

# Assessment of Attitude, Knowledge and Practice of Biomedical Waste Management in Surgical Theaters of Some Selected Hospitals in Urban Kano, Northern Nigeria.

\*Imam, T. S.<sup>1</sup>, Sani, M.<sup>2</sup> and Sani, A.<sup>1</sup>

<sup>1</sup>Biological Sciences Department,  
Bayero University, Kano,  
PMB 3011, Kano, Nigeria

<sup>2</sup>Saadatu Rimi College of Education,  
Kumbotso, Kano,  
PMB 3218, Kano, Nigeria  
tsimam.bio@buk.edu.ng

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## Abstract

*Proper knowledge and attitude in medical waste management (MWM) play a major role in enhanced and sustainable system of medical waste management. The study was aimed at assessing the knowledge, attitude, and practice of medical waste management in surgical theaters of some hospitals in urban Kano. A total of twelve (12) of HCFs were purposively sampled base on possession of a functioning theater, from the six major local government areas constituting urban Kano (one public and the other private). Questionnaire survey was used to solicit information from the population of 202 doctors and nurses divided across the hospitals. 167 (comprising of 70 doctors and 97 nurses) representing 82.7% of the questionnaires administered were retrieved. The results indicated that both respondents have adequate knowledge of medical waste constituents and their hazardous nature, although, there is some confusion with regard to some medical waste constituents. Findings of the study also revealed that the respondents have positive attitude toward MWM. Meanwhile, the results showed improper practice of MWM which may be due to insufficient of color coded bins that will immensely help segregating the waste. It was concluded that there is value-action gap between the respondent's behaviour in one hand and the practice of MWM on the other hand. Hence it was recommended that extensive training and incentives should be provided, this will help in changing the behaviour to a more sustainable practice.*

**Keywords:** Attitude; Biomedical waste; Knowledge; Practice; Surgical theatres

## INTRODUCTION

Hospital waste or biomedical waste refers to biological or non- biological wastes generated from hospitals which are not mean for usage and hence discarded. Biomedical wastes pose a potential risk for the patients, public and professional healthcare providers. The management of hospital waste depends solemnly on providers of healthcare, attitude, awareness and proper knowledge of its severe impacts on health (Radha, 2012).

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\*Author for Correspondence

Nurses, hospital attendants, and clinicians spend much time with patients which increases their risks and exposure of the hazards associated in a hospital environment, most importantly, biomedical waste. For, there is a need of acquaintance with most recent information, skills and proper activities of managing the waste in order to reduce infections acquired in hospitals, and also protect personal health. In addition, they have a responsibility of preventing risk to the community due to waste disposal (Singh, 2002). Insufficient and inappropriate knowledge of the healthcare waste handling might pose a serious health and environmental implications. About 80% of the total waste produced from healthcare activities is regarded as general waste. The other 20% is considered hazardous that is, might be infectious, toxic or even radioactive. Addition of these waste to the general waste make them to be hazardous completely (WHO, 2011).

Hospitals are generating various types of wastes which contains more of infectious wastes that are far dangerous than the other types of wastes. Infectious wastes have pathogenic agents that may disperse when there is contact inside the hospital, or outside. The infectious waste when not managed appropriately can cause a variety of diseases such as tetanus, wound infection, cholera, diarrhea, HIV, HBV, HCV and T.B. Infections are termed endogenous infections when they originate from patients that are admitted in the hospital, while those that spread from the ward or the environment are termed as exogenous infections. The exogenous and endogenous infections may cause respiratory infection (Zarin and Ahmed, 2009).

In a study conducted by Bhatti *et.al* (2007) to measure knowledge, attitude, and practice of doctors, nurses and waste handlers BMW. It was found out that the doctors are more knowledgeable than the nurses about the dangers of improper MWM. On the other hand the waste handlers are by far less knowledgeable than the doctors and the nurses. Similarly, Asim *et al* (2013) found out that there is less knowledge and awareness as regard to proper handling of BMW in the hospital at Faisalabad city in Pakistan.

In developing countries generally, there is low level of healthcare waste management knowledge. It was reported by many researches. In South Africa, it was reported that there was poor knowledge on key documents among the health workers in regulating healthcare waste management (Ramokate and Basu, 2009). Moreover, another study conducted in Agra India revealed a low level of knowledge in healthcare waste management rules among the healthcare workers (Shallini, 2010). Similar findings were reported in Kolar district India that the paramedical staff had less knowledge of appropriate rules in waste management (Tejas, 2009). Additional study was done in a tertiary hospital in New Delhi, India and a high knowledge of biomedical waste management rules among the doctors (81%) was reported but there was a low knowledge among the laboratory staff (12%) and sanitary staff (14%) (Saini *et al.*, 2005). Another study in India was conducted and reported that only about 1.6% of the paramedics studied, knew about the divisions of biomedical waste appropriately (Shafee *et al.*, 2010). In Gaza, only about 55.8% of the medical workers observed, are aware that viral hepatitis could be transmitted due to improper management of medical waste (Massrouje, 2001). In Nigeria, a study was conducted in Edo and it revealed that that only 46% of the healthcare workers (doctors and nurses) comprehend the significance of healthcare waste management in ensuring public safety (Abah and Ohimain, 2011).

The present study was aimed at assessing the knowledge, attitude, and practice of healthcare workers in some selected hospitals in Kano Metropolis, Nigeria

## MATERIALS AND METHODS

### Study Area

The study was conducted in urban Kano which comprise of Dala, Fagge, Gwale, Municipal, Nassarawa, and Tarauni, part of Kumbotso and Ungogo as shown in Figure 1. It falls within Latitudes  $11^{\circ} 52'N$  to  $12^{\circ} 7'N$  and Longitudes  $8^{\circ} 22.5'E$  to  $8^{\circ} 47'E$  and is 472.14m above sea level (Ahmed, 2010).

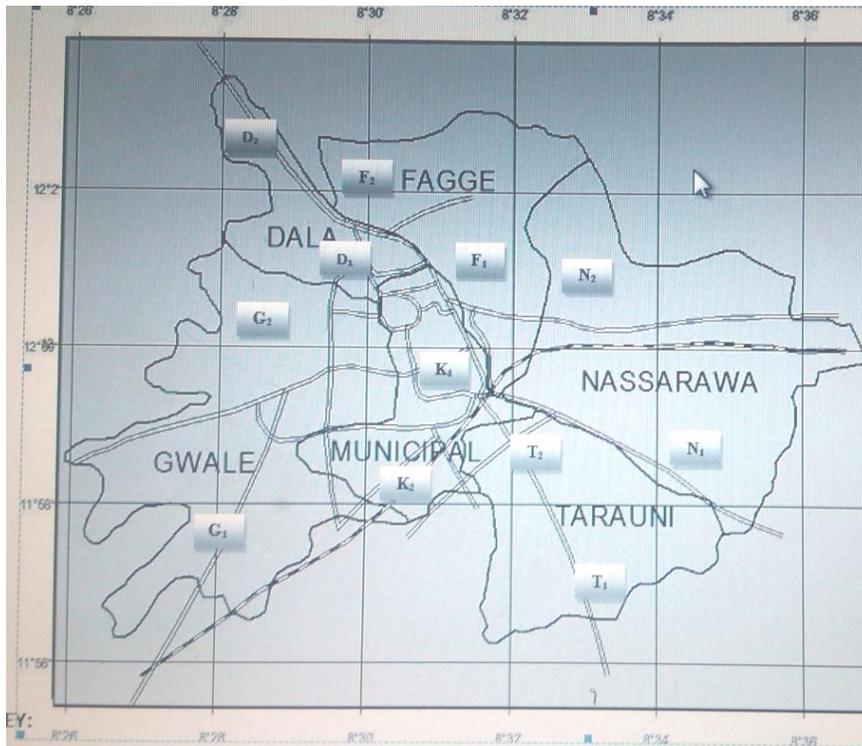


Figure 1: Map of Kano Metropolis and the Study Sites

#### KEY

T<sub>1</sub> = AKTH, T<sub>2</sub> = AL-NOURI SPEC. HOSP, K<sub>1</sub> = MMSH, K<sub>2</sub> = HEAL TUNE, F<sub>1</sub> = SHEIKH M JIDDA, F<sub>2</sub> = AMFANI I KABOMO  
G<sub>1</sub> = MARMARA MATERN., G<sub>2</sub> = GETWELL, N<sub>1</sub> = MAWSH, NASSARAWA, N<sub>2</sub> = AREWA MED. CONS, D<sub>1</sub> = SABO BAKIN ZUWO  
D<sub>2</sub> = ZAKIRAI NURS. HOME

Source: Kibon and Ahmed (2013)

The climatic condition of Kano comprise of dry and wet climate. Annual rainfall is about 850 – 870mm. Temperature of about 27°C is relatively warm to hot throughout the year (Olofin and Tanko, 2002).

### Study Design and Sample Sites

A total of 141 registered private HCFs, 22 State own hospitals and clinics and many primary health Care services own by Local Governments are operating in the area under study, i.e. Kano

Urban Area. The study was designed to have included two hospitals (one public and the other private) from each of the six local governments constituting Kano urban area, making a total of twelve (12) hospitals. The HCFs were chosen purposively based on possession of one or more theatres.

**Target Group and Sample size**

The target groups were those staff involved in maintaining the theatres of each HCF. The sample comprised of all the staff (theater attendants) in the theater of all the selected HCFs.

**Questionnaire Design**

A questionnaire for MWM was designed. The questionnaire was a structured type with closed ended questions. The questionnaire includes items related to knowledge, attitude and practice of WM of the respondent. There were three sections: A, B and C. Section A included personal data of the respondent such as profession, gender and age. Section B contains data on knowledge of MWM, comprising questions such the ability of the of the respondent to distinguish between general waste and MW, how hazardous some MW are, when is waste bins sealed, coding system of waste bins and sacks, and the risks associated with mixing of general waste and MW. Section C dealt with practice and attitude of the respondent towards MWM. The section includes questions like, awareness of occupational hazards associated with improper WM, attending any training on MWM, duration of the training, and attitude towards need for proper MWM.

**RESULTS**

Table 1: Socio-demographic Distribution of the Respondents

Items	Respondents	
	Doctors (%)	Nurses (%)
Age (years)		
20 - 29	14 (20)	19 (20)
30 - 39	37 (53)	38 (39)
40 - 49	18 (26)	39 (40)
>49	01 (01)	01 (01)
<b>Sex</b>		
Male	59 (84)	46 (47)
Female	11 (16)	51 (53)
<b>Working Experience (years)</b>		
<1	05 (07)	04 (04)
1 - 3	13 (18)	14 (14)
3 - 5	08 (11)	24 (25)
5 - 7	08 (11)	10 (10)
>7	36 (51)	45 (46)

**Assessment of Attitude, Knowledge and Practice of Biomedical Waste Management in Surgical Theaters of Some Selected Hospitals in Urban Kano, Northern Nigeria.**

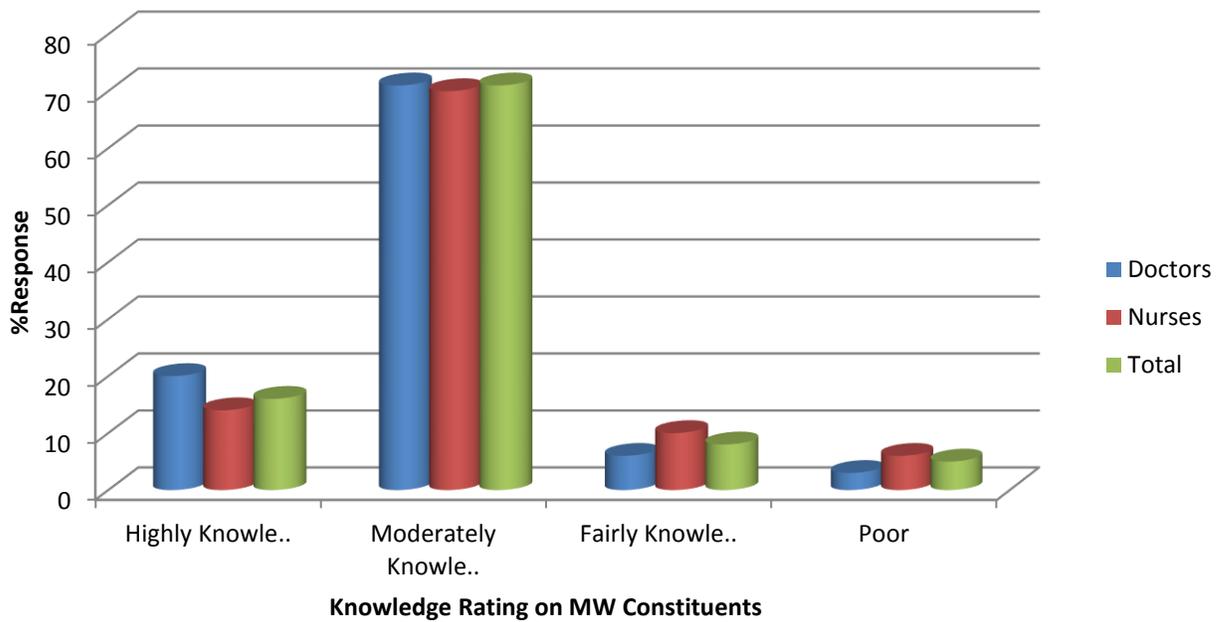


Figure 2: Knowledge on Constituents of Medical Waste

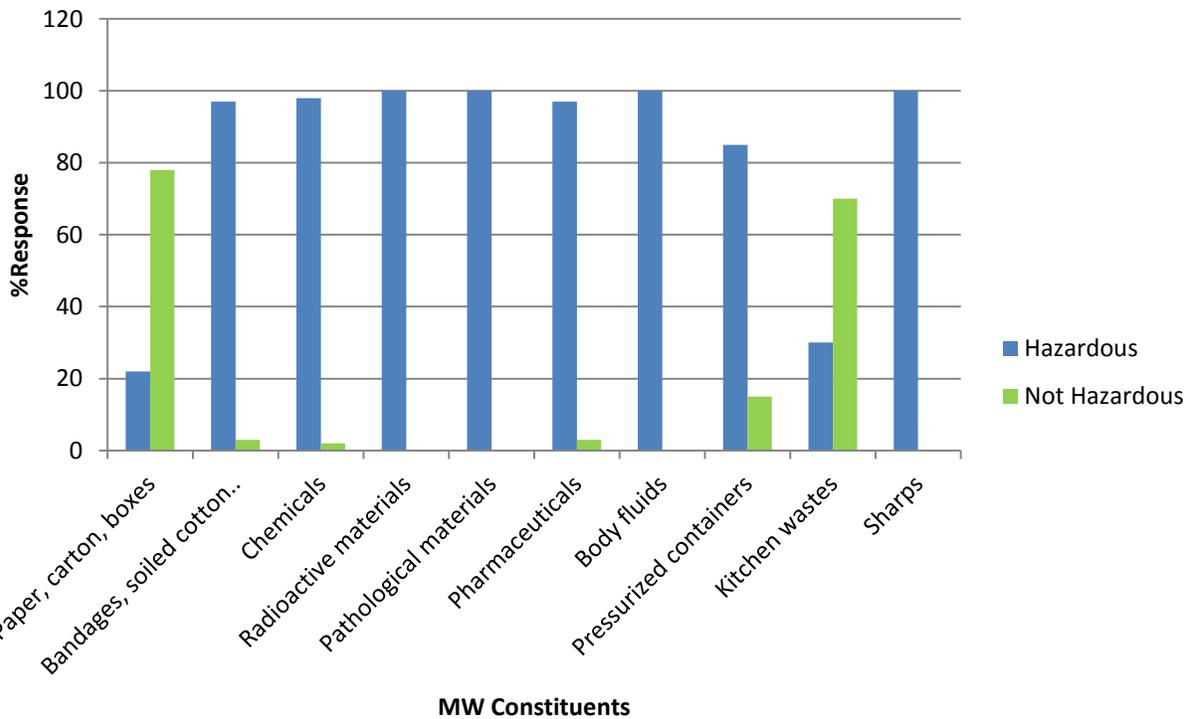


Figure 3: Doctors Knowledge on Hazardous Nature of Some Constituents of Medical Waste

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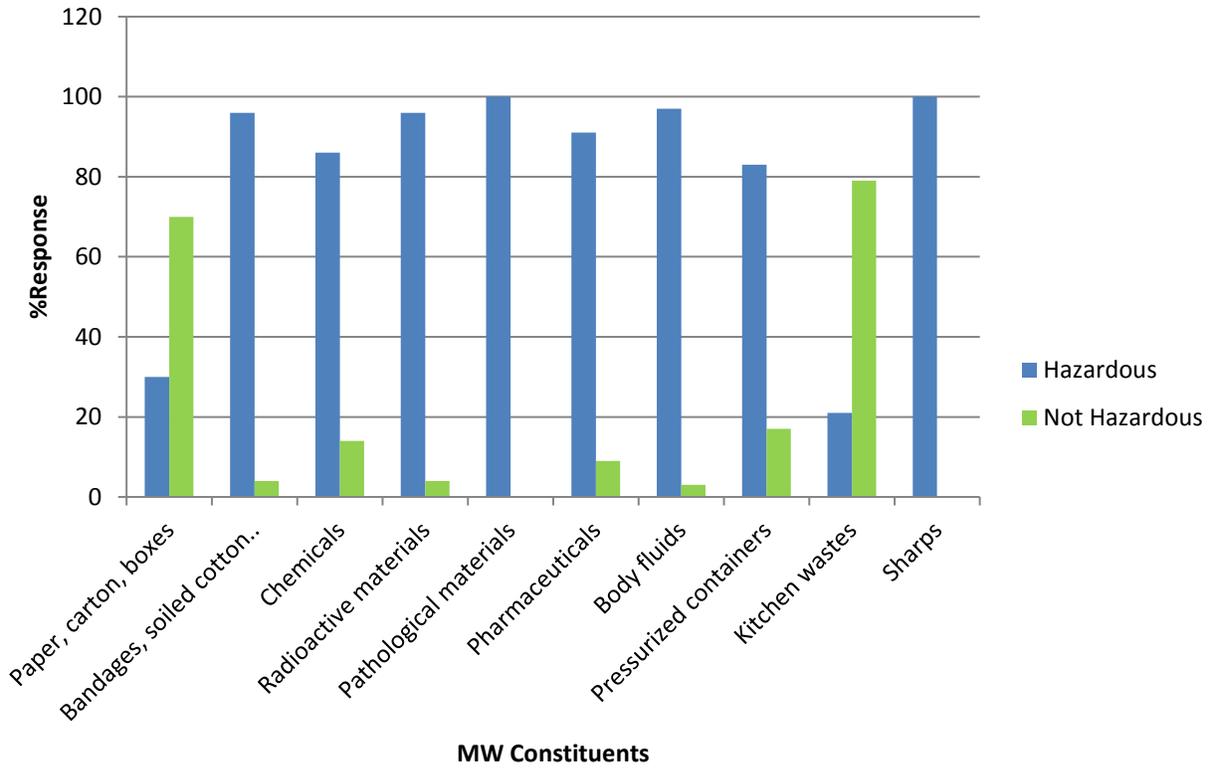


Figure 4: Nurses Knowledge on Hazardous Nature of Some Constituents of Medical Waste

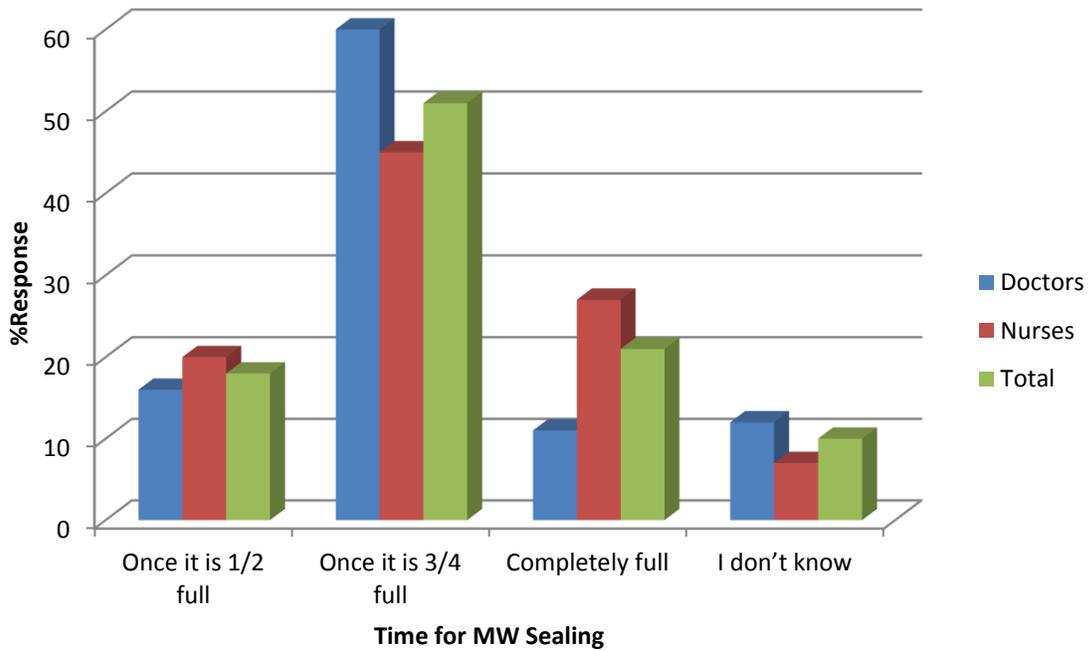


Figure 5: Knowledge on Time of MW Bin Sealing.

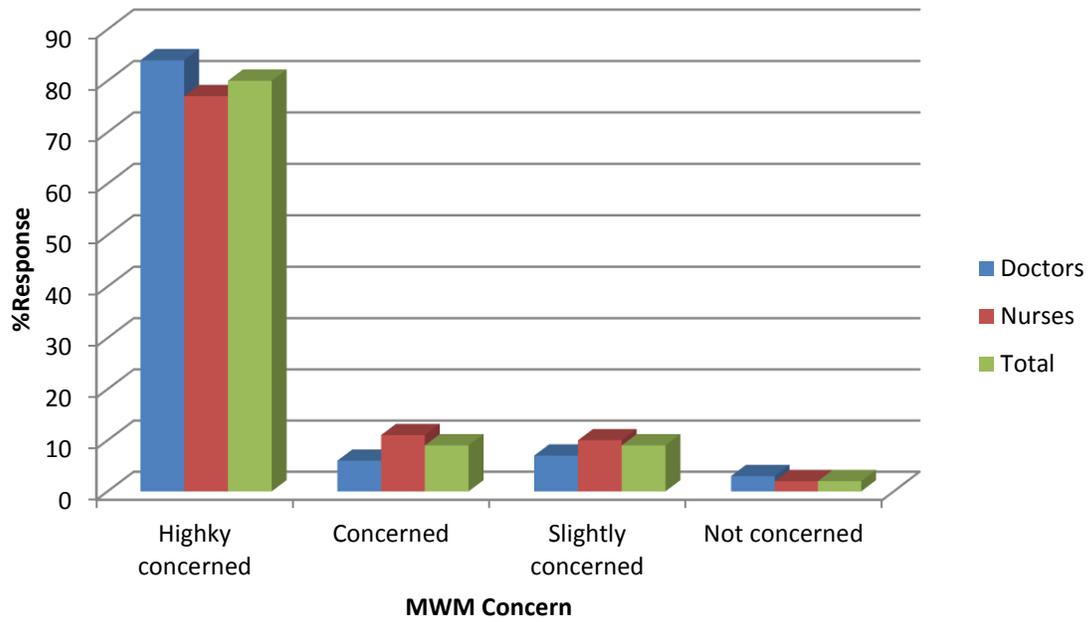


Figure 6: Concern on Medical Waste Management

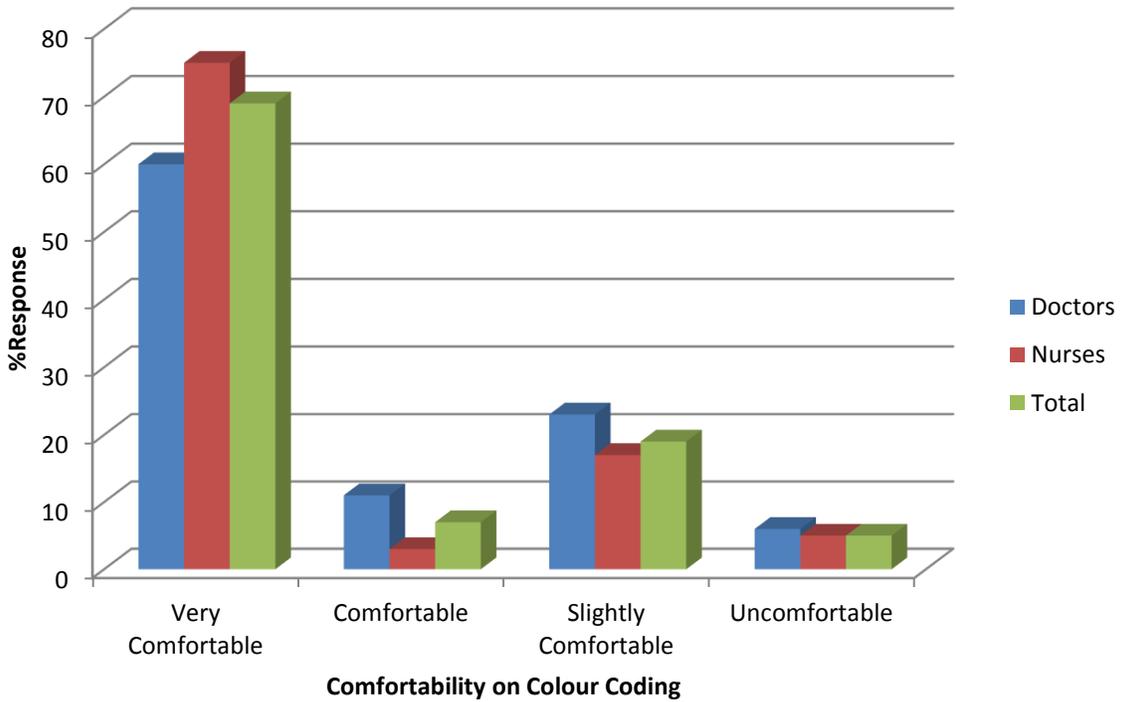


Figure 7: Comfortability with Present Colour Coding System

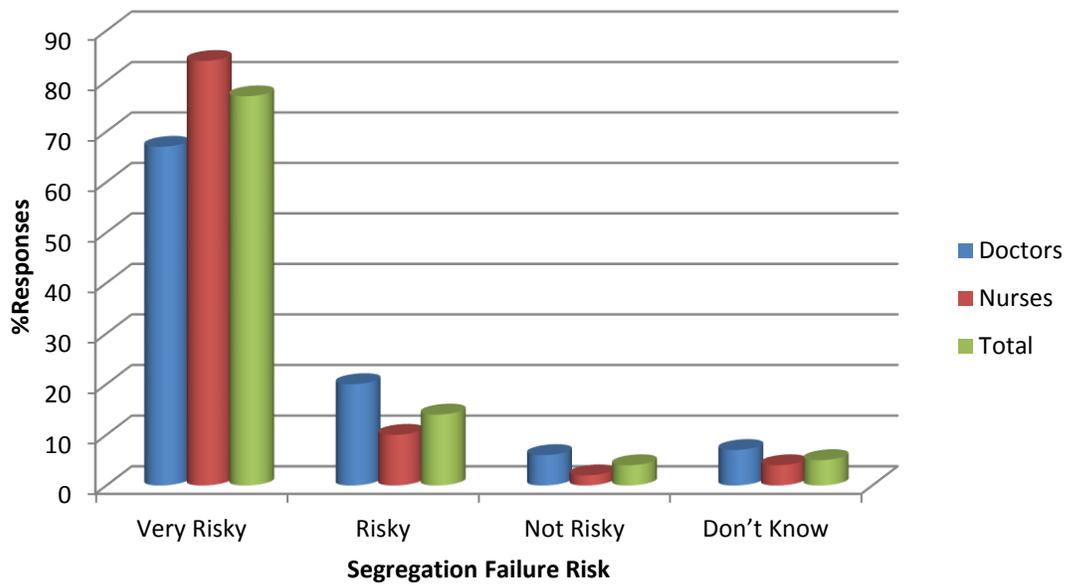


Figure 8: Risk Involved in Segregation Failure

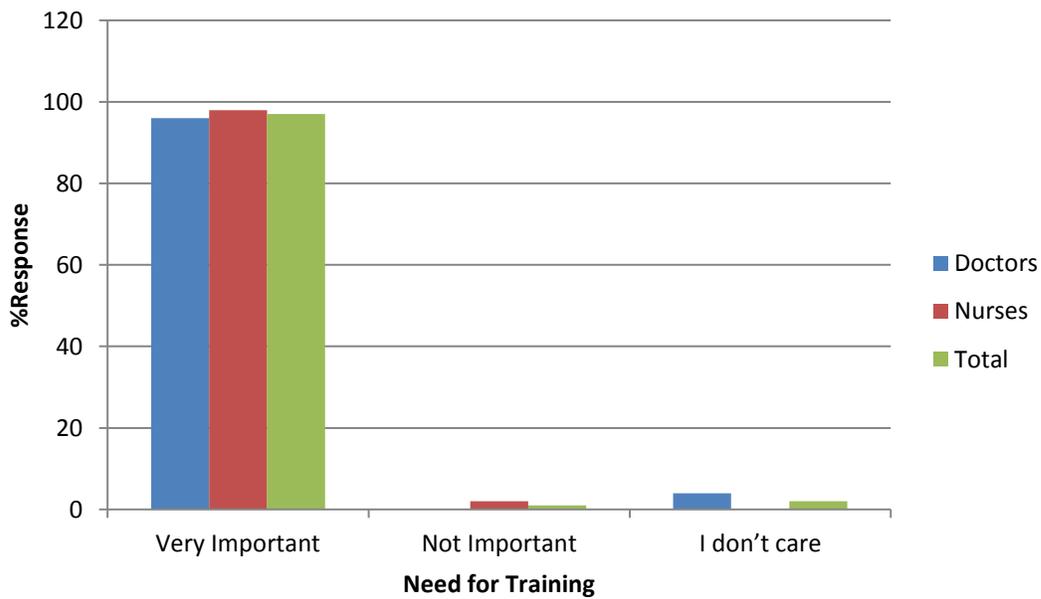


Figure 9: Attitude Toward Need for Training

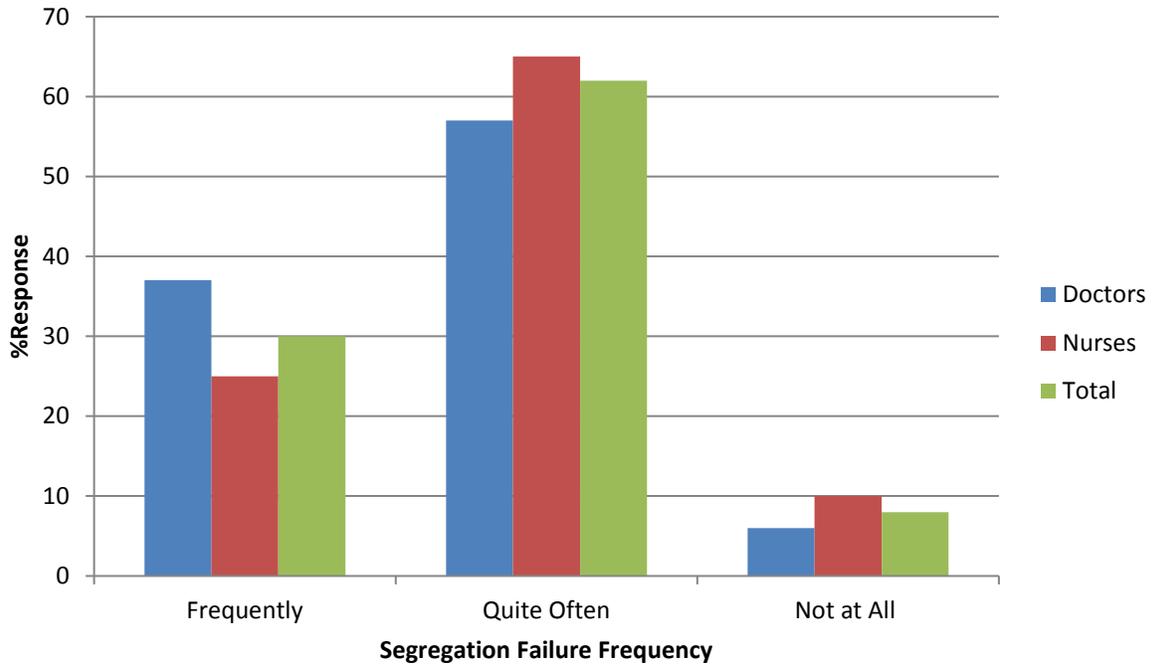


Figure 10: Frequency of Segregation Failure

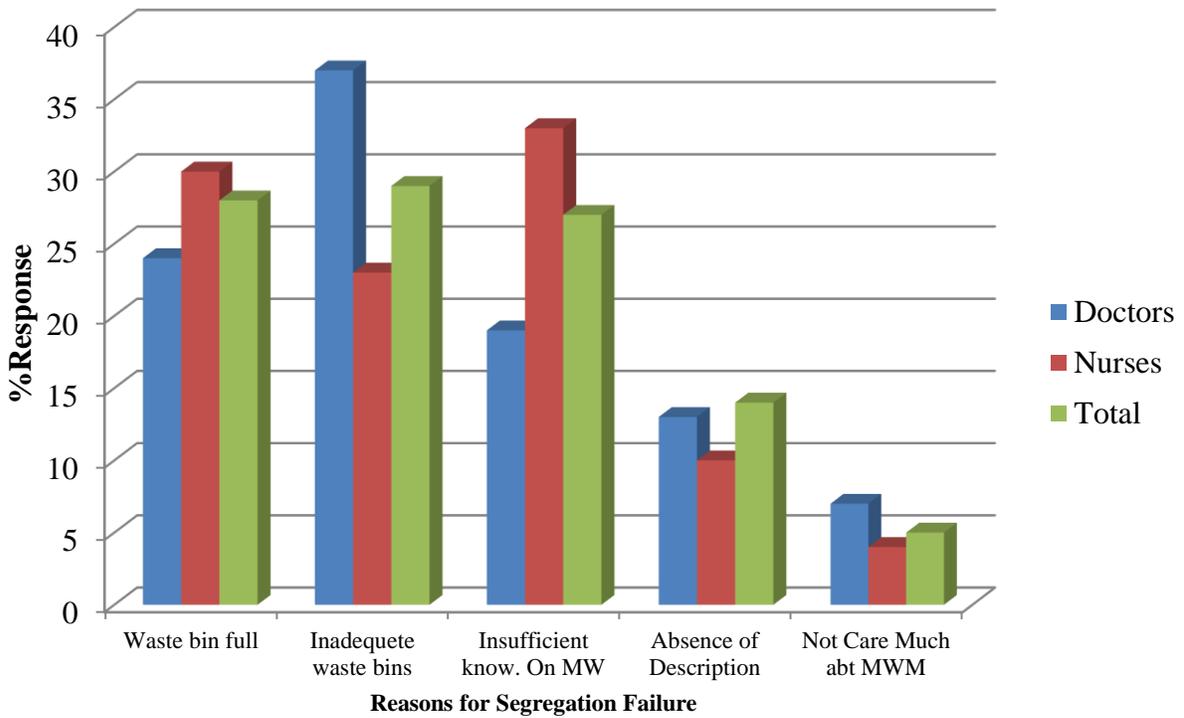


Figure 11: Reasons for Failure of Segregation

## **DISCUSSION**

Socio-demographic distribution of the Respondents is presented in Table 1. From the results, out of the 167 study participants; 70 (41.9%) were observed to be doctors with tertiary education, 97 (58.1%) were nurses who attained tertiary education. Age (years) of the respondents varied from 20-29, 30-39, 40-49 and > 49 respectively. The lower and the higher age groups (20-29 and > 49 years) for the doctors, and nurses were observed to be 14 (20%) and 01 (01%), 19 (20%) and 01 (1%) respectively. Amongst the study participants, 09 (11%) and 46 (47%) were observed to be males and females respectively. The lower and higher range for working experience (<1 and >7 years) for the doctors, and nurses were observed to be 05 (07%) and 36(51%), 04 (04) and 45 (46%) respectively.

### **Knowledge on Medical Waste Management**

Result on knowledge rating on some constituents of medical waste is shown in Fig. 2. The results revealed that 71% of the respondents are moderately knowledgeable, meanwhile highly knowledgeable among doctors and nurses population are 20% and 14% respectively. On the other hand, those observed to be poorly knowledgeable among the respondents are less than 5%. The results thus, showed that doctors are more knowledgeable with regard to MW constituents.

Knowledge on hazardous nature of some medical constituents as above is shown in Fig 3 and 4. The results indicated that both respondents have adequate knowledge on hazardous nature of the presented medical waste constituents. However, there is confusion among some respondents who indicated that paper, carton and boxes, and kitchen wastes are hazardous. These categories of wastes are considered non-hazardous (Kaseva and Mato, 1999) as such they are disposed of just like municipal wastes. It is also worth noting that some of the respondents, especially nurses, also consider soiled bandages and cotton, chemicals, radioactive materials and even body fluids as not hazardous. These are also categorized as hazardous medical waste (Kaseva and Mato, 1999; WHO, 2005) hence requires proper handling and disposal.

The knowledge as to when waste bin should be closed for disposal is shown in Fig 5. The result indicated that about 60% of the doctors and 45% of the nurses indicated when it is  $\frac{3}{4}$  full. 27% of the nurses and 11% of the doctors indicated when completely full. Yet some indicated when  $\frac{1}{2}$  full and some do not know. At least, the result indicated that more than 50% are knowledgeable on the recommended time for sealing of medical waste bin i.e when it is  $\frac{3}{4}$  full. (ICRC, 2011).

From the results above it can be deduce that most of the respondents are averagely knowledgeable on medical waste management, which is contrary to the findings of Shallini (2010) and Isma'il *et al.* (2013) in India and Asim, *et al.* (2013) in Pakistan who reported poor knowledge of MWM among health care workers. On the other hand the finding agrees with findings of Saini *et al.* (2011) who reported high knowledge of BMWM among doctors and nurses, although low among laboratory staff and sanitary staff. It again agrees with findings of Azuike *et al.* (2015) in Nigeria.

### **Attitude on Medical Waste Management**

Fig 6 shows concern of the respondents on MWM. It can be seen that most of the respondents, over 70% are highly concerned about MWM. Only few of the respondents, less than 5% indicated that they don't. Since most of the people that participated in the survey are educated people

(nurses, doctors), it can be concluded that education has helped in increasing interest towards medical waste management.

Response on comfortability with present color coding system is shown in Fig 7. The result showed that 75% of the nurses and 60% of the doctors are very much comfortable, while few less than 10% of the respondents indicated that they are not. Positive attitude towards comfortability with color coding will play a very important role in better segregation practice.

Risk that may be involved due to segregation failure is shown in Fig 8. The result indicated that 83% of the doctors and 65% of the nurses indicated that it is very risky. Very few, less than 10% indicated "not risky" and "I not know". Although the percentage is low but it is of concern as standard practice indicated that waste should be segregated, failure of which may lead to nosocomial infection and even environmental pollution if the waste is disposed of untreated (ICRC, 2011)

Attitude towards training was also positive as shown in Fig 9. The results indicated that over 90% of the respondents considered training about medical waste management as very important. Less than 5% considered it not important which means they don't mind attending the training sessions.

Considering the results on attitude by and large, it can be concluded that the attitude of the respondents (doctors and nurses) is positive. The findings are similar to that of Hakim *et al.* (2014) in which he reported higher percentage of attitude towards medical waste management among physician and nurses but low among housekeepers.

### **Practice on Medical Waste Management**

Figure 10 shows that more than 60% of the doctors and around 60% of the nurses put the waste in wrong waste container quiet often, 30% of the respondents put wastes in wrong bin frequently, and around 10% of the workers indicated non deposit of waste in wrong bin.

The problems encountered by the health care workers during segregation are shown in the Figure 11. Inadequate waste bins, insufficient knowledge about the constituents of medical waste and waste bins form largely the most dominant reasons for wastes being dumped in wrong bin as stated by the respondents.

Results on attendance of training on medical waste management are shown in Fig. 12. The results indicated that 45% of the doctors and 33% of the nurses attended training on waste management. The result therefore, indicated that majority of the respondents are not trained in aspect of MWM. In addition, the greater percentage of doctors that attended training could explain the reason why doctors are more knowledgeable in some aspects of MWM.

From the result on practice of MWM, it can be concluded that the practice is not optimum as More than 60% fail to segregate the waste properly, and also only few attended training on MWM. Similar results were reported by Azuiké, *et al.* (2015) and among the staff of Nnamdi Azikiwe Teaching Hospital and also Chudasama *et al.* (2013) reported that there is need for improvement in better BMWM practice. On the other hand the results are not in agreement with findings of

Hakim *et al.* (2013) in Ain Shams University Hospital, Cairo in which they reported high percentage of MWM practice among doctors and nurses with 63% and 83% respectively.

## CONCLUSION

In conclusion, the knowledge of the respondents (doctors and nurses) on MWM is high. Similarly, the attitude is also positive, but the practice not optimal. These facts seem to be contradictory, indicating that there is value-action gap between their intended behaviour and their actual practice of medical waste management. This behaviour needs to be changed or reduced so that proper management of BMW is attained.

## RECOMMENDATIONS

1. There is also need for training and refresher courses to all stakeholders. The training will help in developing skills on one hand and raise awareness on the other. The refresher course will help in updating the staff on any changes that might have occurred in the medical waste management system.
2. Introduction of some form of incentive, as a motivation to any staff that excel in proper practice of medical waste management.
3. Provision of sufficient facilities such as waste bins, color coded waste sacs and even posters (as a reminder to better practice of waste management) in appropriate and strategic locations in the hospital.
4. In case of unavailability of colour coded waste sacs improvisation can be made with available materials, with the required label so long the material used is leak proof. This will help in inculcating segregation practice, reduce the volume of the waste and protect the environment.

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