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Knowledge, Attitudes, and Practices of Healthcare Providers at the Public Health Establishment of Touba Ndamatou (Senegal) on Healthcare Associated Infections in 2024

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Abstract

Introduction: Healthcare-associated infections (HAIs) represent a major public health challenge worldwide. Their prevalence is higher in developing countries, where inappropriate care practices are often blamed. The aim of this study is to investigate the knowledge, attitudes, and practices of healthcare staff at the Touba Ndamatou Public Health Establishment (PHE) regarding HAIs in 2024. **Methodology:** A descriptive and analytical cross-sectional study was carried out among health care staff at the Touba Ndamatou PHE in 2024. Participants were recruited exhaustively. Data were collected using a self-administered questionnaire. Statistical analyses were performed with R software version 4.2.2, including univariate, bivariate, and multivariate analyses using a binomial logistic regression model. Adjusted Odds Ratios with their 95% confidence intervals were determined for each variable retained in the final model. **Results:** A total of 101 agents were surveyed. The majority were female (62.4%), and the majority were nurses (36.6%). The average age was 31. Only 10.9% of participants had good knowledge of HAIs; 39.6% had good attitudes and 47.5% had good practices. Knowledge was favored by physician status (aOR = 12.5 [2.22 - 33.3]), while attitude was improved by female gender (aOR = 3.55 [1.15 - 12.0]) and paramedic status (aOR = 4.45 [1.18 - 20.1]). **Conclusion:** The results reveal low levels of knowledge, attitudes, and practices regarding HAIs prevention. Physicians showed better knowledge, while Allied health professionals were more inclined to adopt good attitudes. Ongoing training and clear protocols are needed to improve HAIs prevention.

Keywords

Healthcare-Associated Infections, Knowledge, Attitudes, Practices, Senegal

1. Introduction

Healthcare-associated infections (HAIs) occur during or following patient care, in the absence of an initial infection, and can affect both users and healthcare professionals [1].

According to the latest World Health Organization estimates, HAIs affect around 7 out of 100 patients in high-income countries and up to 15 out of 100 in low- and middle-income countries, with an even higher prevalence in intensive care units, particularly in sub-Saharan Africa [2].

These infections prolong hospital stays, increase healthcare costs, aggravate comorbidities, and contribute significantly to hospital morbidity and mortality. The factors most frequently associated with HAIs are invasive procedures (catheterization, urinary catheterization, intubation), prolonged hospital stays, patient promiscuity, lack of resources in terms of protective equipment, and deficiencies in hygiene practices [3]. However, it does not always appear to be a major concern for many caregivers, who are unaware of its scope [4].

In this context, healthcare providers play a central role in HAIs prevention. Several studies have shown that, despite good theoretical knowledge of preventive measures, attitudes often remain defensive, and practices do not systematically comply with standards, particularly in terms of hand hygiene, wearing Personal Protective Equipment (PPE), or disinfecting equipment [5].

High levels of education, continuing training, and professional experience are positively associated with knowledge of HAIs. Conversely, a low level of qualification or lack of training is associated with poor knowledge of preventive measures [6] [7].

Positive attitudes are linked to institutional involvement, accumulated experience, and support from the hierarchy [8]. Defensive attitudes are often associated with high workloads, lack of supervision, and trivialization of infectious risk [9].

Standard-compliant practices are encouraged by the availability of Personal Protective Equipment (PPE), ongoing training, and regular audits/supervision [5]. Inadequate practices are correlated with material shortages, insufficient staffing levels, and professional stress or overload [10].

The Public Health Establishment (PHE) of Touba Ndamatou, as a primary-level hospital receiving a large flow of patients within the city of Touba and beyond, is exposed to a high risk of healthcare-associated infections. It was with this in mind that the present study was conducted. It aims to assess the knowledge, attitudes, and practices of healthcare providers at the Touba Ndamatou PHE in terms of preventing healthcare-associated infections, and to identify the factors associated with these dimensions. The expected results should help guide strategies for improving the quality of care in this high-stakes hospital setting.

2. Methodology

2.1. Study Framework

Touba is located in central Senegal, 193 km from Dakar. The population of Touba is estimated at 904,411 residents [11], although there has been an exponential increase in the population due to migration favored by the city's religious character. The level 1 PHE of Touba Ndamatou is a referral center for the two Health Districts (Mbacke and Touba) comprising three Health Centers (Mbacke, Khelcom, and Darou Khoudoss), on which 45 Health Posts depend. It includes medical-surgical and support services. Human resources are made up of 28 doctors, including thirteen specialists, a pharmacist-biologist, 16 health technicians, 22 state-approved midwives, 37 nurses, 38 care assistants, six management executives, and 25 administrative staff.

2.2. Type and Period of Study

This was a descriptive and analytical cross-sectional study conducted among health care staff at the Touba Ndamatou PHE in 2024.

2.3. Study Population

The study population consisted of all healthcare providers working at the Ndamatou PHE (medical and paramedical staff).

❖ **Inclusion criteria**

All care providers working at Ndamatou EPS were included.

❖ **Non-inclusion criteria**

Providers who refused to participate in the study and those who were unavailable or absent from the facility during the survey period were not included.

2.4. Recruitment

An exhaustive recruitment process was carried out, and all providers meeting the inclusion criteria were interviewed. A total of 101 people were enrolled.

2.5. Data Collection

Collection tool

An anonymous questionnaire was developed based on a literature review of the assessment of healthcare providers' knowledge and practices regarding healthcare-associated infections [12]-[15]. The questionnaire focused in particular on: 1) respondents' socio-professional data, 2) general knowledge of healthcare-associated infections, 3) standard precautions to prevent HAIs, 4) hand hygiene practices, 5) personal protective equipment, 6) use and disposal of sharps, 7) treatment of reusable materials and instruments, and 8) housekeeping and waste disposal.

Collection technique

The questionnaire was administered to service providers during face-to-face interviews.

Operational definition of variables

Definition of HAIs

The definition of healthcare-associated infections was considered correct if the person chose the most precise and complete answer, *i.e.*: "any infection occurring during or following the management (diagnostic, therapeutic, or preventive) of a patient and if it was neither present nor incubating at the start of the management, all within a period ≥ 48 hours or > the incubation period."

Examples of HAIs

For the examples of healthcare-associated infections, the answer was considered correct if the respondent chose the following three (3) answers out of five (5): Urinary tract infection caused by *Escherichia coli*, catheter-related infection caused by Staphylococcus epidermidis, and pneumonia caused by *Pseudomonas aeruginosa*.

Allied health professionals

For the purpose of this study, the category allied health professionals was operationally defined to include pharmacists, biologists/laboratory technicians, care assistants, medical imaging technicians, nurses, and midwives. This grouping was adopted to capture the broader non-physician workforce directly involved in patient care and support services within health facilities

Risk factors for healthcare-associated infections

To the question concerning the main risk factors contributing to healthcare-associated infections, the answer was considered correct if the respondent chose the following four (4) propositions: Invasive procedures, Length of hospital stay, Immunocompromised patients, and Extreme age.

Transmission modes

As for the modes of transmission of HAIs, the answer was considered correct if the respondent chose the following three (3) propositions: handling, septic material, and lack of asepsis.

Persons exposed to HAIs

To accept that the respondent knew all the categories of people potentially exposed to healthcare-associated infections, he had to choose the following five (5) answers: Patients, Visitors/carers, Nursing staff, Hygiene and maintenance staff, and administrative staff.

Components of personal protective equipment

We considered that respondents were familiar with PPE components if they selected the following items: Gloves, Masks (surgical, FFP), Goggles, Gown, Overblouse or gown cap, Operating theatre scrubs, Face shield, Caps, and Shoe covers.

Simple hand-washing steps

For the steps involved in simple hand washing, the following combination was considered the correct answer: A - C - B - D - E - G - F, (A) Wet your hands with lukewarm water, (C) Apply soap, (B) Rub your hands together for at least 20 seconds, (D) Wash all surfaces of your hands, including your fingernails, thumbs,

and between your fingers, (E) Rinse your hands under running water, (G) Dry your hands thoroughly, (F) If possible, turn off the tap with a paper towel or towel.

Surgical hand-washing steps

For the steps involved in surgical handwashing, the following combination was considered the correct answer: C - A - B - F - E - H - D - G, (C) Wet your hands, (A) Apply soap, (B) Rub your hands together for 60 seconds, (F) Wash all surfaces of your hands (including nails, thumbs, between your fingers), your wrists, and forearms, (E) Rinse your hands and arms under running water, starting with your fingertips, (H) Repeat the wash three times, (D) Dry yourself carefully from your hands to your elbows, (G) Keep your hands always above your elbows.

Isolation indications

The respondent knew the situations in which a patient had to be isolated (septic isolation/protective isolation) if he gave the following two (2) answers: Patient carrying a potentially contagious infection and Subject abnormally susceptible to infections.

Disposal of sharp objects

With regard to the choice of container for the disposal of sharp objects, the answer was correct if the respondent chose the proposal: «In a safety box».

Antibiotic prophylaxis

The provider knew the appropriate time to initiate antibiotic prophylaxis if he chose to do so before the potentially contaminating invasive procedure.

Knowledge score

To assess the level of HAIs knowledge, a total knowledge score was established. A score of one (1) point was awarded to those who gave the correct answer to the knowledge questions, and a score of zero (0) was given to those who gave the wrong answer. Providers with a total score ≥ 60% were considered to have good knowledge. On the other hand, those with a score < 60% were considered to have poor knowledge.

Attitude score

To assess the level of HAIs attitude, a total attitude score was established. A score of one (1) point was awarded to those who gave the correct answer to the attitude questions, and a score of zero (0) to those who gave the wrong answer. Providers with a total score ≥ 60% were considered to have a good attitude. On the other hand, those with a score < 60% were considered to have a poor attitude.

Practice score

To assess the level of HAIs preventive practices, a total practices score was established. A score of one (1) point was awarded to those who gave the right answer to the practice questions, and a score of zero (0) to those who gave the wrong answer. Providers with a total score ≥ 60% were considered to have good practices. On the other hand, those with a score < 60% were considered to have poor practices.

2.6. Data Analysis

Data were analysed using R 4.4.2 software. Quantitative variables were described

by mean, median, mode, and standard deviation. For qualitative variables, absolute and relative frequencies were calculated. In the analytical part, bivariate and multivariate analyses were performed, with cross-tabulations between variables to address the concerns formulated in the objectives. The dependent variables were HAIs knowledge, attitude, and practice. Chi-square or Fisher tests were used, depending on their applicability. The test was significant if the p-value was less than 0.05. Variables with a p-value of less than 0.25 were entered into the model using simple logistic regression with R software. The adjusted odds ratio, surrounded by its confidence interval, was used to quantify the strength of the relationships found.

2.7. Ethical Considerations

Authorization for the survey was obtained from the Chief Medical Officer of the Touba Ndamatou PHE before the study began. After a verbal explanation of the purpose and interest of the study, a consent form was offered to participants before submission of the questionnaire. Data were collected anonymously and confidentially using identification codes, and no personal identification was left on the questionnaire.

3. Results

3.1. Socio-Professional Characteristics

A total of 101 agents were interviewed, 62.4% of whom were women. Their average age was 31.6 ± 6.0. The 25 - 30 age group was the most represented, at 36.6%. The majority of respondents were nurses (36.6%). Less than a third worked in the medical department, accounting for 32.7%. The average length of time in the profession was 5.3 years ± 4.0. More than half the nurses in our series (50.5%) had been in the profession for between 2 and 5 years (Table 1).

Table 1. Distribution of participants by socio-professional characteristics.

Socio-professional characteristics (N = 101)		Absolute frequency (N)	Relative frequency (%)
Sex			
	Men	38	37.6
	Female	63	62.4
Age group			
	20 - 25 years	11	10.9
	26 - 30 years	37	36.6
	31 - 35 years	33	32.7
	36 - 40 years	10	9.9
	41 - 45 years	6	5.9
	46 - 50 years	4	4.0
Profession			

Continued

	Nurse	40	39.6
	Midwives	13	12.9
	Doctors	33	32.7
	Pharmacist	1	1.0
	Biologist/technicians laboratory	6	5.9
	Care assistant	7	6.9
	Medican imaging technician	1	1.0
Care services			
	Medicine	33	32.7
	Surgery	10	9.9
	Maternity ward	15	14.9
	Other	43	42.6
Professional experience			
	Less than or equal to 1 year	12	11.9
	2 - 5 years	51	50.5
	6 - 10 years	28	27.7
	Over 10 years	10	9.9

3.2. Knowledge of Healthcare-Associated Infections

Over half of the agents surveyed (64.3%) defined HAIs as any infection occurring during or following care. A further 30.7% defined them as infections contracted in healthcare establishments, and 5% as infections contracted during care provided outside healthcare establishments. Catheter-related infections caused by Staphylococcus epidermidis (92.1%), those caused by *Escherichia coli* (80.2%), and those caused by *Pseudomonas aeruginosa* (69.3%) were the main examples of HAIs cited by the agents. With regard to risk factors for HAIs, invasive procedures (89.1%) and length of hospital stay (77.2%), immunocompromised patients (56.4%), and extreme age were known to be risk factors for HAIs. Concerning modes of contamination with HAIs, defects in asepsis (89.1%), septic equipment (67.3%), and handling were indicated by respondents as the modes of HAIs contamination. According to them, the people most exposed to HAIs were patients (90.1%), nursing staff (80.2%), hygiene and maintenance staff (50.5%), and visitors/accompanying persons (46.5%). 37.8% of staff occasionally updated their knowledge of the latest HAIs prevention practices. In all, only 10.9% of those surveyed had a good overall knowledge of HAIs (Table 2).

3.3. Attitudes towards Healthcare-Associated Infections

Strict compliance with HAIs prevention protocols was noted by 39.6% of participants. Among the staff surveyed, 55.4% felt that the equipment needed for care was sufficient in quantity. With regard to HAIs risk assessment within the

Table 2. Distribution of participants by knowledge of HAIs.

Knowledge of healthcare-associated infections (N = 101)	Absolute frequency (N)	Relative frequency (%)
Defining healthcare-associated infections		
Yes	65	64.3
No	36	35.7
Examples of healthcare-associated infections		
Catheter-related Staphylococcus epidermidis infections		
Yes	93	92.1
No	8	7.9
Urinary tract infection caused by *Escherichia coli*		
Yes	81	80.2
No	20	19.8
Pneumonia by *Pseudomonas aeruginosa*		
Yes	70	69.3
No	31	30.7
Risk factors contributing to healthcare-associated infections		
Extremes ages		
Yes	51	50.5
No	50	49.5
Immunocompromised patients		
Yes	57	56.4
No	44	43.6
Length of hospital stay		
Yes	78	77,2
No	23	22.8
Invasive procedures		
Yes	90	89.1
No	11	10.9
HAIs transmission modes		
Handling		
Yes	46	45.5
No	56	55.5
Septic equipment		
Yes	68	67.3
No	33	32.7

Continued

Lack of asepsis		
Yes	90	89.1
No	11	10.9
People exposed to HAIs		
Administrative staff		
Yes	9	8.9
No	92	91.1
Visitors/accompanying persons		
Yes	47	46.5
No	54	53.5
Hygiene staff		
Yes	51	50.5
No	50	49.5
Nursing staff		
Yes	81	80.2
No	20	19.8
Sick people		
Yes	91	90.1
No	10	9.9
Updating knowledge of HAI prevention		
Never	3	3.0
Rarely	25	24.8
Occasionally	38	37.6
Frequently	35	34.7
Overall knowledge of HAIs		
Good	11	10.9
Wrong	90	89.1

healthcare facility, 47.6% of providers stated that it was carried out regularly. Just over half (52.5%) said that they communicate with and educate patients and their families about HAIs risks and preventive measures. According to 60.4% of agents, staff awareness-raising activities on the prevention of healthcare-associated infections were organized at the health facility level. Only 39.6% had good overall attitudes to HAIs (Table 3).

3.4. Practices Related to Healthcare-Associated Infections

PPE use during care was strict in 36.6% of participants. Hand washing with soap and water was the main hand hygiene technique used by staff (67.3%). The

Table 3. Distribution of participants according to HAIs' attitudes.

Attitudes toward healthcare-associated infections (N = 101)	Absolute frequency (N)	Relative frequency (%)
Monitoring infection prevention protocols		
Never	3	3.0
Rarely	16	15.8
Frequently	42	41.6
Always	40	39.6
Equipment availability		
Yes	56	55.4
No	45	44.6
Regular assessment of IAS risks		
Yes	48	47.6
No	37	36.6
Don't know	16	15.8
Communication and patient education		
Yes	93	92.1
No	8	7.9
Raising awareness and training staff in HAI prevention		
Yes	61	60.4
No	40	39.6
Globale Attitude		
Good	40	39.6
Poor	61	60.4

majority of participants (87.1%) systematically practiced hand hygiene between each patient. The same applied to the mastery of the simple (73.3%) and surgical (71.3%) hand-washing steps. 73.3% felt that there were sufficient functional water points and detergents to perform hand-washing when the indication arose. With regard to instrument handling, the majority of staff (81.2%) stated that reusable equipment was systematically decontaminated and sterilized after each procedure. With regard to the hygiene of the patient's immediate environment, participants said they systematically disinfected examination tables (53%), operating tables (70%), treatment tables (69%), hospital beds (83%), and bedside tables (62%). Most participants (73.3%) claimed to isolate any patient carrying a potentially contagious infection. Hygiene and cleaning staff were available on a daily basis in 77.2% of cases. More than three quarters of surveys (76.2%) systematically sorted medical waste. 71.3% reported the existence of a waste management plan. Less than half of participants (46.5%) placed sharp objects in a trap box. Concerning the indications for prophylactic antibiotic therapy, 40.6% of them said they would

institute antibiotic prophylaxis before the procedure, 5% during the procedure, 31.7% after the procedure, and 12.9% at any time. Furthermore, the majority of staff (52.5%) said they had never been directly involved in the management of a healthcare-associated infection during their practice. In all, 47.5% of participants had good overall HAIs practices (Table 4).

Table 4. Distribution of participants according to HAIs practices.

Practices on healthcare-associated infections (N = 101)	Absolute frequency (N)	Relative frequency (%)
Use of Personal Protective Equipment		
Never	12	11.9
Rarely	17	16.8
Frequently	35	34.7
Always	37	36.6
Choice of hand hygiene technique		
Rubbing with hydroalcoholic gel		
Yes	33	32.7
No	68	67.3
Wash with soap and water		
Yes	68	67.3
No	33	32.7
Systematic hand hygiene		
Yes	88	87.1
No	13	12.9
Mastery of the simple hand-washing technique		
Yes	74	73.3
No	27	26.7
Mastery of surgical hand-washing techniques		
Yes	72	71.3
No	29	28.7
Availability of hand-washing stations		
Yes	74	73.3
No	27	26.7
Treatment of instruments and reusable materials		
Yes	82	81.2
No	16	15.8
Don't know	3	3.0

Continued

Hygiene of the patient's immediate environment			
Disinfection of examination tables between patients			
	Yes	54	53
	No	47	47.0
Disinfection of operating tables between each patient			
	Yes	71	70
	No	30	30.0
Disinfection of treatment tables			
	Yes	70	69
	No	31	31.0
Disinfection of hospital beds			
	Yes	84	83
	No	17	17.0
Bedside table disinfection			
	Yes	63	62
	No	38	38.0
Mastering the indications for patient isolation			
Patient with a potentially contagious infection			
	Yes	74	73.3
	No	27	26.7
Abnormally susceptible to infections			
	Yes	15	14.9
	No	86	85.1
Any patient presenting with an infectious syndrome			
	Yes	8	7.9
	No	93	92.1
Permanent availability of hygiene and maintenance staff			
	Yes	78	77.2
	No	23	22.8
Systematic sorting of biomedical waste			
	Yes	77	76.2
	No	24	23.8
Disposal of sharp objects in appropriate containers			

Continued

Yes	47	46.5
No	54	53.5
Appropriate antibiotic prophylaxis practices		
Before the act		
Yes	41	40.6
No	60	59.4
During the act		
Yes	5	5.0
No	96	95.0
After the act		
Yes	32	31.7
No	69	68.3
At any time		
Yes	13	12.9
No	88	87.1
Participation in the management of a healthcare-associated infection		
Yes	53	52.5
No	48	47.5
Global IAS practice		
Good	48	47.5
Wrong	53	52.5

3.5. Factors Associated with HAI Knowledge

Professional category was statistically related to knowledge of HAIs. Doctors were more likely to have good knowledge than allied health professionals (aOR = 12.5 [2.22 - 33.3]) (Table 5).

Table 5. Factors associated with knowledge about healthcare-associated infection practices.

Variables	aOR	95% CI	p-value
Age			
>30 years	—	—	
≤30 years	1.56	0.35, 7.46	0.6
Sex			
Male	—	—	
Female	1.48	0.30, 7.66	0.6
Profession			
Doctor	—	—	

Continued

Allied health professionals	0.08	0.03, 0.45	0.007
Sectors			
Other	—	—	
Medicine	0.40	0.07, 1.94	0.3
Professional experience			
>5 years	—	—	
≤5 years	0.34	0.08, 1.39	0.14

3.6. Factors Associated with Attitudes towards HAIs

Factors associated with attitude to HCAI were gender: women were more likely to have good attitudes than men (aOR = 3.55 [1.15 - 12.0]); professional category: allied health professionals were more likely to have good attitudes than doctors (aOR = 4.45 [1.18 - 20.1]) (Table 6).

Table 6. Factors associated with attitudes about healthcare-associated infection practices.

Variables	aOR	95% CI	p-value
Age			
>30 years	—	—	
≤30 years	0.63	0.21, 1.76	0.4
Sex			
Male	—	—	
Female	3.55	1.15, 12.0	0.032
Profession			
Doctor	—	—	
Allied health professionals	4.45	1.18, 20.1	0.035
Services			
Other	—	—	
Medicine	0.51	0.16, 1.53	0.2
Professional experience			
>5 years	—	—	
≤5 years	1.48	0.52, 4.40	0.5
Knowledge			
Poor	—	—	
Good	1.27	0.20, 7.86	0.8

3.7. Factors Associated with HAI Practices

No factor was statistically associated with HAIs practices (Table 7).

Table 7. Factors associated with practices regarding healthcare-associated infection practices.

Variables	aOR	95% CI	p-value
Age			
>30 years	—	—	
≤30 years	1.33	0.54, 3.31	0.5
Sex			
Male	—	—	
Female	0.88	0.30, 2.46	0.8
Profession			
Doctor	—	—	
Allied health professionals	2.27	0.70, 7.73	0.2
Services			
Other	—	—	
Medicine	0.74	0.28, 1.96	0.5
Professional experience			
>5 years	—	—	
≤5 years	0.82	0.33, 2.03	0.7
Knowledge			
Poor	—	—	
Good	2.11	0.52, 9.14	0.3
Attitude			
Poor	—	—	
Good	1.78	0.71, 4.55	0.2

4. Discussion

Healthcare-associated infections are a silent endemic burden that complicates patient management in health facilities. Our study assessed the knowledge, attitudes, and practices (KAP) of staff at the Ndamatou PHE regarding HAIs. It does, however, have a number of limitations, which were minimized as far as possible during its implementation. Firstly, the self-declarative nature of the participants' answers on their knowledge, but above all on their attitudes and practices, could have led to differences with reality, thus giving rise to a social desirability bias [16]. Secondly, the cross-sectional nature of the study makes it impossible to establish a clear causal relationship between the associated factors and the good knowledge, attitudes, and practices of HAIs [17].

Socio-professional characteristics

Staff at Touba Ndamatou Hospital were predominantly female. The same results were found in the work of Butoyi S. in Burundi [18] and Zuwaira I Hassan in Nigeria [19]. This predominance can be explained by the fact that from child-

hood, girls are more encouraged to develop qualities of care and empathy, which leads them more often to health professions with a strong human dimension [20]. The majority of providers came from the medical department. The same observation was made in the Irutingabo study in Burundi in 2020 [14]. The over-representation of the medical department in our study may be due to the fact that this department generally handles the greatest diversity and number of hospitalized patients, including many infectious and chronic pathologies [21]. Half of the agents in our series (50.5%) had between 2 and 5 years' professional seniority. Kentsa M.'s study in Cameroon found a preponderance of providers with 0-5 years' seniority [22]. Healthcare professionals at the beginning of their careers often make up the majority of staff in hospital studies, as middle managers or more experienced staff are often less likely to be employed in departments dedicated to healthcare [23].

HAIs knowledge

The level of HAIs knowledge in our study was very low at 10.9% of survey personnel. This result is lower than that of Bayleyegn in 2021 at Ethopie [24] and Ojo in 2023 in Nigeria [25]. Differences in available resources, such as access to manuals, protocols, and training, and in the level of exposure to national awareness campaigns may also explain this discrepancy [26].

HAIs practices

In our study, 41.6% of staff frequently complied with established protocols for the prevention of HCAI, which is higher than the result for Chpfuwa in Zimbabwe in 2023 [27]. This observed difference could be explained by better availability of written protocols, regular training, and a favorable institutional environment at Touba Ndamatou [28].

Less than half the agents had good HAIs practices. This is lower than Kaushik Nag's result. [29] where the respondents had good HAIs practices. This discrepancy could reflect the day-to-day realities of the healthcare organization: teams are often faced with a heavy workload combined with time constraints and limited availability of resources, making it difficult to apply HAIs prevention measures rigorously and regularly, even when they are well understood. [30].

Factors associated with HAIs knowledge

Profession influences the level of knowledge about HAIs. In fact, doctors were more knowledgeable than paramedical staff. Medical training generally includes more in-depth content on the pathophysiology of infections, hospital epidemiology, and HAIs prevention. This broader academic base gives doctors a more complete understanding of HAIs concepts [31]. Furthermore, doctors are often given priority for continuing training in HAIs prevention and have better access to up-to-date institutional resources, which reinforces their expertise compared to paramedical staff [32].

Factors associated with attitudes toward HAIs

It is worth noting that the questions assessing attitudes captured not only personal beliefs of the respondents but also their perceptions of institutional factors,

such as the availability of equipment and the frequency of training sessions. Allied health professionals had better attitudes toward HAIs than doctors. Indeed, paramedical staff, through their daily and frequent contact with patients for care, hygiene, and sampling, are regularly exposed to prevention protocols, reinforcing their familiarity with and adherence to the right attitudes [33]. In addition, paramedical staff are often tasked with performing technical procedures such as injections, wound care, blood sampling, or handling invasive devices, for which strict compliance with protocols is essential due to their direct consequences. Repeated practice of high-risk procedures reinforces the need for these professionals to adhere faithfully to HAIs prevention measures [26].

5. Conclusion

HAIs represent a major public health challenge worldwide, and their incidence is increasing despite efforts to control hospital-acquired infections, contributing significantly to morbidity and mortality. Healthcare workers are particularly at risk of contracting HAIs due to their occupational exposure. Overall, levels of knowledge, attitudes, and practices among providers at the Touba Ndamatou PHE were low. The study showed that knowledge of HAI was enhanced by being a doctor, and that attitudes were improved by being an allied health professional. There is a need to strengthen infection prevention and control (IPC) training through more structured approaches, such as targeted workshops tailored to different professional categories and regular refresher sessions. The establishment of institutional mechanisms, including periodic audits of IPC protocols and systematic feedback to staff, would further support adherence to best practices. In addition, the implementation of a monitoring system to continuously remind and guide healthcare workers and patients on good practices would help improve compliance.

Conflicts of Interest

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

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