Hand Hygiene Promotion In NICU – A Journey Towards Sustained Compliance

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Introduction

- Nosocomial infections are a continuing problem in Hospital environment - a serious source of morbidity, mortality and excess health cost

- Proper Hand Hygiene (HH) is the single most effective mean of preventing the transfer of potential pathogen from staff to patient and vice versa
Hand Hygiene Compliance
Simple and Complex

- Dichotomy between HH knowledge and HH compliance among HCW
- Most HH initiatives induce an immediate effect, wash out effect commonly observed
- Factors which could significantly alter and sustain the change of human behaviour is very complex
Factors Influencing HH Compliance

1. Material factors
   - Convenient and accessible HH facilities
   - Preparations that do not cause skin irritation

2. Environmental Obstacles
   - Time constraint
   - Unbalanced patient staff ratio
   - overcrowding

3. Behavioural factors**
6 hours per day

3 times per day

20 - 40 times per day
How to Sustain HH Compliance?

Behavioural factors

- Positive reinforcement - feedback
- Concern for third party opinions e.g. peer pressure, patient / parent pressure
- Role modeling from seniors
- Perceived benefit for patient
- Perceived danger of self infection
- Perceived danger for career
Hand Washing Questionnaire & Observational Study 2000-2001

- Study subject - 516 staff working in NICUs of 8 HA hospitals
- Unobtrusive HW observational study using standardized methodologies in 6 NICU of HA
## Self-reported & Observed HW Compliance

<table>
<thead>
<tr>
<th></th>
<th>Overall (mean)</th>
<th></th>
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<tbody>
<tr>
<td></td>
<td>Reported</td>
<td>Observed</td>
<td></td>
</tr>
<tr>
<td><strong>High risk contact</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before</td>
<td>80%</td>
<td>34%</td>
<td></td>
</tr>
<tr>
<td>After</td>
<td>80%</td>
<td>27%</td>
<td></td>
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<tr>
<td><strong>Low risk contact</strong></td>
<td></td>
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<tr>
<td>Before</td>
<td>75%</td>
<td>23%</td>
<td></td>
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<tr>
<td>After</td>
<td>75%</td>
<td>15%</td>
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Handwashing Questionnaire Study and Observational Study 00-01

Obstacles to Handwashing

1. Patients condition needs immediate attention and takes priority over HW
2. Poor design of HW facilities
3. Insufficient time/too busy
4. Understaffed
5. Interrupted care process - have to touch other surface/ object before actual patient contact
Multimodal Approach for Hand Hygiene Promotion in QMH NICU 2001-2002

1. Problem based and task orientated HH promotion and educational programme

2. Minimal handling nursing protocol and clustering of care

3. Hand hygiene facilities – liberal availability of alcohol handrub, modification of water taps and basins
Hand Washing Facilities
1. Palm to palm

2. Palm to palm; fingers interlaced

3. Plam over dorsum, finger interlaced, interchange of hands

4. Back of fingers to opposing palms

5. Rotate finger tips in palm, interchange of hands

6. Rotate thumbs in palm, interchange of hands
Regular Hand Hygiene Audit
IN NICU QMH

- Unobtrusive observation
- Washing opportunities before and after contacts of target patient by attending personnel (doctors, nurses, allied health and others) were observed
- If washed hands are contaminated before or after actual patient contact, it is counted as non-compliance
- HW were required regardless whether gloves were used or changed
- HW Technique - Checklists steps 1-10
- Duration of HW
HH Compliance Before Patient Contacts

Overall handwashing compliance
Pre-intervention: 40%
Post-intervention: 53%

High contact
Pre-intervention: 35%
Post-intervention: 60%

Low contact*
Pre-intervention: 43%
Post-intervention: 49%

* NS: Non-significant (P value > 0.05)
HH Compliance After Patient Contacts

Overall handwashing compliance:
- Pre-intervention: 39%
- Post-intervention: 59%

High contact:
- Pre-intervention: 41%
- Post-intervention: 71%

Low contact:
- Pre-intervention: 37%
- Post-intervention: 51%
### Nosocomial Infection Surveillance Data  

<table>
<thead>
<tr>
<th></th>
<th>Pre-</th>
<th>Post-</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total infection rate Per 100 patient</td>
<td>17.2</td>
<td>9.1</td>
</tr>
<tr>
<td>Total infection rate Per 1000 patient days</td>
<td>11.3</td>
<td>6.2</td>
</tr>
<tr>
<td>Blood stream infection (BSI) per 1000 cath days</td>
<td>6.8</td>
<td>1.2</td>
</tr>
<tr>
<td>Ventilator associated pneumonia per 1000 ventilator days</td>
<td>16.9</td>
<td>6.4</td>
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BCC Lam et al Paediatrics 2004; 114:e565-571
Hand Hygiene compliance Needs Booster Shots?
SARS Came to Hong Kong in 2003
A New Norm
Full PPE for Resuscitation
Another Booster
Clustering of Necrotising Enterocolitis in Premature Babies in NICU June 2004

Complication of premature babies with mortality and morbidity
Infective etiology in some outbreaks
Investigators pursue baby-killing infection

A hospital spokesman said the extremely premature baby was born at 24 weeks' gestation, and weighed only 730 grams at birth. The seven other babies were in a stable condition last night and responding to treatment, he said.

"I must emphasise that this condition only affects premature babies," Dr Lam said.

"That means normal babies would not be affected. We have many normal babies born and none of them has been infected," he added.

Infection control measures had been introduced, including isolating the infected babies and stopping new admissions to the neonatal intensive care unit, said the spokesman for the teaching hospital at the University of Hong Kong. Parents of the babies have been informed.

The hospital authority and the Centre for Health Protection (CHP) were informed late yesterday afternoon.

A bacterium associated with NEC was traced to the use of powdered infant formula in the US state of Tennessee in 2001, in an outbreak in which 90 babies were infected, one of whom died.

The CHP's head of the Surveillance and Epidemiology Branch, Dr Lai-yiu, told the South China Morning Post the immediately sent clulse investigators to the hospital in Pokfulam after the通报 received notification. "We are still investigating. I do not have the full picture yet," she said.

The University of Hong Kong's chair professor of paediatric surgery, Paul Tam Kwong-hung, said: "NEC is an infection disease — but it is not primarily an infection disease. It is a disease where infection is a component. But the major suspect is because of prematurity, when the immune system is weak."
HH Compliance Before Patient Contacts

Nurse
- Pre-NEC: 69%
- Post-NEC: 76%

Doctor
- Pre-NEC: 68%
- Post-NEC: 92%
HH Compliance Needs Booster Shots

Before

After

Pre Intervention
Post Intervention
Post SARS
Post NEC 2006 (Overall)

Pre Intervention
Post Intervention
Post SARS
Post NEC 2006 (Overall)

%
HH Audit IN NICU in 2006

• Sustained high compliance rate of 80% & 90% for nurses & doctors

• Suggesting HH habit had became an established habit of HCW in NICU

• Associated with progressive improvement in nosocomial infection rate (infection rate/thousand patient days) from 11.3 pre-intervention in 2001 to
  – 4.8 per thousand patient days in 2005
  – 4.7 per thousand patient days in 2006
Summary

• Multimodal invention - task oriented training, clustering of care procedure, and regular audit is essential to maintain a high baseline HH compliance and culture among HCW

• Staff general alertness on infection control measure after an outbreak of contagious disease could further modify and booster the HH compliance

• Regular evaluation of HH behaviours for performance feedback could help to sustain the compliance

• Sustained HH compliance is the key to reduce NI
HH Compliance Before Patient Contacts

* NS: Non-significant (P value > 0.05)
HH Compliance - Booster effect of SARS Outbreak 2003

Before Patient Contact

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<tr>
<th></th>
<th>Nurse</th>
<th>Doctor</th>
<th>Allied Health</th>
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<tbody>
<tr>
<td>Pre-intervention</td>
<td>30%</td>
<td>63%</td>
<td>50%</td>
</tr>
<tr>
<td>Post-intervention</td>
<td>50%</td>
<td>68%</td>
<td>50%</td>
</tr>
<tr>
<td>SARS</td>
<td>69%</td>
<td>78%</td>
<td>50%</td>
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