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Assessment of access to hygiene in health care facilities in Kisangani, Democratic Republic of Congo

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Abstract

Background: Access to hygiene services in healthcare facilities is a key component of healthcare quality and infection prevention. In Kisangani, Democratic Republic of the Congo, evidence on Water, Sanitation and Hygiene (WASH) services in healthcare facilities remains limited. This study assessed access to hygiene services in healthcare facilities in Kisangani.

Methods: A cross- sectional analytical study was conducted in 93 healthcare facilities, including 88 health centers and 5 general referral hospitals. A total of 206 respondents participated in the survey. The main variables assessed were the availability of handwashing stations with water and soap, the use of personal protective equipment (PPE), the availability of functional sterilization equipment, and the presence of water points with handwashing facilities in toilets. Data were analyzed using Pearson's Chi-square test with a significance level of 5%.

Results: Functional handwashing stations were available in 64.08% of facilities, whereas only 19.9% had water and soap available in service areas. Personal protective equipment was available in all facilities (100%), while only 50.97% had functional sterilization Equipment. Functional hygiene committees existed in 13.59% of facilities, and none had menstrual hygiene management facilities. Overall, 50.97% of healthcare facilities demonstrated good hygiene access, while 49.03% showed poor hygiene access. Multivariate analysis revealed that being a public healthcare facility (AOR = 0.30; 95% CI: 0.15–0.68; p = 0.003) and having separate toilets for staff and patients (AOR = 7.4; 95% CI: 2.92–18.52; p < 0.0001) were significantly associated with better hygiene access.

Conclusion: Significant gaps remain in hygiene access across healthcare facilities in Kisangani, particularly regarding the availability of water and soap, sterilization equipment, and hygiene governance mechanisms. Strengthening WASH infrastructure, staff training, and hygiene management systems is essential to improve healthcare quality and reduce healthcare-associated infections.

Keywords: Hygiene; WASH; Healthcare Facilities; Kisangani; Democratic Republic of The Congo

1. Introduction

Access to hygiene in healthcare facilities is a fundamental determinant of the quality and safety of care. Water, Sanitation and Hygiene (WASH) services play a central role in preventing healthcare-associated infections, reducing the transmission of pathogens, and improving clinical outcomes. According to the World Health Organization (WHO),

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healthcare-associated infections are one of the leading preventable causes of morbidity and mortality in low- and middle-income countries, where health systems often face major structural constraints. [6]

Globally, nearly one in four healthcare facilities lacks basic hygiene services, and almost half lack access to adequate sanitation. [8] This situation is particularly concerning in sub-Saharan Africa, where WASH deficiencies not only compromise the safety of care but also undermine public trust in healthcare services. The absence of functioning handwashing stations, a lack of personal protective equipment, insufficient sterilization facilities, and the lack of water points in toilets contribute to the spread of healthcare-associated infections, leading to longer hospital stays, higher healthcare costs, and increased preventable mortality. [4]

In the Democratic Republic of Congo, challenges related to access to hygiene in healthcare facilities are exacerbated by chronic underfunding of the health sector, outdated health infrastructure, and difficulties in providing safe drinking water. [3] Despite international commitments made under the Sustainable Development Goals, particularly SDG 6 on universal access to water and sanitation, progress remains slow and unevenly documented at the local level. Empirical data on the state of WASH services in health facilities remain fragmented, limiting the ability of policymakers to plan targeted, evidence-based interventions. [2]

The city of Kisangani, capital of Tshopo province, has 93 healthcare facilities, including 88 health centers responsible for health areas and 5 general referral hospitals, distributed across five health zones (Makiso -Kisangani, Kabondo, Lubunga, Tshopo, and Mangobo). Although these facilities play a vital role in providing care to a growing urban population, few studies have systematically assessed access to hygiene in these facilities. The lack of robust local data is a major obstacle to improving infection prevention and control in the urban context of Kisangani. [1]

In this context, this study aims to assess access to hygiene in healthcare facilities in Kisangani using key indicators from the Water, Hygiene, and Sanitation package, including the availability of handwashing stations with soap and water, the use of personal protective equipment by healthcare staff, the availability of functional sterilization equipment, and the presence of handwashing facilities at toilets. By analyzing these indicators by health zone and using bivariate analysis, this study intends to provide evidence to inform public policy, guide interventions by technical and financial partners, and contribute to the sustainable improvement of the quality and safety of healthcare in the Democratic Republic of Congo.

2. Methods

2.1. Type and framework of the study

Our study is cross-sectional with an analytical aim and was carried out in the period from July 5 to September 30, 2025.

2.2. Study population

The target population includes all functional healthcare facilities in Kisangani and staff responsible for managing WASH infrastructure (service providers, maintenance managers, nurses).

At the HGR level: Healthcare providers (MD, Mstaff, DN, …), administrative staff (AG, Secretary, …), the EHA officer.

At the CS level: healthcare providers (IT, ITA, SMI, …), the EHA officer, President of the health community (PRECODESA).

We used a comprehensive sample of 93 healthcare facilities, including 5 general referral hospitals and 88 health centers (HCs) responsible for health areas; we included two people per health center and 6 people per general referral hospital (GRH). Our sample size was 206 interviewees.

2.3. Variables

- Sociodemographic conditions
- Handwashing station with soap and water
- Wearing PPE
- Functional sterilization equipment
- Existence of a functional hygiene committee in the social and solidarity economy
- Water point with hand basin at the toilet level
- Monthly hygiene device at the toilet

- Distance between water source and latrine

2.4. Data analysis plan

- Data saved on Kobotoolbox then exported to Kobocollect
- Data entry and cleaning : data entered into Excel and imported into STATA 13 for analysis.
- The distribution of categorical variables using proportions and that of quantitative variables using means and their standard deviations if the distribution is symmetrical. [12]
- And the median and interquartile ranges if the distribution is skewed.
- Inferential statistics or statistical analysis
- Descriptive analysis : frequencies, proportions, means and standard deviations for EHA variables.
- We used bivariate analysis with Pearson's Chi-squared or Fisher's exact test for categorical variables according to their conditions of application:
- Student 's t-test or ANOVA for symmetrically distributed variables or the Wilcoxon or Kruskal -Wallis test depending on their conditions of application.
- All variables that showed an association in bivariate analysis were included in a stepwise backward logistic regression model at the 10% significance level.
- The ORs with their 95% CIs and WALD p-values were presented [18]
- Bivariate analysis : chi- -square to test the association between type of establishment, level of care and access to EHA services.
- Multivariate analysis : logistic regression to identify independent factors associated with adequate access to WASH services.
- Significance threshold : $p < 0.05$.

2.4.1. Ethical considerations

Before the collection, we sought to obtain the necessary authorizations from

- Ethics Committee of the Faculty of Medicine and Pharmacy of the University of Kisangani;
- Head of Provincial Health Division of TSHOPO;
- Chief Medical Officers of 5 Health Zones in the city of Kisangani;
- IT professionals responsible for all social and solidarity economy (SSE) initiatives;
- Verbal informed consent was obtained from the respondents before their participation in the study;
- Anonymity and confidentiality have been guaranteed.

Ethical considerations regarding fundamental principles, respect for the individual, compassion, and justice were integrated. They took into account that the subject involved in the investigation is a free and autonomous collaborator, and the privacy of the information they provide will be preserved.

3. Results

Table 1 Sociodemographic characteristics of respondents

Variables	**n=206**	**%**
Health zone of belonging		
Kabondo	7	3.4
Lubunga	18	8.74
Makiso -Kisangani	52	25.24
Mangobo	64	31.07
Tshopo	65	31.55
ESS Membership		
Health center	172	83.5
HGR	34	16.5

Legal status of social and solidarity economy (SSE)		
State	56	27.18
Private/confessional	150	72.82
Location of social and solidarity economy (SSE)		
Urban	176	85.44
Urban -rural	30	14.56
Age range (years)		
< 30	59	28.64
> 30	147	71.36
Sex		
Male	78	37.86
Female	128	62.14
Marital status		
Lives with a spouse	107	51.94
Lives without a spouse	99	48.16
Education level		
Secondary	18	8.74
University	188	91.26
Training in WASH		
Yes	42	20.39
No	164	79.61

Table 1 shows that the majority of respondents came from the Mangobo (31.07%) and Tshopo (31.55%) health zones. Health centers represented the majority of establishments (83.5%), while private/faith-based structures were by far the most prevalent (72.82%).

From a public health perspective, this means that the study primarily reflects the reality of primary care facilities and the private/faith-based sector, which play a major role in healthcare delivery. The predominance of urban areas (85.44%) also suggests that the results are more relevant to urban than rural areas.

The majority of respondents were over 30 years old (71.36%), female (62.14%), and had a university degree (91.26%). Despite this high level of education, only 20.39% had received training in WASH (Water, Hygiene, and Sanitation); this reveals a significant lack of capacity building for staff on WASH issues, even though these skills are essential for preventing healthcare-associated infections and improving the quality of services.

Table 2 Access to Hygiene in Healthcare Facilities

Variables	**n=206**	**%**
Availability of a functional handwashing station		
Yes	132	64.08
No	74	35.92
Availability of water and soap at the service points		
Yes	41	19.9

No	165	80.1
Availability of PPE at the ESS level		
Yes	206	100
No	0	0
Availability of functional sterilization equipment		
Yes	105	50.97
No	101	49.03
Types of sterilization equipment (n=105)		
Pressure cooker	91	86.67
Poupinel	6	5.71
Autoclave	6	5.71
Others	2	1.91
Existence of a functional Hygiene Committee in the ESS		
Yes	28	13.59
No	178	86.41
Water and soap are available in the restrooms.		
Yes	23	11.17
No	183	88.83
Availability of menstrual hygiene facilities in the toilets		
Yes	0	0
No	206	100
Distance of water sources from latrines		
>20m	144	69.9
< 20m	62	30.1
Global access to hygiene		
Good access	98	47.57
Limited access	108	52.43

Table 2 shows that 64.08% of facilities had functional handwashing stations. However, the actual availability of soap and water in the facilities remained low (19.9%). All surveyed facilities had personal protective equipment (100%), while only 50.97% had functional sterilization equipment. Among the latter, the pressure cooker was the most commonly used device (86.67%). A functional hygiene committee was observed in only 13.59% of facilities. Furthermore, soap and water were available in the toilets in only 11.17% of the facilities, and no facility had menstrual hygiene products. Finally, the overall assessment revealed that 47.57% of establishments had good access to hygiene compared to 52.43% with poor access, reflecting significant deficiencies in hygiene services in the health facilities studied.

Table 3 Analysis of factors associated with access to hygiene in healthcare facilities

Variables	**Access to hygiene at the level of EES**		**ORb (95% CI)**	**p value**	**Ora (95% CI)**	**p**
	Good n(%)	Low n(%)				
Location of the social and solidarity economy						
Urban	95(53.98)	81(46.02)		0.037*	NEITHER	
Urban -rural	10(33,33)	20(66,67)				
Membership in the social and solidarity economy						
Private/religious	66(44.00)	84(56.00)		0.001*	1	0.003
State	39(69,64)	17(30,36)			0.3 (0.1507-0.6780)	
Distance of latrines from a water source						
<20m	21(33,87)	41(66,13)		0.001*	NR	
>20m	84(58,33)	60(41,67)				
Availability of functional sterilization equipment in the social and solidarity economy (SSE)						
Yes	105 (100)	0(0.00)		<0.0001**	NR	
No	0(0.00)	101(100.00)				
Availability of a functional hygiene committee						
Yes	27(96,43)	1(3.57)	34.6(5.394-1430.78)	<0.0001**	NR	
No	78(43,82)	100(56.18)				
ESS with separate toilets for staff and patients						
Yes	61(89,71)	7(10,29)		<0.0001**	1	<0.0001
No	44(31,88)	94(68,12)	18.61(7.574-51.416)		7.4(2.9184-18.5156)	
ESS with separate toilets for men and women						

Yes	34(100)	0(0.00)		<0.001**	NR	
No	71(41,28)	101(58,72)				
Availability of water and soap in the toilets						
Yes	18(78,26)	5(21,74)	3.97(1.3387-14.1895)	0.005*	NR	
No	87(47,54)	96(52,46)	1			

*Pearson's chi-square, **Fisher's exact test, NI = Not retained in the model

Bivariate analysis of Table 3 showed that several factors were significantly associated with access to hygiene in healthcare facilities. Facility location was associated with the level of access to hygiene (p = 0.037), with facilities located in urban areas having a higher proportion of good access to hygiene (53.98%) compared to those located in urban -rural areas (33.33%).

The legal status of the institution was also associated with access to hygiene (p = 0.001). State-run institutions had a significantly higher proportion of good access to hygiene (69.64%) than private or faith-based institutions (44.00%).

Furthermore, the distance between latrines and water sources was significantly associated with access to hygiene (p = 0.001). Establishments with latrines located more than 20 meters from a water source had better access to hygiene (58.33%) compared to those with latrines located less than 20 meters away (33.87%).

The availability of functional sterilization equipment was strongly associated with better access to hygiene (p < 0.0001). All establishments with functional sterilization equipment were classified in the category of good access to hygiene, while no establishment without this equipment belonged to this category.

The existence of a functional hygiene committee was also associated with access to hygiene (ORb = 34.6; 95% CI: 5.39–1430.78; p < 0.0001). Facilities with a functional hygiene committee had a 96.43% rate of good access to hygiene, compared to 43.82% for those without one.

The presence of separate toilets for staff and patients was significantly associated with better access to hygiene (p < 0.0001). Indeed, 89.71% of facilities with this infrastructure had good access to hygiene, compared to 31.88% of those without separate toilets.

Similarly, all establishments with separate toilets for men and women had good access to hygiene (100%), compared to 41.28% for those without this separation (p < 0.001).

Finally, the availability of water and soap in toilets was significantly associated with access to hygiene (ORb = 3.97; 95% CI: 1.34–14.19; p = 0.005). Facilities with these amenities were nearly four times more likely to have good access to hygiene than those without.

After adjustment in the multivariate logistic regression model, two factors remained independently associated with access to hygiene: the legal status of the facility and the availability of separate toilets for staff and patients. State-run facilities were significantly more likely to have good access to hygiene than private or faith-based facilities (aOR = 0.30; 95% CI: 0.15–0.68; p = 0.003). Similarly, facilities with separate toilets for staff and patients were about seven times more likely to have good access to hygiene than those without (aOR = 7.4; 95% CI: 2.92–18.52; p < 0.0001).

4. Discussion

4.1. Sociodemographic characteristics of the respondents

This study showed that the surveyed healthcare facilities were predominantly Health Centers (83.5%) and belonged mainly to the private or faith-based sector (72.82%). This situation is comparable to that observed in several sub-Saharan African countries where frontline structures and faith-based organizations play a leading role in the provision of primary healthcare [1,2].

The majority of respondents were over 30 years old (71.36%), female (62.14%), and had a university degree (91.26%). The female predominance observed in this study aligns with observations reported by the World Health Organization that women constitute the majority of healthcare workers in low- and middle-income countries [3]. However, despite this high level of education, only 20.39% of participants had received training in Water, Hygiene, and Sanitation (WASH). This low training coverage represents a major obstacle to improving hygiene practices and infection prevention. Similar results have been reported in Ethiopia, where less than one-third of healthcare professionals had received specific training in infection prevention and control [4].

4.2. Access to hygiene in healthcare facilities

The results of this study reveal that 64.08% of facilities had functional handwashing stations. Although this proportion is higher than that observed in some rural areas of sub-Saharan Africa, it remains lower than the recommendations of the WHO and UNICEF, which advocate universal coverage of handwashing infrastructure in health facilities [2,5].

However, only 19.9% of facilities had soap and water available in their wards. This deficiency is concerning because the continuous availability of soap and water is one of the key factors in preventing healthcare-associated infections [6]. A global analysis conducted by WHO and UNICEF showed that nearly half of health facilities in low- and middle-income countries have soap and water available at points of care, a significantly higher proportion than that observed in our study [2].

All the facilities surveyed had personal protective equipment (100%). This result probably reflects the efforts to strengthen infection prevention measures undertaken after the COVID-19 pandemic as well as the support of technical and financial partners in the health sector [7].

In contrast, only 50.97% of facilities had functional sterilization equipment. Among these, pressure cookers were the most commonly used device (86.67%), while autoclaves were present in only 5.71% of facilities. This predominance of rudimentary equipment reflects the technical and financial difficulties already described in other African contexts [8]. A study conducted in Senegal also showed that the majority of health centers still use traditional sterilization methods due to a lack of modern equipment [9].

The existence of a functional hygiene committee was observed in only 13.59% of facilities. This situation reflects weak governance of hygiene activities. According to the WHO, hygiene committees are nevertheless a fundamental pillar of infection prevention and control programs in healthcare facilities [10].

Furthermore, only 11.17% of facilities had water and soap in the toilets and none had menstrual hygiene facilities. These results corroborate UNICEF's observations, which highlight that menstrual hygiene management remains insufficiently addressed in many African health facilities [11].

The overall level of access to hygiene showed that 47.57% of facilities had good access, while 52.43% had poor access. This situation is close to the estimates published by the WHO/UNICEF Joint Programme, according to which nearly half of health facilities in sub-Saharan Africa still do not have a minimum level of hygiene services [2].

4.3. Factors associated with access to hygiene

bivariate analysis highlighted several factors associated with access to hygiene, including the legal status of the establishment, the availability of sterilization equipment, the existence of a functional hygiene committee, and the presence of separate toilets for staff and patients.

After adjustment, two factors remained independently associated with access to hygiene. The first was the legal status of the facility. State-run facilities had better access to hygiene than private or faith-based facilities (ORa = 0.30; 95 % CI: 0.15–0.68; p = 0.003). This result could be explained by better oversight of sanitation standards and more regular access to government programs for strengthening sanitation infrastructure [12]. Similar results were observed in Tanzania and Ethiopia, where public facilities performed better in providing WASH services [13, 14].

The second factor was the existence of separate toilets for staff and patients (ORa = 7.4; 95% CI: 2.92–18.52; p < 0.0001). Facilities with this infrastructure had a significantly higher probability of having good access to hygiene. This observation aligns with WHO recommendations, which consider the separation of sanitary facilities as a key indicator of the quality of healthcare infrastructure [5]. Several studies have shown that the availability of suitable toilets helps reduce the risk of cross-contamination and improves patient safety [10, 15].

Overall, these results underline the need to strengthen WASH/EHA infrastructure, improve the continuous availability of water and soap, upgrade sterilization equipment and promote the establishment of institutional hygiene governance mechanisms in order to sustainably improve the quality of care in health facilities in Kisangani.

5. Conclusion

Access to hygiene is a fundamental element of quality care, patient safety, and the prevention of healthcare-associated infections in healthcare facilities. This study, conducted in healthcare facilities in the city of Kisangani, assessed the level of access to hygiene using several indicators related to water, sanitation, and hygiene (WASH) services.

The results highlight progress in certain areas, particularly the availability of personal protective equipment and functional handwashing stations. However, significant shortcomings persist regarding the effective availability of water and soap, sterilization equipment, institutional hygiene management, and the provision of menstrual hygiene. More

than half of the assessed facilities have low levels of access to hygiene, revealing conditions that are still insufficient to guarantee safe and high-quality care.

Analysis of the associated factors showed that state-run facilities and those with separate toilets for staff and patients performed better in terms of access to hygiene. These results highlight the importance of governance, the organization of health infrastructure, and adherence to WASH standards in improving hygiene conditions within health facilities.

In light of these findings, it is essential to increase investment in water, sanitation, and hygiene infrastructure; ensure a continuous supply of drinking water and soap; modernize sterilization equipment; establish effective hygiene committees; and promote ongoing training for healthcare personnel in infection prevention and control. These interventions would help reduce healthcare-associated infections, improve the quality of healthcare services, and strengthen public trust in healthcare systems.

Finally, this study provides an important database for planning future interventions in Tshopo Province and the Democratic Republic of Congo. Further research, including microbiological, environmental, and economic assessments of WASH services in health facilities, would deepen our understanding and better guide public policies toward achieving the Sustainable Development Goals, particularly SDG 3 on health and SDG 6 on water, sanitation, and hygiene.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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