

Hand Hygiene Facilities in the Clinical Laboratories of a Tertiary Health Facility in a Lassa Fever Endemic Country

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Abstract: Hand hygiene is a general term referring to any action of hand cleansing. It basically includes hand washing and hand rubbing. It is considered the most important simple measure for preventing the spread of pathogens generally and particularly in health-care setting. The objective of the survey was to evaluate the availability and accessibility of hand hygiene facilities in the clinical laboratories of a tertiary health facility in south west Nigeria. A previously used survey checklist assessing the condition of sink and other hand hygiene facilities in a health care setting was further modified and employed for data collection. Descriptive data analysis was done by calculating the frequencies. There were sixteen sinks in the laboratories where the survey was conducted. All the sixteen sinks were accessible to the users and were physically intact. Four (25%) of the sinks had damaged draining pipes. Half of the sinks had hand-held faucet. There was no sink with automated faucet. None of the faucets had water flowing when turned on at the time of the survey. Also, none had water flowed through it in the past 72 hours prior the survey according to users' interview. Soap was available in only 6 (37.5%) of the sinks and there was no hand rub/ hand disinfectant or hand drying materials available. The survey has shown that there was a gross lack of hand hygiene facilities in the clinical laboratories of the tertiary health facility. There is an urgent need for critical stakeholders in the health sector to give policy and financial priority to provision of adequate modern hand hygiene facilities in all health care settings.

Keywords: Hand Hygiene Facilities, Clinical Laboratories, Hospital-Acquired Infections, Lassa Fever Endemic Setting

1. Introduction

Hand hygiene (HH) is a general term referring to any action of hand cleansing. It basically includes hand washing and hand rubbing [1]. Hand washing is defined as a vigorous, brief rubbing together of all surfaces of hands with water and soap or other detergents containing an antiseptic agent, followed by rinsing under a stream of water [1]. Hand rubbing is applying a waterless antiseptic hand rub to reduce or inhibit the growth of microorganisms without the need for

an exogenous source of water and requiring no rinsing or drying with towels or other devices [1]. HH is considered the most important simple measure for preventing the spread of pathogens generally and particularly in health-care setting (HCS) [2-4]. Lassa fever is an extremely virulent and infectious viral haemorrhagic fever that occurs very frequently in different parts of Nigeria and affects about 100,000-500,000 persons per year [5-8].

In West Africa, Lassa virus is a zoonotic disease and infected rodents in the *mastomys natalensis* species complex

are reservoirs capable of excreting the virus through urine, saliva, excreta, and other body fluids. Nosocomial transmission is also not uncommon [9-13].

In the HCS, a prospective controlled trial in a hospital nursery and research conducted in the past 40 years have confirmed the critical link between poor HH practices and transmission of health care associated pathogens [4, 14]. In the community, HH has been acknowledged as an important measure to prevent and control infectious diseases and can significantly reduce the burden of disease, particularly among children in developing countries [15-18]. Clinical laboratory is an important physical and functional integral component of an effective HCS. Clinical laboratory is a laboratory where tests are done on clinical specimens to provide additional information about the health of patients in terms of supporting diagnosis, treatment and prevention of disease. HH is part of the infection control mechanisms in clinical laboratory and in the health facility where health care workers (HCW) are at risk of exposure to potentially infectious materials [19-23]. HH with soap and water has been considered a measure of personal hygiene for centuries but the link between it and the spread of disease has only been established in the last 200 years [24, 25]. In the mid 1800s, studies by Ignaz Semmelweis in Vienna and Oliver Wendell Holmes in Boston established that some hospital-acquired diseases, not known to be caused by infectious agents, were transmitted through poor HH practices [2, 26]. However, as simple and important HH is, poor practices are commonplace in HCS, particularly in developing countries where HH infrastructure is also lacking [2, 27-30]. In

resource constraint settings, inadequate access to soap and water, alcohol-based solutions, and limited provision of sinks are major hindrances to performing HH at the points of care and services in HCS [31, 32]. To the best of the authors' search, there is very little research and documentation on HH facilities in the clinical laboratories of hospitals in Nigeria and Africa at large. The objective of the survey was to evaluate the availability and accessibility of HH facilities in the clinical laboratories of a tertiary health facility in south west Nigeria. This is a country plagued by infectious diseases and where Lassa was first diagnosed in 1969 and which has since experienced repeated outbreaks with case fatality of 37.9%.

2. Materials and Methods

The survey was conducted in the clinical laboratories of a tertiary health facility in Southwest Nigeria. The clinical laboratory departments were: Haematology and Blood Transfusion, Microbiology and Parasitology, Chemical Pathology and Immunology, and Morbid Anatomy and Histopathology. The study protocol was approved by the Research Ethics Committee of the facility. A previously used survey checklist assessing the condition of sinks and other HH facilities in a HCS was further modified and employed for data collection [2]. The conduct of the survey was a direct observation of HH facilities in the laboratories mentioned above by Principal Investigator. Descriptive data analysis was done by calculating the frequencies.

Table 1. Modified checklist for survey of HH facilities in clinical laboratories.

Accessibility of sink	Accessible/not accessible (including faulty design of Space/blocked by object/not in work environment)
Physical condition of the sink	Intact/Damaged
Condition of the sink draining pipe	Intact/Damaged (including broken/blocked)
Type of faucet	Hand/Elbow/Automated
Is water flowing from the faucet?	Yes/No
If 'No' to above, has it flowed in the last 72 hours?	Yes/No
Availability of soap	Yes/No
If 'Yes' to above, what type of soap?	Hard/Liquid
Availability of hand rubs/disinfectant	Yes/No
If 'Yes' to above, what type?	Alcohol-based/Non-alcohol
Availability of hand drying facilities	Yes/No
If 'Yes' to above, what type?	Paper towel/Cloth towel/Automated hand dryer
Availability of hand hygiene instruction demonstrating standard techniques	Yes/No

3. Results

There were sixteen sinks in the laboratories where the survey was conducted. All the sixteen sinks were accessible to the users and were physically intact. Four (25%) of the sinks had damaged draining pipes. The results of the survey are highlighted in Table 2. Half of the sinks used hand held faucet. There was no automated faucet. None of the faucets had water flowing through it at the time the survey was conducted (Table 2). Also, none had water flowed through it in the previous 72 hours before the survey according to the

interview with the HCW. Soap was available in only 6 (37.5%) of the sinks and it was in liquid preparation inside bottle dispensers. There was no hand rub/ hand disinfectant available. No hand drying materials and no electric hand dryer. None of the sinks had instructions on HH techniques pasted beside it or at any other place in the laboratories.

Table 2. Results of HH facilities in clinical laboratories.

Total number of sinks surveyed		16
Sinks	Accessible	16 (100%)
	Intact	16 (100%)
	Intact drain	12 (75%)
	Damaged drain	4 (25%)

Total number of sinks surveyed		16
Faucet	Hand held	8 (50%)
	Elbow operated	8 (50%)
	Automated	-
	Water flowing	-
	Water not flowing	16 (100%)
Soap Availability	Yes	6 (37.5%)
	No	10 (62.5%)
Handrub Availability	Yes	-
	No	16 (100%)
Hand drying facilities Availability	Yes	-
	No	16 (100%)
Hand hygiene instructions Availability	Yes	-
	No	16 (100%)

4. Discussion

HH is an important component of the infection control mechanisms in the HCS including the clinical laboratories where HCW are at risk of exposure to potentially infectious blood, body fluids and secretions, and body tissues [19-23]. Safety is a key word in a clinical laboratory setting, and effective HH practices promoted by availability and accessibility of HH facilities are essential to achieving it. High standard of hygiene are required in the laboratories for all procedures involving microbiological specimens and cultures, and with body substances and fluids. The survey showed that all the sinks in the laboratories were accessible by the users. Accessibility of HH facilities and supplies by the HCW in terms of relative location and distance to the points of services and whether or not they are obstructed by other facilities or equipment have been shown to be an important risk factor for poor adherence to HH [30, 33, 34]. Although the body of all the sinks observed was physically intact, 75% of them had damaged draining pipes. This is similar to the findings of a previous study by Busari *et al* in the same facility but clinical points of care [2].

The survey also revealed that half of the faucets for the sinks were hand operated and none of them had water flowing through when opened. In addition, from the interview with the users, no water had flowed in the last 72 hours before the survey was conducted. The finding of hand operated faucets is not different from several reports from studies conducted in other resource-constraint settings in developing countries [30, 35, 36]. The use of hand held faucet can predispose to recontamination of the hands from faucet' handles as it was observed during a *Shigella sonnei* outbreak in a clinical microbiology laboratory [37]. Having a sink without water flowing through the faucet negates the very foundation of hand washing. The survey found that buckets of water were provided beside the sinks with bowls and/or cups to take water whenever hand washing is to be done. Obviously, there are many flaws in these processes which encourage multiple contacts of contaminated hands with objects which are supposed to serve as media for hand washing. Therefore the washed hands might not be effective or might become re-contaminated.

In the survey, soap availability was 37.5% and there was no handrub products. These findings are consistent with

reports by Busari *et al* and in contrast to findings by Devlani *et al*, Kesavan *et al* and Caniza *et al* [2, 32, 35, 38]. A hand rub is a waterless alcohol-based compound that is used as a rub or rinse for hands. Hand rubs kill microorganisms but do not remove soil or organic material and they are not an option if hands are visibly soiled. No sink and water are necessary, and the dispenser can easily be mounted at care points or any service areas in the laboratory. There have been several studies comparing hand washing with the use of hand rub in HCS [30, 39-41]. The main pitfall of hand washing is the poor compliance by HCW in situations in which hand washing is necessary. However, the use of hand rubs has been found to be very crucial to improvement of compliance with HH in clinical settings. Other aspects where the use of hand rubs may be better than hand washing are: more antimicrobial efficacy, shorter time of procedure, and less potential for recontamination by water or soap particularly in low socioeconomically, resource-constraint settings [37]. The US National Guidelines on Hand Hygiene recommends HH with soap and water as the standard of care and waterless antiseptic hand rubs only in situations where sinks are not available [42-44]. The WHO Infection Control Guidelines also suggest that HH can be performed by either hand washing or hand rubbing, but without stating any advantage of one over the other [45, 46]. However, the Centre for Disease Control and Prevention (CDC)/Healthcare Infection Control Practices Advisory Committee (HICPAC) Guidelines issued in 2002 defined alcohol-based hand rubbing as the standard of care for HH practices in health-care settings [4].

Finally, the survey also showed that there was neither hand drying materials nor HH instructions available with the sinks or near them in any of the laboratories. This corroborates the findings of the study by Alex-Hart *et al* that disposable paper towel and electric hand dryer were not available for HH in most of the wards of the hospital [47]. Hand drying is an essential step in hand washing and should be done in a way that hand re-contamination does not occur [48]. Although, hand drying should ideally be done using individual disposable paper towels, there are other methods such as cloth towels and electric air dryers [49]. The report of a study that compared four methods of hand drying: cloth towels from a roller; paper towel left on a sink; electric air dryer; and letting hands dry by evaporation; showed no significant difference in the efficacy of the methods [50]. However, reusing or sharing cloth towels should be avoided because of the risk of cross-infections [51]. Electric air dryer requires longer time to achieve dry hands with a possible negative impact on HH compliance; and performs worse than drying with paper towel in terms of ability to remove bacteria from washed hands [49].

5. Conclusion

The survey has shown that there was a lack of HH facilities in the clinical laboratories of the tertiary health facility. This is worrisome in a country endemic for several infectious diseases, including Lassa fever. If the very basic

health infrastructure such as HH facilities is inadequate and antiquated, then modern hospital facilities are going to be absent. There is an urgent need for critical stakeholders in the health sector to give policy and financial priority to provision of adequate modern hand hygiene facilities in all health care settings in the country. Also, practical emphasis should be placed on establishment of effective infection control unit in each health facility and in the Department or Ministry of Health to formulate and implement policies on infection control.

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