Validation and adaptation of an instrument for assessing the perceived organizational infection prevention climate: evidence from Chinese healthcare workers

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In recent years, organizational factors such as infection prevention climate have been recognized as important factors of healthcare workers' adherence to infection prevention practices. However, there is a lack of instruments with good reliability and validity to measure infection prevention climate within organizations in Chinese context. Therefore, this study aims to translate, culturally adaptation and test for the psychometric properties of the Chinese version of Leading a Culture of Quality for Infection Prevention (CLCQ-IP). The original scale was translated into Chinese through 1) Forward translation; 2) Expert review; 3) Back translation; 4) Applicability evaluation. Then, a multicenter cross-sectional survey was conducted using the CLCQ-IP. Reliability in terms of internal consistency was evaluated. The content validity, exploratory factor analysis, confirmatory factor analysis, were tested for assessing the construct validity of the CLCQ-IP. After linguistic and cultural adaptation, the CLCQ-IP was finally formed with 19 items in 4 dimensions and a total 882 HCWs from 4 provinces finished the survey. The overall Cronbach's alpha of the CLCQ-IP was 0.865. The items of content validity index, ICVI of the C-SPQ ranged from 0.875 to 1.00, and the scale of content validity index S-CVI/AVE was 0.894. In terms of construct validity, the exploratory factor analysis extracted a total of 4 factors, which were consistent with the original scale. The factor loadings of each item were above 0.70, and the cumulative variance contribution to the scale was 71.88 %. The Confirmatory factor analysis showed the good model indicators: x^2/df =1.508, RMSEA=0.41, GFI=0.934, AGFI=0.912, NFI=0.953, TLI=0.981, CFI=0.984. The results of the study show empirical evidence of validity and reliability of CLCQ-IP can be highly recommended to be widely used among Chinses HCWs.

Keywords: Infection prevention climate; Questionnaire; Healthcare workers; Reliability; Validity

The impact of hospital wide measures to reduce mupirocin resistance among methicillin-resistant *Staphylococcus aureus* in a Singapore hospital

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Introduction: Methicillin-resistant Staphylococcus aureus (MRSA) is a leading cause of healthcare associated infections. Colonization with MRSA increases the risk of subsequent nosocomial infection. The primary concern regarding widespread use of mupirocin is the emergence of mupirocin resistance. A prospective cross-sectional study in Singapore in 2013, found mupirocin resistance to be 31.6% in Changi General Hospital (CGH). Annual usage of mupirocin (g) in CGH was 36870 and hospital-onset MRSA bacteremia was 1.1/10,000 patient-days in 2013. **Objective:** To study the impact of hospital measures to reduce mupirocin resistance among MRSA by detection of mupirocin resistance in screening isolates. **Method:** Changi General Hospital is a 1000 bedded acute care hospital. Hospital wide measures were instituted in CGH to reduce mupirocin resistance in MRSA included a) universal body wash with Octenidine for all hospitalized patients in the wards with MRSA cubicles b) 2% mupirocin ointment removed from formulary (available for nasal decolonization only) A study was conducted on MRSA screening isolates from the Microbiology Laboratory between May and September 2019. These were obtained by swabbing nasal, axilla and groin on all newly admitted patients as part of an active surveillance program since 2013. The swabs were streaked onto MRSA[i]selective media plates which were incubated at 35 °

C for 20 hours and stored at 4 °C. E-test was performed to determine the susceptibility and minimum inhibitory concentration (MIC) of MRSA isolates to mupirocin, oxacillin and vancomycin, following the CLSI guidelines for S. aureus. MPCR (multiplex polymerase chain reaction) assay was used for the simultaneous identification of *ileS*-2 (primers MupA and MupB) and mecA (primers MecA1 and MecA2). PCR amplification of *ileS*- 2 gene for high level mupirocin resistance and Mec A gene was performed on Touch thermal cycler. **Results:** 200 MRSA isolates were tested. E-test revealed 5 isolates were detected to be High Level mupirocin-resistant (2.5%) and 69 isolates were detected to be oxacillin-resistant (74%). The MPCR assay detected mecA gene in 100% and *ileS*-2 gene in 3 isolates (1.5%). **Conclusion:** Our study indicated the low prevalence of high level mupirocin resistance among MRSA screening isolates in 2019 in CGH. This suggested that the hospital wide measures to reduce mupirocin resistance were effective.

Antimicrobial effect of atomized Ionless™ hypochlorous acid water in nursing care facilities and facility shuttle vehicle

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Objectives: Japan is becoming a super-aging society, with people aged over 65 years old accounting for 28.9% of the total population. Therefore, nursing care facilities have significant implications in contemporary Japanese society. In those facilities, it is important to clean and disinfect the environment in order to prevent the spread of infection to the residents. Thus, the aim of this study was to verify the disinfection effect of atomizing IONLESS™ hypochlorous acid water (CLFine™) as a newly efficient disinfection method of environment by evaluating its antimicrobial effect against *Staphylococcus aureus* in two nursing care facilities and one facility shuttle vehicle. **Methods:** The bacterial suspension of *Staphylococcus aureus* was dripped onto petri dishes, and they were used as test carriers after drying. The test carriers were allocated in the area of interest (six sites for Facility A and B, two sites for shuttle vehicle), and then CLFine™ was atomized by ultrasonic humidifier so as to adjust the atmospherically available chlorine concentration to 0.03 ppm. The test carriers were collected 3 and 5 hours after atomization of CLFine™ followed by evaluation of the viable bacterial counts. **Results:** In Facility A and B, antimicrobial effect of 1.68 to 3.79 LogR and 0.98 to 2.76 LogR were observed 5 hours after atomization, respectively. In shuttle vehicle, antimicrobial effect of 2.70 to 6.32 LogR were observed 5 hours after atomization. **Conclusions:** The atomization of CLFine™ has also been suggested to be useful as a control measure against aerosol infections. Therefore, it is expected to be applied as a non-touch disinfection method in addition to regular wet cleaning in nursing care facilities.

Improving surgical instrument cleaning processes through collaborative efforts between central sterile supply department and operation room

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Objectives: The development of medical technology has led to increasingly intricate surgical instruments, varying in types and structures. This complexity has posed challenges in the instrument reprocessing.The Emergency Care Research Institute in the United States has continuously issued alerts regarding the reprocessing of instruments or endoscopes from 2013~2020, It is evident that failure to perform thorough cleaning in accordance with the standards may result in organic debris on the instruments, posing the risk of infection or even death to patients **Methods:** We

collected data on 39 visibly soiled instruments reported by the OR from 2021 to October 2023. Through personnel interviews, questionnaires, and identification of types of soiled instruments,we identified key issues using fishbone diagram analysis, the findings as follows (1).only 48% of OR personnel had received precleaning education and training, 75% of respondents cited being too busy for not precleaning (2).CSSD staff demonstrated a cleaning cognitive test success rate of 81%, particularly challenging were instruments with intricate designs, requiring specialized cleaning procedures (3). Failure to provide different cleaning methods depending on the level of residues or difficulty to clean.The following strategies are proposed:(1). Enhanced precleaning education and training for OR staff (2).Use of enzymatic precleaning products to saturate instruments prior to cleaning. 3. Development of a classification system for instruments requiring longer cleaning times. **Results:** Between November 2023 to March 2024, one visibly soiled instrument was reported, marking a significant drop from an incidence rate of 1.15 to 0.20 per month. Cognitive test success rate rose from 81 to 97%. Implementing different methods based on the difficulty of cleaning or the complexity of features, as well as enzymatic precleaning products, were universally adopted in the OR **Conclusion:** Thorough cleaning is a crucial process for effective sterilization. Collaborative efforts between CSSD and OR significantly reduce the possibility of cross-contamination

Keywords: precleaning; surgical instrument; infection risk

A study on the effectiveness of N95 mask-wearing training through fit tests for healthcare workers at a tertiary hospital in South Korea

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Background: The risk of respiratory infection varies on the degree of the fit of N95 masks, so education and training of appropriate wearing methods are required. This study was conducted to investigate whether there are differences in the fit of N95 masks among healthcare workers (HCWs) with education and experience in N95 mask-wearing and to assess the effectiveness of N95 mask-wearing training through fit tests. **Methods:** From October 2023 to February 2024, training on the wearing of N95 masks was conducted through fit tests for 195 high-risk department HCWs and new HCWs at a tertiary hospital. Fit tests was conducted before and after the training. Previous experiences of N95 mask-wearing education were investigated using questionnaires. The fit test was measured using QNFT (Quantitative Fit Test). Data was analyzed using percentages and a chi-square test. **Result:** Out of the 195 participants, 44 HCWs had experience by group or rote learning. The fit test pass rate in the group with education experience was 45.5%, which was higher than the 32.9% in the group without education experience; however, there was no statistically significant difference (P=0.293). The fit test pass rate for N95 mask-wearing training increased significantly from 35.8% (70 HCWs) before training to 98.5% (192 HCWs) after training (p=0.000). The three HCWs who failed the first test all passed the fit test after retraining using N95 masks of different shapes and sizes. **Discussion:** It was confirmed that N95 mask-wearing training through fit tests was effective in increasing fit, whereas group or rote learning was not effective. N95 mask-wearing training through fit tests is an effective method to enhance N95 mask fitting. It is essential to explore diverse approaches to sustain the training impact.

Keywords: N95 mask; Healthcare workers (HCWs); Training; Quantitative fit test (QNFT)

Risk assessment and intervention strategies in controlling HAIS risk in the HCU at Premier Bintaro Hospital

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Introduction: Hundreds of millions of patients worldwide are infected with Healthcare-Associated Infections (HAIs) each year causing deaths and significant financial losses to health systems. HAIs incidence in Indonesia (2021) reached 15.74%, far above in developed countries (4.8-15.5%). At Premier Bintaro Hospital (RSPB), the number of High Care Unit (HCU) patients at risk of HAIs reached 51% in the January - June 2023 period. The aim of this research is to reduce the risk of HAIs in HCU patients at RSPB. **Methods:** The HAIs risk identification was conducted on all HCU patients when first admitted using the SIRS (Systemic Inflammatory Response Syndrome) and REDS (Risk Emergency Department Scoring) criteria. Based on the screening results, interventions were applied through environmental modifications, implementation of HAIs care bundle, and nurse allocation based on colour codes: At risk of infection as RED, and no risk of infection as GREEN. The risk monitoring was conducted using HAIs scoring. **Results:** The research was conducted in the January - June 2023 period on 206 patients. It was found that 51% of the patients were at risk of HAIs. After interventions, the number reduced to 39%. In addition, there were zero incidents of HAIs during that period. **Conclusions:** To control the risk of HAIs in HCUs, the implementation of risk screening & scoring and interventions such as environmental modifications, nurse allocation, and HAIs care bundle, have shown to be effective strategies. This is evident from the decrease in the number of patients at risk of HAIs.

Recommendations for hospital is to continue implementing risk control of HAIs by regularly assessing the risk, applying interventions, and consistently monitoring the risk as efforts in continuously reducing the HAIs risks. For future research, it is recommended to expand the sample of patients and extend the period to implement risk control of HAIs even further.

Keywords: HAIs; Screening; Scoring; HCU

Hospital-wide surveillance of central line-associated bloodstream infections in a tertiary hospital in South Korea

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Objectives: Central Line-Associated Bloodstream Infections (CLABSIs) are associated with prolonged hospitalization, increased healthcare costs. It is important to reduce CLABSI rates through interventions. This study investigated the current status of CLABSI rates among hospitalized patients to gather foundational data for implementing CLABSI intervention measures. **Methods:** During a month from June 1st to 30th, 2023, a retrospective investigation of CLABSI rates was conducted among patients hospitalized at a tertiary hospital in South Korea. Psychiatric and obstetric, hospice, emergency, neonatal wards, and delivery rooms were excluded from the study. CLABSI was defined according to NHSN and Korean