Nasal Carriage of Methicillin Resistant Staphylococcus aureus (MRSA) in School Children of Udupi Taluk: An Epidemiological Study

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Abstract
Nasal colonization of methicillin resistant *Staphylococcus aureus* (MRSA) is considered as one of the reasons for its spread in the community. These community associated MRSA causes serious skin and soft tissue infections including necrotizing fasciitis and necrotizing pneumonia. The production of Panton Valentine Leucocidine (PVL) toxin is implicated in its enhanced virulence. School going children are found to be the major colonizers of MRSA. Therefore, it is important to know the prevalence of MRSA nasal colonization among school children in order to develop strategies to prevent their spread. In the last decade of the 20\textsuperscript{th} century, epidemic methicillin resistant SA - 15 (EMRSA-15) emerged in the hospital settings as per the reports from UK. Later, this classical EMRSA-15 has been isolated from community settings as well and characterized as staphylococcal cassette chromosome mec (SCC mec) type IV community associated MRSA (CA-MRSA). A variant of EMRSA-15 which produces PVL toxin has been isolated and characterized by PFGE method from the Indian population both in hospital and community settings. There is not much published data available on the prevalence of MRSA colonization in school children or their epidemiological types in India. The current study was undertaken to address the above compelling need as also to investigate the associated risk factors. The target population was confined to children in the age group of 5 – 16 years belonging to the Udupi taluk of Karnataka, India. A total of 1503 children studying in government, private aided and private unaided schools were screened for MRSA colonization. All the Staphylococcus aureus (SA) isolates were tested for susceptibility to various antibiotics. Resistance to 30 µg disc of cefoxitin was considered as methicillin resistance. *Pvl* gene detection and SCC mec typing were also carried out. Selected strains were typed by PFGE after *Sma* I restriction enzyme digestion. Risk factors associated with MRSA colonization were assessed using a standardized questionnaire. Prevalence of MRSA colonization in the study population was found to be 1.1 % (17/1503) while 29.3 % (441/1503) of the subjects were carriers of SA in their anterior nares. MRSA strains were susceptible to all the non-beta-lactam drugs tested. A highly significant 71% (12/17) inducible clindamycin resistance was also noticed in the case of MRSA. Among MRSA, 58.8% (10/17) of isolates were positive for *pvl* and 41.7% (7/17) were identified as SCC mec type IV. PFGE patterns of all the strains were identical with Indian variant EMRSA-15; however they were different from classical EMRSA-15 in 3-4 bands. The Indian variant EMRSA-15 gains much epidemiological relevance owing to the acquisition of *pvl* gene. Among the several risk factors considered, the one which was significantly associated with MRSA colonization was male gender (p = 0.012). In spite of low prevalence of nasal colonization of MRSA, emergence of the virulent Indian variant EMRSA-15 in our community is a worrisome fact to be reckoned with. Highly organized precautionary measures on the part of health care professionals are warranted for an effective control of the spread of these deadly strains, in the wake of observations made in this epidemiological study.

Key words: MRSA, Nasal carriage, PVL, SCC mec, PFGE, Risk factors

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