Palm Printing on Agar Plates of Hands of Health Care Workers from the Intensive Care Units of the National University Hospital of Singapore

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Nosocomial infections are one of the major causes of morbidity and mortality in hospitals resulting in increasing health care costs.[1,2] The intensive care unit (ICU) is ideal for the acquisition of nosocomial pathogens.[3] In this study, health care workers (HCW) were shown how their hands can produce cross infections in the ICUs by demonstrating to them the microbes which were grown from hands. The entire hand was also clearly outlined on agar plates by the microbes.

One hundred hands of HCW were studied over three days in August 1997, comprising 23 from paediatric intensive care unit (PICU), 16 from neonatal unit (NNU), 15 from cardiothoracic unit (CTU) and 46 from joint surgical intensive care unit/medical intensive care unit (SICU/MICU). Eighty-one were females and 19 males; comprising 52 nurses, 31 doctors and 17 others (cleaners, porters, physiotherapists and pharmacists). Volunteers for clean hands applied the aseptic hand wash technique and their results were used as criteria for the clean hand category. Palm imprints on 150 mm horse blood agar plates were carried out in three stages to achieve maximum contact of the palms with the agar. Standard operating procedures for microbiological investigation were carried out. Unfortunately, detection of enterococci was omitted. Statistical Package for Social Sciences (SPSS) was used to analyse the results and to calculate statistical significance.

Clean hands had £10 colony forming units (CFUs) consisting of coagulase-negative *Staphylococcus* (CNS). Figure 1 shows the bacterial counts found on the hands of HCW from the various ICUs. The ranking of clean hands was: NNU>CTU>PICU. The association was statistically significant (P <0.000). Comparison of bacterial counts also showed that SICU/MICU had the largest proportion (76.6%) of hands with >50 CFUs. Unusual organisms (i.e. not belonging to normal skin flora) were significantly associated (P <0.006) with counts exceeding 30 CFUs. Thirty-three hands had unusual organisms and these were *Enterobacteriaceae* (28%), *Acinetobacter* spp (17%), *Streptococcus* (14%), yeasts (2%) and *Aeromonas* (1%). Four strains of the *Enterobacteriaceae* had multiple drug resistances to aminoglycosides, quinolones and third generation cephalosporins. One of the *Acinetobacter* spp. strain was resistant to imipenem.

What would be the consequences if the dirty hands continued to work in the ICUs without washing them adequately? Nosocomial infections can be spread by hands, and proper hand washing is as important as the devising of new drugs, antibiotic policies[4] and education about the judicious use of antimicrobial agents[5] in the course of stemming out nosocomial infections.

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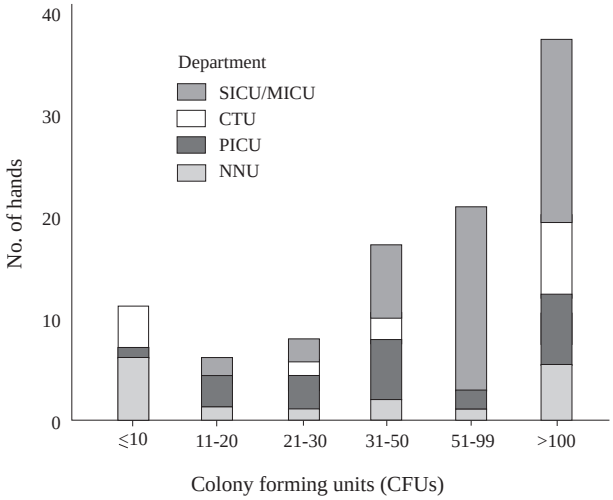

Fig. 1. Bacterial count (CFUs) on palms of 100 health care workers.

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