Pioneer Implementation of Simulation-Based Crew Resource Management Training in Hong Kong Public Hospitals

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Speaker Bio
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• Dr TANG graduated from the University of Hong Kong in 1993. He joined the Hospital Authority (HA) of Hong Kong in 1994 and had worked in many clinical departments during his postgraduate training. He was awarded fellowship status by the Hong Kong College of Physicians in Internal Medicine, Respiratory Medicine and Critical Care Medicine in 2001, 2002 and 2005 respectively. Before joining the Quality and Safety Division, Dr TANG was Associate Consultant of the Intensive Care Unit of Tuen Mun Hospital. He joined the Quality and Safety Division of New Territories West Cluster of Hospital Authority in 2011 and is currently the Service Director of the Division.
Contact Information

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Roots of Crew Resource Management

• A series of aviation disasters in the 1970’s
  - Poor team work in the cockpit
  - A **WAKE UP** call for aviation

• **National Aeronautics and Space Administration** air safety workshop in 1979.
  - **human error** aspects of the majority of air crashes as failures of **interpersonal communications**, **decision making**, and **leadership**
The Evolution of Crew Resource Management

- The CRM concept continuously evolute in the last two decades.
  - From a model that targeted individual styles and correcting deficiencies in human behavior to the current Error Management model

- Human error is ubiquitous and inevitable. CRM acts as a set of error countermeasures
  1) The avoidance of error
  2) To trap incipient errors before they are committed
  3) To mitigate the consequences of those errors which occur and are not trapped.

Error Troika by Professor R. Helmreich of the University of Texas, 1997
What is CRM?

According to The Federal Aviation Administration definition:

- Utilization of all available human, informational, and equipment resources toward the effective performance of a safe and efficient flight.

- CRM is an active process by crew members
  - identify significant threats to an operation
  - communicate them to a person in charge
  - develop, communicate, and carry out a plan to avoid or mitigate each threat.
Crew Resource Management in Healthcare

1994

CRM was first applied in healthcare in the operating room of the University Hospital in Basel, Switzerland. (2)

1999

The Institute of Medicine (IOM) report, To Err is Human: Building a Safer Health System recommended CRM as a concept that should be incorporated in healthcare practice to enhance patient safety.

2001

The Institute of Medicine (IOM) recommended that the CRM training should be used to improve patient safety. It is also advocated by the National Academies, the Agency for Healthcare Research and Quality and the Institute for Healthcare Improvement.
Crew Resource Management in Hong Kong Healthcare

2001
- Discrete principles e.g. SBAR was introduced.

2009
- A systematic classroom-based CRM training was piloted in a Hong Kong public hospital (PYNEH).

2013
- Simulation was incorporated into the CRM training program and further rolled out in two Hong Kong public hospitals (QEH & TMH).
Benefits of Simulation-Based Training

Simulation-based learning / training is increasingly used by healthcare professionals. It provides opportunities for participants:

• To *learn through recreating real-life crisis scenarios* while monitoring the effects of human performance;\(^{(3)}\)

• To *apply principles of patient care in near real-life* (simulated) circumstances aided by computerized, high-fidelity mannequin simulators;\(^{(3)}\)

• To *practice the learned competencies in a safe environment*
Simulation-Based CRM Training

2012

• NTWC CRM Committee with broad representation was established.

2013

• Staff engagement → **Kick-off ceremony** on CRM training program was held in the cluster.

• A group of healthcare professionals were equipped to become **simulation-based CRM instructors**.

• A locally adapted **simulation-based CRM curriculum** for healthcare professionals was formulated and launched.
Evaluation of Simulation-Based CRM Training

Objective
• To investigate the impact of locally adapted Simulation-based training on improving teamwork and communication skills for frontline healthcare professionals.

Methodology
• A 12-item standardized questionnaire was used to assess participants’ satisfaction with the course.
• A 32-item standardized questionnaire was administered before and after the workshop (1 month & 1 year) to assess the changes in participants’ perception of
  - Their current work situation
  - CRM knowledge &
  - Competency
Evaluation on Simulation-Based CRM Training

**Period:** MAY 2013 – JUN 2015

**Workshop Composition**
- 42 Simulation-based CRM workshops were conducted.

**Categories of Participants**
- 658 staff joined the Simulation-based CRM workshops.

**Diagram:**
- Doctor: 16%
- Nurse: 74%
- Others: 1%
- Administrator: 6%
- Surgery: 1%
- Obstetrics & Gynaecology: 3%
- Senior Nursing Staff: 3%
- Psychiatry: 1%
- Pharmacy: 1%
- Ear, Nose & Throat: 1%
- Mixed Specialties: 1
- Anaesthesia & Intensive Care: 3
- Surgery: 1
- Mixed Specialties: 1

**Additional Details:**
- 658 staff joined the Simulation-based CRM workshops.
- Period: MAY 2013 – JUN 2015
- 42 Simulation-based CRM workshops were conducted.
# Evaluation on Simulation-Based CRM Training

## Completion Rate of Pre & Post Questionnaires

<table>
<thead>
<tr>
<th>Completion Rate (%)</th>
<th>Pre &gt; Post-1m</th>
<th>Pre &gt; Post-1yr</th>
<th>Post-1m &gt; Post-1yr</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completion Rate (%)</td>
<td>547/658 (83.1%)</td>
<td>145/329 (44%)</td>
<td>133</td>
</tr>
<tr>
<td>Average Completion Time (day)</td>
<td>13.5</td>
<td>413.4</td>
<td>NA</td>
</tr>
</tbody>
</table>
## Evaluation on Simulation-Based CRM Training

### Participants’ Satisfaction Rate with the Program

<table>
<thead>
<tr>
<th>Items</th>
<th>Satisfaction Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I am <strong>overall satisfied</strong> with this training program</td>
<td>99.2</td>
</tr>
<tr>
<td>Scenarios are <strong>realistic</strong></td>
<td>98.9</td>
</tr>
<tr>
<td>Scenarios are able to <strong>facilitate decision making</strong></td>
<td>98.1</td>
</tr>
<tr>
<td><strong>Debriefing</strong> session is useful</td>
<td>99.0</td>
</tr>
<tr>
<td><strong>Simulation is more powerful</strong> than lecture-based training for this program</td>
<td>96.6</td>
</tr>
</tbody>
</table>

Note: Response rate = 94.5% (622/658)
### Evaluation on Simulation-Based CRM Training

#### Comparison of mean score on work situations between pre and post 1 year CRM workshop (n=145)

<table>
<thead>
<tr>
<th>Item</th>
<th>Team Climate</th>
<th>Safety Climate</th>
<th>P-value</th>
<th>Mean Pre</th>
<th>Mean Post-1yr</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>B11) Team work is usually less productive than the same number of staff working alone</td>
<td>3.52</td>
<td>3.25</td>
<td>P=0.084</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B3) I would prefer taking short-cuts to complete my work than following the standard procedures</td>
<td>3.42</td>
<td>3.01</td>
<td>P=0.010</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B5) Staff are afraid to ask questions when something does not seem right</td>
<td>4.51</td>
<td>3.92</td>
<td>P=0.002</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B6) Patient safety rules and regulations are presented in a simple &amp; understandable format in your Unit</td>
<td>6.92</td>
<td>7.4</td>
<td>P&lt;0.001</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B15) Clinical Errors are common in your unit</td>
<td>3.64</td>
<td>3.68</td>
<td>P=0.610</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Evaluation on Simulation-Based CRM Training

Comparison of mean score on work situations between pre and Post 1 year CRM workshop (n=145)

<table>
<thead>
<tr>
<th>B7) Our Unit ensures that everyone in our Unit clearly understands our goals</th>
<th>B9) Our unit deals with personal conflicts in fair and equitable ways</th>
<th>B14) Your Unit encourages you to speak up to other staff about work-related problems</th>
<th>B10) Working in this unit has provided me with an opportunity for professional growth and development</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre</td>
<td>Post-1yr</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.97</td>
<td>7.36</td>
<td>6.87</td>
<td>6.97</td>
</tr>
</tbody>
</table>

P=0.005

P=0.462

P=0.009

P=0.808

Perception of Management

Job Satisfaction
CRM Knowledge

- Overall, increment in CRM knowledge was statistically significant ($p<0.001$).

Comparison of CRM Knowledge between pre, post 1 month and post 1 year CRM workshop
Evaluation on Simulation-Based CRM Training

Competent Level
- Participants felt more competent to be a team member and leader after joining the workshop.

Comparison of competent level between pre workshop, post 1 month and post 1 year CRM workshop

<table>
<thead>
<tr>
<th></th>
<th>Pre vs. Post-1m (n=547)</th>
<th>Pre vs. Post-1yr (n=145)</th>
</tr>
</thead>
<tbody>
<tr>
<td>D1) Competence as a Clinical Team Member</td>
<td>P&lt;0.001 6.7 8.02</td>
<td>P&lt;0.001 6.53 7.66</td>
</tr>
<tr>
<td>D2) Competence as a Clinical Team Leader</td>
<td>P&lt;0.001 5.91 7.58</td>
<td>P&lt;0.001 6.3 7.52</td>
</tr>
<tr>
<td>D3) Chance to apply CRM or similar concept in your daily work</td>
<td>P&lt;0.001 6.3 8.02</td>
<td>P&lt;0.001 7.04 7.69</td>
</tr>
</tbody>
</table>
Take home message

1. Errors in Complicated or complex task completion (such as clinical practice) due to team failure is common
   – Increase training of individual skills would not help

2. Crew Resource Management (CRM) is a evolving concept and practice that could help to improve human team performance
   – Evidence is now starting to emerge that patient outcome might be improved

1. Simulation based CRM training in a Hong Kong Public Hospital was shown to have lasting effect on perception and practice of clinical staff.
   – Whether this is generalizable remains to be seen
References


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<th>Type of Relationship</th>
<th>Nature of Compensation</th>
<th>Relevant to Presentation Content Yes/No</th>
</tr>
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<tbody>
<tr>
<td>Example: Self</td>
<td>Company M</td>
<td>Board of Directors</td>
<td>Honorarium</td>
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</tbody>
</table>

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Name: TANG KAM SHING Date: 18 June 2015

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