Standard precaution knowledge and adherence: Do Doctors differ from Medical Laboratory Scientists?

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Abstract

Background
Doctors and laboratory scientists are at risk of infection from blood borne pathogens during routine clinical duties. After over 20 years of standard precautions, health care workers knowledge and compliance is not adequate.

Aim
This study is aimed at comparing adherence and knowledge of standard precautions (SP) among Medical Laboratory Scientists (MLSs) and doctors.

Methods
It was a cross sectional study done at University of Nigeria Teaching Hospital, ItukuOzalla. A semi structured pre-tested questionnaire was the study instrument.

Results
General knowledge of SP was high, 76.2% in doctors and 67.6% in MLSs although there were differences between the two groups on the knowledge of components of SP. Safe injection practices, use of personal protective equipment as well as safe handling of contaminated equipment or surfaces was higher amongst doctors. Even though more than half of respondents in both groups, 53.1% among doctors and 58.1% among MLSs had received training on standard precautions, this did not reflect in the practice. MLSs reported more use of personal protective equipment such as gloves and coveralls (100% in MLSs and 35% of doctors), P<0.001. Recapping of syringes was higher amongst doctors (63.6%) than MLSs (55.1%). The doctors practiced better hand hygiene than MLSs (P<0.001). Constraints that affected SP included non-availability of PPEs and emergency situations for both groups.

Conclusion
SP knowledge and practice are still low, and as such, there is a need to train doctors and MLSs on the components of SP. Policies on SP need to be enforced and facilities for practice regularly supplied.

Introduction
Careful adherence to standard precautions (SP) can protect health care workers and patients from infections. Health worker surveys and observations in Nigeria and Africa document that health workers often fail to practice standard precautions consistently and correctly. Medical doctors and laboratory scientists are some of the health care workers that are significantly at risk of direct exposure to blood and other body fluids during the course of their normal clinical duties. Blood borne infections acquired during clinical and laboratory services have remained a major health issue worldwide, particularly in low income countries where there is high morbidity and mortality associated with such infections. Some studies have shown that there is selective adherence and non-adherence to universal and standard precautions in daily medical practice and these differences in knowledge and adherence by health care workers may be influenced by their varying type of training.

Standard precautions are a set of infection control practices used to prevent transmission of diseases that can be acquired by contact with blood, body fluid, and non-intact skin including rashes and mucous membranes. They are the basic level of infection control precautions which are to be used as a minimum in the care of all patients. The standard precautions emphasize the major features of universal precautions (designed to reduce the risk of pathogens from moist body substances) and apply them to all patients receiving care in hospitals regardless of their diagnosis or presumed infection status. Compliance with standard precautions has been shown to protect health care workers from different infections like human immunodeficiency virus, hepatitis B, hepatitis C from sharps injuries and contact with body fluids. WHO estimates that about 2.5% of HIV cases and 40% of Hepatitis B and C cases among health care workers are the result of these exposures.

Standard precautions consist of: hand hygiene before and after every episode of patient contact, use of personal protective equipment, safe use and disposal of sharps, routine environmental cleaning, reprocessing of reusable medical equipment and instruments, respiratory hygiene and cough etiquette, aseptic non-touch technique, waste management and appropriate handling of linen. Several hospitals have instituted standard precaution policies for all employees for all patients which include all the aspects of barrier use like hand washing, use of PPE like gloves, protective face and eye wear, gowns, protective apparel as well as patient placement and precautions when handling laboratory specimens. Marcus et al reported that 37% of exposures to risks to blood borne infections might have been prevented if infection control precautions are adhered to and concluded that adherence to infection control precautions reduced exposure significantly. studies on knowledge and compliance to SP have been done in Nigeria but professional differences have not been established.

This study was done to determine if the knowledge and adherence to standard precautions differ amongst these two groups of health workers. The study would help management to know the different aspects of standard precautions to emphasize for the different groups.

The study was descriptive cross-sectional done in October,
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2014 among doctors and laboratory scientists at University of Nigeria Teaching Hospital (UNTH), Ituku-Ozalla, Enugu. These groups of HCWs are known to come in contact with hospital hazards. UNTH is located in Ituku Ozalla, a semi-urban community about 30 minutes drive from the state capital. It is the biggest teaching hospital in the South east and South-south of Nigeria and gets referrals from most parts of these two regions. The departments studied were those ones that handle biohazards namely: Intensive Care Unit (ICU), Theatre, Wards, Laboratories, Casualty, Out-patient Department and Blood bank.

**Ethical Permit**

Ethical permission was obtained from the Ethics Committee of University of Nigeria Nsukka while informed consent was obtained from the management of University of Nigeria Teaching Hospital and the respondents.

**Data Collection**

The doctors and MLS who work in these departments were invited to be part of the study. Pre-tested self-administered questionnaires were used to collect data from respondents. Contents of the questionnaire include demographical variables, knowledge and adherence to SP and associated factors.

**Data Analysis**

Data was entered and analyzed in Statistical Package for Social sciences (SPSS) version 17.

**Results**

One hundred and forty three doctors (77.6% Males) and 136 MLS (49.3% males) participated in the study. The age range was 23–58 years for both groups. Majority (65% of doctors and 70.6% of laboratory scientists) had between 1 and 10 years of service (Table 1).

Most of the respondents (93.7% of doctors and 96.3% of MLS) had heard of SP but only 76.2% of Doctors and 67.6% of MLS could correctly define SP (Table 2).

All the doctors (100%) correctly identified the use of PPE compared to 76.5% of MLS. Similarly, Safe injection practices were correctly identified by 100% of doctors and 75% of MLS while identification of safe handling of contaminated equipment was done by 100% of the doctors and 79.4% of MLS. Knowledge of anal and peri-anal hygiene was poor among the MLS with only 16.9% compared to 76.2% in the doctors. Respiratory etiquette was only reported by 50.3% of doctors and 41.2% of the MLS. Almost 73% of doctors and 48.5% of MLS had knowledge of hand hygiene before aseptic procedures. On the other hand, 51.7% of doctors

| Demographic variables | Doctors | Lab Scientists |
|-----------------------|---------|----------------|
| Gender                | Frequency | Frequency |
| Male                  | 111(77.6) | 67(49.3) |
| Female                | 32(22.4)  | 69(50.7) |

| Age range | Doctors | Lab Scientists |
|-----------|---------|----------------|
| 20 – 29   | 27(18.9) | 32(23.5) |
| 30 – 39   | 62(43.4) | 46(33.8) |
| 40 – 49   | 33(23.1) | 44(32.4) |
| 50 – 59   | 21(14.6) | 14(10.3) |

| Marital Status | Doctors | Lab Scientists |
|----------------|---------|----------------|
| Married        | 86(60.1)| 77(56.6) |
| Single         | 49(34.3)| 47(35.6) |
| Widow/Widower  | 6(4.2)  | 9(6.6)  |
| Divorced/Separated | 2(1.4) | 3(2.2) |

| Religion        | Doctors | Lab Scientists |
|-----------------|---------|----------------|
| Christianity    | 131(91.6)| 128(94.1) |
| Islam           | 6(4.2)  | 6(4.4)  |
| African traditional religion | 6(4.2) | 2(1.5) |

| Location of work | Doctors | Lab Scientists |
|------------------|---------|----------------|
| ICU              | 6(4.2)  | 2(1.5)  |
| Theatre          | 23(16.1)| 5(3.7)  |
| Ward             | 39(27.3)| 7(5.1)  |
| Lab              | 4(2.8)  | 112(82.4)|
| Casualty         | 14(9.8) | 5(3.7)  |
| Outpatient dept. | 50(35.0)| 0(0.0)  |
| Blood bank       | 1(0.7)  | 5(3.7)  |
| Others           | 6(4.2)  | 0(0.0)  |

| Years of service | Doctors | Lab Scientists |
|------------------|---------|----------------|
| 1 – 5            | 61(42.7)| 57(41.9) |
| 6 - 10           | 31(21.7)| 39(28.7) |
| 11 - 15          | 21(14.7)| 22(16.2) |
| 16 - 20          | 16(11.2)| 12(8.8)  |
| 21 - 25          | 6(4.2)  | 5(3.7)   |
| 26 – 30          | 7(4.8)  | 0(0.0)   |
| 31 – 35          | 1(0.7)  | 1(0.7)   |

**Table 1: Socio - Demographic distribution of doctors**

Age range: 23 – 58 years; Years of service: 1 – 34 years

http://dx.doi.org/10.4314/mmj.v29i4.3
Similarly, a study in Northern Nigeria also found that 77.9% of doctors and 96.3% in MLSs) as was also reported in other recent studies in Nigeria and 96.3% in MLSs) as was also reported in other recent studies in Nigeria.

Majority of the respondents could define SP properly. Despite the SP guidelines, knowledge and compliance vary among health care workers and have been found to be inadequate in both developing and developed countries. Despite reports of high knowledge in previous studies over several years in Nigeria, there has not been a reflection on the practice of SP. Adherence to SP is poor in public health facilities in resource limited settings due to limited organizational support. The knowledge of SP in our study was high amongst both groups (93.7% in doctors and 96.3% in MLSs) as was also reported in other recent studies in Nigeria.

Majority of the respondents could define SP properly. Similarly, a study in Northern Nigeria also found that 77.9% of MLSs knew about hand hygiene after glove removal. (Table 2). Only 12.6% of doctors and 19.1% of the MLSs reported knowledge of a hospital policy that enhances compliance to SP. There is however no formal hospital policy on standard precautions in the study area. (Table 3)

Table 2: Knowledge and Information on standard precaution

| Variables                                         | Doctors | Lab Scientist | \(\chi^2\) | P Value |
|---------------------------------------------------|---------|---------------|------------|---------|
| Variables                                         | Frequency | Percent | \(\chi^2\) | P Value |
| N = 143                                           | 143 (100.0) | 136 (100.0) |            |        |
| Those who have heard of standard precaution        | 134 (93.7) | 131 (96.3) | 1.002 (0.317) |        |
| Main Source of information for those who have heard of SP | 78 (54.5) | 85 (62.5) | 5.315 (0.02) |        |
| - Formal training                                  | 39 (27.3) | 38 (27.9) | 0.257 (0.61) |        |
| - Colleague/Friend                                 | 11 (7.7) | 7 (5.1) | 0.423 (0.52) |        |
| - Media                                           | 6 (4.2) | 1 (0.7) | 0.188 (0.66) |        |
| - Others                                          | 9 (6.3) | 5 (3.8) | 0.119 (0.73) |        |
| - Have not heard                                   | 109 (76.2) | 92 (67.6) | 41.266 (<0.001) |        |
| Correct knowledge of standard precaution           | Definition of standard precaution | 124 (86.7) | 114 (83.8) | 0.085 |
| Components of standard precaution                  | 143 (100.0) | 104 (76.5) | 0.085 |
| - Hand hygiene                                     | 143 (100.0) | 102 (75.0) | 0.085 |
| - Use of personal protective equipment             | 143 (100.0) | 108 (79.4) | 0.085 |
| - Safe injection practices                         | 72 (50.3) | 56 (41.2) | 0.085 |
| - Safe handling of potentially contaminated equipment or surfaces | 109 (76.2) | 23 (16.9) | 0.085 |
| - Respiratory hygiene etiquette                    | 117 (81.8) | 97 (71.3) | 0.085 |
| - Anal/perineal hygiene                            | 111 (77.6) | 103 (75.7) | 0.085 |
| When are standard precautions indicated             | Advantages of standard precaution | 130 (90.9) | 114 (83.8) | 0.085 |
| The examples of body fluids to be guarded against  | - Protects both health workers and patients | 86 (60.1) | 99 (72.8) | 0.085 |
| - Not associated with stigma and discrimination     | 143 (100.0) | 107 (78.7) | 0.085 |
| - Reduced spread of communicable disease           | Indications for hand hygiene include | 55 (38.5) | 51 (37.5) | 0.085 |
| - Before touching a patient                        | 76 (53.1) | 52 (38.2) | 0.085 |
| - Before exiting the patient’s care area           | 143 (100.0) | 87 (64.0) | 0.085 |
| - After contact with, body fluids or secretions    | 104 (72.7) | 66 (48.5) | 0.085 |
| - Prior to performing any aseptic procedure         | 74 (51.7) | 65 (47.8) | 0.085 |
| - After glove removal                              | http://dx.doi.org/10.4314/mmj.v29i4.3
Table 3: Attitude of doctors and laboratory scientists to standard precautions

| Attitude         | Doctors (%) | Laboratory Scientists (%) | (P Value) |
|------------------|-------------|---------------------------|-----------|
| Strongly disagree| 98.2 (63.2) | 95.2 (68.6)               | 2.684     |
| Disagree         | 9.8 (3.7)   | 4.2 (2.6)                 | 0.261     |
| Indifferent      | 1.6 (1.2)   | 0.7 (0.8)                 | 0.271     |
| Agree            | 11.3 (6.9)  | 7.2 (6.2)                 | 0.929     |
| Strongly agree   | 76.7 (50.3) | 80.7 (64.7)               | 0.689     |

Table 4: Presence of Nosocomial Infection and Control measures provided by hospital management

| Variables                                      | Doctors Frequency | Laboratory Scientists Frequency | (P Value) |
|------------------------------------------------|-------------------|---------------------------------|-----------|
| Presence of hospital acquired infection among workers since being employed | 110 (76.9) | 95 (69.9) | 0.261 |
| No                                             | 19 (13.3)         | 28 (20.6)                       | 0.271 |
| Yes                                            | 14 (9.8)          | 13 (9.6)                        | 0.271 |
| Don’t know                                     | 18 (12.6)         | 26 (19.1)                       | 0.261 |
| *Aware of hospital policy that enhances compliance to standard precaution | 76 (53.1) | 79 (58.1) | 0.261 |
| Received training on standard precaution        | 21 (14.7)         | 100 (73.5)                      | 0.261 |
| Received training on wearing or removing PPEs (gloves, gowns, etc) | 79 (55.2) | 78 (57.3) | 0.261 |
| Frequency of supply of personal protective equipment by hospital | 60 (42.0) | 54 (39.7) | 0.261 |
| Always                                         | 4 (2.8)           | 4 (3.0)                         | 0.261 |
| Sometimes                                      | 93 (65.0)         | 75 (55.2)                       | 0.261 |
| Never                                          | 49 (34.3)         | 58 (42.6)                       | 0.261 |
| Access to hand hygiene                         |                  |                                 | 0.261 |
| -Always                                        | 3 (2.1)           | 5 (3.7)                         | 0.261 |
| -Sometimes                                     | 25 (17.5)         | 22 (16.2)                       | 0.261 |
| Measures put on ground in the department to limit spread of respiratory infections | 30 (21.0) | 24 (17.6) | 0.261 |
| -None                                          | 37 (25.9)         | 50 (36.8)                       | 0.261 |
| -Signs at entrances with instructions to cover mouths and noses when cough or sneezing | 48 (33.6) | 35 (25.7) | 0.261 |
| -Provide tissues and non touch receptacles for disposal of tissues | 3 (2.1) | 5 (3.7) | 0.261 |
| -Offer masks to coughing patients              | 25 (17.5)         | 22 (16.2)                       | 0.261 |
| -Triage patients and ensure that coughing patients are among the first to be seen | 5.164 | 5.164 | 0.261 |

*No known policy document in the study area.

http://dx.doi.org/10.4314/mmj.v29i4.3
Concerning the resources available for practice of SP, our respondents reported lack of resources. Poor supply of PPE was reported in both groups. This is similar to findings in other studies in low income countries\(^4\). Concerning respiratory hygiene, only 36.8% of the MLSs and 25.9% of doctors reported that there were signs at entrances with instructions on cough etiquette however 21% of doctors and 17.6% of MLSs reported no measures were put in place. This has shown that there are inadequate signs in the hospital encouraging SP.

Concerning the practice of SP, there was a significant difference between the doctors and the MLSs. The MLSs were more likely to use PPEs than the Doctors regularly, this could be due the fact that majority of the MLSs (73.5%) received training on wearing and removal of PPE compared to only 14.7% of the doctors. Lack of PPE was the major reason for non use among doctors. The low use of PPE among doctors in this study is greatly lower than what was found among doctors in India, where glove use was found to be 85.1%\(^5\). In contrast, only 2.5% of health workers in Ilorin wore protective aprons\(^6\).

Safe disposal of used needles and syringes was very poor. Recapping was still being practiced by doctors and MLS. This is similar to what was found in India, where 59.3% of doctors and nurses reported recapping of used needles\(^7\). More doctors practiced recapping than the MLSs similar to what Sadoh reported that recapping was more likely to be done by doctors than nurses or MLS\(^1\). (Table 5)

The enablers to practice of SP among the two groups was mostly when managing an infected person, whereas the constraints were mostly non-availability of PPE, similar to findings in a study in North East Nigeria where 98.6% reported non compliance due to non-availability of equipment\(^8\). Poor commitment of hospital management towards studies in Nigeria where 62.1 %\(^9\) and 95%\(^10\) of the health workers believe that SP protects health workers from getting infections from getting infections. Studies have shown that HCWs are highly at risk of occupational hazards as they perform their clinical duties in the hospital especially when disposing bacteriological and other laboratory waste\(^11\). Only 12.6% of doctors and 19.1% of the MLSs reported knowledge of a hospital policy that enhances compliance to SP and this provision of basic hospital amenities and personal protective devices have been reported in some studies as a barrier to practicing universal precautions\(^12\). Some respondents also found it difficult to use PPE during emergency situations. (Table 6) This is similar to some other studies where it was reported that during emergencies it was difficult to practice SP as well as during high job demands\(^2\). Both doctors and

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**Table 5: Practice of Standard precaution by health workers**

| Practice of Standard precaution | Doctors | Lab Scientists | \(\chi^2\) (P Value) |
|---------------------------------|---------|----------------|---------------------|
| Prior to performing an aseptic procedure | Frequency | Frequency |  |
| - Before wearing gloves | 19 (13.3) | 13 (9.6) | 90.153 (0.001) |
| - After removal of gloves | 51 (35.7) | 71 (52.2) |  |
| - Before touching a patient | 13 (9.1) | 9 (6.6) |  |
| - Before leaving a patient's care area | 83 (58.0) | 34 (25.3) |  |
| - Prior to performing an aseptic procedure | 143 (100.0) | 9 (6.6) |  |

| Action taken during the most recent contact with patient's body fluid | Doctors | Lab Scientists | \(\chi^2\) (P Value) |
|---------------------------------------------------------------------|---------|----------------|---------------------|
| - During administration on the same patient | 91 (63.6) | 75 (55.3) |  |
| - Disconnect and discard needle and safety box without recapping | 52 (36.4) | 58 (42.7) |  |
| - Discard both syringe and needle | 91 (63.6) | 75 (55.3) |  |
| - Discard needle and replace with new needle for another drug administration on the same patient | 0 (0.0) | 3 (2.2) |  |

http://dx.doi.org/10.4314/mmj.v29i4.3
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MLSs have been exposed to serum during the course of their jobs. Exposure to blood and body fluids by health care workers is one of the major occupational hazards and this high level of exposure emphasizes the dire need for them to be educated on SP and the need for hospital policies to be enforced. (Table 7)

Conclusion

Doctors and MLSs have a good attitude to standard precautions but in depth knowledge and compliance is very poor. Hand hygiene, use of personal protective equipment and needle safety need to be re-emphasized. Training on standard precautions and use of personal protective equipment should be done more often and consistently. Standard precautions should be included in the curriculum of all health workers. Hospital policies should be enforced and management should provide materials needed for the practice of infection control.

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