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ORIGINAL ARTICLE

Methicillin Resistant *Staphylococcus aureus:* Awareness, Knowledge and Disposition to Screening among Healthcare Workers in Critical Care Units of a Nigerian Hospital

Staphylococcus aureus résistant: sensibilisation, les connaissances et la disposition à de dépistage chez les travailleurs de la santé dans les unités de soins intensifs d'un hôpital nigérian

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ABSTRACT

BACKGROUND: **Awareness level about methicillin resistant *Staphylococcus aureus* (MRSA) is high in the western world but the status in developing countries is not well defined.**

OBJECTIVE: **To assess MRSA awareness level, knowledge and disposition to screening among critical healthcare givers (HCGs) in Nigeria.**

METHODS: A **self-administered questionnaire was used to assess the level of awareness and knowledge of HCGs in critical care units of the University of Ilorin Teaching Hospital, Ilorin, Nigeria on MRSA and their willingness to submit to screening.**

RESULTS: **Only 103 (52.0%) of the 198 participants were aware of MRSA but all were favourably disposed to screening for the organism. Awareness was through hospital rounds 65(63.1%) and journals/ textbooks 35(34.0%), and Many, 120 (60.6%) considered MRSA as a threat in the hospital, while only 27 (13.6%) thought otherwise and 51(25.8%) were indifferent. Most HCGs, 124 (87.9%) reported that there were no MRSA control measures in their respective duty post. The age, cadre of work, and number of years in the hospital's critical care units correlated positively with awareness level.**

CONCLUSION: **Methicillin resistant *Staphylococcus aureus* awareness level among the HCGs in our hospital is just a little above 50.0% with substantial proportion of them not realizing the medical implication of the organism. However, majority are well disposed to MRSA screening. Inadequate publicity is a major contributor to poor knowledge and awareness. There is need for educational intervention and sensitization programs on MRSA and other infection control techniques for HCGs in developing nations especially Nigeria. WAJM 2011; 30(4): 282–287.**

Keywords: **Healthcare workers, MRSA, knowledge, screening, control**

RÉSUMÉ

CONTEXTE: le niveau de sensibilisation au sujet Staphylococcus aureus résistant à la méthicilline (SARM) est élevée dans le monde occidental, mais le statut de pays en développement n'est pas bien définie.

OBJECTIF: Évaluer le niveau de sensibilisation au SARM, les connaissances et la disposition au dépistage parmi les donneurs de soins critiques (HCGs) au Nigeria.

MÉTHODES: Un questionnaire auto-administré a été utilisé pour évaluer le niveau de conscience et la connaissance des HCGs en unités de soins critiques de l'Université d'Ilorin Teaching Hospital, Ilorin, Nigeria, le SARM et leur volonté de se soumettre au dépistage.

RÉSULTATS: Seulement 103 (52,0%) des 198 participants étaient au courant du SARM mais tous étaient favorablement disposés au dépistage de l'organisme. Sensibilisation a été à travers des séries d'hôpital 65 (63,1%) et les journaux / livres 35 (34,0%), et beaucoup, 120 (60,6%) considérées comme une menace à SARM à l'hôpital, alors que seulement 27 (13,6%) pense autrement, et 51 (25,8)% étaient indifférents. La plupart HCGs, 124 (87,9%) ont déclaré qu'il n'y avait aucune mesure de contrôle du SARM dans leur poste d'affectation respectifs. L'âge, cadre de travail, et le nombre d'années dans les unités de l'hôpital aux soins intensifs était corrélée positivement avec le niveau de sensibilisation.

CONCLUSION: Staphylococcus aureus résistant à niveau de sensibilisation parmi les Staphylococcus HCGs dans notre hôpital est juste un peu au-dessus de 50,0% en proportion substantielle d'entre eux ne réalisent pas les conséquences médicales de l'organisme. Toutefois, la majorité sont bien disposés à le dépistage du SARM. Publicité inadéquate est un contributeur majeur à la mauvaise connaissance et la sensibilisation. Il ya nécessité d'une intervention éducative et les programmes de sensibilisation sur le SARM et d'autres techniques de contrôle des infections pour les HCGs des pays en développement en particulier le Nigeria. **WAJM 2011; 30(4): 282–287.**

Mots-clés: Travailleurs de la santé, le SARM, les connaissances, le dépistage, le contrôle.

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Abbreviations: HCW, Healthcare workers; **HCGs,** Healthcare Givers; **MRSA,** Methicillin Resistant *Staphylococcus aureus;* **UITH,** University of Ilorin Teaching Hospital.

INTRODUCTION

The organism, Methicillin-resistant *Staphylococcus aureus* (MRSA), has become endemic in many countries of the world particularly within the past two decades.[1–3] Hospital-acquired (HA-MRSA) as well as Community-acquired (CA-MRSA) strains and infections of MRSA have also been widely described.[2] Outbreaks of infections due to MRSA within hospital settings are well reported in literature[4–5] with attendant consequences of increased hospital stay, cost, morbidity and mortality which is worse amongst the critically ill patients.[5]

The degree of problems associated with MRSA infections and its sequelae have made certain individuals/organisations to call for yearly observation of World MRSA Day (WMD) to increase awareness and stimulate interest in the control of this "super bug".[6] Notable advocates of WMD are the survivors of MRSA infections in the developed parts of the world who believe that MRSA infections can be more fatal than HIV / AIDS.[6] Similarly, calls have been made to the World Health Organisation (WHO), the Centres for Disease Control and Prevention (CDC), United State Surgeon General, Department of Health and Human Services and Ministers of Health to declare MRSA as an ongoing epidemic /pandemic and take immediate action to obtain needed funds to raise awareness level, initiate educational campaigns and provide funding for healthcare facilities to launch Active Detection and Isolation (ADI) programmes.[6–7]

Nigeria may be one of the countries where methicillin-resistant staphylococcus aureus is endemic going by the results of various studies.[1,8–9] Methicillin-resistant *Staphylococcus aureus* prevalence and carriage, as high as 34.7%[10] and 52.5%[8] respectively, have been reported in Ilorin, Nigeria. MRSA is not uncommon in some other African countries such as Kenya and Cameroon where prevalence are between 21.0–30.0%, and Tunisia, Malta, and Algeria with 10.0% prevalence[3] while 26.9% was found in Uganda.[11] According to the CDC, MRSA infections accounted for 2.0% of all staphylococcal infections in 1974, 22.0% in 1995 and a staggering 63.0% in 2004 despite the robust economy and standard routine infection control policies in the USA.[7] Therefore, the prevalence of MRSA in Nigeria and many other African countries, classified as resource poor and bewildered by ignorance and misplacement of priority, may undergo geometric increase within the next few years if nothing is done to stem the tide of infections due to this organism.

Intervention aimed at control of MRSA can be at multiple levels. One of such point of controls involves abrogation of transmission through healthy carriers. Healthcare givers often serve as transmitters of MRSA in their capacity as either temporary/transient or permanent carriers. This is favoured by their occurrence at the interface between the hospital and the community where they can serve as agents of cross-transmission of HA-MRSA and CA-MRSA.[2] Rather than be a helper therefore, healthcare workers may constitute risk to patients if they are carriers and transmitters of MRSA. It is thus very important for healthcare workers to be aware of MRSA, its control techniques/ policies and more importantly, their carriage status in order to avoid being a risk to their contacts including patients and especially, the critically ill. This will enable them to take informed and rational decision on MRSA control having developed appropriate perception and attitude about the organism.

Our focus in this study was on healthcare givers in the critical care units of the University of Ilorin Teaching Hospital, Ilorin, Nigeria (UITH). There is a paucity of information on MRSA surveillance system and control policies in most hospitals in developing nations. At UITH, *Staphylococcus aureus* isolates from infected patients are not routinely tested for methicillin susceptibility and HCW has never been screened for MRSA. In addition, the huge economic burden of MRSA infections among the critically ill patients as well as the need to put in place educative intervention in consonance with the global agitation for MRSA control demand that the level of MRSA awareness in our hospitals be defined. This study therefore was aimed at determining the level of awareness, knowledge and disposition to MRSA screening and control among healthcare workers in critical care units of our hospital.

SUBJECTS, MATERIALS, AND METHODS

Methodology

The study design was a cross-sectional survey of HCGs in the critical care units (neonatal intensive care, renal/ dialysis and the adult intensive care units) of the University of Ilorin Teaching Hospital, Ilorin, Nigeria (UITH). This study was part of a wider project on MRSA carriage by HCGs in the critical care unit of the same hospital. Healthcare givers awareness and knowledge on MRSA control were sought before being asked about their willingness or otherwise to submit to MRSA screening.

University of Ilorin Teaching Hospital, Ilorin, Nigeria is a tertiary health care facility with 450 beds and an average of 10,000 and 12,000 annual admissions and outpatient hospital visits, in the last five years. The study was conducted between December, 2009 and February, 2010. All members of staff in the primary critical care units of the hospital were recruited into the study except those who declined consent. Medical and nursing students who were on posting in the critical care units of the hospital at the time of the study were also recruited except when they did not give their consent.

Information on the general purpose of the study and the need to respond correctly to anonymous questions in the questionnaire were given to the participants. They were also informed that their participation was voluntary and could be terminated at any time they desired having assured them of the confidentiality of information supplied. The study was approved by the Ethical and Research Committee of UITH.

The instrument of research was a self-administered questionnaire containing 22 items. Some of the questions were semi-structured while others were open-ended. The questionnaires were issued to the participants on reporting to duty and were to be returned at the close of work on the same day of administration. Every HCG who failed to

return the completed questionnaire on the same day was traced to their work stations on the following day and when not seen, text messages were sent to their mobile phones as a reminder imploring them to return completed questionnaire without further delay.

The information obtained through the questionnaire was in three parts:

(a) Socio-demographic characteristics such as age, sex, socio-economic class, occupational group, number of years in hospital employment and number of years spent in the critical care unit.
(b) Awareness and disposition to MRSA screening. Awareness was taken as having heard about MRSA at any time and disposition meant willingness or refusal of nasal screening for MRSA
(c) Knowledge and views about MRSA control. The knowledge of MRSA control of the respondents was assessed based on self-reported understanding that MRSA infections constitute a threat in hospital settings and ability to mention at least one correct MRSA control measure.

Statistical Analysis

All information obtained was inputted into the computer and statistical analysis was performed using SPSS software version 15 (SPSS Inc, Chicago, IL, USA, 2007). MRSA awareness was correlated to a number of factors including age, gender, category of work, socio-economic class, number of years in hospital employment and number of years in the critical care unit by Spearman's correlation technique. Spearman's co-efficient value ranges between –1 and +1 with a positive value implying that with increase in the value of the variable there was an increased likelihood of MRSA awareness while a negative value implied that an increase in value of the variable connotes a reduced likelihood of MRSA awareness.

RESULTS

Socio-demographic Characteristics

A total of 198 HCGs and students who were in the critical care units of the hospital during the study period participated in the study. The mean age of the participants was 33.7 ± 8.7 years. They consisted of 101 (51.0%) males and 97 (49.0%) females with a M: F ratio of 1.04:1 (Table 1). The participants comprised 69 (34.8%) doctors, 51 (25.8%) nurses, 42 (21.2%) students, 18(9.1%) attendants, 11 (5.6%) porters, 4 (2.0%) technicians and 3 (1.5%) administrative staff. Many, 70 (35.4%) of the respondents belonged to the upper socio-economic class.

Awareness and Disposition to MRSA Screening

One hundred and three (52.0%) of the participants were aware of MRSA while all the respondents (100%) were favourably disposed to screening for the organism (Table 2). Almost all, 191 (96.5%), wanted eradication therapy if found to be MRSA carriers. The same set of respondents 191 (96.5%) would allow for monitoring of their response to eradication therapy. Absence of active infection or illness symptom was the reason given by a few, (3.5%) that would decline eradication therapy.

Knowledge and Views about MRSA Control

A total of 120 (60.6%) respondents considered MRSA as a threat in the hospital, 27 (13.6%) did not, while 51(25.8%) were indifferent (Table 3). Majority, 124 (87.9%) of the respondents reported that there were no MRSA control measures in their respective work stations. Most of the HCW, 89(45.0%) failed to respond to question on the impact of a good MRSA control programmeme in the hospital. Less than one third, 56 (28.3%) of the respondents believed that adequate control of MRSA will reduce nosocomial spread while 26(13.1%) and 27(13.6%) respectively felt it would reduce morbidity and mortality.

When asked to give one MRSA control measure, 101 (51.0%) of the participants gave correct response, 8 (4.0%) were wrong while 89 (45.0%) failed to respond. Amongst the suggested MRSA control measures by the responding HCGs were; regular screening of hospital staff 36 (18.2%), active surveillance/ institution of Hospital wide Control policy 31(15.7%) and health education 15(7.6%) as presented in Table 3. The only wrong MRSA control measure suggested was antibiotic prophylaxis for staff and at risk patients 8(4.0%).

Table 1: Characteristics of Participants

Characteristic	Number (%)
Age years*	
20 – 29	75(37.9)
30 – 39	80(40.4)
40 – 49	25(12.6)
50 – 59	18 (9.1)
Number of years in service*	
≤5	141(71.2)
>5	57(28.8)
Number of years in critical unit†	
≤5	159(80.3)
>5	39(19.7)
Socioeconomic class	
Upper	70(35.4)
Middle	55(27.8)
Low	73(36.9)
Sex distribution	
Males	101(51.0)
Females	97(49.0)
Category of work	
Doctors	69(34.8)
Nurses	51(25.8)
Students	42(21.2)
Attendants	18(9.1)
Porters	11(5.6)
Technicians	4(2.0)
Administrative staff	3(1.5)

**Mean number of years respectively 7.3±7.8.*

Table 2: Respondents Awareness and Disposition to MRSA Screening

Variable	Number (%)
Awareness	
Yes	103(52.0)
No	95(38.0)
MRSA Information Source	
Books	81(78.6)
Lectures	18(17.5)
Internet	3(2.9)
Hospital (ward/ground rounds)	1(1.0)
Media	0(0.0)
Preparedness for MRSA screening	
Yes	198 (100.0)
No	0 (0.0)
Favourably Disposed to Eradication therapy	
Yes	191(96.5)
No	7(3.5)
Favourably Disposed to Monitoring of response to Eradication therapy	
Yes	191(96.5)
No	7(3.5)

Table 3: Respondents Knowledge and View about MRSA Control

Knowledge of View	Number (%)
Consider MRSA a Threat in the Hospital	
Yes	120 (60.6)
No	27 (13.6)
Indifferent	51 (25.8)
Respondents assessment of MRSA control measure in their hospital unit	
Present	24 (12.1)
Absent	174 (87.9)
Respondents view about the implication of MRSA control	
Reduces MRSA nosocomial spread	56(28.3)
Reduced morbidity	26(13.1)
Reduced mortality	27(13.6)
Failed to respond	89(45.0)
Know at least one MRSA control measure	
Yes	101 (51.0)
No	8 (4.0)
Indifferent	89 (45.0)
Respondents suggested MRSA control measures	
Regular screening of hospital staff	36(18.2)
Active surveillance/Institution of Hospital wide Control policy	31(15.7)
Health education	15(7.6)
Hand wash before and after patient handling by hospital staff	12(6.1)
Wearing of protective clothing by hospital staff	1(0.5)
Mupirocin cream/spray application	4(2.0)
Isolation of affected patient	1(0.5)
Treatment of affected patient	1(0.5)
Antibiotic prophylaxis for staff and at risk patients	8(4.0)
Failed to respond	89(45.0)

Table 4: Factors Associated with MRSA Awareness-Based on Spearman's Correlation

Variable	Spearman's Co-efficient Correlation Value	p-value	Remark
Age	0.657	0.013	Significant at 0.05
Gender	0.272	0.000	Significant at 0.01
Number of years in hospital employment	0.815	0.000	Significant at 0.01
Number of years in the hospital critical unit	0.720	0.000	Significant at 0.01
Category of work	0.784	0.018	Significant at 0.05
Socio-economic class	–0.005	0.942	No significant association

Factors Associated with MRSA Awareness

The age, number of years in the hospital employment, number of years in the critical care units, and the cadre of work correlated positively with MRSA awareness as shown in Table 4.

DISCUSSION

The observed level of HCG's MRSA awareness of 52.0% in this study is low when compared with the 86.0%[12] recorded in Dundee in similar studies. Despite the fact that Kesah *et al* [3] have advocated that there is a need to maintain surveillance and control of MRSA infections in Africa as far back as nearly a decade ago, close to half (48.0%) of the HCW in this study remained unaware of MRSA. This underscores the need for active and reinforced education in order to promote awareness and the likelihood of these HCGs developing a high index of suspicion for early diagnosis and adequate treatment of MRSA infections. This is because HCGs low MRSA awareness level observed in this study suggests that they might not even consider it as a diagnostic option when it occurs among their patients since most of the healthcare workers studied were doctors (34.8%) and nurses (25.8%). The consequences of inactions, by these frontline HCGs could be overwhelming because MRSA is a multi-drug resistant bacterium known for causing fulminant disease for which it is termed "superbug". Therefore, there is a need for repeated enlightenment and educational intervention among the HCG on MRSA in line with the agitations of the United States, Chicago-based non-profit and official organisation calling for annual celebration of World MRSA Day with the sole aim of increasing the awareness on MRSA and more Government involvement.[6]

The low level of MRSA awareness recorded in this study is unlikely to be different in other African countries in contrast to the situation in the developed countries where MRSA awareness even among patients/visitors was 94.0% and 100.0% among Nation Health Service employees in the United Kingdom.[6–7, 13] These perhaps suggest that HCGs in the developed world are quite aware and adequately informed about MRSA than their contemporaries in Africa. This will no doubt affect the prevalence of MRSA in these two sides of the divide. The observed differences may be related to the source and people's attitude to information among others. None of the HCG in this report for instance knew about MRSA through the media as against the finding in United Kingdom where general media was the commonest source of information.[13] The mass media in Africa and particularly Nigeria will therefore need to give more presentations on MRSA to increase the public level of awareness and knowledge while health institutions needs to ensure same is taught at schools.

The readiness of all HCGs in this study to undergo screening for MRSA carriage is however commendable. This probably is because the participants did not view MRSA carriage as a condition

associated with stigmatisation like HIV. Furthermore, low level of awareness and knowledge on MRSA could be contributory as the decisions of the HCGs to undergo screening might not have been well informed. This is because some researchers are against routine screening of hospital staff except during nosocomial infection outbreak mainly because of ethical issues with emphasis on the security of job.[14] The participation of all HCGs will however assist in arriving at the true situation of MRSA carriage among them in this environment and formulation of appropriate control strategies. Similarly, overwhelming majority of the HCGs (96.5%) were well disposed to eradication therapy if found to be carriers of the organism. This is also a good omen for the control of MRSA since carrier HCGs will be able to avoid serving as transmitter of MRSA both in the hospital and community.[2]

While all visitors and patients recognised MRSA as a major concern in the hospital setting in developed countries,[13] 13.6% of the participants in this study did not considered it to be a threat and 25.8% were indifferent. This is probably because close contact with patients tend to cause HCGs to underestimate perceived MRSA risk at the same time as it led them to regard it as controllable. These categories of healthcare givers require training. There is also the need to factor in the effect of hospital practice in Nigeria where many relatives are allowed to have close contact with very sick patient; not knowing that they could be at risk or constitute risk to patients. Only certified MRSA free HCGs should be allowed to have regular contact with critically ill patients while relatives are restricted or allowed to give limited assistance in care. Even though about half (51.0%) of all the respondents knew one correct means of control for MRSA, nearly all (87.9%) of them reported that MRSA control measures were absent in their hospital units. There is therefore the need for policy makers to put in place adequate control as reports of relatively high prevalence were from places where some infection control mechanisms had been put in place.[13–15] This intervention is very necessary because Nigeria has maintained the highest prevalence of MRSA compared to several other African countries.[17–18]

The inability of many (45.0%) respondents to suggest MRSA control measure can be attributed to lack of in-depth knowledge on MRSA. Furthermore, only 6.1% of the healthcare givers recognised hand washing as an important simple MRSA control measure indicating that the general infection control practices in our institution may be sub-optimal. Nevertheless, these findings are in agreement with the 87.9% of the healthcare workers attestation to absence of MRSA control measures in their hospital units.

MRSA awareness correlated positively with age, number of years in service, number of years in the critical care unit as well as the category of work in this study implying that HCGs that were not aware or have knowledge of MRSA were those that had not stayed long either in employment or the critical care units. This is in agreement with previous reports in which healthcare workers' experience (length of service) and work situation (part time versus full time) affected their perception of MRSA infection risk.[19–20] This observation may be borne out of occasional exposures to teaching sessions on MRSA such as in ward rounds and morbidity/mortality reviews indicating that posting of experienced HCGs to critical care hospital units may be helpful. Such teachings need to be intensified in every unit of the hospital so that HCGs will be well informed about the dangers of MRSA. Furthermore, educative posters, hand bills and booklets on MRSA must be readily available so that MRSA awareness will be independent of factors such as age, number of years in service, number of years in the critical care unit and the category of work but everyone visiting the units will have first hand information.

Conclusion

In conclusion, this study has revealed a low level of awareness as well as gaps in knowledge of healthcare givers about MRSA although there is paradoxically high disposition to screening. Inadequate publicity on MRSA is a major contributor to poor knowledge and awareness.

There is need for educational intervention and sensitisation programmes on MRSA. Healthcare workers should be trained, re-trained and kept informed of infection control techniques. There is also the need for adequate publicity about MRSA on both electronic and print media while educative posters, hand bills and booklets on MRSA should be made available in the various hospital units. There may also be need to post experienced staff with higher MRSA awareness level to critical hospital care units.

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CONFLICTS/DUALITY OF INTEREST

There are no conflicts or duality of interest with respect to the conduct of this study.

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