



Full Length Research Paper

Retrospective study of nosocomial infections in six private hospitals in Kwara State, Nigeria

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Abstract

A 1-year Retrospective study of nosocomial infections of patients admitted and discharged in six private hospitals in Kwara State (Nigeria) was carried out. Patients' folders and Microbiology laboratory records from each hospital were used for the determination of prevalence of nosocomial infections in the six hospitals. The result showed that the prevalence rate ranged from 9.3% to 16.3%, with overall prevalence rate of 15.2%. Analysis of incidence of nosocomial infection rates by site of infections showed that surgical site infection ranked the highest with prevalence rate of 26.1% followed by infection of the blood stream, urinary tract and respiratory tract in descending order. It can be concluded that nosocomial infections in the six private hospitals in Kwara State were higher than the widely quoted World Health Organization rate of 5 to 10%, prospective study of nosocomial infections in these hospital is therefore recommended.

Keywords: Nosocomial infections, Retrospective nosocomial study, Nosocomial infections in Kwara, Nosocomial infections in private hospitals.

INTRODUCTION

The World Health Organization (2002) offers several definitions of nosocomial or hospital-acquired infection. Two of such definitions are: An infection acquired in hospital by a patient who was admitted for a reason other than that infection, or an infection occurring in a patient in a hospital or other health care facility in whom the infections were not present or incubating at the time of admission, which include infections acquired in the hospital but appearing after discharge, and also occupational infections among the staff of the facility (Benson, 1995; Bolyard et al., 1998; Ducl, 2002; Coffin and Zaotis, 2005).

Nosocomial infections develop while in a healthcare facility due to the introduction of pathogens whether or not the disease is expressed during the duration of the

hospital stay (Johnson, 2002; Morley, 2002). Infections occurring more than 48 hours after admission are usually considered nosocomial (Garner, 1988). Nosocomial infections are most frequently infections of the urinary tract, surgical wounds, and lower respiratory tract. Several definitions have been developed to identify nosocomial infections in specific infection sites. A number of these were derived from those published by the Centre for Disease Control and Prevention (CDC) in the United State of America (Garner, 1988; Horan, 1992) and during international conferences and are used for surveillance of nosocomial infections. These are based on clinical and biological criteria, and include approximately 50 potential infection sites.

Nosocomial infections may be considered endemic

or epidemic (Coffin and Zaotis, 2005). Endemic infections are defined as sporadic infections that constitute the background rate of the infection at the healthcare facility; the rate of such infections usually fluctuates from month to month but is not overall significantly different from the average background rate of these infections (Jarvis, 1991). Of all nosocomial infections, endemic infections account for the majority of occurrence within the setting and are the focus of most infection control activities (National Nosocomial Infections Surveillance (NNIS), 1995). Epidemic infections occur at a rate significantly higher than the background rate of such infections or when there is an unusual increase in infection above baseline for a specific infection or organism (Ducel *et al.*, 2002).

At least 5 to 10% of patients entering hospitals in United State of America acquire an infection that was not present or incubating on admission (Haley, *et al.*, 1985); it may be higher in the developing countries. Such hospital acquired infections did not only add significantly to the morbidity and mortality in patients, but also a huge economic burden expected from underlying disease (Dixon, 1987; Freeman *et al.*, 1979).

The aim of this work therefore is to carry out retrospective survey of prevalence of nosocomial infections in selected private hospitals in the state, with a view to provide base data for the prospective study, so that appropriate health policies can be put in place by the hospitals concerned and the government in general.

MATERIALS AND METHODS

Retrospective Study of Nosocomial Infections

A retrospective study in six private hospitals in Kwara State was carried out in 2010, by assessing the medical records of patients kept with the medical record units of the hospitals. Approvals to examine patients' medical record were given to the heads of the medical record units by the Chief Medical Director of each hospital.

The study was based on review of hospital records of patients admitted and discharged between January and December in the year 2010 as contained in their hospital, folders and Microbiology laboratory records. For patients whose information about their microbiological tests results was not available in the folders, visits were made to the microbiology laboratory to retrieve the same. Attempts were also made to verify the microbiological test results in the folders by matching them with records kept in the hospital microbiology laboratory. The folders were arranged month by month and sorted out ward by ward.

The following information was obtained from the folders: patients hospital numbers, names, age, date of admission, diagnosis on admission, Ward

admitted, specimen sent to the microbiology laboratory and results, type of organism(s) isolated, susceptibility of the isolates to the antibiotics tested, second diagnosis and date and interval between the first and second diagnosis.

To classify an infection to be nosocomial, the following criteria, as specified by WHO/CDC (2002) were used:

- Time interval between the first and second diagnosis is not less than 48 hours
- Positive culture results in the first and second diagnosis
- Isolated pathogen in second diagnosis is different from the first isolated pathogen.

Classification of Infections into Sites

Classification of infections into sites was based on the diagnosis in the folders and the type of specimen sent to the microbiology laboratory for investigations.

When record indicated surgical operation and wound swab was sent to microbiology laboratory for culture and the culture was positive, the infection acquired was considered as surgical site. Where the sample involved was urine, with significant bacteria level, the infection was considered urinary. Whereas, when sputum and blood cultures produced positive result, the patients were deemed to have developed respiratory and blood stream infections respectively.

Determination of Rates of Infections

Rate of infection was determined by dividing total number of patients infected by total number of patients discharged multiply by 100.

$$\text{Infection rate} = \frac{\text{No of patients infected}}{\text{Total no of patients discharged}} \times 100$$

Hospital wards with high prevalence of nosocomial infections were noted for prospective study.

RESULTS

The results of prevalence of nosocomial infections in six selected private hospital in Ilorin showed that, hospital E, had the highest prevalence rate (18.0%) and the lowest prevalence was recorded in hospital B (Table 1).

Analysis of the available medical records in the six private hospitals studied indicate that surgical site was the most commonly implicated nosocomial infection site, with an occurrence rate (26.1%) twice that in respiratory tract site (9.0%); Table 2

Table 3 showed the nosocomial infection rates in the surgical wards of the six private hospitals studied. Hospital E had the highest prevalence rate of 31.0%.

Table 1. Prevalence of nosocomial infections in six private hospitals in Ilorin.

Hospitals	No. of patients discharged	No. of patients infected	Infection rate (%)
A	80	13	16.3
B	86	8	9.3
C	74	12	16.2
D	127	20	15.7
E	111	16	18.0
F	106	89	15.0
Total	584		15.24

Table 2. Prevalence of Nosocomial Infections by Sites in Private Hospitals in Ilorin

Site of infections	No. of patients discharged	No. of patients infected	Infection rate (%)
Urinary tract	230	24	10.4
Surgical	153	40	26.1
Respiratory tract	77	7	9.0
Blood stream	124	18	14.0
Total	584	89	15.23

Table 3. Comparison of Incidences of Nosocomial Infection in Surgical Wards of the six Private Hospitals in Kwara State.

Hospitals	No discharged	No. infected (rate)
A	21	6 (28.6)
B	23	5 (21.7)
C	20	6 (30.0)
D	33	8 (24.2)
E	29	9 (31.0)
F	27	6 (22.2)
TOTAL	153	40 (26.14)

The prevalence rates in five other hospitals were similar. The nosocomial infection rate in Hospital B was comparably low.

Table 4 *Staphylococcus aureus* was the highest pathogen bacteria isolated.

DISCUSSION

Nosocomial infections are a major source of concern to health workers because; it continues to hamper effective management of health care delivery in hospitals all over the world. This study addressed the prevalence of nosocomial infections in six private health care institutions in Kwara state with the hope of providing an impetus to health-care givers to initiate serious reforms in initiating nosocomial infections control.

In this study we found that there was high rate of nosocomial infections in the six hospitals studied. All the hospitals except the hospital B, present nosocomial

infections rate higher than the World wide established rate of 5 to 10% (Haley *et al.*, 1985; WHO, 2002).

As shown in table 1, the infection rate ranged from 9.3% to 18.0% with the overall average incidence rate of 15.24%. The significance of these findings is that the admitted patients acquired nosocomial infections during their stay in the hospital and has reported by Francisco *et al.*, (2006) must have contributed to increase in their duration of hospitalization, medical bills and spread of multi-antibiotic resistant pathogens in the hospital and community. The significant morbidity and mortality associated with nosocomial infections has led to many advanced countries of the world setting up surveillance teams in health institutions and at national levels (NNIS, 1995). Such efforts or measures are however non-existent in Nigeria and many other developing countries of the world. This is probably due to scanty scientific data on nosocomial infections and a lack of awareness about infection control.

This study also incriminated surgical site as the most

Table 4. Isolated bacterial pathogens as contained in the folders of patients with nosocomial infections in the six private hospitals in Kwara state.

Isolates	Number	Percentage
<i>Escherichia coli</i>	23	19.2
<i>Staphylococcus aureus</i>	34	28.3
<i>Staphylococcus spp</i>	9	7.5
<i>Staphylococcus epidermidis</i>	17	14.2
<i>Pseudomonas aeruginosa</i>	21	17.5
<i>Klebsiella spp.</i>	16	13.3
Total	120	100.0

Staphylococcus aureus was the highest pathogen bacteria isolated.

prevalent site of nosocomial infections (Table 2). As shown on the table, despite the fact that 230 patients were admitted and discharged for urinary tract infection, only 24 representing 10.4% were infected. In contrary, out of 153 patients admitted and discharged for surgical wound infections, 40 patients (26.1%) were infected; this therefore put surgical site infection as the leading site of nosocomial. This rate is also higher than the 1.4% prevalence rate reported in a similar survey at a University teaching hospital in Nigeria (Atata *et al.*, 2006).

The reason for the higher prevalence rate of nosocomial infections in private hospitals than Worldwide established rate in Nigeria may be adduced to the following:

- Level of hygiene in majority of these private hospitals is low.
- Unregulated entry into the wards of the hospitals by visitors. Visitors enter the wards severally at almost all times, contributing to microbial bioload of the wards and increasing the rate of nosocomial infections.

Classification of infections by sites in these studies among the hospitals used showed that surgical site had the highest prevalence rate, compared with blood stream, urinary and respiratory nosocomial infection sites. This order corroborated the earlier findings of Atata, *et al.*, (2006) in the study of retrospective prevalence of nosocomial infections in a tertiary health care institution in Nigeria, where surgical wound was found to be the most prevalent nosocomial infection (60%) when compared with other sites of nosocomial infections.

Comparison of rate nosocomial infections in the wards of the six hospitals showed that surgical wards had the highest rate of infections, this is a further testimony to the fact that surgical site was the most implicated in nosocomial infection in these studies. This finding is in contrast to Ogunsola *et al.*, (1998), where the Urinary tract was reported as the most prevalent infection site at the University of Lagos Teaching hospital (LUTH).

The isolated bacteria as shown in table 4, revealed the following bacterial species; *Staphylococcus aureus*, *Staphylococcus epidermidis*, *Staphylococcus species*,

Escherichia coli, *Pseudomonas aeruginosa*, *Klebsiella species* in this study have been identified in many different studies as the agents of nosocomial infection (WHO 2002, Atata *et al.*, 2006, Victor *et al.*, 2006, Atata *et al.*, 2010).

the results of retrospective study of nosocomial infections in six private hospitals in Kwara State revealed as follow; the average of nosocomial infections rate in the studied hospitals was 15.2%, the leading bacterial pathogens in descending order are; *Staphylococcus aureus*, *Escherichia coli*, *Pseudomonas aeruginosa*, *Staphylococcus epidermidis*, *Klebsiella sp.* and *Staphylococcus sp.*, surgical wards had the highest rate of infections, surgical wound infections is the leading nosocomial infection in the studied hospitals. It can be concluded that *Staphylococci* bacteria which according to the result of this work gave 35.5% of the total isolates might be responsible for very high rate of surgical wound infections in all the six hospitals. The conclusion is corroborated by the work of Atata *et al.* (2010), where *Staphylococci* bacteria were incriminated as most frequent agent of surgical site nosocomial infection. Prospective study of nosocomial infections particular in surgical wards of these hospitals is recommended.

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