

**A STUDY OF DEMOGRAPHIC PERSONNEL CAPACITY SEEN IN SOME CLEAN ORTHOPAEDIC WOUNDS SURGICAL SITE INFECTIONS PROCEDURES**Professor Kwashie Ajibade Ako-Nai<sup>1</sup>, Olubunmi Titi Attah<sup>2</sup> and A. L. Akinyoola<sup>3</sup><sup>1,2</sup>Department of Microbiology, Obafemi Awolowo, Ile-Ife, Nigeria.<sup>3</sup>Department of Orthopaedic Surgery and Traumatology, Obafemi Awolowo University Teaching Hospitals Complex Ile-Ife, Nigeria.

\*Corresponding Author: Professor Kwashie Ajibade Ako-Nai

Department of Microbiology, Obafemi Awolowo, Ile-Ife, Nigeria.

Article Received on 10/01/2019

Article Revised on 31/01/2019

Article Accepted on 22/02/2019

**ABSTRACT**

**Background:** One thousand and ninety-one (1,091) different personnel participated in the clean orthopaedic surgical site infection study at the Obafemi Awolowo University Teaching Hospitals Complex (OAUTHC), Ile-Ife, Nigeria, between December 2013 to May 2016. Their contribution strongly affected the outcome of the study in terms of the host, bacteria and environment. Furthermore, Seventy-five participants were recruited for the study but only three (4%) of them had surgical site infection (SSI) while seventy-two did not develop SSI. The groups' personnel capacity is shown in this study. **Method:** The personnel were divided into different categories with respect to their specialization/job duties, age and sex. The groups were associated to their physical duties carried out at different sections of the hospital environments, such as, operation theatre, theatre operation tables and hospital ward. **Results:** Seventy-five participants were recruited for the study but only three (4%) had surgical site infection. Among the seventy-five subjects, forty – four (58.7%) was male and 31 (41.3%) female. Their age ranged from a year old (1 yr) infant to an eighty year old (80 yr) woman. The mean age of participants was  $35.82 \pm 0.48$  (standard error of mean) for male and  $43.65 \pm 0.47$  for female, with most of the subjects within the age range of twenty one and forty. The majority of the subjects were between the age group of twenty one to forty. Three (4%) out of the seventy – five subjects had post – operative surgical site infection and two (66.67 %) of them being male and one (33.33 %) female. **Conclusion:** The study showed that a high number of personnel were involved in the procedures and thus suggests possibility of contamination in the theatre and the wards.

**KEYWORDS:** Demographics, patients, personnel, Surgical Site Infections, Clean Orthopaedic Wounds.**INTRODUCTION**

Orthopaedic infection is a major challenge among patients undergoing surgery (Bercion *et al.*, 2007; Taylor *et al.*, 1990). It occurs as a result of wounds caused by bacteria contamination and patient's flora (Bercion *et al.*, 2007; Tiemersma *et al.*, 2004). In addition, it brings toll to the patient because it involves introduction of prosthetics during surgical operation which could be expensive and cause the patient costs, delay in healing as a result of prolong hospital stay (Thomas *et al.*, 2004). The study was undertaken between December 2013 to May 2016, and it involved time and personnel to accomplish, thus, a high number of personnel capacity and hence the study.

**MATERIALS AND METHODS****Study Centre**

The study was carried out prospectively at the Obafemi Awolowo University Teaching Hospitals Complex (OAUTHC) Ile-Ife between (December 2013 to May

2016) The hospital is a referral centre for over 1 million people in South-western Nigeria.

**Ethical Approval**

The investigators proposals were reviewed and approved by the Ethical Committee of the Obafemi Awolowo University, Ile-Ife, Osun State, Nigeria (Protocol number IPHOAU/12/507). Informed consent was obtained from each participant and parental consent from parents of subjects aged 13 years.

## RESULTS

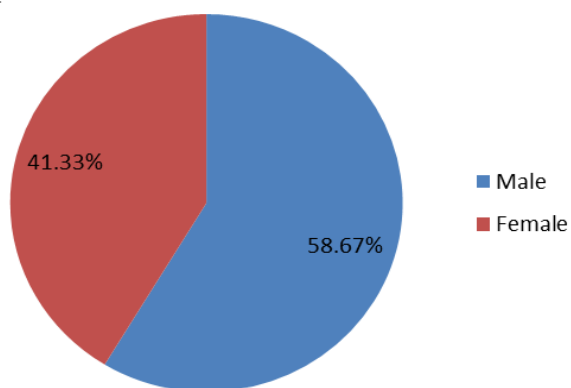
**Table 1: Incidence of Post - Operative Surgical Site Infection in Relation to the Number of Medical Personnel in the Operating Room.**

Surgical procedure	Total (%)	Number of medical personnel				Incidence of infection (%)	P value
		Physicians	Nurses	Medical student	Others		
Hip hemiarthroplasty	41 (3.76)	13	9	0	19	0	
Open reduction and internal fixation	713 (65.35)	224	111	78	300	3	(0.001)
Amputation	13 (1.91)	7	2	0	4	0	
Total hip replacement	16 (1.47)	7	3	0	6	0	
Darrach's procedure	8 (0.73)	4	2	0	2	0	
Soft tissue release	32 (2.93)	11	7	7	7	0	
Patelectomy	17 (1.56)	4	3	0	10	0	
Limb lengthening	23 (2.11)	8	5	0	10	0	
Corrective osteotomy	30 (2.75)	11	7	0	12	0	
Excisional biopsy	60 (5.50)	23	14	4	19	0	
Bone grafting	25 (2.29)	6	7	0	12	0	
Other musculoskeletal	113 (10.36)	43	22	6	42	0	(0.049)
Total	1091	361	192	95	443	3	

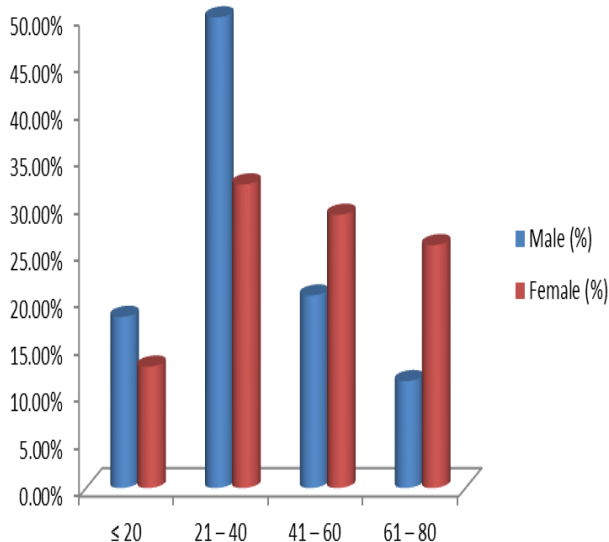
The medical personnel in the theatre include the physicians (surgeons, resident doctors and house officers), nurses (scrub, circulating and peri operative nursing (PON) students), medical students and other medical personnel (which included anaesthetists and researchers). The total number of medical personnel altogether was one thousand and ninety one (1,091) with the number of people that were not directly involved in the procedure had the highest percentage. Three patients (4%) underwent hip hemiarthroplasty procedure involving thirteen (31.71 %) physicians, nine (21.95 %) nurses and nineteen (46.34 %) other medical personnel making a total of forty one (3.75%). Furthermore, forty-seven patients (62.67%) had open reduction and internal fixation (ORIF) procedure with a total of seven hundred and thirteen (65.35%) medical personnel involved. The medical personnel included two hundred and twenty four (31.42%) physicians, one hundred and eleven (15.57%) nurses, seventy eight (10.94 %) medical students and three hundred (42.08 %) other medical personnel. In addition, a (1.33 %) patient had amputation of the limb involving a total of thirteen (1.19 %) medical personnel. This includes seven (53.85 %) physicians, two (15.38 %) nurses and four (3.77 %) other medical personnel. Total hip replacement was carried out one (1.33 %) patient in which sixteen (1.47 %) medical personnel consisting of seven (43.75 %) physicians, three (18.75 %) nurses and six (37.5 %) other medical personnel participated. Eight (0.73 %) medical personnel were involved in the only patient that underwent Darrach's procedure. This included four (50 %) physicians, two (25 %) nurses and two (25 %) other medical personnel. Two (2.66 %) of the patients had a soft tissue release procedure involving thirty two (2.93 %) medical personnel, consisting of eleven (34.37 %) physicians, seven (21.87 %) nurses, seven (21.87 %) medical students and seven (21.87 %) other medical personnel. One patient (1.33 %) underwent

patelectomy with seventeen (1.56 %) medical personnel involved in the procedure in which four (23.52 %) physicians, three (17.64 %) nurses and ten (58.82 %) other medical personnel participated. Furthermore, two (2.67 %) patients had limb lengthening involving twenty three (2.11 %) medical personnel, which consisted of eight (34.78 %) physicians, five (21.73 %) nurses and ten (43.47 %) other medical personnel. Corrective osteotomy was performed on two (2.67 %) patients during which thirty (2.75 %) medical personnel, consisting of eleven (36.67 %) physicians, seven (23.33 %) nurses and twelve (40 %) others. Five (6.67 %) patients had excisional biopsy involving sixty (5.50 %) medical personnel. This includes twenty three (38.33 %) physicians, fourteen (23.33 %) nurses, four (6.67 %) medical students and nineteen (31.67 %) other medical personnel. Also two (2.67 %) patients underwent bone grafting and this involved twenty five (2.29 %) medical personnel, involving six (25 %) physicians, seven (28 %) nurses and twelve (48 %) other medical personnel. Other surgical procedures which included acute clocking corticotomy were grouped as other musculoskeletal. These were carried out by eight different surgical procedures involving one hundred and thirteen (10.36 %) medical personnel, including forty three (38.05 %) physicians, twenty two (16.54 %) nurses, six (5.30 %) medical students and forty two (37.16 %) other medical personnel. Overall (Table 1), ORIF procedure had the highest number of medical personnel which contributed a very high number of personnel that were not involved directly with surgical procedure.

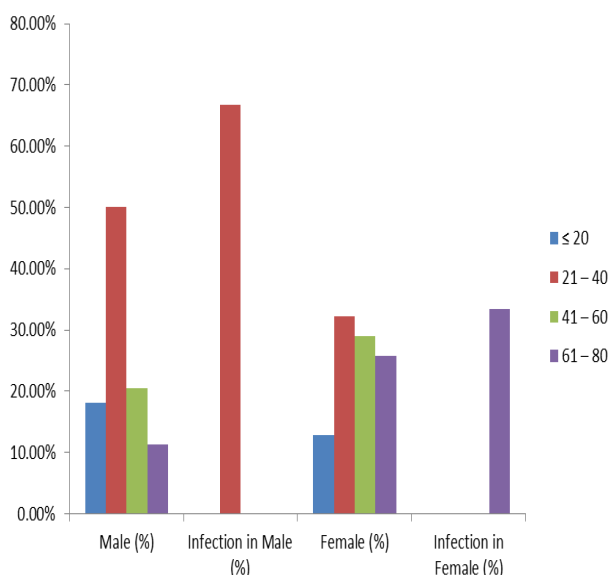
**Distribution and Demographic Survey of Study Population**



**Figure 1: The Overall Sex Distribution of Participants.**



**Figure 2: Age Distribution of Subjects.**



**Figure 3: The Incidence of Post-Operative Infection in Relation to the Overall Age and Sex Distribution.**

**DISCUSSION**

The total number of medical personnel for all the procedures in this study was 1,091 which included the physicians, nurses, medical students and other members of the medical team that were not directly involved in the surgical procedures. The mean of medical personnel in the theatre during the procedures for the three patients that experienced post operative infection was 20.3 with a maximum of 30 persons. This included physicians (5.3), medical students (7.3), nurses (2.7) and other members of the medical team (5). Similarly, the mean of the medical personnel in the operating room for the remaining patients that did not experience post operative infection was 14.3 with a maximum of 30 persons. This included physicians (4.8), medical students (1.0), nurses (2.6) and other members of the medical team (6). Interestingly, in our hospital setting, this factor has been confirmed as a significant risk factor for SSIs ( $p=0.001$ ) in this study. Therefore many clinical students, house officers and residents that tended to attend orthopaedic operations and the operation rooms are not designed as a teaching setting. Thus, reduction of number of persons in the operating room may lower the incidence of SSIs according to (Scherrer, 2003) findings.

**CONCLUSION**

In conclusion, our study showed that quite a large number of personnel participated in the study suggesting the complexity, thoroughness and patience involved in these procedures. It also reflects the number and possibility of ease whenever medical students and others are given the opportunity to observe the procedure through media which will reduce theatre number and contamination.

**REFERENCES**

1. Bercion R, Gaudeuille A, Mapouka P.A, Behounde T and Guetahoun Y. Surgical site infection survey in the orthopaedic surgery department of the “Hôpital communautaire de Bangui,” Central African Republic. *Bull Soc Pathology Exot*, 2007; 100: 197-200. pmid: 17824315.
2. Taylor G, Bannister G and Calder S. Perioperative wound infection in elective orthopaedic surgery. *Journal of Hospital Infections*, 1990; 16: 241-247.
3. Tiemersma E.W, Bronzwaer S.L, Lyytikainen O, Degener J.E, Schrijnemakers P and Bruinsma N, Methicillin-resistant *Staphylococcus aureus* in Europe, 1999–2002. *Emergence of Infectious Diseases*, 2004; 10: 1627–34.
4. Thomas C, Cadwallader H.L and Riley T.V Surgical-site infections after orthopaedic surgery: statewide surveillance using linked administrative databases. *Journal of Hospital Infections*, 2004; 57(1): 25–30. [PubMed: 15142712].
5. Scherrer M. Hygiene and room climate in the operating room. *Minimum Invasive Therapy. Allied Technology*, 2003; 12: 293-9.