Scientific Research Publishing

Health, 2025, 17(8), 963-979
https://www.scirp.org/journal/health
ISSN Online: 1949-5005
ISSN Print: 1949-4998

Determinants of Low Hand Hygiene Compliance in Healthcare Facilities in Lualaba Province, Democratic Republic of the Congo

Fidèle Ilunga Kabala[1*], Eddy Kakese Masela[2], Dauphin Yava Kalenga[2], Andy Zeng Mukand[1], Joel Konde Numbi Nkiama[1], Dieudonné Mukendi Mpunga[1]

[1]School of Public Health of Kinshasa, Faculty of Medicine, University of Kinshasa, Kinshasa, Democratic Republic of the Congo
[2]Faculty of Medicine and Public Health, University of Kolwezi, Kolwezi, Democratic Republic of the Congo
Email: *drkabalailunga@gmail.com

How to cite this paper: Kabala, F.I., Masela, E.K., Kalenga, D.Y., Mukand, A.Z., Nkiama, J.K.N. and Mpunga, D.M. (2025) Determinants of Low Hand Hygiene Compliance in Healthcare Facilities in Lualaba Province, Democratic Republic of the Congo. *Health*, **17**, 963-979.
https://doi.org/10.4236/health.2025.178062

Received: July 3, 2025
Accepted: August 12, 2025
Published: August 15, 2025

Abstract

Introduction: Hand Hygiene (HH) in hospital settings is an effective measure to protect patients from the spread of healthcare-associated infections (HAIs). However, its compliance is still low. We aimed to determine the factors associated with low compliance with HH by providers in Lualaba Province. **Methods:** A cross-sectional study was conducted with 384 providers from five healthcare facilities (HCFs) from November 23 to December 10, 2023. A self-administered questionnaire and an HH observation grid were used to collect data. Chi-square tests and logistic regression measured the association between the variables of interest at an alpha significance level of 0.05. **Results:** A total of 5266 opportunities for compliance with HM were identified, and the overall compliance rate for HH was estimated at 37.9%. Some factors were associated with low compliance with HH: absence of administrative measures, OR = 1.966 (95% CI 1.064 - 3.631), p = 0.031; excessive workload, OR = 1.782 (95% CI 1.102 - 2.880), p = 0.018; absence of an infection prevention and control (IPC) committee, OR = 2.528 (95% CI 1.656 - 3.860), p < 0.001; lack of on-the-job training, OR = 2.348 (95% CI 1.337 - 4.125), p = 0.003; and lack of knowledge of HH OR = 4.749 (95% CI 2.398 - 9.407), p < 0.001. **Conclusion**: Few healthcare providers observe HH in Lualaba healthcare facilities. There is a need to implement administrative measures, train staff, and revitalize infection prevention and control (IPC) committees to address the challenges of low hand hygiene compliance.

Keywords

Determinants, Low Compliance, Hand Hygiene, Health Facilities, Lualaba

1. Introduction

Healthcare-associated infections (HAIs) are the most frequent adverse events among hospitalized patients and a major global problem for patient safety [1]. It is estimated that over 1.4 million people suffer from hospital-acquired infections, and the risk of contracting them is two to twenty times higher in developing countries [2]. In sub-Saharan Africa, the prevalence of HAIs ranges from 1.6% to 28.7% [3] [4]. About 50% of these infections are transmitted by the hands of healthcare providers in the course of their work [5].

The World Health Organization (WHO) recommends five indications for hand hygiene (HH) in healthcare settings and encourages providers to regularly clean their hands in the performance of their duties. However, HH membership among providers remains low, with an average of 40% worldwide [5].

In addition to the physical and moral consequences they have for patients and their families, healthcare-associated infections are the basis for longer hospital stays, excess costs, high resistance of microorganisms to antibiotics, and high mortality rates. They therefore place a high financial burden on health systems [6] [7].

The high burden of healthcare-associated infections is due to the lack of standardized infection prevention and control (IPC) programs [7]. Many healthcare facilities (HCF) are not equipped with handwashing facilities; an estimated 7% of healthcare facilities in sub-Saharan Africa and 2% worldwide are completely devoid of them [4]. There is thus a gap between the desired quality of hand hygiene as recommended through the IPC standard and that applied in healthcare facilities [8].

During the COVID-19 pandemic, HH has garnered unprecedented attention and has become the central pillar of national COVID-19 prevention strategies. However, it should not be just a temporary public health measure in times of crisis, but a daily vital attitude contributing to health and economic resilience [9].

The results of two studies conducted in Malawi and in Kisangani also showed low adherence to the practice of hand hygiene among hospital health providers, at 22% and 39%, respectively [6] [10]. Even a recent study in Togo on staff's knowledge reported: 31.1% of practitioners did not wash their hands on arrival and departure in services; 62.2% did not wash their hands before treatment [11]. A recent qualitative study carried out in Ethiopia identified three main categories of barriers to hand hygiene practice: barriers related to individuals (including three sub-categories: lack of knowledge and skill, improper attitude, and poor attention and negligence of healthcare workers); leadership barriers (including two sub-categories: lack of dedicated staff and low attention of leaders); and institutional barriers (including three sub-categories: inappropriate infrastructure and lack of resources, shortage of water, and high workload and staff turnover) [12].

Despite its justified interest and contribution to improving the quality of care, HH is still poorly known and poorly implemented within healthcare facilities [13]. Its implementation therefore requires that IPC teams be functional, that the indi-

cations and practical modalities on hygiene promotion are defined, that administrative measures be applicable in the healthcare facilities, that workload is respected, and that providers are trained and made aware of the value and need to apply hand hygiene in healthcare settings. This can only be successful if there is in-depth information on the knowledge and practices of providers in the field of hand hygiene.

The Democratic Republic of Congo (DRC), and particularly the province of Lualaba, should be no exception to this general observation, especially since healthcare facilities operate in a context with limited resources. However, the existing data on claimants' behavior towards HH do not provide in-depth information on the explanatory factors for this [6] [14]. Thus, this study was conducted to determine the factors associated with low adherence to HH practice among providers of healthcare facilities in Lualaba province, their characteristics, and their knowledge of HH in order to contribute to the implementation of interventions for the control of infections carried by the hands.

2. Methods

2.1. Study Framework

The Lualaba Provincial Health Division is one of the 26 divisions in the DRC, whose capital is in Kolwezi. It has 14 health zones, including 14 general reference hospitals (GRHs) of responsibility (second-level HCFs). Given the geographical inaccessibility, we made a convenience choice of a third of the HCFs in the areas of the provincial capital that could allow us to carry out our research, namely: Mwangeji, Mupanja, Dipeta, Kanzenze, and the Gécamines Staff Hospital (GSH).

2.2. Study Design

The cross-sectional study was conducted to determine the explanatory factors for low HH adherence among providers in Lualaba Province in five second-level healthcare facilities during the period from November 23 to December 10, 2023. In each of these HCFs, only the emergency departments, internal medicine, pediatrics, gynecology, obstetrics, and surgery were concerned. In order to ensure the quality of the work, 7 interviewers and 1 supervisor were recruited in Kolwezi (capital of the province) from November 15 to 19, 2023, among the providers according to the criterion of being nursing staff not working in the structure where the survey would take place. Training of the interviewers was organized for 2 days, during which aspects of the direct observation of HH among the providers were addressed, followed by a pre-test day at the Kasulo healthcare facility.

2.3. Sampling

The study population was made up of care providers and cleaning technicians working in the targeted departments in these hospitals, with the inclusion criterion of being a provider (doctor, nurse, midwife/birth attendant, laboratory technician) or a cleaning technician on duty in the targeted departments during the

study period and who agreed to be part of the study.

Study participants were selected through multi-stage sampling: in the first stage, the healthcare facilities (HCFs) Mwangeji, Mupanja, Dipeta, Kanzenze, and the Gecamines Staff Hospital were chosen by purposive sampling on the basis of their geographical accessibility. In the second stage, in each of these HCFs, a simple random sampling of the subjects to be included in the study was carried out from the list of healthcare providers that we had prepared with the help of the managers of the targeted services.

$$n \geq \frac{Z^2_{\alpha pq}}{d^2}$$

The proportion of the population with the desired characteristic was obtained from healthcare providers who had good hand hygiene (p = 0.39) in a study conducted in Kisangani [6].

2.4. Data Collection

Data were first collected by direct observation of the practice of HH by healthcare providers using an observation grid, and then, at the end of the observation, the same providers completed a self-administered questionnaire.

Our investigators observed each healthcare provider for an average of 15 to 30 minutes per observation, for about 4 hours. Several observation sessions were carried out in order to count the opportunities related to the 5 indications of hand hygiene [5] and record on the observation grid the behavior of the providers, if they washed their hands with soap and water, if they used the hydro-alcoholic solution (HAS) or did not perform any of these actions. The WHO recommendation to obtain a minimum sample of 200 HH opportunities for each care unit/service per observation period was used as a guide in determining the number of observations to be carried out in this study [5] [15]. Thus, the overall compliance rate of the hand hygiene by professional category and by department was calculated using the following formula:

$$\text{Compliance} = \frac{\text{ACTIONS ACHIEVED}\left(\text{washing} + \text{friction HAS}\right)}{\text{NUMBER OF OPPORTUNITIES}} \times 100$$

A rate greater than or equal to 75% was considered adequate individual compliance with HH, and a rate less than 75% was considered low compliance.

The dependent variable was "adherence to hand hygiene during care activities", while the independent variables were: 1) the sociodemographic characteristics of the providers; 2) the characteristics of healthcare facilities (HCFs); 3) the knowledge of service providers about HH. To collect data in the field, "excessive workload" was defined as whether a provider, in his daily work, could handle multiple patient loads on his own, measured by the nominal scale: Yes if there is overload and No if there is not. "Administrative measures" were also defined as the negative sanction (punishment) of providers for non-compliance with hand hygiene in their healthcare facility, measured by the nominal scale: Yes if there is punishment and No if there is no punishment.

2.5. Data Analysis

Data were verified, numbered, and codified. Data entry was done using Epidata 3.5 software and then exported to an Excel 2016 sheet for cleaning purposes and to SPSS 25.0 software for analyses. Quantitative variables were summarized by the median with interquartile space (IQS), while categorical variables were summarized as proportions.

We used Pearson's Chi-square test to measure the association between the dependent variable and the individual independent variables. Logistic regression, on the other hand, made it possible to measure the strength of this association. All statistics were calculated with their 95% confidence intervals at the alpha significance level of 0.05.

2.6. Ethical Considerations

All selected providers were free to participate, and verbal consent to the purpose and methodology of the collection was obtained. Targeted claimants who did not consent were not interviewed (6 non-responses). The data were collected anonymously.

3. Results

A total of 384 interviews were completed out of the 400 expected, giving a response rate of 96.0%. Thus, 1996 HH actions were identified out of 5266 opportunities, representing an overall compliance rate of 37.9%. Table 1 summarizes HH compliance levels among care providers.

Table 1. Level of compliance with hand hygiene among healthcare providers in the Lualaba Province.

Variables	Number of Opportunities n = 384	Number of Shares of the HH, n = 384	Compliance (%)
Professional Categories			
Nurse	1990	780	39.2
Doctor	1534	569	37.1
Midwife or birth attendant	552	245	44.4
Laboratory Technician	572	235	41.1
Cleaning Technician	618	167	27.0
Hospital Services			
Pediatrics	970	398	41.0
Internal Medicine	1041	320	30.7
Surgery	943	325	34.5
Obstetric Gynecology	1279	561	43.9
Emergency room	1033	392	37.9

Continued

Types of HH applied in services			
Friction of the hydroalcoholic solution	5266	1543	29.3
Hand washing	5266	453	8.6
Overall HH compliance rate	5266	1996	37.9

Midwives/birth attendants had the highest rate of HH adherence (44.4%), followed by laboratory technicians (41.1%), nurses (39.2%), and doctors (37.1%). However, hand-rubbing using the hydroalcoholic solution was used more often for HH (29.3%) than hand washing (8.6%). Table 2 describes the characteristics of health care facilities, providers, and general knowledge of hand hygiene in the Province of Lualaba.

Table 2. Characteristics of care facilities, providers, and general knowledge about Hand Hygiene.

Variables	Frequency n = 384	Proportion (%)
SEX		
Feminine	252	65.6
Masculine	132	34.4
Median age with EIQ*: 37 [32 - 43] *years old		
≤37 years old	193	50.3
>37 years old	191	49.7
Professional Categories		
Nurse	148	38.5
Doctor	108	28.1
Cleaning Technician	47	12.2
Laboratory Technician	42	10.9
Midwife/midwife	39	10.2
Healthcare Facilities (HCFs)		
Mwangeji	143	37.2
Gecamines Staff Hospital in Kolwezi (GSHK)	128	33.3
Mupanja	25	6.5
Dipeta	39	10.2
Kanzenze	49	12.8
Existence of an IPC team		
NO	208	54.2
Yes	176	45.8

Continued

***Existence of administrative measures* (*punishment*)**		
NO	298	77.6
Yes	86	22.4
Origin of water used for hand hygiene		
Borehole water	211	54.9
REGIDESO Water	168	43.8
Rainwater	5	1.3
Accessibility to Hydroalcoholic Solution		
NO	95	24.7
Yes	289	75.3
Follow-up training		
NO	261	68.0
Yes	123	32.0
Knowledge of the 5 HH indications		
NO	295	76.8
YES	89	23.2
Promotion of HH through awareness-raising or wall posters		
NO	101	26.3
Yes	283	73.7
Replacement of the HH indication by the use of gloves		
NO	105	27.3
YES	279	72.7
Hand hygiene is practiced only when dirt is evident on the hands		
NO	196	51.0
YES	188	49.0
The perception of HH as an effective way to prevent HAIs		
NO	57	14.8
YES	327	85.2

Of these interviews, 143 (37.2%) took place at the Mwangeji second-level HCF; 128 (33.3%) at the Gécamines Staff Hospital in Kolwezi; 49 (12.8%) at the second-level HCF in Kanzenze; 39 (10.2%) at the Dipeta second-level HCF; and 25 (6.5%)

at the Mupanja second-level HCF.

The majority of providers interviewed (38.5%) were nurses, followed by physicians (28.1%). In relation to the origin of the water used for hand hygiene, in 54.9% it came from boreholes, and in 43.8% the source was the national water distribution company (REGIDESO). Hydroalcoholic solution (HAS) was not widely available, with 24.7% of healthcare providers reporting that they did not have access to it.

Concerning the existence of a functional IPC team or committee in healthcare facilities (HCFs), less than half of providers (45.8%) acknowledged the existence of an IPC team; in just over one in five establishments (22.4%), administrative measures in the form of negative sanctions/punishments for non-compliance with HH were regularly taken.

Hand hygiene involves the ability to wash hands with soap and water or to rub hands with alcohol-based hand sanitizer (HAS). The results of this work indicate that 261 (68.0%) health providers had not received any training on hand hygiene in the last 3 years. Thus, 28.9% of providers did not know the definition of hand hygiene, and 76.8% were not able to cite the 5 indications of hand hygiene according to the WHO. For 7 out of 10 health care providers (72.7%), the use of gloves in a healthcare setting provides hand hygiene indications; and for 49.0% of them, the practice of hand hygiene should be done only when dirt is evident on the hands. Hand hygiene is an effective way to prevent healthcare-associated infections; however, our results indicate that 14.4% of providers had a poor perception of it. Table 3 and Table 4 summarize factors associated with low adherence to hand hygiene by HCFs' providers in the Lualaba province.

The analysis of the Chi-Square test looked for an association between low compliance with HH and certain characteristics of HCFs. It appears from this analysis that the absence of administrative measures in the HCFs ($p = 0.004$), the excessive workload ($p = 0.018$), the absence of the committee for the control of healthcare-associated infections ($p < 0.001$), low access to hydroalcoholic solution ($p = 0.016$), and the nursing profession ($p = 0.018$) were associated with low compliance with HH in the HCFs visited.

Low adherence to HH was also associated with providers' low knowledge of the 5 indications for HH ($p < 0.001$), lack of on-the-job training ($p < 0.001$), and not perceiving the risk of hand-to-hand transmission of healthcare-associated infections ($p = 0.002$) (Table 3).

In the multivariate model, the independent variables that had been associated with low compliance with HH in the bivariate analysis were introduced. Thus, only low knowledge of the 5 indications of HH ($p < 0.001$), lack of training ($p = 0.003$), low access to hydro-alcoholic solution ($p = 0.043$), and absence of administrative measures ($p = 0.031$) were associated with low compliance with HH. Indeed, health care providers with low knowledge of the 5 indications of HH were up to five times more likely not to adhere to HH compared to those with good knowledge (OR = 4.749; 95% CI 2.398 - 9.407; $p < 0.001$).

Table 3. Bivariate analysis of factors associated with low hand hygiene adherence in the Lualaba Province.

Variables	Low compliance with HH. (239)	Compliance with HH (145)	OR (95% CI)	P value
SEX				
Feminine	162	90	1.286 (0.835 - 1.979)	0.253
Masculine	77	55	1	
AGE				
≤37 years old	121	72	1.040 (0.688 - 1.571)	0.853
>37 years old	118	73	*1*	
Professional Categories				
Nurse	92	56	2.676 (1.188 - 6.031)	**0.018**
Doctor	67	41	2.182 (0.936 - 5.085)	0.071
Midwife or midwife	21	18	3.090 (1.180 - 8.094)	**0.022**
Laboratory Technician	23	19	2.875 (1.105 - 7.480)	**0.030**
Cleaning Technician	36	11	1	
Water scarcity in the HCFs				
NO	156	113	0.532 (0.331 - 0.855)	0.009
YES	83	32	1	
Accessibility of the Hydroalcoholic Solution in the Department				
NO	69	26	1.858 (1.118 - 3.088)	**0.016**
YES	170	119	1	
Existence of an IPC team				
NO	150	58	2.528 (1.656 - 3.860)	**0.000**
YES	89	87	1	
Existence of administrative measures (punishment)				
NO	197	101	1.183 (1.047 - 1.337)	**0.004**
YES	42	44	1	
Excessive workload				
NO	78	31	1.782 (1.102 - 2.880)	**0.018**
YES	161	114	1	
Follow-up training				
NO	193	68	4.751 (3.005 - 7.511)	**0.000**
YES	46	77	1	

Continued

Knowledge of the 5 HH indications				
NO	211	84	8.049 (4.475 - 14.477)	**0.000**
YES	28	61	1	
Promotion of HH through awareness-raising or wall posters.				
NO	68	33	1.350 (0.836 - 2.179)	0.219
YES	171	112	1	
Replacement of the HH indication by the use of gloves;				
NO	54	51	1.194 (1.040 - 1.371)	**0.007**
YES	185	94	1	
Practice hand hygiene only when dirt is evident on the hands.				
NO	101	95	1.674 (1.305 - 2.148)	**0.000**
YES	138	50	1	
The perception of HH as an effective way to prevent HAIs				
NO	46	11	2.903 (1.451 - 5.810)	**0.002**
YES	193	134	1	

Table 4. Multivariate analysis of factors associated with low hand hygiene adherence.

Variables	OR (95% CI)	p value
Professional categories		
Nurse	0.922 (0.326 - 2.602)	0.877
Doctor	1.225 (0.406 - 3.700)	0.718
Midwife or midwife	0.746 (0.213 - 2.608)	0.646
Laboratory Technician	0.618 (0.185 - 2.064)	0.434
Cleaning Technician	1	
Water scarcity in the HCFs		
NO	0.464 (0.255 - 0.846)	0.012
YES	1	
Accessibility of the Hydroalcoholic Solution in the Department		
NO	1.996 (1.021 - 3.902)	**0.043**
YES	1	

Continued

***Existence of administrative measures* (*punishment*)**		
NO	1.966 (1.064 - 3.631)	**0.031**
YES	1	
Existence of an IPC team		
NO	1.616 (0.939 - 2.780)	0.083
YES	1	
Excessive workload		
NO	1.725 (0.943 - 3.156)	0.077
YES	1	
Follow-up training		
NO	2.348 (1.337 - 4.125)	**0.003**
YES	1	
Knowledge of 5 HH indications		
NO	4.749 (2.398 - 9.407)	**0.000**
YES	1	
***Promotion of HH through awareness-raising or wall posters*;**		
NO	1.006 (0.542 - 1.868)	0.984
YES	1	
Replacement of the HH indication with the use of gloves;		
NO	1.020 (0.539 - 1.931)	0.951
YES	1	
***Hand hygiene is practiced only when dirt is evident on hands*.**		
NO	0.574 (0.333 - 0.990)	**0.046**
YES	1	
The perception of HH as an effective means of preventing healthcare-associated infections (HAIs).		
NO	1.195 (0.453 - 3.150)	0.719
YES	1	

Healthcare providers who were not trained in HH were up to 2 times more likely not to adhere to HH (OR = 2.348; 95% CI 1.337 - 4.125; p = 0.003) compared to the others. The inaccessibility of the hydro-alcoholic solution for the providers would double the chance of not performing HH (OR = 1.996; 95% CI 1.021 - 3.902; p = 0.043). Similarly, the absence of administrative measures in favor of HH

within the HCFs doubled the chance of not observing HH among healthcare providers (OR = 1.966; 95% CI 1.064 - 3.631; p = 0.031).

Conversely to the above, the permanent availability of water in HCFs (p = 0.012) and the perception of the risk of HAI transmission via hands at any time (p = 0.046) were associated with good adherence to HH. Indeed, the permanent availability of water in HCFs would halve the risk of poor adherence to HH (OR = 0.454; 95% CI 0.255 - 0.846; p = 0.012). Similarly, the perception of the risk of transmission of HAIs by hands at any time (OR = 0.574; 95% CI 0.333 - 0.990; p = 0.046) reduces the risk of poor adherence to HH by almost half.

4. Discussions

The results of this study showed that there is an overall low adherence to hand hygiene among healthcare providers in Lualaba province. From this point of view, this result is similar to that reported in Burkina Faso in 2013 [16], and to those found in Kisangani in 2020 [6] and in the USA in 2022 [17]. However, the rate of compliance with HH found in our work appears to be higher than that reported by Mathai *et al.* in India [3], and that found by Nzanga *et al.* in Malawi [10]. Thus, this result is far higher than that reported in 2011 in a study organized in Ethiopia [18]. Conversely, the HH compliance rate found in this work is lower than those reported by Musu *et al.* in 2017 [19] and in Saudi Arabia in 2015 [20]. The implementation of interventions to promote HH can improve its compliance rate. Indeed, a study carried out in Nigeria in a Federal Teaching Hospital in the Southeast reported a higher rate of compliance with HH. This was due to the implementation of interventions such as training (provider education), introduction of hand sanitizer, and hand hygiene reminders [21]. In the present study, the Obstetrics and Gynecology department recorded a higher rate of compliance with HH than other HES departments; also, midwives have a higher rate of compliance with HH compared to physicians. These results are similar to those reported in Nigeria in 2014, where the rate of HH adherence was higher among nurses compared to doctors [21], but do not agree with the Kisangani study [6]. Our result, however, is lower than that found in Bamako in 2016 [22]. The difference observed in this study compared to the other authors is due to the difference in the training programs, the existence of the functional control committee, the promotion and monitoring of hand hygiene in health care facilities, as well as the awareness of the providers.

The occupational category of nurse was associated with low adherence to HH among providers. This result is different from that found by some studies that have shown low compliance with HH in physicians [10] [21]. This difference is due to a lack of time, a lack of perception of the risk of HAIs, and the speed of care interventions in the group of nurses. It should also be noted that the excessive workload of nurses in healthcare establishments and the lack of training in hand hygiene could explain this low compliance.

The inaccessibility of alcohol-based hand sanitizer (HAS) in the department,

the absence of administrative measures, and the absence of an IPC committee in healthcare facilities have been identified as explanatory factors for low compliance with HH. These results are consistent with those found in a study conducted in Ethiopia [23]. The existence of the IPC functional committee is of paramount importance in HCFs for the monitoring of HH practice, the supervision of providers, feedback, the holding of coordination meetings, and the popularization of directives, and the taking of negative or positive administrative measures against health care providers on the application of hand hygiene.

This study reported that the provincial government and technical and financial partners were the main suppliers of consumables (borehole water, hydro-alcoholic gel, and liquid soap) necessary for compliance with HH. However, in the majority of cases, we noted the absence of administrative measures in healthcare institutions. These results are contrary to those found by several authors in the literature [6] [14] [24].

We found that excessive workload was associated with low adherence to the practice of HH. However, in a study conducted in India, the results showed that the factor associated with low compliance with HH was a lack of time [3]. Several authors have also reported that a lack of time hinders the practice of HH by healthcare providers [24]-[26].

Through our study, however, we did not find the relevance of the promotion of HH and that of wall posters containing the procedures on HH. Indeed, no association between these practices and low compliance with HH has been demonstrated. These findings are contrary to the findings of Nzanga *et al.*, who reported that the absence of specific hygiene promotion interventions would lead to low compliance with HH by providers [10]. This discrepancy can be explained by the fact that most healthcare facilities in the province of Lualaba are supplied with inputs every quarter (hydro-alcoholic gel and wall posters of HH procedures). With the majority of providers at the bedside, few are trained in HH, and others are negligent and lack conscientiousness.

In terms of on-the-job training for providers, the lack of training was associated with low compliance with HH in Lualaba province. These observations are similar to those found in other studies [20] [23] [27] [28]. This is because capacity building of all professional categories is an ideal way to acquire knowledge of HH, which motivates and improves compliance with HH in healthcare settings.

As for knowledge of HH indications, we reported an association between low knowledge and low compliance with HH, which is similar to the results found in Ethiopia in 2014 [23]. Atif *et al.* showed that a lack of knowledge on the part of providers about hospital hygiene was a recurring theme in several studies; hence, appropriate IPC training could help address this problem [29].

The other results of this study indicate that the poor perception of HH as an effective means of infection prevention would multiply the chance of not adhering to it by 2.4. These results are similar to those of a study conducted in the USA, which showed that providers do not consider HH necessary to prevent HAIs and that they also do not perceive the risk of transmission of healthcare-associated

infections via the hands [29]. Thus, it is quite evident that when providers are not regularly trained and encouraged, they do not perceive the risk of transmission of healthcare-associated infections through the hands, as is the case in this study.

5. Limitations of the Study

This study has strengths but also limitations. One of its strengths was that selection biases were minimized by probability sampling of targeted providers and a sufficient sample size. Information bias was also reduced by training investigators in HH observation and by pre-testing tools.

As for the limitations of this work, information bias has not been completely avoided since self-administered questionnaires can lead to response bias [6] [13]. We tried to reduce these biases by triangulating the information collected from the interviews and that from the observations of the practice of HH. The study was carried out in a third of the province's health-care facilities and was selected on a purposive basis, so the results cannot be generalized to all second-level health-care facilities. However, a representative cross-sectional study is essential to confirm the results of this research in Lualaba province.

6. Conclusions

The level of knowledge and practices reported on HH compliance in this study indicates that, at present, few providers observe this practice, with regard to the standards laid down by the WHO, and this therefore constitutes an increased risk of healthcare-associated infections in healthcare facilities in Lualaba province.

The lack of administrative measures and the non-existence of the functional committee of the IPC; excessive workload; the lack of in-service training; insufficient knowledge of the 5 indications; and poor risk perception of healthcare-associated infection transmission through the hands were identified as explanatory factors. The application of administrative measures, coupled with provider training, as well as the revitalization of IPC committees in health care institutions, would improve hand hygiene compliance for the benefit of both patients and health providers. The study is therefore a reference document in the implementation of interventions for the control of manufactured infections in healthcare facilities in the province of Lualaba.

Acknowledgements

We thank the team of the Regional Project for the Strengthening of Disease Surveillance Systems in Central Africa, Fourth Phase (REDISSE IV), for funding this study. We thank the Director of the School of Public Health of Kinshasa (SPHK) and all his staff for making this work possible. We also thank everyone who participated in the data collection.

Conflicts of Interest

The authors do not declare any conflict of interest.

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