

CHAPTER VI

RESULTS

The results will be presented in 4 sections : demographic data, general information of study results, poor performance items with significant correlation between knowledge and practice, and items with poor performance. In the latter 2 sections, the study results of a procedure/item are described only when the score of performance of that particular procedure/item falls beneath an agreed-upon level of acceptability that is determined by experts. In general, these results are likely to reveal deficits in common procedures.

Demographic Data

The general characteristics of the nursing personnel of all 5 intensive care units of Maharaj Nakorn Chiang Mai Hospital are described in this section. As a group, the variation with regards to sex, age, religion, marital status, educational background and working status and working experience is assessed as proportion (percentage) of each variable within the group. These demographic data were gathered from questionnaires which were distributed and collected after finishing the observational program in order to diminish the Hawthorn effect.

With regards to sex distribution, most of the nursing personnel studied are female (92.8%), the rest are male (Table 1).

Table 1 Proportion of nursing personnel according to sex

Sex	Number	Percentage
Male	11	7.2
Female	142	92.8
Total	153	100.0

The age of nursing personnel varies from 20 - 45 years. When divided into 5 age groups, the 22 - 26 year-old group constitutes about half of all personnel in this study (56.3%)(Table 2).

Table 2 Proportion of nursing personnel according to age

Age/year	Number	Percentage
< 21	6	3.9
22 - 26	86	56.3
27 - 31	32	20.9
32 - 36	19	12.4
> 37	10	6.5
Total	153	100.0

Most of the nursing personnel studied are Bhuddhist (96.1%) (Table 3). Only 3.3% and 0.7% are Christian and Islamic, respectively.

A large proportion of nursing personnel (75.2%) is single while 23.5% is married and only 1.3% is divorced (Table 4).

Table 3 Proportion of nursing personnel according to religion

Religion	Number	Percentage
Bhuddism	147	96.1
Christianity	5	3.3
Islam	1	0.7
Total	153	100.0

Table 4 Proportion of nursing personnel according to marital status

Marital status	Number	Percentage
Single	115	75.2
Married	36	23.5
Divorced	2	1.3
Total	153	100.0

A majority of the nursing staffs graduated from Chiang Mai University (81.7%)(Table 5). Only 9.8% graduated from Payap University, 7.2% from other institutions and only 1.3% from Chulalongkorn University.

Table 5 Proportion of nursing personnel according to graduating institution

Institution	Number	Percentage
Chiang Mai U.	125	81.7
Payap U.	15	9.8
Chulalongkorn U.	2	1.3
Others	11	7.2
Total	153	100.0

Nursing personnel can be divided into 2 broad groups according to the educational background: practical nurse and nurse. All of the practical nurses received nursing certificate. There are 3 graduational levels for nurses: Diploma, Bachelor degree and Master degree. Among all nursing personnel, 70.6% received B.Sc. degree, only 0.7% and 1.3% received Diploma and Master degree, respectively (Table 6).

Table 6 Proportion of nursing personnel according to educational level

Status	Education	Number	Percentage
Practical N.	Certificate	42	27.5
Nurse	Diploma	1	0.7
Nurse	B.Sc.	108	70.6
Nurse	Master	2	1.3
Total		153	100.0

According to the working status, 6 head nurses are observed (3.9%) in 5 intensive care units (Table 7). Among the remainder, 68.6% and 27.5% of the observed personnels are nurses and practical nurses, respectively.

Table 7 Proportion of nursing personnel according to working status

Status	Number	Percentage
Head nurse	6	3.9
Nurse	105	68.6
Practical nurse	42	27.5
Total	153	100.0

When the experience of the nursing personnel is considered, about half of the personnel (45.8%) has worked for 1 - 5 years (Table 8). There are 32.7% and 21.5% of the personnel who have working experience of more than 5 years and less than 1 year, respectively.

Table 8 Proportion of nursing personnel according to nursing experience

Experience/year	Number	Percentage
< 1	33	21.5
1 - 5	70	45.8
> 5	50	32.7
Total	153	100.0

General Information of Study Results

During a period of 9 months, it was possible to observe an overall of 166 nursing personnel. However, 11 of them were later excluded from the study since they were not available during knowledge assessment period. Among these, six had resigned, one was sick and admitted in the hospital, three took a leave for continuing education and one was transferred to another department. One hundred fifty-five questionnaires were sent out and 153 were returned, resulting in the return rate of 98.7%.

For all of the common procedures, it was possible to observe the nursing activities adequately in every ward and from 16-87 observations were done in each ward. But for 3 rare procedures (intubation, extubation and weaning from ventilator

care), the number of observations did not meet the minimal requirement in some/all wards. As shown in Table 9, intubation and extubation were observed less than 16 times in all 5 wards. There were only 2 wards (Acute care and ICU-P) where weaning from ventilator care was not observed adequately.

Table 9 Number of observations in each ward for intubation, extubation and weaning from ventilator care

Ward	Intubation	Extubation	Weaning from ventilator care
Acute care	6	8	6
ICU-M	7	12	16
ICU-N	2	14	21
ICU-P	8	14	4
ICU-S	3	8	17
Total	26	56	64

Poor Performance Items with Significant Correlation between Knowledge and Practice

Among 10 procedures which are selected for this study, there are only 2 procedures (tracheal suctioning and continuing mechanical ventilator care) that we find, in some items, a significant correlation between knowledge and practice in addition to poor performance.

For tracheal suctioning, a negative correlation is found between knowledge and practice for the item: monitor signs and symptoms that indicated need for suction ($Z = - 2.55$)(Table 10). Surprisingly, this means that the nursing staffs who know that they

should assess patients before suctioning will have 0.21 times less chance of doing it right (odds ratio = 0.21) compared with the ones who do not know.

For the item: select appropriate amount of vacuum pressure, the result shows a positive correlation between knowledge and practice ($Z = 2.23$)(Table 10). This means that the nursing personnel who know the appropriate amount of vacuum pressure for suctioning will have 3.39 times more chance of choosing the right level of pressure than the ones who do not know (odds ratio = 3.39). Similar result is found with the item: record procedure after suctioning.

When the actual frequency of the correct performance was assessed for these 3 items of tracheal suctioning, we find that the percentage of correct performance is less than the expectation of experts(Table 10). The first two items are done correctly in only 49.8% and 78.8% of the times compared with the level of 90% as expected by experts. For the last item, the percentage of correct performance is 61.9% compared to the expected 80% of the experts.

For the procedure of continuing mechanical ventilator care, the item: cleanse adaptor of respirator or self inflating bag with 70% alcohol before connected to patients shows a highly positive correlation ($Z = 2.07$) (Table 11). This means that the ones who know will have 35.2 times greater chance of making a right thing compared with the ones who do not know (odds ratio = 35.2). This item is not performed as frequently as the experts expect (77.1% vs 90%).

Table 10 Items with significant correlation between knowledge and practice for tracheal suctioning.

Items	Percentage of correct performance	Z	Odds ratio
Monitor signs/symptoms **	49.8	- 2.55	0.21
Select appropriate pressure **	78.8	2.23	3.39
Record procedure *	61.9	3.54	4.91

* denotes less important item, ** denotes important item.

In the same procedure, the item: measure tidal volume this shift is performed correctly only in 57.1% of the times as compared with the expected 90% of the experts. There is also a positive correlation between knowledge and practice of this item ($Z = 3.45$). The results indicate that the nursing staffs who remember that they should measure tidal volume in every shift will have a 10.5 times more chance of doing it compared to the ones who do not know.

Table 11 Items with significant correlation between knowledge and practice for continuing mechanical ventilator care

Items	Percentage of correct performance	Z	Odds ratio
Cleanse adaptor **	77.1	2.07	35.2
Measure tidal volume **	57.1	3.45	10.5

** denotes important item.

Items with Poor Performance

In addition to the 5 items described in the previous section, there are many other nursing activities that need to be improved. Poor performance of these items, however, is not associated with the correlation between knowledge and practice. They are as follows:

In the intubation procedure, there is one item: explain the procedure for patient that the nursing staffs perform in only 50% of the times as compared to the 90% expectation level of the experts.

For the procedure of initiation of mechanical ventilation, all of the items are rated as important, so experts expect that they should be performed correctly for at least 90% of the times. On the contrary, the percentage of actual performance are quite low for 2 items, explain procedure for patient and measure tidal volume during initiation of mechanical ventilation, which are 13.9% and 32.7%, respectively (Table 12). It is markedly low for the item: record breath sound, at only 1.9%. The rest of the items are performed better but still indicate the need to be improved when compared with the criterion standard.

For the continuing mechanical ventilator care procedure, the percentage of correct performance for the item: cleanse or change ventilator every 3 days is very low (17.5%)(Table 13). It is much better for the item: support tube when changing position at 74.3%. Both of these items are rated as important so at least 90% of correct performance is expected.

Table 12 Items with poor performance for initiation of mechanical ventilation

Items	Percentage of correct performance
Explain procedure for patients **	13.9
Measure tidal volume **	32.7
Wash hand before preparing ventilator **	49.5
Assess chest excursion/breath sounds **	52.3
Auscultate chest to assess tube's placement **	39.3
Record breath sound **	1.9

** denotes important item.

Table 13 Items with poor performance for continuing mechanical ventilator care

Items	Percentage of correct performance
Cleanse or change respirator every 3 days **	17.5
Support tube when changing position **	74.3

** denotes important item.

The care of endotracheal tube is a common procedure in intensive care units. Among 9 items of endotracheal tube care selected for study, 3 of them, as listed in Table 14, are not performed adequately. The first two items are rated as important items but the percentage of correct performance were only 54.1% and

14.1%, respectively. For the last item, record procedure, only 27.1% were performed correctly compared to 80% of the rating criteria.

Table 14 Items with poor performance for endotracheal tube care

Items	Percentage of correct performance
Aspirate trachea before providing endotracheal tube care **	54.1
Provide oral, nasal and skin around mouth and nose care **	14.1
Record procedure *	27.1

* denotes less important item, ** denotes important item.

In the care of tracheostomy tube inner cannula, 2 very simple items are commonly omitted. The suctioning of outer cannula before reinserting cleansed inner cannula is done only 10.8% of the times. Quite similarly, the percentage of correct performance for recording procedure was 28.0%.

Table 15 Items with poor performance for tracheostomy inner cannula care

Items	Percentage of correct performance
Suction outer cannula before reinserting cleansed inner cannula **	10.8
Record procedure after tracheostomy inner cannula care *	28.0

* denotes less important item, ** denotes important item.

Suctioning of the trachea is another very common procedure in intensive care units. Interestingly, this is a procedure of which we find the highest rate of poor performance (8 out of 20 items). There is a critical item, monitor dysrrhythmias during suctioning, which is expected to be performed correctly 100% of the times, but only 12.2% is noted in a total of 231 observations (Table 16). Two important items, place the patient in optimal position during suctioning and if fluid contaminated then discard, are performed in less than 1/4 of the expected level. The recording the procedure is a common problematic item; in all 10 procedures, only 5 of them are adequately recorded.

Table 16 Items with poor performance for tracheal suctioning

Items	Percentage of correct performance
Explain procedure before suctioning *	33.8
Hyperventilate lung with oxygen before suctioning **	74.9
Place the patient in optimal position before suctioning **	16.5
If fluid contaminated then discard **	16.7
Monitor dysrhythmias during suctioning ***	12.2
Record procedure after suctioning *	61.9

* denotes less important item, ** denotes important item,

*** denotes critical item.

After obtaining 16 arterial blood gas samples, all samples are sent to the laboratory but only 6.3% are labelled. The labeling is considered important by the experts.

Among 10 items of the weaning from mechanical ventilator procedure, 2 out of 4 critical items and 1 out of 6 important items are not adequately performed (Table 17). These critical items are explain procedure before weaning and encourage deep breathing and coughing during weaning. For an important item: measure tidal volume during weaning from ventilator, none of them has performed this step.

Table 17 Items with poor performance for weaning from mechanical ventilation

Items	Percentage of correct performance
Explain procedure before weaning ***	78.5
Measure tidal volume during weaning from ventilator **	0
Encourage deep breathing and coughing during weaning ***	83.3

** denotes important item, *** denotes critical item.

Shown in the last table (Table 18) are 2 important items, oxygenate the patient before extubation and extubate at peak of inspiration, within the procedure of extubation. These 2 items are performed correctly in only 48.2% and 21.8% of the times, respectively.

Table 18 Items with poor performance for extubation

Items	Percentage of correct performance
Oxygenate the patient before extubation **	48.2
Extubate at peak of inspiration **	21.8

** denotes important item.