1. Introduction

The bacterium *Staphylococcus aureus* is a common cause of human infection, and it is becoming increasingly virulent and resistant to antibiotics. The nosocomial strains of *S. aureus* are very prone to develop resistance to various anti-Staphylococcal drugs. The beta-lactamase resistant Penicillins (methicillin, oxacillin, cloxacillin, and flucloxacillin) were developed to treat penicillin resistant *S. aureus* and are still used as first-line treatment. Methicillin was the first antibiotic in this class to be used, but only two years later, the first case of Methicillin Resistant Staphylococcus aureus (MRSA) was reported in England. [Jevons M. P et al. 1961] *S. aureus* is one of the most significant human pathogen that causes both nosocomial and community-acquired infection [Diekema D. J et al. 1997-99]. *S. aureus* mainly cause opportunistic infections acquired from different sources like patients, hospital staff mainly through their hands and also from their normal flora. The common types of disease caused by *S. aureus* are various types of infections including, Staphylococcal scalded skin syndrome (SSSS), Osteomyelitis, Meningitis, Pneumonia, Septicemia, Gastroenteritis etc [Shanmugam J. et al. 2009]. Strains of *S. aureus* that are resistant to methicillin, oxacillin and all other β-Lactam antibiotics have spread worldwide from the last four decades [Report from NNIS System 2004]. Infection with MRSA strains, which are resistant to wide range of antibiotics, is associated with considerable morbidity and mortality. [Ambramson MA et al., 1992]. *S. aureus* is well known for its ability to become resistant to antibiotics. Infections that are caused by antibiotic-resistant strains often occur in epidemic waves that are initiated by one or a few successful clones. MRSA features prominently in these epidemics. Epidemic strains of these methicillin-resistant *S. aureus* (MRSA) are usually also resistant to other antibiotics. Methicillin resistance is a complex property, and more than one mechanism is involved. Resistance to methicillin is due to low affinity PBP’s substituting the activities of the normal and essential PBP’s. This low affinity PBP’s are called PBP2a (PBP2), which is encoded for by the *Mec A* gene. In addition methicillin resistance is dependent on other factors like Methicillin-repressor Mec-1, anti-repressor *Mec R1* and factors essential for expression of methicillin resistance [Lee HJ, et al. 2001]. Historically associated with hospitals and other health care settings, MRSA has now emerged as a widespread cause of community
infections. Community or community-associated MRSA (CA-MRSA) can spread rapidly among healthy individuals. Outbreaks of CA-MRSA infections have been reported worldwide. Infection with MRSA is likely to be more severe and requires longer hospitalization. The spread of MRSA may indicate that recommended preventive strategies are either inadequate or improperly implemented [Jean-Christophe Lucet et al. 2005]. The incidence of methicillin resistant *S. aureus* (MRSA) in India ranges from 30-70% [Verma S. et al. 2000]. *S. aureus*, whether methicillin resistant (MRSA) or methicillin susceptible, exhibits a propensity to asymptomatically colonize human hosts. Common anatomic locations of asymptomatic MRSA carriage include anterior nares, throat, groin region, perineal region, mammary folds, axilla, umbilicus, and the sites where the skin integrity has been breached. [Evans et al. 2008]. The carrier rate of *S. aureus* in the nasal canal among the healthy people range from 20-30%. From the healthy carriers among the hospital health care personnel, there are more chances of spreading from their hands, nose or throat by way of touching, sneezing, talking, coughing etc. The growing problem in the Indian scenario is that MRSA prevalence has increased from 12% in 1992 to 80.83% in 1999 [Verma S. et al. 2000].

Sepsis is the most common cause of neonatal mortality. As per National Neonatal Perinatal Database (NNPD) 2002-2003, the incidence of neonatal sepsis in India was 30 per 1000 live birth [Shalini et al. 2010]. It is 3% among intramural babies and 39.7% among extramural admissions. The early manifestations of neonatal sepsis are vague and ill-defined. Septicemia in neonates refers to generalized bacterial infection documented by a positive blood culture in the first four weeks of life and is one of the four leading cause of neonatal mortality in India. [Singh M. et al. 1991.]. Prior to the antibiotic era, the mortality from septicaemia was 90%, but it declined to 24-58% after antibiotics come into use. [Kaushik S.L et al. 1998]. Over the last 60 years, bacteria and, in particular those pathogenic for humans have evolved towards antimicrobial drug resistance. This evolution has two key steps: emergence and dissemination of resistance. [Courvalin P. et al. 2005]. According to W.H.O estimates, neonatal sepsis remains major cause out of five million neonatal deaths per year. [W.H.O Report No.WHO/FRH/MSM/967. Geneva 1996]. The incidences of neonatal sepsis caused by staphylococci continue to increase in many countries worldwide. Therefore, rapid and accurate detection of MR strains of staphylococci
and differentiating them from susceptible strains by clinical microbiological laboratories have a great importance in the therapy of infectious disease caused by staphylococci. [Chambers H.F. et al. 1993]. Several methods for the detection of MR staphylococci have been evaluated and widely used in many bacteriological laboratories including the following: agar dilution, disk diffusion, MIC determination by broth dilution, Oxacillin agar screening test. [Sakoulas et al. 2001]. Methicillin resistance in staphylococci is due to the acquisition of mecA gene, which encodes the low affinity penicillin-binding protein 2a. Presence of the mecA gene defines the staphylococcus as MR, while absence of the gene from a staphylococcal strain indicates methicillin susceptibility (MS). The test based on detection of gene by polymerase chain reaction is considered as “gold standard” for detection of MR in staphylococci [Maes N. et al. 2002].

Staphylococcal infections are very common in the pediatric age group, accounting for most superficial and deep-seated soft tissue infections. Traditionally community-acquired strains are sensitive to methicillin, and usual antibiotic regimens for these infections include beta-lactams with appropriate anti-staphylococcal coverage. In the 1990s, methicillin-resistant Staphylococcus aureus strains were increasingly recognized in the community, and varying rates of community-acquired MRSA infection and nasal colonization in both adults and children have been reported. Data are available on MRSA colonization rates in both pediatric hospitals and child day-care centers. [Yecheil Schlesinger et al. 2003] The one having physical or mental disability, more often than not, becomes a parasite on the family and the community making life a miserable, experience. Mental retardation refers to sub average general intellectual functioning which originates during the development period and is associated with impairment in adaptive behaviour. The mentally retarded from childhood experiences unusual difficulties in learning which affects his capacities for adjustment in day to Staphylococcus appears to become drug resistant more readily than the most other bacteria,[ A.K. Agarwal et al. 2002]. Penicillin was the first antibiotic used for staphylococcal infection and penicillin resistance appeared shortly after its introduction. This was followed by the resistance to co-trimoxazole, ampicillin, amoxicillin and tetracycline. Resistance to erythromycin and chloramphenicol also occurs but to a lesser extent than other antibiotics. Strains resistant to more than one
antibiotic are now by rule. Methicillin resistant Staphylococcus aureus is an increasing problem in health care facilities. Infection with this MRSA strains, which are resistant to wide range of antibiotics, is associated with considerable morbidity and mortality. The spread of MRSA may indicate that recommended preventive strategies in these countries are either inadequate or improperly implemented. Staphylococcus aureus nasal carriage, present in about 20% of the general population, has been identified as a risk factor for the subsequent development of community acquired and nosocomial staphylococcal infections. [G.N. Al-Rawahi et al. 2008] Transmission of MRSA occurs primarily from colonized or infected patients to other patients or staff, or vice-versa. Widespread antibiotic use has resulted in increased frequency of clinically important bacteria acquiring single or multiple antibiotic resistance. [Thomas McDonald et al. 2012] Nosocomial transmission of MRSA serves as a source of hospital outbreaks, and recent reports of vancomycin resistant S. aureus strains in the United States emphasize the need for better control of MRSA and other resistant bacteria within healthcare settings.

The rationale for our study was to assess the antibiogram of MRSA strains obtained from clinical samples and healthy hospital staff members who remain persistently in contact with patients. we also planned to evaluate the methicillin susceptibilities of Coagulase negative Staphylococi and Staphylococcus aureus clinical isolate from neonatal septicaemia positive blood culture using various susceptibility testing methods like disk diffusion method with Mueller Hinton agar (MHA), Disc diffusion method with Mannitol salt agar (MSA) and comparing the results obtained by meca based PCR. The prevalence of MRSA carriage and to investigate possible risk factors for development of multiple drug resistance was carried out in physically and mentally retarded students studying in Anoopam Mission, Anand.