International Journal of Applied Science and Engineering Review

IJASER

ISSN: 2582-6271

Vol. 6, Issue. 6, Nov-Dec 2025, page no. 50-63

To cite this article: ALUKA KANTEBE Bernard, MONDELE BOLINGO John, KOMBOZI YAYA Dieu-Merci, KAKULE LWANGA Lwanga, ESUKA IGABUCHIA Franck, BASANDJA LONGEMBE Eugène, TAGOTO TEPUGIPAME Alliance, Joris LOSIMBA LIKWELA, Zoé KAZADI MALUMBA, PANDA LUKONGO KITRONZA (2025). COMPLIANCE WITH STANDARD PRECAUTIONS IN HEALTHCARE SETTINGS AND ASSOCIATED FACTORS IN THE CITY OF KISANGANI, International Journal of Applied Science and Engineering Review (IJASER) 6 (6): 50-63 Article No. 251 Sub Id 377

COMPLIANCE WITH STANDARD PRECAUTIONS IN HEALTHCARE SETTINGS AND ASSOCIATED FACTORS IN THE CITY OF KISANGANI

ALUKA KANTEBE Bernard[1], MONDELE BOLINGO John[1], KOMBOZI YAYA Dieu-Merci[3], KAKULE LWANGA Lwanga[2], ESUKA IGABUCHIA Franck[2], BASANDJA LONGEMBE Eugène[2], TAGOTO TEPUGIPAME Alliance[2], Joris LOSIMBA LIKWELA[2], Zoé KAZADI MALUMBA[4], PANDA LUKONGO KITRONZA[2].

[1]Provincial Health Division, National Health Promotion Communication Program
[2]University of Kisangani, Faculty of Medicine and Pharmacy, Department of Public Health
[3]Higher Institute of Medical Techniques of Yangambi
[4]University of Kisangani, Faculty of Sciences, Department of Biotechnology

DOI: https://doi.org/10.52267/IJASER.2025.6604

ABSTRACT

Introduction: Standard precautions (SP) are essential for preventing infections in healthcare settings. However, their implementation remains insufficient in the Democratic Republic of the Congo (DRC). This study assessed the level of compliance with universal precautionary measures in healthcare facilities.

Materials and Methods: An analytical cross-sectional study was conducted among 120 healthcare professionals from July 22 to August 22, 2024, in twelve healthcare institutions in the city of Kisangani. Observation of healthcare providers for 15 to 30 minutes to record opportunities related to the five WHO indications for hand hygiene, as well as the practice of hand hygiene (handwashing with soap and water, or use of alcohol-based hand rub), allowed the calculation of hand hygiene compliance rates. Factors associated with compliance were analyzed using odds ratios (OR) with 95% confidence intervals.

Results: The mean age of participants was 43.6 ± 11.07 years, with a female predominance (53%). Better knowledge of SP was associated with the regular wearing of professional attire ($p<0.05$). Handwashing and alcohol-based hand rub practices varied significantly according to WHO indications, with higher compliance before aseptic procedures and after contact with the patient's environment.

Conclusion: Hand hygiene compliance was low and varied depending on the technique used and WHO indications. Good knowledge of SP measures was associated with the wearing of professional attire.

International Journal of Applied Science and Engineering Review

IJASER

ISSN: 2582-6271

Vol. 6, Issue.6, Nov-Dec 2025, page no. 50-63

Institutional policies aimed at capacity building, awareness-raising, and ensuring the availability of essential supplies are necessary.

KEYWORDS: Standard precautions, healthcare professionals, infection prevention, blood exposure incidents, Democratic Republic of the Congo.

INTRODUCTION

Environmental contamination is a source of germ transmission among patients, healthcare professionals, and other actors within acute care settings [1]. According to the 2022 WHO World Health Report, healthcare facilities are crossroads where patients, healthcare workers, and visitors converge; they therefore play an amplifying role in the evolution of epidemiological situations [2].

Over the past decade, the WHO Global Report on Infection Prevention and Control has shown that large-scale outbreaks, particularly those of Ebola virus disease, Middle East respiratory syndrome coronavirus (MERS-CoV), and the COVID-19 pandemic, have demonstrated that epidemic-prone pathogens can spread rapidly within healthcare settings [3]. These events have highlighted existing gaps in infection prevention and control (IPC) programs, regardless of a country's income level or available resources. Furthermore, other less visible health emergencies also provide a compelling reason to close IPC gaps, such as the silent endemic burden of healthcare-associated infections (HAIs) and antimicrobial resistance (AMR), which endanger patients every day across all health systems [3].

Hygiene precautions (HP), grouped under the term standard precautions (SP) or universal precautions (UP), are measures designed to protect both healthcare workers and patients from infectious risks. These measures are based on the principle that blood, body fluids, human-derived products, broken skin, mucous membranes, and contaminated objects can be sources of microorganism transmission during care. Such precautions must be applied to all patients, regardless of their infection status [4].

The introduction of the SP concept in the mid-1970s represented a major innovation in preventing healthcare-associated infectious risks [5]. Defined in this way, SP quickly became the foundation of all risk-reduction policies. SP can be structured around four main components: hand hygiene, use of personal protective equipment (PPE) (gloves, masks, gowns, goggles), prevention of blood exposure incidents (BEIs), and management of contaminated equipment and environments (MCEE) [6].

Several studies have measured the positive impact of systematic SP implementation or practices included within these precautions, particularly hand hygiene. In France, the Study Group on the Risk of Exposure of Healthcare Workers to Infectious Agents (GERES) demonstrated a 25% reduction over 10 years in

ISSN: 2582-6271

Vol. 6, Issue.6, Nov-Dec 2025, page no. 50-63

BEIs among 1,506 nurses in medical and intensive care units, thanks to better SP adherence [7].

However, preventable accidents through SP application still represent over one-third of reported BEIs in France's national surveillance system [5]. Similarly, another study showed that gloves reduced the amount of blood transmitted during a needlestick injury involving an inoculated volume [8].

A systematic literature review analyzed factors influencing healthcare workers' adherence, positively or negatively, to handwashing, considered the fundamental act for preventing HAIs. Findings indicated that adherence levels were often below 50%, particularly among physicians. While adequate sink availability supports compliance, high infrastructure levels alone do not guarantee satisfactory adherence, motivation and feedback play a greater role [9].

Training has a positive impact when it includes active methods such as error analysis, feedback on care practices, and regular evaluations with systematic communication of results to healthcare teams. Awareness of a patient's infection status also improves hygiene adherence, which paradoxically reflects poor internalization of the concept of SP in many facilities [9].

Further research is needed to assess the impact of alcohol-based hand rubs (ABHR) on improving compliance, to integrate hand hygiene into workload studies, and to better define handwashing indications according to contact type and glove use [10].

The most feared infections were viral hepatitis (77.5%) and HIV (89.3%). Only 40.6% of healthcare workers were properly vaccinated against hepatitis B (with post-vaccination serology performed in just 1.8% of vaccinated individuals). During the previous 12 months, 58.9% had experienced at least one blood exposure incident, of which only 5.8% were reported. Only 65.6% of healthcare workers consistently wore gloves for invasive procedures, 61.5% disinfected their hands properly, and needle recapping was reported in 51.2% of cases [11].

Results from another study showed that only 28.7% of healthcare workers had received training on SP. Additionally, 87.7% reported washing their hands between patients, and 75.7% recognized the need to change gloves between patients. However, individual protective measures were rarely mentioned for many high-risk situations [12].

A study conducted in Tshopo Province on hand hygiene compliance in general referral hospitals in Kisangani found an overall compliance rate of 39% (95% CI: 37–41), with a predominance of handwashing with soap and water (34%) compared to alcohol-based hand rub use (5%). Cleaning staff

ISSN: 2582-6271

Vol. 6, Issue.6, Nov-Dec 2025, page no. 50-63

and physicians had higher compliance rates (49% and 44%, respectively) than nurses (33%). About one-third of professionals knew WHO's hand hygiene indications, and 36% understood its importance in healthcare settings. Differences in knowledge were not statistically significant among professionnal categories ($p > 0.05$) [13].

In another study conducted in healthcare facilities in Isiro, overall knowledge about the three main pathogens transmitted through blood and other body fluids was low; nearly 91.1% of respondents had suffered at least one BEI during the previous 12 months. Needle recapping and insufficient standard precautions were associated factors [14].

Given the frequency and severity of BEIs, the heightened awareness of hand hygiene during the COVID-19 pandemic, and the promotion of alcohol-based hand rub use, the objective of this study was to evaluate the level of compliance with universal precautionary measures in healthcare settings.

II. MATERIAL ET METHODS

2.1. Materials

2.1.1. Study Site

Kisangani (formerly Stanleyville or Stanleystad from 1883 to 1966) is a city in the Democratic Republic of the Congo (Central Africa). It is the capital of **Tshopo Province**, located in the northeastern part of the country. Kisangani is the fifth most populated urban area in the DRC, with an estimated population of 1 356 640 inhabitants in 2021.

2.1.2. Study Population

The study population consisted of all healthcare professionals and healthcare facilities in the city of Kisangani, encompassing all ownership sectors (private, faith-based, and public).

2.2. Methods

2.2.1. Type and Period of Study

This was a cross-sectional descriptive study with an analytical purpose, conducted from July 22 to August 22, 2024, in healthcare facilities across the city of Kisangani.

2.2.2. Sampling

Due to constraints related to financial resources, time, and geographic accessibility, a convenience sampling method was used. Twelve healthcare facilities (four public, four faith-based, and four private)

ISSN: 2582-6271

Vol. 6, Issue.6, Nov-Dec 2025, page no. 50-63

were randomly selected from the comprehensive list of healthcare institutions located on the right bank of the Congo River, according to the inclusion criteria below.
The following professional categories were included: physicians, nurses, midwives, laboratory technicians, and cleaning staff.

Below is the list of selected healthcare facilities by Health Zone:

No.	Health Zone	Healthcare Facility
1	Mangobo	Matete
2		Bethsaïda
3		Anuarite
4	Makiso-Kisangani	Boyoma
5		Alwaleed
6		CELPA
7		Rosaria
8		COKIS
9	Tshopo	Saint Joseph
10		Gloria
11	Kabondo	Lilemo
12		Foyer

In each healthcare facility, ten (10) providers were selected, representing all professional categories present at the time of data collection. The total number of participants included in the study was 120.

2.2.3. Variables of Interest

- **Characteristics of respondents:** sex, age, professional category, qualification, years of experience, ownership status of the facility (private, faith-based, or public), and department/unit.
- **Hand hygiene compliance:** number of hand hygiene practices performed compared to the total number of opportunities, by professional category and according to WHO hand hygiene indications.

Note: The assessment of hand hygiene compliance was carried out at the workplace (laboratory, treatment room, hospitalization ward, and maternity unit). Providers were observed for a specific period, and the

International Journal of Applied Science and Engineering Review

IJASER

ISSN: 2582-6271

Vol. 6, Issue.6, Nov-Dec 2025, page no. 50-63

number of hand hygiene opportunities and practices performed were counted.

2.2.4. Data Collection and Analysis Techniques

Data were collected through interviews using an interview guide and through direct observation using an observation checklist. According to the WHO, a minimum of 120 hand hygiene opportunities are required for valid measurement.

Regarding hand hygiene compliance, healthcare workers were observed for 15 to 30 minutes to record opportunities related to the five WHO indications for hand hygiene and to assess actual practices (handwashing with soap and water or use of alcohol-based hand rub). The WHO recommends an average of 120 opportunities per healthcare facility, distributed across all professional categories. If the 120 opportunities were not reached within 15 to 30 minutes, observation was temporarily stopped and resumed later.
The overall, departmental, and professional compliance rates were calculated as follows:

$$\sum Observed\ hand\ hygien\ practices\ /\ total\ number\ of\ opportunities$$

Statistical inferences were made using Pearson's Chi-square or Fisher's exact test, depending on applicability conditions, for categorical variables; and Student's t-test or Wilcoxon test as appropriate. Bivariate analysis was performed to verify associations between factors and compliance with standard precautions, using a 5% significance level and 95% confidence intervals.

III. RESULTS

Table 1. Description of the Sample

Variables (N=120)	Categories	Frequency	Percentage
Age (Mean ± SD) (years)	43.6 ± 11.07		
Age group	21–30	17	14
	31–40	36	30
	41–50	31	26
	51–60	30	25

International Journal of Applied Science and Engineering Review

IJASER

ISSN: 2582-6271

Vol. 6, Issue.6, Nov-Dec 2025, page no. 50-63

Variables (N=120)	Categories	Frequency	Percentage
	61–75	5	5
Sex	Male	56	47
	Female	64	53
Qualification	Doctorate	10	8
	Bachelor's degree	49	40
	Undergraduate degree	28	23
	Diploma (D6 or A2)	15	13
	Auxiliary	6	5
	Other	12	10
Professional category	Physician	12	10
	Nurse	69	58
	Laboratory technician	13	11
	Cleaning staff	26	22
Years in current position (Mean ± SD)	11.7 ± 9.5		

The table above shows that the mean age of participants was 43.6 ± 11.07 years, with the dominant age groups being 41–50 and 51–60 years. Both sexes were nearly equally represented, and the majority were nurses with a bachelor's degree. The mean length of service was 11.7 ± 9.5 years.

International Journal of Applied Science and Engineering Review

IJASER

ISSN: 2582-6271

Vol. 6, Issue.6, Nov-Dec 2025, page no. 50-63

Table 2. Factors Associated with Wearing Professional Attire

Variables	Wearing Professional Attire	OR	95% CI	P value
	Yes (N=94)	No (N=26)		
Sex			1.03	0.39–2.71
Male	44 (47)	12 (46)		
Female	50 (53)	14 (54)		
Professional category			-	-
Physician	9 (10)	3 (12)		
Nurse	54 (57)	15 (58)		
Laboratory technician	12 (13)	1 (4)		
Cleaning staff	19 (20)	7 (27)		
Qualification			-	-
Doctorate	8 (9)	2 (8)		
Bachelor's degree	42 (45)	7 (27)		
Undergraduate degree	21 (22)	7 (27)		
Diploma (A2/D6)	9 (10)	6 (23)		
Auxiliary	5 (5)	1 (4)		
Other	9 (10)	3 (12)		
Overall knowledge level			0.20	0.07–0.56
Good	68 (72)	9 (35)		
Poor	26 (28)	17 (65)		

* Pearson's Chi-square

Analysis of factors associated with wearing professional attire showed that having a good overall knowledge of universal precautions was significantly associated with compliance in wearing professional attire ($p < 0.05$).

International Journal of Applied Science and Engineering Review

IJASER

ISSN: 2582-6271

Vol. 6, Issue.6, Nov-Dec 2025, page no. 50-63

Table 3. Distribution of Hand Hygiene Compliance by Professional Category and Technique

Professional category	Total opportunities	Handwashing n (%)	ABHR n (%)	None n (%)	P value
Physician	78	12 (15.4)	33 (42.3)	33 (42.3)	0.147*
Nurse	312	29 (9.3)	131 (42)	152 (48.7)	
Midwife	114	18 (15.8)	55 (48.2)	41 (36)	
Laboratory technician	84	10 (11.9)	42 (50)	32 (38.1)	
Overall compliance	**588**	**69 (11.7)**	**261 (44.4)**	**258 (43.9)**	**56.1**

* Pearson's Chi-square

This table shows that overall hand hygiene compliance was 56%, with no significant difference in compliance levels across professional categories or techniques of hand hygiene.

Table 4. Distribution of Hand Hygiene Compliance by Indication and Opportunity

Hand hygiene indication	Total opportunities	Handwashing n (%)	ABHR n (%)	None n (%)	P value
Before and after patient contact	195	26 (13)	72 (37)	97 (50)	0.020
After contact with patient environment	99	20 (20)	33 (33)	46 (47)	
After risk of contact with biological fluids	193	31 (16)	44 (23)	118 (61)	
Before aseptic procedure	101	22 (22)	25 (25)	54 (53)	

This table shows that handwashing was significantly more frequent before aseptic procedures and after contact with the patient's environment, whereas alcohol-based hand rubbing was significantly more frequent before and after patient contact and after contact with the patient's environment.

V. DISCUSSION

4.1. Characteristics of Respondents

ISSN: 2582-6271

Vol. 6, Issue.6, Nov-Dec 2025, page no. 50-63

The demographic characteristics of respondents (Table 1) show a relatively older population (43.6 ± 11.07 years on average), with a predominance of the 41–50 and 51–60 age groups. These findings are consistent with those reported in other studies conducted in Africa, where healthcare providers often have a similar average age. A study in Nigeria also found a relatively older population among nurses and doctors, which can be explained by the experience accumulated over the years [15].

The gender distribution in this study (53% female and 47% male) reflects the trends observed in Sierra Leone, where women often dominate healthcare professions [16]. The majority of healthcare providers in this study were nurses (58%), which is comparable to findings in Nigeria where nurses represent a large portion of the health workforce [17].

In a study conducted in Burkina Faso on standard precautions, 63% of healthcare providers were women [18].

The predominance of females can be explained by the historical fact that the nursing profession began with religious sisters, and all midwives are women.

4.2. Factors Associated with Compliance with the Wearing of Professional Attire

The analysis of factors associated with compliance with wearing professional attire (Table 5) revealed that the level of knowledge of universal precautions is a key factor. Those with a “good” level of knowledge are more likely to consistently wear professional attire. This result is similar to those reported in other studies in Africa, where better knowledge of prevention measures is often associated with greater compliance with safety practices [19].

Wearing professional attire is mandatory for all healthcare activities and must be adapted to the type of procedures being performed, such as wet care, surgical operations, maternity services, or specialized care units (cholera treatment centers, Ebola treatment centers, etc.). Awareness of infectious risks and specific protective measures is therefore an advantage.

4.3. Distribution of Hand Hygiene Compliance by Professional Category and Technique

Our results show that hand hygiene compliance does not vary according to professional category. The observed differences are not statistically significant ($p = 0.147$). The lack of any form of hand hygiene observed among nurses (48.7%) and doctors (42.3%) is concerning, given their frequent contact with patients.

These results differ from those observed in the analysis by Yilma M et al., where laboratory technicians showed better compliance, probably due to targeted training on biological risks [20]. A multicenter study

ISSN: 2582-6271

Vol. 6, Issue.6, Nov-Dec 2025, page no. 50-63

conducted by Erasmus et al. showed that nurses and doctors tend to be less rigorous than other categories in systematically applying hygiene measures [21].

The results of a study conducted in referral hospitals in Kisangani (Tshopo Province) showed, contrary to our findings, higher compliance among cleaning technicians (49%) and doctors (44%), significantly different from nurses (33%) [13].

The absence of statistically significant differences in our study may be due to a general homogeneity of poor practices in the hospital work environment in Kisangani, suggesting an institutional and organizational problem rather than an individual one. A targeted approach including continuous training, regular audits, and improved access to hygiene materials (water, soap, and alcohol-based hand rub) could improve hand hygiene practices in Kisangani healthcare facilities.

4.4. Distribution of Hand Hygiene Compliance by Indication and Technique

The results show a statistically significant association between hand hygiene indications and the technique used ($p = 0.020$). Compliance was higher during patient contact (50.2% using handwashing or alcohol-based hand rub) than during contact with biological fluids (38.3% using either method), which is counterintuitive. Handwashing was significantly higher before a clean procedure and after contact with the patient's environment, while alcohol-based hand rubbing was significantly higher before and after patient contact, and after contact with the patient's environment. The fact that more than 61% of opportunities involving biological fluids were not followed by any hand hygiene practice demonstrates a serious violation of standard precautions.

These findings confirm trends reported in other contexts. Pittet et al. highlighted that healthcare professionals tend to underestimate the importance of hygiene after contact with the environment or surfaces, compared to direct patient contact [22]. A study in Benin also reported low compliance with hand hygiene after exposure to biological fluids, despite a high perceived risk [23].

In Burkina Faso, by contrast, compliance with recommendations was observed in 26% of cases for systematic handwashing/disinfection, 19% for sharp object management, and a higher rate (66%) for cleaning/disinfecting contaminated surfaces [18].

This lack of adherence reflects a lack of awareness or trivialization of infectious risks associated with bodily fluids. It may also be due to lack of time, insufficient materials, or the absence of a safety culture within healthcare institutions in Kisangani.

ISSN: 2582-6271

Vol. 6, Issue.6, Nov-Dec 2025, page no. 50-63

It is therefore urgent to strengthen specific training on hand hygiene indications, with practical demonstrations. There is also a need to establish written and visible protocols in care areas and to promote an institutional culture focused on patient and staff safety, integrating hygiene compliance as a performance indicator.

CONCLUSION

The results of this study shed light on the issue of compliance with standard precautions in healthcare settings in the city of Kisangani.

The level of compliance with standard (universal) precautions in healthcare settings in Kisangani remains very low and unevenly distributed according to techniques and indications defined by WHO. Knowledge levels are also insufficient. A globally "good" knowledge of universal precautions was found to be significantly associated with compliance with wearing professional attire.

Institutional policies aimed at capacity building, awareness raising, and ensuring the availability of hygiene facilities are necessary.

REFERENCES

1. World Health Organization report. https://doi.org/10.1001/jamanetworkopen.2022.42131
2. Warren BG, Barrett A, Graves A, King C, Turner NA, Anderson DJ. *An Enhanced Strategy for Daily Disinfection in Acute Care Hospital Rooms: A Randomized Clinical Trial.* JAMA Network Open. 2022;5(11):e2242131.
3. World Health Organization Global Report on Infection Prevention and Control.
4. *Prevention of Nosocomial Infections.* World Health Organization (WHO/DOC/71 pages). 2008. 2nd edition.
5. *Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings.* CDC, Atlanta, 2007, p. 67.
6. *Basic Infection Control and Prevention Plan for Outpatient Oncology Settings.* Division of Healthcare Quality Promotion, National Center for Emerging and Zoonotic Infectious Diseases. (http://www.cdc.gov/hai/pdfs/guidelines/basic-infection-control-prevention-plan-2011.pdf).
7. Abiteboul D, Lamontagne F, Lolom I, Tarantola A, Descamps JM, Bouvet E. *Incidence of Blood Exposure Accidents Among Nursing Staff in Metropolitan France, 1999–2000: Results of a Multicenter Survey in 32 Hospitals.* BEH No. 51/2002;255.
8. Mast ST, Woolwine JD, Gerberding JL. *Efficacy of Gloves in Reducing Blood Volumes Transferred During Simulated Needlestick Injury.* J Infect Dis. 1993;168(6):1589–1592.

ISSN: 2582-6271

Vol. 6, Issue.6, Nov-Dec 2025, page no. 50-63

9. Krikorian R, Lozach-Perlant A, Ferrier-Rembert A, Hoerner P, Sonntag P, Garin D, et al. *Standardization of Needlestick Injury and Evaluation of a Novel Virus-Inhibiting Protective Glove.* J Hosp Infect. 2007;66:339–345.
10. Mallaret MR, Le Coziffenecker A, Duc DL, Brut A, Veyre M, Chaize P, Micoud M. *Compliance with Handwashing in Hospital Settings: Literature Review.* Médecine et Maladies Infectieuses. 1998;28(4):285–290.
11. Laraqui O, Laraqui S, Tripodi D, Zahraoui M, Caubet A, Verger C, Laraqui CH. *Assessment of Knowledge, Attitudes and Practices on Blood Exposure Accidents in Healthcare Settings in Morocco.* Médecine et Maladies Infectieuses. 2008;38(12):658–666.
12. Benboubker M, El Marnissi B, Nhili A, El Rhazi K. *Knowledge, Attitudes, and Practices Regarding Standard Precautions Among Healthcare Workers at Hassan II University Hospital in Fez (Morocco).* Information for Authors. 1995;1.
13. Eugène Basandja Longembe, Panda Lukongo Kitronza. *Compliance with Hand Hygiene in General Referral Hospitals in Kisangani, DRC.* Pan African Medical Journal. 2020;35:57. (Google Scholar).
14. Mandana Bambenongama N, Losimba Likwela J. *Knowledge, Attitudes, and Practices of Healthcare Professionals Regarding Standard Precautions in Hospital Settings.* Santé Publique. 2013;(5):663–673.
15. Olumide EA, Oyebola D, Olasode O, et al. *The Prevalence of Needlestick Injuries Among Healthcare Workers in a Nigerian Teaching Hospital.* J Hosp Infect. 2015;91(1):67–73.
16. Kanu N, Kallon S, Njoku D, et al. *Gender Representation in the Healthcare Workforce in Sierra Leone: Implications for Healthcare Delivery.* Afr J Health Sci. 2019;30(3):63–69.
17. Agbato O, Aderounmu A, Olaniyan A. *Survey of Nurses' Knowledge and Practice of Universal Precautions in Nigerian Hospitals.* J Health Educ Res Dev. 2017;35(2):209–214.
18. Dahourou D, Kabore M, Daht T, Kabore I, Cisse K, Koulibaly A, Ouedraogo S. *Knowledge and Practices of Healthcare Providers in Burkina Faso Regarding Standard Precautions for the Prevention of Healthcare-Associated Infections in 2023.* Revue Burkinabé de Santé Publique. 2025;1(Jan–Jun):28–39.
19. N'dri N, Yao A, Koffi K, et al. *Knowledge and Attitudes of Healthcare Workers Towards Universal Precautions in Abidjan, Côte d'Ivoire.* Infect Control Hosp Epidemiol. 2017;38(4):417–423.
20. Yilma M, Taye G, Abebe W. *Magnitude of Standard Precautions Practices Among Healthcare Workers in Low- and Middle-Income Countries: Systematic Review and Meta-Analysis.* PLoS One. 2024;19(4):e0302282. doi:10.1371/journal.pone.0302282

ISSN: 2582-6271

Vol. 6, Issue.6, Nov-Dec 2025, page no. 50-63

21. Erasmus V, Daha TJ, Brug H, et al. *Systematic Review of Studies on Compliance with Hand Hygiene Guidelines in Hospital Care.* Infect Control Hosp Epidemiol. 2010;31(3):283–294. doi:10.1086/650451
22. Pittet D, Allegranzi B, Storr J, et al. *"Clean Care is Safer Care": The Global Patient Safety Challenge 2005–2006.* Int J Infect Dis. 2006;10(6):419–424. doi:10.1016/j.ijid.2006.06.001
23. Yehouenou CL, Dohou AM, Fiogbe AD, Esse M, Degbey C, Simon A, Dalleur O. *Hand Hygiene in Surgery in Benin: Opportunities and Challenges.* Antimicrob Resist Infect Control. 2020 Jun 15;9(1):85. doi:10.1186/s13756-020-00748-z. PMID: 32539867; PMCID: PMC7296752.