

Root Cause Analysis of Sharps Injuries sustained by nurses in a tertiary hospital

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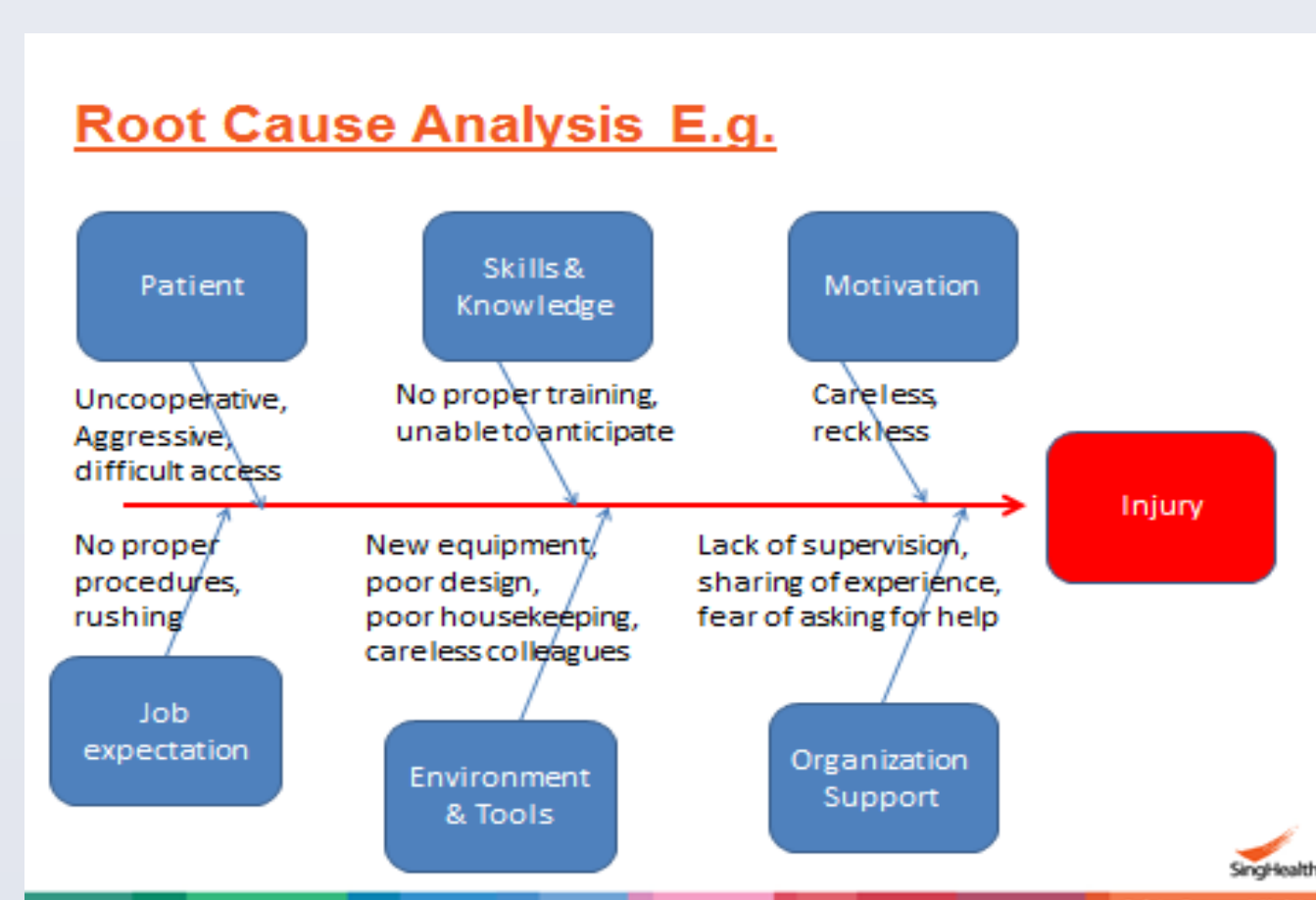
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INTRODUCTION

Sharps injuries are workplace hazards that healthcare workers (HCWs) have to deal with on a daily basis. These injuries can transmit infectious diseases, especially blood-borne viruses. Concern includes the Human Immunodeficiency Virus (HIV) which leads to AIDS (Acquired Immune Deficiency Syndrome), hepatitis B, and hepatitis C.

The Occupational Medicine Unit of Singapore General Hospital (SGH) monitors incidents of sharps injuries sustained by HCWs. Among HCWs, most cases tend to occur among the nursing staffs. On average, 1-2 cases are reported per week. In order to better understand the causes of these incidents and help educate nursing staffs to prevent future occurrences, doctors from the unit routinely visit staffs who had sustained injuries in their workplaces to re-enact the scenarios. This is done in the presence of their supervisors to get their feedbacks and give recommendations at the same time.

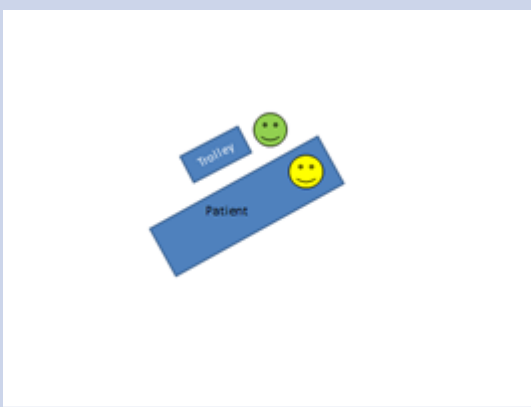
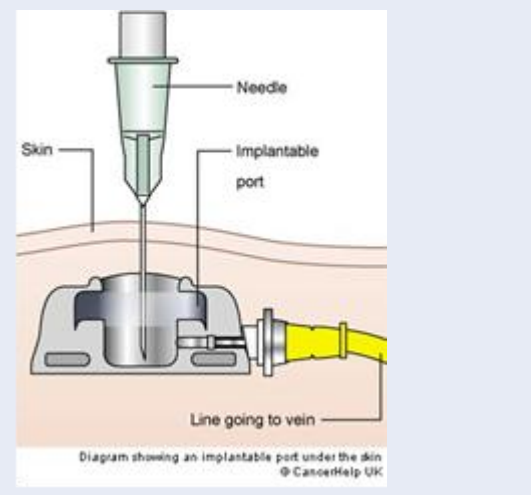
In 2004, the CDC published a web based resource: Workbook for Designing, Implementing, and Evaluating a Sharps Injury Prevention Program.¹ It employs Root Cause Analysis which is a process for identifying causal factors to use in needlestick prevention and asks key questions (What happened?, How did it happen?, Why did it happen?, What can be done to prevent it from happening in the future?) to get at the "root" of situations resulting in injuries, thus identifying areas for correction. Our unit adopts a similar approach for each case. The following fishbone diagram shows an example of the approach:

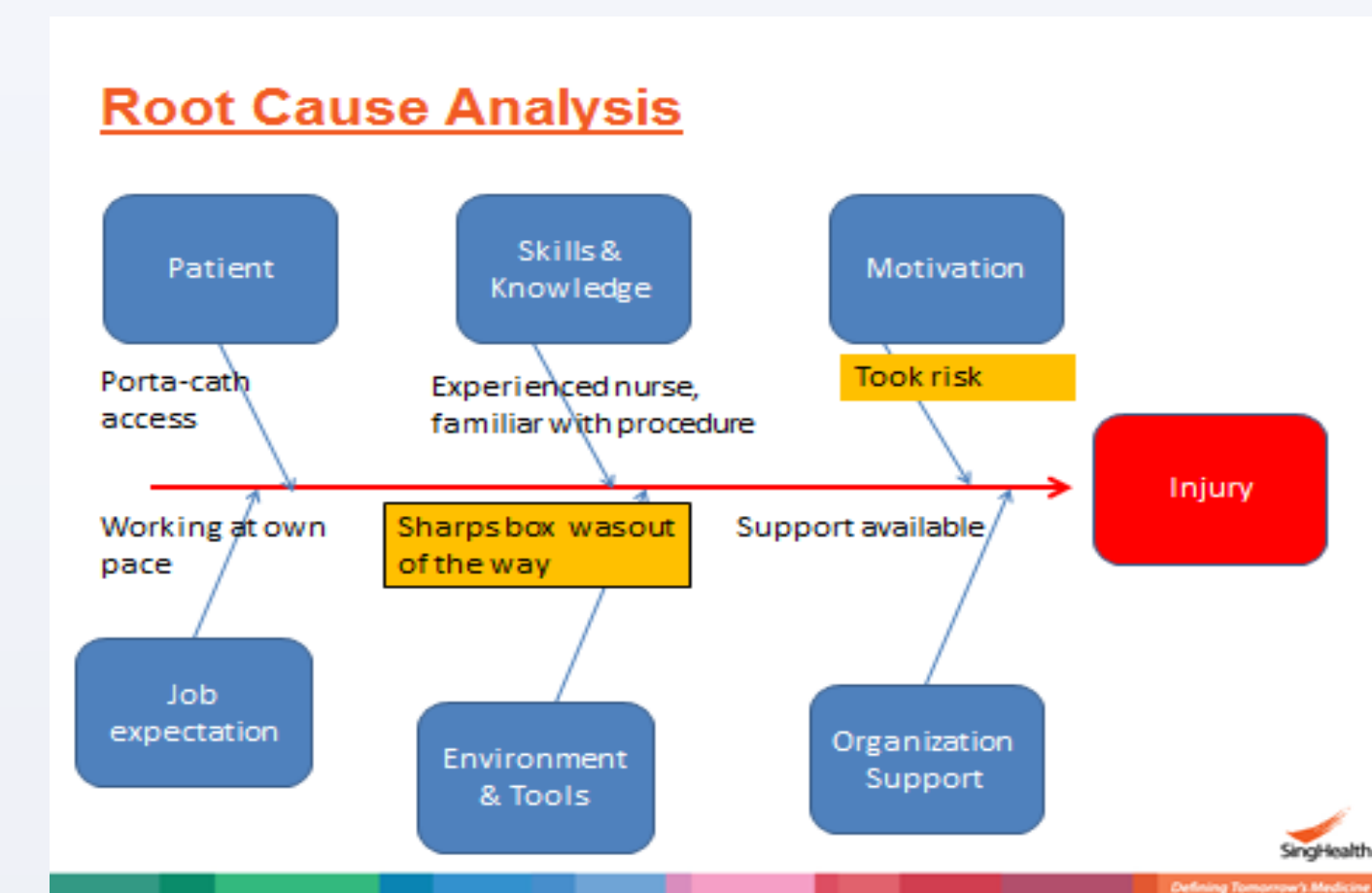


APPLICATIONS

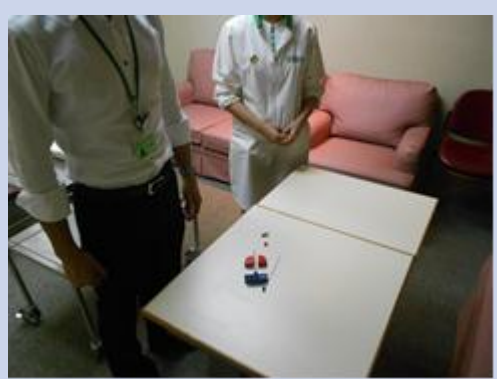
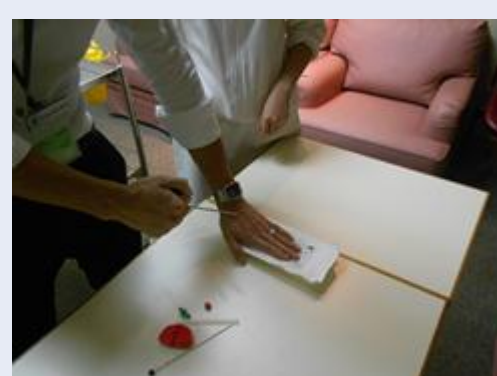
The following illustrates two cases of sharps injuries sustained by nurses in SGH. Re-enactment of each scene and construction of root cause analysis was performed by doctors from the unit with the participation of staff involved in the incident.

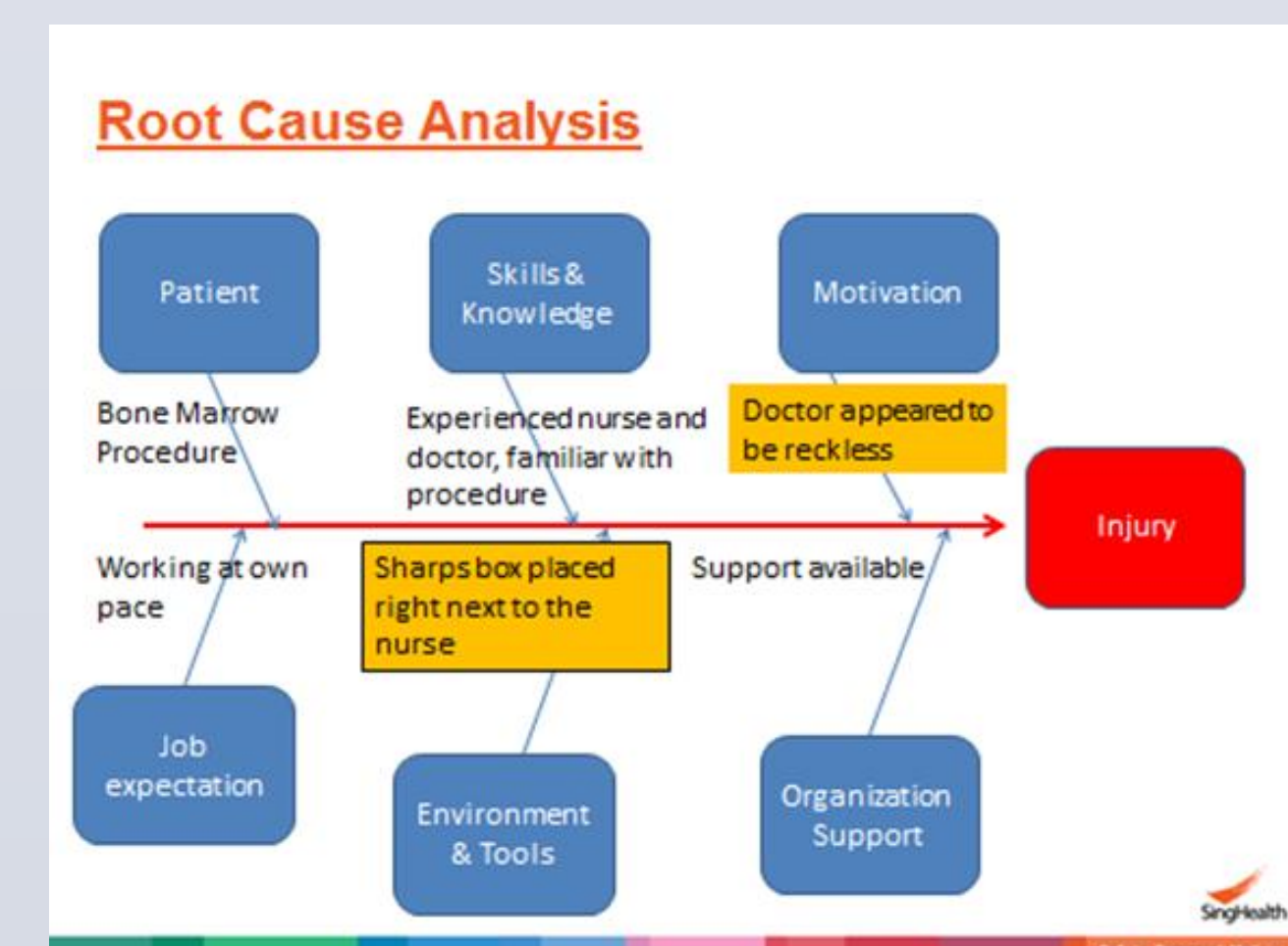
Case 1: Nurse injured by butterfly needle after giving intravenous injection via patient's porta-cath.

Scenario	Description	Scenario	Description
	Nurse was standing on the patient's right, with a dressing trolley containing a dressing set and a sharps box. The Portacath is a device that is implanted subcutaneously, in this case over the patient's right upper chest.		Nurse was standing on the right side of the patient. She uses both hands to flush the butterfly needle which has been embedded in the Portacath (as simulated by the bread cushion).
	Side view: It requires moderate amount of force to puncture the needle into the port. The needle has to be angled perpendicularly to the porta-cath.		After completing flushing, the butterfly needle is withdrawn from the Portacath. The needle points away from the hand.
	This setup shows the sharps box on the bottom rung of the dressing trolley during the incident.		The butterfly needle was then placed in one of the compartments of the open dressing set instead of the sharps box as it was located on the lower rung which hindered access.
	A properly set up trolley should have the sharp box mounted on one of the legs for easy access to dispose sharps.		After tidying up the patient, while clearing her equipment, the elastic recoil of the tubing attached to the needle caused the needle to point upwards and hence pricked the nurse's left index finger while she was attempting to pick up the tubing part of the needle.



Case 2: Nurse injured by bone marrow needle held by doctor after procedure

Scenario	Description	Scenario	Description
	This photograph shows the relative positions of the doctor (role-played by Dr Liang), the nurse and the bed with the patient (simulated by the table), and the dressing trolley behind the doctor.		Having extracted the bone marrow, the doctor put down the stylet and picked up the needle again, possibly to dispose of it into the sharps box.
	The doctor had just completed the procedure and had withdrawn the trocar / needle set held in her right hand. She used her left hand to apply pressure on the site after withdrawal (simulated by the white packet).		However, the doctor inadvertently turned to her right, possibly to attend to the patient (while holding on to the needle) and pricked the nurse's right hand.
	She then asked the nurse to apply pressure on the site so that she could turn to face the trolley behind her to prepare the bone marrow specimen. This was done in a clockwise motion.		Close up view of the bone marrow needle hitting SN Gao's hand.
	Meanwhile, SN Gao continued to maintain direct pressure on the withdrawal site with her left hand. Her right hand was free but kept close to her body.		



CONCLUSIONS

The objectives of the workplace visits are to increase educational awareness and improve occupational health of our colleagues. They are performed with a no-assignment of blame purview.

By identifying where and how injuries occur in specific settings, interventions can be easily recognized and prioritized. Reporting injuries and documenting all bloodborne exposures is essential for having the evidence to analyze for prevention.

REFERENCES

1. Centers for Disease Control and Prevention. (2004). *Workbook for designing, implementing, and evaluating a sharps injury prevention program.*

CONTACT

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