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Original Research Article

Comparison of Infection control practices among public and private medical laboratories in Jos metropolis, Plateau state, Nigeria

Chingle Moses P[1], Gwomson Dauda[*2], Pius Odunze[2], Shindang Maryam Inno[2], Nkala Anne-Lise Chibuzo[2], Mamza Jabani[2],Yetunde Olubusayo Tagurum, Daboer Jonathan[1], Tyavyar John Akosu[1], Banwat Edmund Matilda[1], Ayuba Ibrahim Zoakah[1]

[1]*Department of Community Medicine, University of Jos, Plateau State, Nigeria*
[2]*Department of Community Medicine, Jos University Teaching Hospital, Plateau State, Nigeria*

Abstract

Background: "Standard precautions" require that health care workers assume that blood and body fluids or tissues of all patients are potential sources of infection, regardless of the diagnosis, or presumed infectious status of the patients. The aim of this study was to assess and compare the infection control practices among public and private medical laboratories in Jos metropolis, Plateau state.

Methods: A cross-sectional study design was used and a cluster sampling technique was applied to select a total of Eighty-five personnel from public and private medical laboratories in Jos metropolis. Data was obtained using a semi structured self-administered questionnaire and analysed using SPSS Version 23 software. Their knowledge of infection control practices was graded as poor and good while their infection control practices were graded as adequate or inadequate. Relationships between their socio- demographic variables and infection control practices were assessed using the Chi square test. A P value of ≤ 0.05 was considered statistically significant.

Results: The mean age of the respondents was 33.38±9.80 years in the public laboratories and 33.10±7.07 years in the private laboratories. All the 24 (100%) respondents working in public medical laboratories had good knowledge of infection control practices as against 59 (95.2%) in private medical laboratories. Up to 20 (23.5%) of those in public laboratories had good attitude towards hand washing compared to 54 (63.5%) of those in private laboratories. Twelve (14.1%) of those in public laboratories had good attitude towards disinfection of used materials as against 54 (63.5%) of those in private laboratories. Eighteen (21.2%) of those in public laboratories had positive attitudes towards waste disposal compared with 52 (61.2%) from private laboratories. Of all cadres in public medical laboratories, 20 (83.3%), 11 (45.8%) and 20 (83.3%) had good attitudes towards hand washing, disinfection and injection safety respectively as against 54 (88.5%), 54 (88.5%) and 51 (83.6%) of their counterparts in private laboratory practices.

Conclusion: Even though the staffs from the private medical laboratories seem to have shown better attitude towards practice of infection prevention and control, there is the need to ensure close supportive supervision of all medical laboratory staff in Jos metropolis.

Keywords: Infection control, Public, Private, medical laboratories, Plateau State.

***Correspondence Info:**
Dr. Gwomson Dauda,
Department of Community Medicine,
Jos University Teaching Hospital,
Plateau State, Nigeria

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1. Introduction

The risk of becoming infected with disease from patients either directly or indirectly has long been established.[1] "Standard precautions" require that health care workers assume that blood and body substances of all patients are potential sources of infection, regardless of the diagnosis, or presumed infectious status. Additional precautions are needed for diseases transmitted by air, droplets and contact.[2] Many infectious diseases have been seen to be responsible for the transmission of deadly

nosocomial infections in the hospital setting including Hepatitis B virus, Hepatitis C and HIV.[3]

To have positive outcomes of Infection Prevention and Control (IPC) and health promotion the existence of the interrelationship between the background factors, intermediate factors and the outcomes must be established. Accordingly, the professional knowledge, experience, qualification and l aptitude largely depend on the institutional assets in order for the outcomes to be achieved in terms of IPC and health promotion. However, the institutional factors including manpower, factual and fiscal resources will enable the achievement of professional knowledge and abilities by the personnel especially as relates to aseptic technique, sterilization, hygiene and sanitation. This acquisition of knowledge and abilities is also a helpful reinforcement and motivating factor which also effect the abilities of the personnel in terms of their IPCs and health promotion practices.[4]

About 2.5% of the global HIV cases are due to occupational exposures among health care worker [5] and 1.7 million hospital-associated infections, from all types of microorganisms combined, cause or contribute to 99,000 deaths each year in the USA.[6] A lot of these happen in the Nigerian medical laboratories with most of them not reported. All laboratories should have standard operating procedures (SOPs) for the general work of the laboratory and for each diagnostic procedure carried out. Medical laboratory workers receive capacity building depending on the category of work they intend to be involved in.[7] An individual may end up working as either of the following based on the competence acquired: Laboratory Assistant, Senior Laboratory Assistant,[8,9] Laboratory Supervisor/ Assistant Technologist or Medical Laboratory Scientist, providing services either at the public or private health facilities.[10] A medical laboratory or clinical laboratory is a system where tests are usually done on clinical specimens in order to obtain information about the health of a patient as pertaining to the diagnosis, treatment, and prevention of disease, and some of these locations could be built by government especially at hospital settings or stand alone as commonly built by individuals of non-governmental organizations. Majority of these private medical laboratories provide locations where patients easily access medical investigations when the public health facilities are unable to do the needful during such times like when there is industrial disharmony leading to strike actions and underfunding.[9]

The aim of this study was to assess and compare the infection control practices among public and private medical laboratory facilities in Jos metropolis.

2. Methodology

The study was conducted in Jos metropolis of Plateau State. Plateau state, located in the North Central of Nigeria, has an approximated population of 3,206,531 (1,598.998 males and 1,607,533 females). Jos metropolis occupies parts of 3 local government areas of Jos North, Jos South and Jos East. Jos East houses the National Center for Remote Sensing. Jos North houses the State secretariat and the area where most commercial activities of the State take place. Jos South LGA hosts the Government house. Jos metropolis has four tertiary hospitals with a total of One hundred and four (104) public health facilities and thirty-seven (37) medical laboratory outfits. The health facilities are organised into the ward system, covering Jos North, Jos East and Jos-South Local Government Areas.

The study population consisted of all the technical staff (i.e. laboratory scientist, technicians and assistants) who had been working in public and private medical laboratories in Jos metropolis for at least six months who gave consent for the study.

The study used a cross-sectional design and participants were selected using a cluster sampling technique. A total of 8 public and 29 private medical laboratories are registered with the State Ministry of Health. Every staff on duty at the time of data collection at the facility was interviewed (with a sample size of 85, 24 public facility staff and 61 private facility staff).

Data was collected by the researchers and trained research assistants using a structured interviewer-administered questionnaire which was adapted from the implementation of infection control in health facilities in Arua district, Uganda: a cross-sectional study questionnaire.[11]

Data collected was analysed using Statistical Package for Social Science (SPSS) version 23.0. Uni-variate, bi-variate and multi-variate analysis was done. Knowledge and practice were scored with 0-50% scores regarded as poor knowledge and practice and 51-100% as good knowledge and practice.[12] Test of significance was performed using a 95% confidence interval and the level of significance set at 0.05.

Ethical approval and permission for the study was obtained from the Plateau State Ministry of Health.. Permission was also obtained from the Local Government Chairmen and directors of PHCs of Jos-North, Jos East and Jos-South L.G.A. Informed written consent was obtained from each participant in the study, using a consent form.

3. Results

The assessment shows that respondent's frompublic and private medical laboratories were comparable with respect to their sociodemographic characteristics. More men were seen to have participated in the study, in both public and private laboratories (55; 64.7%). The mean age of respondents in the public laboratories was 33.4years ± 9.8, while that of the private laboratories was 33.1years ± 7.1. Majority of the

respondents in the private laboratories (39; 79%) were married. More than half of the respondents in both public 15 (62.5%) and private 33 (54.1%) were of the laboratory scientists carder. A large number in both groups 56 (65.9%) of the respondents had received some form of training on infection control **(Table 1).**

All of the Laboratory scientists in the public and private laboratories (15; 31.3%) and 33 (68.7%)] respectively had good knowledge of infection control. Every staff (100%) of the public medical laboratories had good knowledge of infection control, while 59 (95.2%) of private health laboratory staff had good knowledge of infection control (**Table 2**).

Concerning the standard precaution of good hand washing practice, 54 (63.5%) e private laboratory staff carried it out. Some of them (39; 45.9%) also wear hand gloves before carrying out investigations. About a three-quarters (54; 60%) of the private laboratory staff practice sterilization of used equipment and up to 51 (60%) of the private medical laboratory personnel practiced injection safety. Of all the practice of infection control, only disinfection practice 54 (63%, P = 0.001) and housekeeping practice 51 (60%, P = 0.016) show statistically significant difference between public and private medical laboratory staff (**Table 3**).

There was a statistically significant relationship between the carder of staff and practice of infection control, observed to be higher among private laboratory staff 31 (64%, P = 0.001), 30 (62.5%, P= 0.001) and 23 (47.9%, P= 0.001) with respect to hand washing, disinfection and injection safety respectively (**Table 4**).

4. Discussion

Infection control is concerned with preventing nosocomial or health care associated infections. It is about identifying and controlling the factors involved with the spread of these infections, whether from patient-to-patient, from patients to staff, from staff to patients, or among-staff. These factors include prevention (via hand hygiene/hand washing, cleaning / disinfection / sterilization, vaccination, surveillance); monitoring/ investigation of demonstrated or suspected causes for spread of infection within a particular health-care setting; and the surveillance, investigation, and management of outbreaks. By fully integrating health and safety arrangements into the SOPs, employers can also ensure they meet acceptable standards of health and safety in the day-to-day running of the laboratory.[13]–[15]

Regarding knowledge of infection control, the respondents displayed good knowledge with nearly all of them having good knowledge of infection control. This is consistent with a similar study conducted in public and private primary care facilities in Lagos state, Nigeria.[16] This may be due to the training the staffs of the public medical laboratory have received, although the staffs were not asked the kind of training they have received. Interestingly, there was no statistically significant difference in knowledge between staff of the public (100%) and private (95.2%) laboratory staff. This is similar to a study conducted in Lagos, Nigeria.[16] This shows the importance of education as explained by a study designed for nosocomial infection in India.[17] Unlike what was observed in a study conducted in the eastern part of Nigeria.[18]

Disinfection (P=0.001) of equipment after use and good housekeeping (P=0.016) showed significant difference between the staff of public and private laboratories. Medical laboratory health workers are expected to have knowledge and also practice the appropriate disposal of waste, the cleaning, sterilization and disinfection of equipment, instruments and devices. They are expected to follow manufacturer and facility protocols in all instances. This is similar to the finding a study conducted in Ondo State in South-Western Nigeria.[5]The private medical laboratory staff practice disinfection of equipment 54 (63.5%) better than the public medical laboratory staff 12 (14.1%), which similar for good housekeeping with private practice at 51 (60%) and public practice at 14 (16.5%). Therefore there was statistically significant relationship between the type of medical laboratory and infection prevention and control practice, as it was also observed in a similar study done in Lagos among public and private care facilities.[16] This is unlike what was noted in a similar study in Cameroon, where those in public facilities demonstrated better attitude.[17] This could be due to better condition of service for staff of the private medical laboratories since they are profit oriented.

All the staff working in both types of facilities shows high knowledge according to their cadres, especially among the Medical Lab Scientists. There is statistically significant relationship between knowledge and the cadre of staff in public and private medical laboratories. This could be due to higher quality training laboratory Scientists receive compared to other cadre of staff (laboratory Technicians/Assistants). This is consistent with the study conducted in Cameroon where doctors differ significantly to other staff with respect to practicing infection control.[4]

5. Conclusion

Immediate / short term

1) Infection control practices should enforce using the carrot and stick method.
2) The authorities concerned should supply adequate materials/equipment needed to facilitate infection control practices as there was shortage of materials.
3) More modern methods of sterilization of infection control should be provided; thisis because obsolete methods are still being used in these facilities.

4) The relevant authorities should re-enforce supervision which may improve performance.

Moderate term

1) A health district census or an inventory of incinerators and refuse disposal pits should be made and provision made in health facilities where there are no incinerators and refuse disposal pits.
2) Operational and sustainable system of infection control. This entails setting up an infection control unit in each heath facility/ML.
3) Blood Transfusion Coordination and Control service for effective and scrupulous supervision and control of the use of blood products is necessary.

Long term

1) Refresher courses, seminars, workshops and in-service training should be made available to the personnel regularly in order to update their knowledge on infection prevention, control and health promotion.
2) Decentralize the health care delivery system. This will enable the public health authorities take more concerted decisions and actions in health care delivery matters at various levels.

Infection control practice, as important as it is may seem very simple but may not be achieved without close supportive supervision. It is expected that the responsible health authority should develop a national programme to support health facilities in reducing the risk of health-care-associated or nosocomial infections.[2]

Table 1: Socio-demographic Characteristics of respondents

Variable	Frequency(%) n=85 Facility type 5 public, 22 private Labs		Total
Category of staff	**Public**	**Private**	**85 (100)**
Age			
< 30 years	8 (33.3)	20 (32.8)	28 (32.9)
≥ 30 years	16 (66.7)	41 (67.2)	57 (67.1)
Mean age	33.38 ±9.80	33.10±7.07	33.18 ±7.87
Sex			
Male	16 (29.1)	39 (70.9)	55 (100)
Female	8 (26.7)	22 (73.3)	30 (100)
Marital status			
Single	14 (38.9)	22 (61.1)	36 (100)
Married	10 (20.4)	39 (79.6)	49 (100)
Carder			
Lab Science	15 (62.5)	33 (54.1)	48 (56.4)
Lab Tech	5 (20.9)	18 (29.5)	23 (27.1)
Lab Assist	2 (8.3)	10 (16.4)	12 (14.1)
Others	2 (8.3)	0 (0.0)	2 (2.4)
Training on Infection Control			
Yes	18 (32.1)	38 (67.9)	56 (100)
No	6 (20.7)	23 (79.3)	29 (100)

Table 2: Knowledge of Infection Control

Variables Knowledge	Frequency (%), n=85				Total	χ2 (P-value)
	Public		Private			
	Good	Poor	Good	Poor		
Lab Scientists	15 (31.3)	0 (0)	33 (68.7)	0 (0)	48 (100)	4.722 (0.58)
Lab Techs	5 (21.7)	0 (0)	17 (73.9)	1 (4.4)	23 (100)	
Lab Assistants	2 (16.7)	0 (0)	9 (75.0)	1 (8.3)	12 (100)	
Others	2 (100)	0 (0)	0 (0)	0 (0)	48 (100)	
Total	**24 (100)**	**0 (0)**	**59 (95.2)**	**2 (4.8)**		

Table 3: Practice of infection control

Variables	Frequency (%), n=85				Total	χ2 (P value)
	Public		Private			
	Good	Poor	Good	Poor		
Hand washing?	20 (23.5)	4 (4.7)	54 (63.5)	7 (8.2)	85 (100)	0.412 (0.375)
Gloves	20 (23.5)	4 (4.7)	39 (45.9)	22 (25.9)	85 (100)	3.053 (0.065)
Gown wearing	14 (16.5)	10 (11.8)	48 (56.5)	13 (15.3)	85 (100)	3.616 (0.540)
Disinfection	12 (14.1)	12 (14.1)	54 (63.5)	7 (8.2)	85 (100)	14.72 (0.001)
Sterilization	18 (21.2)	6 (7.1)	51 (60)	10 (11.8)	85 (100)	0.835 (0.267)
Housekeeping	14 (16.5)	10 (11.8)	51 (60)	10 (11.8)	85 (100)	6.114 (0.016)
Waste Disposal	18 (21.2)	6 (7.1)	52 (61.2)	9 (10.6)	85 (100)	1.244 (0.209)
Injection Safety	20 (23.5)	4 (4.7)	51 (60)	10 (11.8)	85 (100)	0.001 (0.603)

Table 4: Relationship between cadre of staff and practice of infection control practices

Variables	Frequency (%), n=85				Total	χ^2 (P-value)
	Public		Private			
Cadre	Good	Poor	Good	Poor		
Hand washing						
Lab Scientists	15 (31.3)	0 (0)	31 (64.6)	2 (4.2)	48 (100)	12.145 (0.001)
Others	5 (13.5)	4 (10.8)	23 (62.2)	5 (13.5)	37 (100)	
Total	20 (83.3)	4 (16.7)	54 (88.5)	7 (11.5)		
Disinfection						
Lab Scientists	9 (18.8)	6 (12.5)	30 (62.5)	3 (6.3)	48 (100)	17.268 (0.001)
Others	3 (8.1)	6 (16.2)	24 (64.9)	4 (10.8)	37 (100)	
Total	11 (45.8)	12 (54.2)	54 (88.5)	7 (11.5)		
Inj. Safety						
Lab Scientists	15 (31.3)	0 (0)	23 (47.9)	10 (20.8)	48 (100)	18.188 (0.001)
Others	5 (13.5)	4 (10.8)	28 (75.7)	0 (0)	37 (100)	
Total	20 (83.3)	4 (7.4)	51 (83.6)	10 (16.4)		

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