities vs dental facilities) and the low number of staff in our study [5]. In terms of IPC training, in this study, over 80% of the staff had undergone the training, consistent with Chanie *et al.*, who found that 64.9% had received IPC training [16]. However, the findings disagree with Chaudhary *et al.*, who found that only 12.6% of the oral health workers were trained in infection control [11].

Coordination efforts between dental facilities and the local, regional, and national health authorities help to track disease burden and progress. Evidence from this study showed that most dental healthcare workers had contact with COVID-19 focal persons, and the focal person had contact with sub-national and national health authorities to report COVID-19 suspected and confirmed cases. These findings align with Ayele *et al.*, who found that 82.6% had contact with the COVID-19 focal person, and the focal person had contact with sub-national and national health authorities [5]. Staff contingency planning, such as flexible leave days, telehealth meeting sessions, and reduced work meeting frequency, were available at more than two-thirds of the dental facilities. These findings differ from Chanie *et al.*, who reported that contingency planning was available in 31.2% of the Ethiopian dental facilities [16]. In our study, no human resources-related factors were significantly associated with pandemic preparedness.

5. Conclusion

Based on the study findings, we can conclude that most dental facilities in Nairobi County were only fully prepared to deal with the COVID-19 pandemic. There were gaps in the availability of supplies and human resources to support the pandemic as none of the supplies-related or human resource-related factors received a perfect "yes" response. Facemasks were the most available supplies, while performing inventory for PPE in the last 7 days was least done by the dental facilities. Staff COVID-19 vaccination access was the most available human resource factor, while training of IPC focal person was least available. There was an association between COVID-19 preparedness and PPE inventory as a supply-related factor. PPE shortage was evident in the study, which could be attributed to structural and policy-related challenges such as procurement delays, efficiency and corruption allegations, and lack of funding. Our study did not find any relationship between human resource factors and pandemic preparedness.

6. Recommendations

We recommend further research to assess the relationship between supplies or human resources factors and COVID-19 preparedness. This information would provide insight into how healthcare facilities, including dental facilities, deal with further healthcare emergencies of considerable magnitude. Furthermore, addressing these challenges through streamlined procurement methods, improved transparency, and providing emergency funding could facilitate full access to PPEs making dental health facilities and other facilities more resilient to public health emergencies.

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Conflicts of Interest

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

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