

Reported healthcare workers knowledge and practices of hand hygiene in specialist hospitals of Kano, Northwest Nigeria

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Abstract

Compliance with recommended hand hygiene among healthcare providers is important in the prevention of morbidity and mortality associated with hospital-acquired infections including drug resistant microorganisms. This study aimed to determine the reported knowledge and hand hygiene practices among healthcare workers in Specialist Hospitals in Kano, Nigeria. Descriptive cross-sectional study design was used to study 302 healthcare workers in the specialist hospitals in Kano. Data was collected using semi-structured self-administered questionnaire and analyzed at univariate, bivariate and multivariate levels using IBM SPSS version 22. The age of the respondents ranged from 18 to 59 years with a mean of 31.4±9 years. Up to one-third (36.1%) of the respondents had poor knowledge despite the reported hand hygiene practice of 78%. Use of Alcohol Based Hand Rub and soap and water constituted 26.7% and 15.7% respectively. There was statistically significant association between working in MMSH, working in Pediatrics wards, CHEW cadre, and attendance of hand hygiene training in the last 3

years and having good knowledge of hand hygiene. Hand hygiene training was found to improve hand hygiene knowledge [AOR=1.58, 95% CI= (1.01-2.5)] and practice [AOR=1.12 95%CI= (0.64-1.99)]. Reported knowledge of hand hygiene was poor but the practices were encouraging and associated with formal training of healthcare workers on hand hygiene. Therefore, Hospital management should ensure regular hand hygiene training and re-training among healthcare workers.

Introduction

Every year millions of patients globally are affected by infections that are transmitted in healthcare settings.¹⁻³ Most of these infections can be prevented through a simple precautionary measure of proper hand hygiene. Unfortunately, compliance with hand hygiene guidelines provided by World Health Organization (WHO) is usually poor among healthcare workers, and materials needed for hand hygiene are not readily available.¹⁻³

Health care-associated infections occur worldwide and affect both developed and resource-poor countries.¹⁻⁴ Infections acquired in health-care settings are among the major causes of death and increased morbidity in hospitalized patients.¹⁻⁶ They represent a significant burden for both the patient, healthcare providers, families and public health. Health care-associated infections rank as major killers of patients of all ages, particularly among the most vulnerable members of the population. According to a recent European multicenter study, the proportion of infected patients in the Intensive Care Units (ICU) can be as high as 51% and most of these are health care-associated.¹⁻⁷

It was estimated that at any point in time, more than 1.4 million people worldwide suffer from infections acquired in hospitals.^{2,4} In developed countries, between 5% and 10% of patients acquire one or more infections and 15%–40% of patients admitted to critical care are thought to be affected. In resource-poor settings, rates of infection can exceed 20%, but available data are scanty in developing and transitional countries.^{2,4}

Barriers resulting to poor compliance with recommended hand hygiene practices may be organizational, related to the individual healthcare worker or to patient safety issue.¹⁻⁸ Organizational barriers, such as a lack of accessibility, inadequate maintenance of hand hygiene facilities and poor access to hand hygiene products, overcrowding and understaffing, and lack of role model negatively affect compliance with recommended

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hand hygiene practice.¹⁻⁵ Individual barriers to hand hygiene practices may include the misconception that hand hygiene is not necessary when gloves are worn, skepticism about the value of hand hygiene when the hands are not visibly soiled, lack of peer pressure to perform hand hygiene, lack of time to perform hand washing, poor understanding of the clear association between healthcare-associated microorganisms on the hands of healthcare workers and Hospital acquired infections, and lack of understanding of how effective hand hygiene, when indicated, reduces the cross-transmission of microorganisms.¹⁻⁸ There is paucity of data on healthcare workers hand hygiene knowledge and practices especially in Northwestern Nigeria and data obtained can be used by policy makers in addressing the identified barriers.

Materials and Methods

Study area

Murtala Muhammad Specialist Hospital (MMSH) is located within the ancient city walls of Kano. The Hospital was established in 1927, initially called City Hospital with a capacity of 16 beds at that time. It was renamed after the former Nigerian Head of State, General Murtala Ramat Muhammad, in 1976. It became a Specialist Hospital in 1987 and is located eastward 400m away from Kofar Mata and westward about 700m from the emir's palace. Hasiya Bayero Paediatrics Hospital (HBPH) is a Paediatrics Specialist Hospital that was established in 1990 and was named after the mother of late Emir of Kano State Dr (Alh) Ado Bayero. The hospital has both in-patients and out-patients services, including laboratory services.

There is high patients turn over in the two facilities far exceeding the required healthcare providers to patient ratio. This is partly because MMSH and HBPH serve as a referral center not only for the state but also for some parts of Northern Nigeria and neighboring Niger republic. The State Government is responsible for maintaining the two hospitals including recruitment and training of healthcare workers on infection prevention and control, supervision and also ensuring the supplies of all the logistics needed.

Study design

A cross sectional descriptive study was used.

Study population

The study population included all the health care workers in MMSH and HBPH involved in the care of in-patients. Staff on annual and maternity leave who did not return to work throughout the period of data collection were excluded from the study.

Sample size estimation

Sample of 334 was determined using Fisher's formula for estimating minimum sample size for descriptive studies.⁸ Standard normal deviate (z) 1.96 at 95% confidence interval and margin of error (d) 0.05 and prevalence (p) from previous study,⁹ point prevalence rate (25.7%) obtained from a past study and a non-response rate of 14% was used to compute the sample size.¹⁰

Sampling technique

Three staged sampling technique was used for the selection of respondents in 2 out of 8 specialist hospitals within Kano metropolis. In the first stage, the list of all

the Specialist Hospitals in the Metropolis was obtained from Kano Hospital Management Board from which MMSH and HBPH were selected by simple random sampling technique using balloting. In the second stage, the list of all the clinical departments was obtained from the hospital authorities and 4 out of 16 departments were selected by simple random sampling technique using balloting. In the third stage, the list of healthcare workers in the selected departments were obtained from the respective heads of departments, and respondents were proportionately allocated based on the number of healthcare workers and cadre in each of the selected departments.

Instrument for data collection

The instrument used was adapted semi structured pre-tested self-administered questionnaire.¹¹⁻¹⁶ The questionnaire consisted of three sections: section A sought the socio-demographic characteristics of the respondents, section B explored the knowledge of the respondents on hand hygiene while section C asked questions on hand hygiene practices among the respondent and the barriers to hand hygiene practices. The questionnaire was pretested in another hospital far away from the selected hospitals. Respondents were informed about the importance of filling the questionnaire completely and not checking up answers at home.

Data management and analysis

Data was analyzed using IBM SPSS Statistics for Windows, Version 22. Quantitative variables were summarized using appropriate measures of central tendency and dispersion while categorical variables were presented as frequencies and percentages. The dependent/outcome variables were knowledge of hand hygiene and hand hygiene practices while the independent variables were age, highest educational status, tribe, marital status, among others.

Knowledge items

There were 25 Questions that assessed knowledge of hand hygiene among the respondents; any respondent who correctly responded to question was given one point, while zero point was allocated for wrong response. Proportions obtained were classified as follows: Good knowledge for those with greater than or equal to 75%, fair knowledge for those with greater than 50% but less than 75% and poor knowledge for those with less than 50%.¹⁶

Practice items

There were 12 questions with multiple responses that assessed practice of hand hygiene among the respondents, any

respondent who correctly responded to question was given one point and zero point was allocated for wrong response. Hand hygiene practice was then scored based on points scored by individual respondents. Descriptive statistics was obtained for total hand hygiene practice scored by all the respondents and also for each professional category. Correct hand hygiene practice was considered for those with 50% and above, while wrong hand hygiene practice for those with below 50%.¹⁶

Chi square test was used to test for significant association between categorical variables and compared proportions in two or more groups. Logistic regression was used to adjust for confounders. A p-value of ≤ 0.05 was considered statistically significant. All the variables with a $p \leq 0.1$ at bivariate analysis were included in the logistic regression model to control for confounding. Adjusted Odds Ratio with 95% confidence interval was used to determine the strength of association.

Ethical considerations

Ethical approval was obtained from Health Research Ethics Committee of Kano State Ministry of Health with approval number of MOH/OFF/797/TI/731. Advocacy visit was conducted to the heads of the selected units. Data was collected from May 2018 to August 2018. All the principles of research ethics were respected throughout the study and respondents indicated acceptance by filling and signing the consent form.

Results

Of the 334 questionnaires administered, only 302 were retrieved giving a response rate of 90.4%.

Socio-demographic characteristics of the respondents

The age of the respondents ranged from 18years to 59 years with a mean of 31.4 ± 9 years and more than half 159 (52.7%) of them were between the ages of 21-30 years. More than three quarter 253 (83.8%) of the respondents were from Murtala Muhammad Specialist Hospital, with the remaining 49 (16.2%) from Hasiya Bayero Pediatrics Hospital. Females constituted majority (186, 61.6%) of the respondents. Almost half (150, 49.7%) of the respondents were employed within the last five years, the duration of employment ranged from 1-35 years with a median of 6 years. Forty percent (122) of respondents were nurses/midwives and almost a third (87, 29%) were doctors. The majority (113, 37.4%) of the

respondents were from surgical wards, while Obstetrics and Gynecology ward had the lowest number of respondents (37, 12.3%). Slightly more than half of the respondents (156, 51.7%) received training on hand hygiene in the last three years as shown in Table 1 below.

Healthcare worker's knowledge of hand hygiene

The minimum score for knowledge of hand hygiene was 3 and the maximum was 21, with a mean score of 13.4 ± 4.1 . About two-third 109 (36.1%) of the respondents had good knowledge of hand hygiene as shown in Figure 1 below. The majority of the respondents (233, 77.2%) reported that hand hygiene should be observed before touching a patient and up to 217 (71.9%) correctly responded that hand hygiene after touching a patient can prevent hospital acquired infections as shown in Table 2 below. More than two-thirds (233, 77.2%) of the respondents correctly responded to the question on the role of hand hygiene before touching a patient in preventing infection transmission. However, most of the respondents wrongly answered the question (225, 74.5%) about the time needed for alcohol based hand rub to kill germs when used for hand hygiene.

Healthcare worker's practice of hand hygiene

The minimum score for practice of hand hygiene was 0 and the maximum was 9, with a mean score of 5.6 ± 1.7 . The majority of the respondents (236, 78.0%) had correct hand hygiene practice as shown in Figure 1 below. Similarly, up to (252, 83.4%) reported adhering to recommended hand hygiene practices as shown in Table 3 below.

Shortage of water was reported as a barrier to hand hygiene by 169 (56.0%) as shown in Table 4 below.

Male healthcare workers were 40% more likely to have good hand hygiene practice {AOR= 0.4, 95% CI= (0.2-0.7)} compared to their female counterparts. Likewise, hospital staff who were less than 30 years of age were 70% more likely to have good hand hygiene practice than older

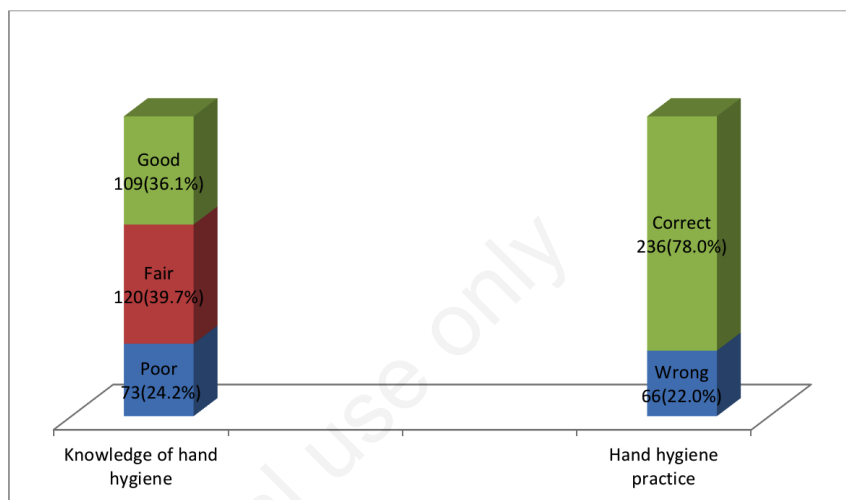


Figure 1. Distribution of hand hygiene knowledge and practices among respondent.

Table 1. Socio-demographic characteristics of respondents.

| Socio-demographic | Characteristics | Frequency n=302 | Percentage (%) |
|---|------------------------------------|-----------------|----------------|
| Age group (years) | 18-20 | 19 | 6.3 |
| | 21-30 | 159 | 52.7 |
| | 31-40 | 76 | 25.2 |
| | 41-50 | 42 | 13.8 |
| | 51-60 | 6 | 2.0 |
| | Mean \pm SD | | 31.4 ± 9 |
| Sex | Male | 116 | 38.0 |
| | Female | 185 | 62.0 |
| Professional Cadre | Doctors | 87 | 29.0 |
| | Nurses/midwives | 122 | 40.0 |
| | Community Health Extension Workers | 46 | 15.0 |
| | Attendants | 17 | 6.0 |
| | Clinical assistants | 30 | 10.0 |
| Duration in employment (years) | 1-5 | 150 | 49.7 |
| | 6-10 | 72 | 23.8 |
| | 11-15 | 25 | 8.3 |
| | 16-20 | 21 | 7.0 |
| | 21-25 | 12 | 4.0 |
| | 26-30 | 16 | 5.2 |
| | 31-35 | 6 | 2.0 |
| | Range and Median | | 1-35, 6 |
| Department/Ward | Medical | 51 | 16.9 |
| | Paediatrics | 101 | 33.4 |
| | Surgical | 113 | 37.4 |
| | Obstetrics & Gynaecology | 37 | 12.3 |
| Hand hygiene training in the last 3 years | Yes | 156 | 52.0 |
| | No | 146 | 48.0 |

healthcare workers {AOR=0.7, 95% CI=(0.4-1.2)}. In addition, doctors were 90% more likely to have good hand hygiene practice than other healthcare providers in the hospital {AOR= 0.9, 95%CI=(0.6-1.3)}. Healthcare workers with good knowledge of hand hygiene were 30% more likely to have good hand hygiene practice {AOR=1.3, 95% CI=(0.9-1.9)}, as shown in Table 5 and 6 below.

Discussion

About two-fifth (39.7%) of the respondents had fair knowledge of hand hygiene with more than a third (36.1%) having good knowledge and about a quarter (24.2%) having poor knowledge. This was lower than the figures of 83%, 79% and 91.7% for good, fair and poor knowledge respectively, reported in previous studies.^{13,14} The difference may be due to availability of hand hygiene consumables that can promote

improved knowledge of the indications and conditions appropriate for hand hygiene. The finding was however higher than the level of hand hygiene knowledge found in a study conducted in India, which reported 16.5% respondents to have good knowledge,¹⁵ which may be linked with previous training that was reported to be conducted in the study hospitals of this study. Healthcare workers with good knowledge of hand hygiene in this study were 30% more likely to practice good hand hygiene,

Table 2. Respondents correct responses to knowledge items.

| Knowledge items | Frequency (%) n=302 |
|---|---------------------|
| Main route of cross contamination | 235 (55.8) |
| Most frequent source of germs for healthcare infections | 111 (36.8) |
| Hand hygiene actions that prevent transmission of germs to the patients | |
| Before touching a patient | 233 (77.2) |
| After a risk of body fluid exposure | 168 (55.6) |
| After exposure to the immediate patients surrounding | 154 (51.0) |
| Before aseptic procedure | 186 (61.6) |
| Hand hygiene actions that prevent transmission of germs to the healthcare workers | |
| After touching a patient | 217 (71.9) |
| Immediately after a risk of body fluid exposure | 176 (58.3) |
| Immediately before clean aseptic procedure | 141 (46.7) |
| After exposure to immediate patient surrounding | 187 (61.9) |
| True statement on alcohol based hand rub and hand washing with soap and water | |
| Hand rubbing is more rapid for hand cleansing than hand washing | 210 (69.5) |
| Hand rubbing cause skin dryness more than hand washing | 106 (35.1) |
| Hand rubbing is more effective against germ than hand washing | 174 (57.6) |
| Hand rubbing and hand washing are recommended to be performed in sequence | 85 (28.2) |
| Time needed for alcohol based hand rub to kill germs | 77 (25.5) |
| Type of hand hygiene required in the following situation | |
| Before palpation of abdomen | 211 (69.9) |
| Before giving an injection | 149 (49.3) |
| After emptying a bed | 64 (21.2) |
| After removing a glove | 114 (37.8) |
| After making a patient bed | 88 (29.1) |
| After visible exposure to blood | 232 (76.8) |
| What to avoid because of increased likelihood of colonization by microbes | |
| Wearing jewelries | 190 (62.9) |
| Damaged skin | 223 (73.8) |
| Artificial finger nails | 219 (72.5) |
| Regular use of hand cream | 102 (33.8) |

Table 3. Respondents correct responses to practice items.

| Practice items | n=302 (%) |
|--|------------|
| Adhering to correct hand hygiene all the time | 252 (83.4) |
| Busy schedule and hand hygiene. | 105 (34.8) |
| Forgotten hand hygiene action. | 151 (50.0) |
| Hand hygiene in emergency situations | 174 (57.6) |
| Wearing gloves and hand hygiene | 216 (71.5) |
| Action when a colleague forgets to observe hand hygiene. | 255 (74.5) |
| Not reluctant to ask others to engage in hand hygiene. | 156 (51.7) |
| Newly employed staff properly instructed on hand hygiene. | 130 (43.0) |
| Feel guilty when hand hygiene is omitted. | 240 (79.5) |
| Adherence to hand hygiene is difficult in the current work set up. | 209 (69.2) |
| Hand hygiene after touching a patient | 233 (77.2) |
| Hand hygiene before touching a patient | 217 (71.9) |

this may likely be due to the fact that, knowledge means awareness of the consequences especially to do with the health and financial burden, with up to 78.0% found to be correctly practicing hand hygiene.

The finding of knowledge and practices of hand hygiene may also be linked with the possibility of checking up for answers by the respondents since the tool used was a self-administered questionnaire, however, efforts were made to explain the need for having correct findings by this study especially in the area of appropriate intervention by the appropriate authority. Furthermore, 51.7% of the respondents in this study

received formal training on hand hygiene within the last three years, though this is less than what was obtained in a study conducted in Saudi Arabia that reported more recent participation in trainings.^{16,17} In addition, a study conducted in Nepal, reported that up to 60.6% and 74.2% of the respondents have respectively attended hand hygiene trainings and seminars within the past 6 months.¹³ We reported in this study that up to 48.3% healthcare workers did not receive any training or educational intervention on hand hygiene in the last 3 years. The number of those without recent training on hand hygiene practices indicated

the need by relevant stakeholders to ensure that hand hygiene training is done periodically as this might reduce the hospital budget that can be due to consequences of hospital acquired infections resulting in poor hand hygiene. This could be due to limited information among the stakeholders on the role of hand hygiene in the prevention of hospital acquired infections.

Further, other categories of health workers showed better knowledge of 40.4%. The survey also found a statistically significant association between belonging to other category of healthcare workers (CHEWs, JCHEW, and CHO) and having good knowledge of hand hygiene. However, doctors were found in this study to be 90% more likely to practice good hand hygiene compared to other healthcare providers in the hospital. This may likely be due to adequate information on the role of transmission of hospital acquired infection associated with poor hand hygiene practice throughout the medical training program that is expected to be part of training of all the specialties expected to be covered before being certified as a doctor. Barriers to non-compliance with hand hygiene practice noted in this study were non-availability of water, high workload, non-availability of soap and alcohol based hand rub and these are necessary for appropriate hand hygiene practice.

Hospital staff less of than 30 years of age in this study were 70% more likely to have good hand hygiene practice than older

Table 4. Reported barriers to hand hygiene practices.

| Reasons given | n=302 (%) | |
|--|------------|------------|
| | Yes | No |
| 1. Increased workload | 138 (45.7) | 164 (54.3) |
| 2. Poorly located sink in the wards and clinic | 121 (40.1) | 181 (59.9) |
| 3. Shortage of sink | 100 (33.1) | 201 (66.9) |
| 4. Shortage of water | 169 (56.0) | 133 (44.0) |
| 5. Shortage of soap | 144 (44.7) | 158 (55.3) |
| 6. Shortage of alcohol based hand rub | 149 (49.3) | 153 (50.7) |
| 7. Lack of encouragement | 67 (22.2) | 235 (77.8) |
| 8. Irritation and skin dryness | 39 (13.0) | 263 (87.0) |
| 9. Lack of role model | 65 (21.5) | 237 (78.5) |
| 10. Low risk of acquiring infection from patients. | 28 (9.3) | 274 (90.7) |

Table 5. Factors associated with knowledge of hand hygiene.

| Variables | Poor | Knowledge Fair | Good | χ^2 | p value | AOR (95%CI) |
|------------------------------|-----------|----------------|------------|----------|---------|---------------|
| Facility | | | | | | |
| MMSH | 56 (76.7) | 97 (80.8) | 100 (91.7) | 8.5 | 0.014* | 2.1 (1.1-3.8) |
| HBPH | 17 (23.3) | 23 (19.2) | 9 (8.3) | | | |
| Department | | | | | | |
| Medicine | 5 (6.9) | 26 (21.7) | 20 (18.4) | 15.7 | 0.015* | 1.4 (1.1-1.7) |
| Paediatrics | 23 (31.5) | 33 (27.5) | 45 (41.3) | | | |
| Surgery | 37 (50.7) | 43 (35.8) | 33 (30.3) | | | |
| Obstetric&Gynecology | 8 (10.9) | 18 (15) | 11 (10) | | | |
| Sex | | | | | | |
| Male | 25 (34.3) | 50 (41.7) | 41 (37.6) | 1.1 | 0.58 | |
| Female | 48 (65.7) | 70 (58.3) | 68 (62.4) | | | |
| Age group | | | | | | |
| <30 | 36 (22.4) | 69 (42.9) | 56 (34.8) | 1.5 | 0.5 | |
| ≥30 | 37 (26.2) | 51 (36.2) | 53 (37.6) | | | |
| Professional Cadre | | | | | | |
| Doctors | 14 (19.2) | 37 (30.8) | 36 (33) | 17.8 | 0.001* | 1.1 (0.7-1.3) |
| Nurses | 36 (49.3) | 57 (47.5) | 29 (26.6) | | | |
| Others | 23 (31.5) | 26 (21.7) | 44 (40.4) | | | |
| Years in service | | | | | | |
| <10 | 47 (64.4) | 92 (76.7) | 83 (76.2) | 4.13 | 0.127 | 1.3 (0.8-2.1) |
| ≥10 | 26 (35.6) | 28 (23.3) | 26 (23.8) | | | |
| Training in the last 3 years | | | | | | |
| Yes | 30 (41.1) | 60 (50) | 66 (60.6) | 6.8 | 0.033* | |
| No | 43 (58.9) | 60 (50) | 43 (39.5) | | | |

AOR: Adjusted Odds Ratio; *Statistically Significant; Blank cells: not qualified for inclusion in regression mode.

Table 6. Factors associated with practices of hand hygiene.

| Variables | Practice | | χ^2 | p value | AOR (95% CI) |
|------------------------------|-----------|------------|----------|---------|----------------|
| | Wrong | Correct | | | |
| Facility | | | | | |
| MMSH | 56 (22.1) | 197 (77.9) | 0.072 | 0.8 | |
| HBPH | 10 (20.4) | 39 (79.6) | | | |
| Department | | | | | |
| Medicine | 8 (15.7) | 43 (84.3) | 2.8 | 0.4 | |
| Paediatrics | 24 (23.8) | 77 (76.2) | | | |
| Surgery | 23 (20.4) | 90 (79.6) | | | |
| O&G | 11 (29.7) | 26 (70.3) | | | |
| Sex | | | | | |
| Male | 14 (12.1) | 102 (87.9) | 10.6 | 0.001* | 0.4 (0.2-0.7) |
| Female | 52 (28.0) | 134 (72.0) | | | |
| Age group | | | | | |
| <30 | 29 (18) | 132 (82) | 3.0 | 0.08 | 0.7 (0.4-1.20) |
| ≥30 | 37 (26.2) | 104 (37.8) | | | |
| Professional Cadre | | | | | |
| Doctors | 14 (16.1) | 73 (83.9) | 2.6 | 0.3 | 0.9 (0.6-1.3) |
| Nurses | 28 (23.0) | 94 (77.0) | | | |
| Others | 24 (25.8) | 69 (74.2) | | | |
| Years in service | | | | | |
| 1-10 | 45 (20.3) | 177 (79.7) | 1.2 | 0.3 | |
| >10 | 21 (26.3) | 59 (73.8) | | | |
| Training in the last 3 years | | | | | |
| Yes | 37 (23.7) | 119 (76.3) | 0.7 | 0.4 | |
| No | 29 (19.9) | 117 (80.1) | | | |
| Knowledge | | | | | |
| Poor | 22 (33.3) | 51 (21.6) | 3.98 | 0.1 | 1.3 (0.9-1.9) |
| Fair | 22 (33.3) | 98 (41.5) | | | |
| Good | 22 (33.4) | 87 (36.9) | | | |

AOR: Adjusted Odds Ratio; * Statistically Significant; Blank cells: not qualified for inclusion in regression mode.

healthcare workers. In addition, better hand hygiene knowledge of 76.2% was found among those less than 10 years in service compared with 23.8% for those older than 10 years in service which may be due to the ability of the younger ones to remember the necessary hand hygiene information they learnt in school. More so, 56.5% of healthcare workers attended training on hand hygiene surprisingly; exposure to training did not translate to their good hand hygiene practices. In addition, up to 80.1% of those not trained had good hand hygiene practices. This may not be unconnected with the fact that some respondents 67.3% interviewed in HBPH were employed in the last 10 years prior to this study. Coincidentally, this is the period hand hygiene was gaining momentum in our hospitals, it was likely incorporated into our curriculum, and therefore they are more likely to remember and practice hand hygiene from information they learnt in school.

Conclusions and Recommendations

The study found the proportion of

respondents with good knowledge and practice of hand hygiene to be 36.1% and 78.0% respectively. Non-availability of materials needed to observe hand hygiene, high patients load, and inadequate water supply, including limited hand hygiene training were some of the barriers identified to negatively affect compliance with recommended hand hygiene practice. Therefore, government should ensure that these identified barriers to hand hygiene practice are addressed. Periodic assessment of compliance to recommended hand hygiene practices should be regularly conducted. Departments and individuals should be graded, those with good scores be recognized to motivate others.

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