

# Reducing Unplanned Extubation in Psychiatric LTC

Jih-Rue Pan, Feng-Chuan Pan

**Abstract**—Today's healthcare industries had become more patient-centric than profession-centric, from which the issues of quality of healthcare and the patient safety are the major concerns in the modern healthcare facilities. An unplanned extubation (UE) may be detrimental to the patient's life, and thus is one of the major indexes of patient safety and healthcare quality. A high UE rate not only defeated the healthcare quality as well as the patient safety policy but also the nurses' morality, and job satisfaction. The UE problem in a psychiatric hospital is unique and may be a tough challenge for the healthcare professionals for the patients were mostly lacking communication capabilities. We reported with this essay a particular project that was organized to reduce the UE rate from the current 2.3% to a lower and satisfactory level in the long-term care units of a psychiatric hospital. The project was conducted between March 1<sup>st</sup>, 2011 and August 31<sup>st</sup>, 2011. Based on the error information gathered from varied units of the hospital, the team analyzed the root causes with possible solutions proposed to the meetings. Four solutions were then concluded with consensus and launched to the units in question. The UE rate was now reduced to a level of 0.17%. Experience from this project, the procedure and the tools adopted would be good reference to other hospitals.

**Keywords**—Unplanned extubation, patient safety, error information

## I. INTRODUCTION

UNPLANNED extubation is an important indicator of quality control monitoring, accident prevention and monitoring of the quality of hospital care management is one important part [1]. It is common to find in the long-term care wards in a psychiatric teaching hospital, of which primarily care patients with combined physical illness, mental illness, and other illness or mental disabilities caused by non-mental diseases. This generally results in some symptoms such as loss of physical function. To maintain the vital system, the patients' were prescribed to replace the biological function with varied tubes to support the life, these tubes may include the nasogastric tube, gastrostomy fistula, catheter, cystostomy tube, and others. Tubes for nutrition retention and urinary excretion are the two most popular in this particular care unit, and are of high-traffic, high-risk, and are easy to make mistake among others. This is particularly true to the psychiatric patients that are generally unaware of the importance and the necessity of these tubes. Factors associated with the occurrence of UE may include brain injured patients that behave abnormal, a sore throat, ill because of alien objects in throat, and verbal communication constraint.

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In addition, efficient actions required due to labor force shortage, and some nurses lacking care experience of this kind had further worsen the occurrence rate [2].

To prevent an unplanned extubation, care-givers should effectively locate and fix the tubes and lines on the correct position that conforms to the instruction. A body constraint may be required whenever the patient's the team leader had determined such a necessity. To assure the tubes free from the patient's reach, a 20 centimeters distance between the tubes and the patient's upper limbs is necessary. This can significantly reduce the UE [3].

Fail to communicate with care-givers tends to further agitate the intubed patients, of which will increase the risk of unplanned extubation. When verbal communication is impossible, the care-givers should utilize alternative methods for effective communication, such as pencil and paper, signs, body language, and other non-verbal methods that the patients may comprehend. In addition, nurses actively engage in a continuous examination and providing basic biological needs with warm consolation can effective ease the patients' anxiety [1].

According to the recent records of the case unit, 4.3% of occurrence rate are found, much higher than the national average. Unplanned extubation (UE) of this kind had caused extreme medical costs with poor or unsatisfactory health service quality [4]. In addition, UE can further incur extra work loading to the nursing team, and bring negative impacts to the morality. The project is to solve this particular problem with a special task force. UE can be categorized as two types, the "addicted" and the "slip", of which the former refers to an extubation forced by the patients, whereas the latter refers to the extubation occurs due to poor intubation or other mistakes of the people in charge.

Purpose of the project is to reduce the UE rate from the current levels to less than 3.0% for urinary catheter, less than 0.1% for tracheostomy tube. To provide efficient and effective intubation services and prevent repetitive intubation by target-oriented training on the intubation and fixing techniques [5].

Goal setting reason: verification of the recent literature unplanned extubation of goal setting, the lack of reference. The telephone interview two municipal hospitals, a scale similar to the private hospital neurosurgery ward did not refer to monitoring thresholds. Therefore, the task force members decided to set the target value, the nasogastric tube for three months based on monitoring of unplanned extubation was 9.3%, unit indwelling nasogastric tube is a high flow of care activities, the group decided to discuss the challenges of self-set progress rate of 70%, the set threshold value is <3.0%, urinary catheter, tracheostomy tube is due to a problem-oriented and high-risk care activities, it is set to monitor threshold <0.1%. Second, the families of patients with high risk of extubation with a sense of crisis and with the implementation of preventive measures. Third, the paper did not happen again due to glue

loose resulting in "unplanned extubation" situation. Fourth, the knowledge of physical restraints in nursing staff measured the total average score of 80 points. Fifth, establish an effective prevention of unplanned extubation standard operation, the nursing staff to ensure full compliance

## II. SITUATION ANALYSIS

According to the information provided by the care records, there were 20 cases of UE, or 5.33% of the total intubation trips, during the period of March 1<sup>st</sup>, 2011 and June 30<sup>th</sup>, 2011. Out of this 20 UE cases, nasogastric and gastrostomy are UE 10 cases, or 8.33% of the total intubation of its kind, whereas cystostomy tube UE is 5 cases, or 1.25%. The information indicated that the current situation is unacceptable and will consequently hazardous to the total service quality.

Background analysis for UE cases: Examine in detail into the information from continuous observation and recording. The average length of stay ranged from 90 to 100 days, 55% of the UE are found in the day shift (11). Patients were diagnosed mostly as stroke with medical illness, accidental brain injury 20% (4), renal and urinary tract system disorders 50% (10), cancer 10% (2), epilepsy 15% (3) patients consciousness is more chaotic, genetic disorders chorea 5% (1). 90% of the extubation cases were treated with sedatives yet still occurred. 95% of the cases were assessed at ADLS20 ~ 40 in Barthel Index that require full living support of care-givers, yet 75% of the extubation events happened. As to the main causes, the patients' physical situation accounts for one-thirds of the extubations. The details of the information are illustrated as in tables I, II.

TABLE I  
 BACKGROUND INFORMATION ON UE CASES

Diagnosis	Diagnosis	Nasogastric tube,	Catheter
Schizophrenia	Renal function and	4 (26%)	3 (60%)
	Cerebral	5(33%)	2 (40%)
	Epilepsy (poor	2(13%)	
	Cancer	3(20%)	
	Degradation of	1(7%)	
Shift	Day	8 (53%)	3 (60%)
	Early night	4 (26%)	1 (20%)
	Late night	3 (20%)	1 (20%)
ADLS	0-20	13 (86%)	3 (60%)
	20-40	2 (14%)	2 (40%)
Nurse escort	Yes	10 (66%)	4 (80%)
	No	5 (34%)	1 (20%)
Tranquilizers	Yes	12 (80%)	5 (100%)
	No	3 (20%)	0 (0%)
Constraint	Yes	5 (34%)	0 (0%)
	No	10 (66%)	0 (0%)

TABLE II  
 CAUSES OF UE

Causes	N (%)
Extricate by hand (PT)	7(35)
Extricate by head moving (PT)	3(15)
Coughing	3(15)
Staff negligence (when bathing)	3(15)
Paper, glue loose	2(10)
Improper piping	1(5)
Body turn	1(5)

Look into the detail of the information contained in the table II, causes of UE are illustrated as follow [6].

(A) The care-givers unaware of the danger of UE. Constraint is essential in most intubation cases, yet the patients in turn feel uncomfortable. Despite the standard operation procedure required or negligent on the danger of the extubation, caregivers may leave the intubed patients alone without notifying the nurses, or even release the constraints simply because of commiserate. These may in turn result in a fatal problem. In the observation period, there are two registered nurses and 15 attendants to provide care to the patients, among which 7 of them are new to the unit. New members joined the unit with few or none prior experiences or trainings on intubation treatment, thus have little knowledge on the importance of intubation and lack perception on the risk of UE.

(B) Improper constraints by attendants. This was found in the movable beds, in which the patients can easily move their heads to the bonded hands for an extubation. This happens when the caregivers are less experienced.

(C) Poor quality of the glue paper. Glue paper is the major material used in bonding the patients' hands. Some UE cases were found in the early morning at 5 am or 6am, on which the paper becomes wet and non-adhesive. Nurses in the shift of late night may be unaware such progress after hours on duty.

(D) Unskilled nurses. Nurses on duty should check in a continuous manner the fixed lines, nasogastric tubes and amend or adjust those improper parts to assure a quality outcome. UE may happen when an adjustment is performed by an unskillful nurse.

(E) Lacking a standard preventive measure

The measure specific for preventing an UE is absent in this unit, such as a monitoring system, the measures in detecting and preventing an UE.

## III. MATERIAL AND METHODS

### A. Solutions

Based on the criteria of effectiveness, autonomy, cost burden and other factors, five alternatives were concluded after three team meetings. These alternatives are (A). Establishing and locating the warning signs of preventing an UE in the easy visible spots. (B). Making a communication card available to the patients' beds. (C). Change the fixed tape. (D). Held a on-the-job education program for the body constraint and fixed services. (E). Establishing a nursing assessment record specific for the prevention unplanned extubation.

### B. Implementation

Solution implementation process is divided into planning phase, implementation phase, evaluation phases in the period of March 1<sup>st</sup> and June 30<sup>th</sup> in 2011.

## IV. RESULTS

A three-month period of monitoring after the first implementation of the project is performed to evaluate the improvement. Two UE of the tracheostomy tube are found out of 375 intubation patients, and 0 UE of catheters occurred out

of 436 patients during the period of evaluation phase. Result of the project is successful. The target rate for urinary catheter was 3.0%, and less than 0.1% for tracheostomy, and the project returned with 0.5% and 0% of the UE in question respectively. Improvement is significant.

#### V. CONCLUSIONS AND RECOMMENDATIONS

Unplanned extubation accidents had not only significantly increased the workload to the medical service team, but also hazardous to the care quality. The case unit organized a project aims to reduce the occurrence rate of UE in the impatient department of a psychiatric hospital. By close observations over the patients and cooperation among team members, the project team proposed and implemented several approaches specific for problem. After a three-month trial, the project gained a satisfactory result with sharply reduction of UE rate.

Critical factors to the success of this project are many. However, the first and major contributor to the success is the comprehensive involvement of the nurses and the attendants (care-givers). The team members were motivated to hold enthusiasm over the activities associated with this program, from observing and collecting information regarding the UE, producing supportive materials for education and reminding, taking additional intubation education and trainings, to duly keeping the assessment records. In other words, it is the high levels of morality of the team had made the project successful. Another factor that also contributable to the success is the educational program, including the materials and the process of the training, that was designed and provided to the new attendants in caring the intubation patients. Participants of the training program had not only learned the knowledge and techniques, but also being motivated by the value and spirit of caring the intubated patients. The latter had further inspired the attendants to be more considerate and sympathy toward the patients. The patients and their families hold a higher level of satisfaction with the current services for more efficient techniques and less repetitive intubations, and more important a more humane oriented.

It is recommended including the UE prevention training as a part of the patient safety program and new staff training program of each unit to foster and assure a patient-centric service delivery.

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