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### RESEARCH ARTICLE

#### METHICILLIN RESISTANT STAPHYLOCOCCUS AUREUS WITH ANTIBIOGRAM IN NASAL CARRIERS AMONG HEALTH CARE WORKERS.

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Staphylococcus, Methicillin, Carriers, Resistance, Infections.

#### Abstract

The present study was carried out in 80 Health Care Workers (including Doctors, Post graduate students, interns, nursing staff, etc..) of government general hospital, Vijayawada to assess the prevalence and antimicrobial susceptibility of Methicillin resistant *Staphylococcus aureus* among nasal carriers. Carriage of *Staphylococcus aureus* in the nose appears to play a key role in the epidemiology and pathogenesis of infection. Nasal swabs were collected and screened for *Methicillin Resistance Staphylococcus aureus* by culturing them on routine basal media. Antibiotic susceptibility was performed by modified Kirby-Bauer disc diffusion method and methicillin resistance was detected by using Cefoxitine disc diffusion method. Out of 80 samples, 35(43.7%) were found to be positive for *Staphylococcus aureus*, followed by *Coagulase Negative Staphylococcus*, *Diphtheroids*, *Micrococci*, etc...resistance to Methicillin was detected in 17 out of 35(49%) *Staphylococcus aureus*. This study showed prevalence of 21% MRSA, which arises to a serious concern about the possibility of transmission of MRSA from the health care workers to the patient. All *Staphylococcus aureus* isolates, irrespective of their methicillin resistance status were sensitive to Vancomycin & Linezolid (60%). The carriage rate of *Staphylococcus aureus* and MRSA is highest among class IV employees and nurses respectively. This highlights the need of educational activities among Health Care Workers regarding hospital acquired infections and their prevention strategies. Frequent surveillance and effective sterile techniques implementation in these groups will reduce the burden of MRSA in hospitals, leading to decrease of infections.

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#### Introduction:-

Highly virulent strains of *Staphylococcus aureus* like Methicillin resistance *Staphylococcus aureus* is responsible for a broad range of nosocomial infections and its resistance to wide range of antimicrobial drugs makes treatment of infections complex. Still awareness is lacking regarding this aspect in various regions of developing countries. Data about nasal carriage of MRSA is limited in our Indian scenario. A health care worker plays a major role in cross contamination of MRSA in developing countries like India. Carriage of *S. aureus* in the nose appears to play a key role in the epidemiology and pathogenesis of infection. Some group of individuals like Physicians and hospital ward attendants may be nasopharyngeal carriers in a higher percentage of cases (50 and 90%, respectively) than the

general population (33%). The present study aim is to assess the prevalence and antimicrobial susceptibility of Methicillin resistance *Staphylococcus aureus* in nasal carriers among hospital staff, and survey of infection control practices like hand washing.

### Methods:-

Study was carried out in health care workers (including doctors, Post graduate students, interns, nursing staff, MNO, FNO, etc.) of Government General Hospital Vijayawada. Informed consent was taken from all the participants. Nasal swabs from 80 health care workers were collected. Participants who are with immunocompromised conditions like diabetes, HIV, and any usage of recent antimicrobial therapy were excluded. Nasal swabs were collected from anterior nares of nose with pre moistened sterile swab and were transported to microbiology department without any delay and were screened for *Staphylococcus aureus* by culturing them on nutrient agar (NA) and Mannitol Salt Agar (MSA) by following standard procedures. Antibiotic susceptibility testing of all staphylococcal isolates was performed by modified Kirby Bauer disc diffusion method as recommended by CLSI guidelines. Methicillin resistance was detected by using Cefoxitin disc diffusion test.

### Results:-

Out of 80 samples processed 35 (43.7%) were found to be positive for *Staphylococcus aureus*. Other organisms isolated were Coagulase negative *Staphylococcus*, Diphtheroids, Micrococci, etc. Resistance to Methicillin was detected in 17(49%) out of 35 *Staphylococcus aureus* isolates. Nasal carrier rate of MRSA among health care workers was found to be 17 (21%). Among MRSA strains it is seen that more than 60% isolates were resistant to Penicillin, Azithromycin & Linezolid. Moderate resistance is seen in Erythromycin & Amoxicillin-salbutam. Low resistance is seen in Vancomycin, Ciprofloxacin & Doxycycline. Descriptive statistics were used to summarize the data.

### Discussion:-

Nasal carriage of *S.aureus* among healthy health care workers attribute to hospital acquired infections like surgical site infections, bacteraemia, etc.,. Our study showed prevalence of 21% MRSA in anterior nares of health care workers, which is in accordance with findings of Mathai JK et al (21.9%); and Tsering et al Sikkim (20.9%) which arises a serious concern about the possibility of transmission of MRSA from the health care workers to the patients. All *Staph aureus* isolates, irrespective of their methicillin status were, sensitive to Vancomycin and Linezolid (60%). This study is in relevant with Jawad R et al (59%). So due to the prevalence of nasal carriers of *S.aureus*, awareness should be provoked about hygienic hand washing before attending any patients, as hands invariably harbour nasal carriers. Hospital acquired infections commonly originate from health care workers. Although nasal carriage of *S. aureus* is harmless in healthy individuals, they can become carriers who could pose the risk of spreading infections to the patients. The carriage rate of *S. aureus* and MRSA is highest among doctors and nurses respectively. When the health care workers were questioned about infection prevention it is seen that most of them were not aware of MRSA and hand hygiene techniques. This highlights the need of educational activities among health workers regarding hospital acquired infections and their prevention strategies. Frequent surveillance and effective lab techniques implemented in these groups, will reduce the burden of MRSA in hospitals which leads to decrease in infections.

### Acknowledgement:-

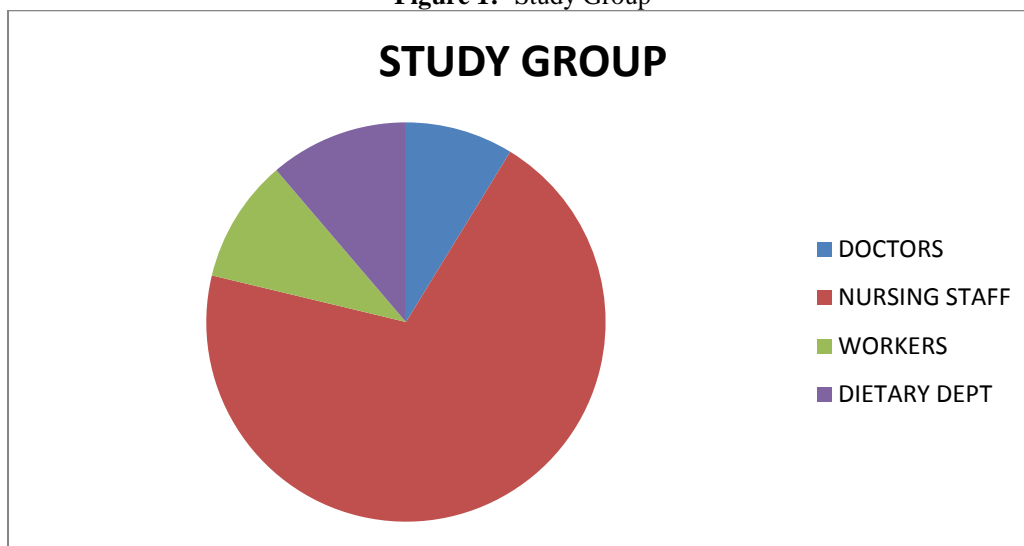
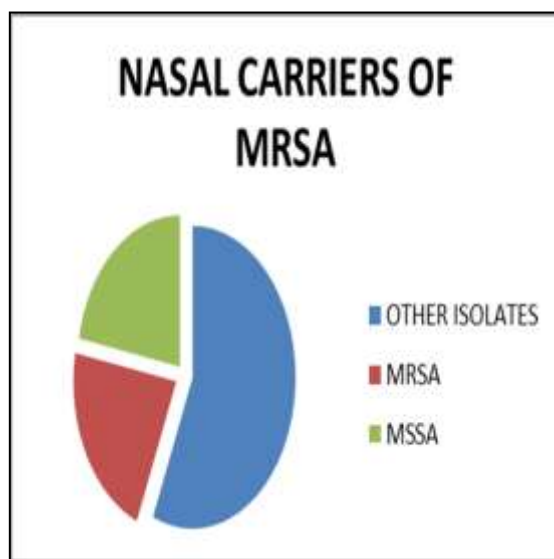
I am thank full to all the doctors, nursing staff, student and technical staff of Government General Hospital, Siddhartha Medical College, Vijayawada who cooperated us in carrying out this research work.

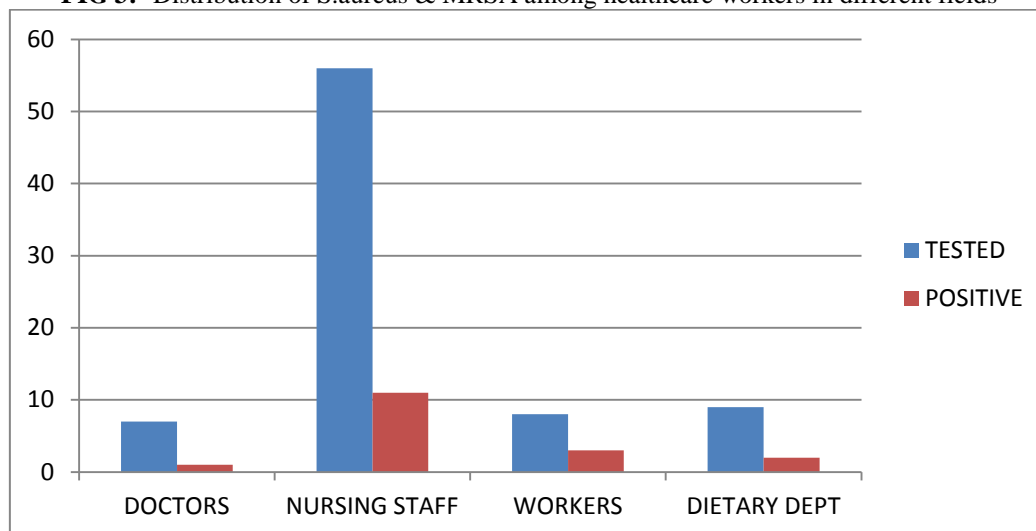
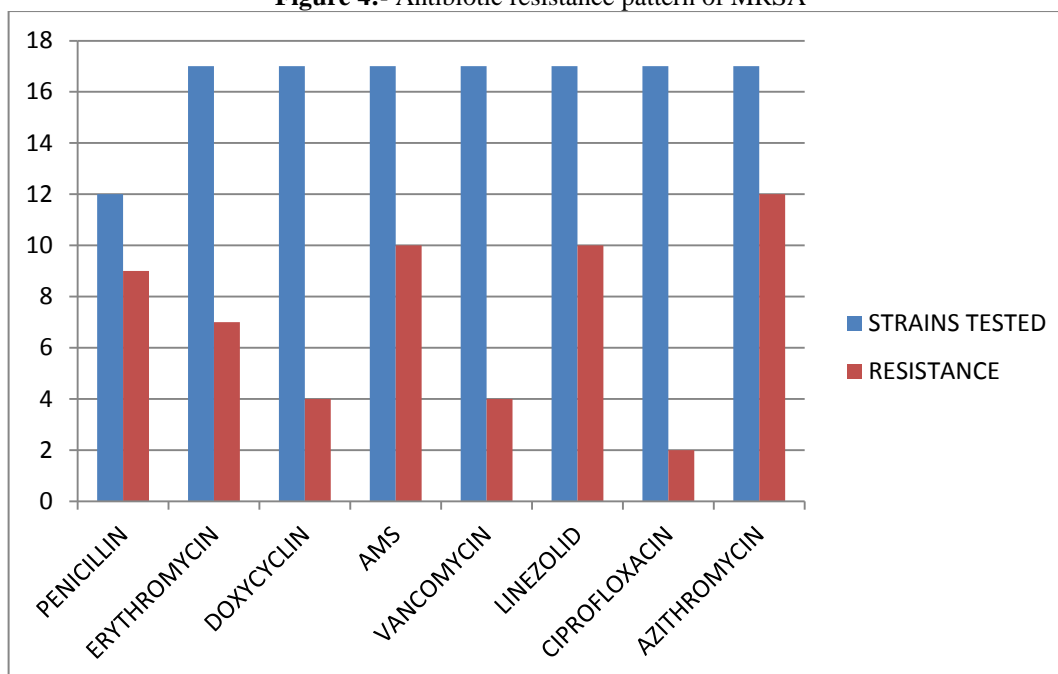
**Table I:-** Prevalence of *S.aureus* and MRSA among healthcare workers

S no	Health care worer	No.of samples taken	<i>Staphylococcus aureus</i>	Mrsa
1	DOCTORS	7	3	1
2	NURSING STAFF	56	22	11
3	CLASS IV WORKERS	8	6	3
4	DIETARY DEPATMENT	9	4	2

**Table II:-** Antibigram

Antibiotic	No. Of strains tested	Resistance	Percentage %
Penicillin	12	9	75%
Erythromycin	5	2	40%
Doxycyclin	13	3	23%
Amoxycillin-salbactam	12	7	58%
Vancomycin	13	3	23%
Linezolid	5	3	60%
Levofloxacin	2	2	100%
Ciprofloxacin	17	2	11%
Azithromycin	3	2	67%

**Figure 1:-** Study Group**Fig 2:-** Nasal Carriers Of Mrsa

**FIG 3:-** Distribution of S.aureus & MRSA among healthcare workers in different fields**Figure 4:-** Antibiotic resistance pattern of MRSA

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