

## Nurses' perception of nursing workforce and its impact on the managerial outcomes in emergency departments

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**Aims.** (1) To understand nurses' subjective perceptions of the current nursing workforce in their emergency departments, (2) to examine the relationship between nurses' workforce perceptions and its impact on the managerial outcomes and (3) to analyse the correlation between nurses' characteristics and the scores on workforce perception.

**Background.** While the association between workforce perceptions and nurse outcomes is well-documented, few studies have examined how emergency department nurses perceive current workforce and related outcomes.

**Design.** A cross-sectional questionnaire survey.

**Method.** A self-reported workforce perception questionnaire was used to survey 538 registered nurses in the emergency departments of 19 hospitals in northern Taiwan, during May to October 2006. Data were analysed using descriptive statistics, chi-square test, independent *t*-test, Pearson correlation and one-way ANOVA.

**Results.** The mean score of workforce perception was 6.28 points (total = 10 points). Both overtime ( $p = 0.02$ ) and number of callbacks on days off ( $p = 0.01$ ) were significantly correlated to current nursing workforce and hospital level. Older nurses tended to have more emergency department experience ( $r = 0.37$ ;  $p = 0.01$ ) and those with more emergency department experience tended to have vacation accumulation ( $r = 0.09$ ;  $p = 0.04$ ), overtime ( $r = 0.10$ ;  $p = 0.03$ ) and better perception of their emergency department's current workforce ( $r = 0.09$ ;  $p = 0.05$ ).

**Conclusions.** Although nurses' perceptions were found to be only moderate, overtime and number of callbacks on days off are potential problems that should be addressed by nursing leaders to benefit future emergency nurses.

**Relevance to clinical practice.** The findings can help drive strategies to ensure adequate staffing, to stabilise the nursing workforce and to prevent nurses from burnout factors such as working long hours, unpredictable schedules and a stressful work environment that may impact both the quality of emergency care and the quality of the nurses' work environment.

**Key words:** burnout, emergency nursing, nurses, nursing, Taiwan, workforce

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### Introduction

Changes in the worldwide emergency care system over the past several decades have challenged nursing leaders and hospitals to provide ever-larger numbers of nurses to meet the

increasing demand for Emergency Department (ED) nursing services, while simultaneously reducing labour costs (Gelinas & Loh 2004, Buerhaus *et al.* 2006). In a report from the

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Taiwan Bureau of Nursing and Healthcare Services, Department of Health, Executive Yuan has indicated that, although Taiwan has not yet experienced a shortage of nurses, 57.7% of nurses with less than one year of experience have drawn attention to the need for nursing leaders to find ways to retain nurses (Tsay & Wang 2007). A high turnover rate can raise the workload and have a negative impact on the well-being of nurses (O'Brien-Pallas *et al.* 2001). Additionally, the nature of EDs makes them places where patient numbers, types and activity all change rapidly, creating a stressful environment for both patients and health care providers (Hackenschmidt 2004, Buchan 2005, Levin *et al.* 2006). Information associated with nurse turnover and the stability of the nursing workforce is needed to help minimise ED hazards.

In general, the impact of the number of staff and workload on patients and nurses is documented by calculating the staff-to-patient ratio (Buchan 2005). Although the actual needs of nurses in hospital settings fluctuate, due to changing patient numbers, staffing and service delivery models, negative nurse attitudes have been documented as leading contributors to poor outcomes. For examples, numerous studies have found strong links between understaffing and adverse outcomes affecting nurses' health, morale, job satisfaction and retention rates (Aiken *et al.* 2002, Schenkel *et al.* 2003, Rogers *et al.* 2004, ICN 2006). Hegney *et al.* (2006) found that nurses in Queensland, Australia felt that their workload was too heavy and that they could not complete their work in the time available to them. Additionally, Lee and Liou (2001) found that both 'understaffing' and 'unfinished work' were often reported as barriers to nurses' being able to complete nursing tasks on time and understanding patient conditions. Laschinger *et al.* (2006) found that about 53% of nurses left their jobs because of stress and an unpleasant work environment.

In general, staffing ratios differ by units, hospitals and countries and are determined by either nurse-to-patient ratios or nurse-to-bed ratios. However, the ratios are a floor, not a ceiling. In California, the minimum nurse-to-patient ratio mandated by law for general ED patients was 1:4 (California Nurse Association 2004). In contrast, in Taiwan, the ratio established by the Taiwan Joint Commission on Hospital Accreditation (2007, March) and based on ED beds and monthly patient volume, was 1:2 for ED beds and plus 1:12 for outpatient visits per day. However, this ratio will be inaccurate if either the number of patients increases or some nurses are absent without giving notice. The International Council of Nurses (ICN 2006) reports that:

Staffing goes beyond numbers and have included other variables that affect staffing and the provision of safe care, such as workload, work

environment, patient complexity, skill level of the staff, mix of nursing staff, cost efficiency and effectiveness and linkage to patient and nurse outcome (p. 7).

Therefore, knowledge of how nurses perceive the nursing workforce in their EDs is important for making adequate personnel adjustments and for future improvements in emergency care settings. Previous studies have mainly focused on the relationships between staffing and patient outcomes (Aiken *et al.* 2002, Anthony 2008, Cho *et al.* 2008), creating models of human resources needs during registered nurse (RN) shortages, the individual, group and organisational determinants of RN turnover and conditions in Western hospitals (Buerhaus *et al.* 2001, 2006, Lin *et al.* 2008). However, factors that may influence nurses' perceptions on ED workforce remain under-investigated.

## Aims

The aims of this study were to obtain a comprehensive understanding of nurses' perceptions of the current workforce in their EDs, to examine the relationship between nurses' perceptions of the workforce and their impact on the managerial outcomes and to compare nurses' characteristics such as age and experience with their scores on a questionnaire designed to elicit their workforce perceptions.

## Methods

### Study design, setting and population

A cross-sectional questionnaire survey was conducted in the EDs of hospitals in northern Taiwan. All 38 hospitals with EDs (eight medical centres, 20 regional hospitals and 10 district teaching hospitals) with a monthly patient volume of more than 2000 visits were identified through national hospital accreditation records (Taiwan Joint Commission on Hospital Accreditation 2004) and were then asked to take part in this survey. The classification of hospital types was based on bed capacity and clinical service capabilities. In general, hospitals were classified as medical centres ( $\geq 500$  beds), regional hospitals (255–499 beds) and district teaching hospitals ( $\geq 20$  beds) (Lin *et al.* 2008). Fifty per cent of these 19 hospital EDs agreed to release the number and names of their nurses. All full-time RNs currently working either a morning or an evening shift at these 19 hospitals and with at least three months of working experience were invited to participate in this study. Data were collected 1 May 2006–30 October 2006.

## Instrument

For the purposes of this study, a self-reported questionnaire was developed by the research team, consisting of three parts:

- 1 Demographic information (six questions): age, education level, level on the clinical ladder (N1, N2, N3 and N4 level), years in the ED, number of professional certifications (Advanced Cardiac Life Support or ACLS, Emergency Trauma Training Course or ETTC, Advanced Paediatric Life Support or APLS, Critical Care Nurse Training or ACCNT, Advanced Trauma Life Support or ATLS and level of hospital – medical centre, district hospital, or regional hospital).
- 2 Managerial outcomes related to nursing workforce (five questions): number of vacation hours accumulated (vacation hours used after earned) and debt (vacation hours used before earned), hours of overtime, number of callbacks on days off and number of incidents (e.g. fall, pressure ulcer, central catheter related bloodstream infection, ventilator associated pneumonia, catheter related urinary tract infection and medical errors) reported during the past month.
- 3 Workforce Perception Scale (WPS) (nine questions). The WPS measured nurses' subjective perceptions of the current nursing workforce in their EDs. The answer to each question was scored on a 10-point scale ranging from 1 (total disagreement) to 10 (total agreement). Then, the research team devised three categories to indicate the degree to which nurses agreed with a given statement (1–4·9 points = low, 5–7·9 points = moderate and 8–10 points = high).

The survey instrument was reviewed and tested to establish face validity by a group consisting of one physician, three nurse supervisors and one nursing administrator. The survey questionnaire was also assessed for content validity by the five experts listed above, using a four-point Likert rating. The resultant content validity index (CVI) was 0·84. Overall, Cronbach's alpha was 0·81, indicating good internal consistency for the questionnaire. The questionnaire was completed by participants in 15–20 minutes, with no difficulties reported in understanding the questions or the response format.

## Ethical considerations

Data collection began after the primary author obtained approvals from the study organisation's institutional ethical committees. Then, the head nurses at the 19 EDs were contacted to obtain the number of RNs in each department and to schedule a date for administering the survey. All the surveys were carried out at each hospital at previously

arranged times and locations. All questionnaires were administered directly to ED RNs by one of the researchers and were returned in the addressed envelope provided or in designated mailboxes at the hospitals. A cover letter assured the nurses that all data would be used solely for research purposes, that all information was confidential and that their participation was voluntary. The research purposes and data collection procedures were also included. All questionnaires were completed anonymously.

## Data analysis

Descriptive statistics, including percentage, mean and standard deviation, were used to analyse the demographic characteristics, managerial outcomes and each item of WPS. A chi-square test and an independent *t*-test were employed to analyse the differences between the scores for the nurses' workforce perceptions and nurse characteristics. A Pearson correlation was used to examine the correlations among the study variables. A one-way ANOVA was used to examine the differences between scores for the nurses' workforce perceptions and nurse characteristics. All data were entered using a double-key method to ensure accuracy. Analysis of all data in this study was undertaken using the Statistical Package for the Social Sciences/PC+, version 13.0 (SPSS, Inc., Chicago, IL, USA) with the level of significance set at  $p = 0\cdot05$ .

## Results

### Characteristics of the samples

Of the 672 questionnaires that were administered, 130 questionnaires were not returned and four questionnaires were returned incomplete or with 20% or more of the data missing. This left 538 nurses included in the analysis. Thus, the effective response rate was 80%. Of the total sample, 340 nurses were from medical centres, 107 from regional hospitals and 91 from district hospitals. The average age of the nurses was 25·56 (SD 4·69) years (range 19–52 years). However, the age did not reflect the nursing workforce in Taiwan. Nurses worked as emergency nurses for an average of 41·12 (SD 32·56) months, ranging from 4–216 months. Nearly all nurses worked 42 hours per week.

Nurses' characteristics at the various levels of hospital are presented in Table 1. Most nurses were under the age of thirty ( $n = 461$ ; 85·1%), had junior college education ( $n = 343$ ; 63·8%), were at N1 and N2 level ( $n = 380$ ; 70·6%) and had ACLS professional certification ( $n = 501$ ; 93·1%). Statistically significant differences were found

**Table 1** Characteristics of emergency nurses ( $n = 538$ )

Variables	Medical centres $n = 340$ $n$ (%)	Regional hospitals $n = 107$ $n$ (%)	District hospitals $n = 91$ $n$ (%)	$\chi^2$	$p$ -value
Age (years)					
$\leq 30$	309 (90.9)	73 (68.2)	79 (86.8)	34.18	0.01*
$> 30$	31 (9.1)	34 (31.8)	12 (13.2)		
Educational level				7.94	0.02*
$\leq$ Junior college	204 (60.0)	70 (65.4)	69 (75.8)		
$\geq$ University	136 (40.0)	37 (34.6)	22 (24.2)		
ED experience				11.81	0.02*
$< 1$ year	59 (17.4)	15 (14.0)	22 (24.2)		
$\geq 1$ to $< 5$ years	191 (56.2)	68 (63.6)	59 (64.8)		
$\geq 5$ years	90 (26.5)	24 (22.4)	10 (11.0)		
Level in the clinical ladder system				31.00	0.01*
None	32 (9.4)	15 (14.0)	27 (29.7)		
N1 & N2	245 (72.1)	75 (70.1)	60 (65.9)		
N3 & N4	63 (18.5)	17 (15.9)	4 (4.4)		
Professional certification				46.94	0.01*
ACLS	315 (92.6)	102 (95.3)	84 (92.3)	1.03	0.60
ETTC	242 (71.2)	50 (46.7)	36 (39.6)	41.53	0.01*
APLS	187 (55.0)	57 (53.3)	28 (30.8)	17.26	0.01*
CCNT	153 (45.0)	24 (22.4)	22 (24.2)	25.50	0.01*
ATLS	15 (4.4)	0 (0)	4 (4.4)	4.90	0.09

ACLS, Advanced Cardiac Life Support; ETTC, Emergency Trauma Training Course; APLS, Advanced Paediatric Life Support; CCNT, Critical Care Nurse Training; ATLS, Advanced Trauma Life Support; ED, emergency department.

\* $p < 0.05$ .

between all the above variables and the hospital level ( $p < 0.05$ ).

### Self-reported managerial outcomes related to the current nursing workforce

The mean accumulation of vacation hours per nurse per month was 6.81 hours (SD 11.15 hours). For vacation debt, the mean was 0.66 hours (SD 2.65 hours) and for overtime, 5.50 hours (SD 5.25 hours). The mean for callbacks on days off per nurse per month was 0.84 times (SD 1.0 times) and for incidents reported by a nurse, the mean was 0.33 times (SD 0.80).

As shown in Table 2, the majority of nurses had accumulated 0.5 to  $< 5$  hours of vacation hours per month, had no vacation debt, overtime of 0.5 to  $< 5$  hours per month, no callbacks on days off and zero incidents reported during the past month. A higher percentage of nurses in regional hospitals reported that they had more than 10 hours vacation accumulation and vacation debt per month,  $> 10$  hours overtime per month and more than one callback on a day off than did nurses who worked in medical centres and district hospitals. In contrast, higher percentage of nurses in medical centres reported that they had more than one incident report, compared to those who worked in regional and district

hospitals. However, a statistically significant difference by hospital level was found only between amount of overtime ( $p = 0.02$ ) and number of callback on days off ( $p = 0.01$ ).

### Perceptions of nursing workforce among nurses

The mean score of each work force perception among nurses was 6.28 points (out of a total of 10 points), indicating that the nurses' perceptions of the current workforce in their EDs was moderate. As shown in Table 3, the highest mean score for all hospital nurses was 7.16 points, for 'I feel I can complete work in the paid time available', and the lowest mean score was 5.10 points, for 'I feel I still have energy to enjoy my interesting hobbies after work'. When comparing each item in the WPS by hospital, we found that nurses who worked in medical centres had the highest score on 'I can handle the current workload in the work unit' (with a mean of 7.17 points). By contrast, nurses who worked in regional and district hospitals had the highest score on 'I feel I am busy because of too much paperwork' (a mean of 7.49 and 7.31 points, respectively). These results indicated that the nurses felt that their current workload was only moderately heavy. However, for all items in the WPS, significant differences were found for six out of nine items by level of hospital ( $p < 0.05$ ) (Table 3).

Table 2 Differences between the outcomes related to nursing workforce and hospital levels ( $n = 538$ )

Variables	Medical centres $n = 340$ $n$ (%)	Regional hospitals $n = 107$ $n$ (%)	District hospitals $n = 91$ $n$ (%)	$\chi^2$	$p$ -value
Vacation accumulation (hours per month)					
0	91 (26.7)	35 (32.7)	19 (20.9)	5.04	0.53
$\geq 0.5$ to $< 5$	107 (31.5)	28 (26.2)	30 (33.0)		
$\geq 5$ to $< 10$	58 (17.1)	15 (17.0)	19 (20.9)		
$\geq 10$	84 (24.7)	29 (27.1)	23 (25.2)		
Vacation debt (hours per month)					
0	303 (89.1)	93 (86.9)	90 (98.9)	11.66	0.07
$\geq 0.5$ to $< 5$	19 (5.6)	5 (4.7)	0 (0)		
$\geq 5$ to $< 10$	8 (2.4)	5 (4.7)	1 (1.1)		
$\geq 10$	10 (2.9)	4 (3.7)	0 (0)		
Overtime (hours per month)					
0	32 (9.4)	16 (15.0)	7 (7.7)	14.96	0.02*
$\geq 0.5$ to $< 5$	155 (45.6)	42 (39.3)	45 (49.5)		
$\geq 5$ to $< 10$	89 (26.2)	16 (15.0)	23 (25.3)		
$\geq 10$	64 (18.8)	33 (30.7)	16 (17.5)		
Number of callbacks on days off (per month)					
0	179 (52.6)	34 (31.8)	48 (52.7)	14.98	0.01*
$\geq 1$	161 (47.4)	73 (68.2)	43 (47.3)		
Number of incidents reported (per month)					
0	254 (74.7)	87 (81.3)	75 (82.4)	3.64	0.16
$\geq 1$	86 (25.3)	20 (18.7)	16 (17.6)		

\* $p < 0.05$ .Table 3 Workforce perception of nurses by hospital level ( $n = 538$ )

Items	All hospitals $n = 538$ Mean (SD)	Medical centres $n = 340$ Mean (SD)	Regional hospitals $n = 107$ Mean (SD)	District hospitals $n = 91$ Mean (SD)	$F$	$p$ -value
I feel I can complete work within the paid time available	7.16 (1.96)	7.14 (1.95)	7.11 (2.11)	7.30 (1.81)	0.27	0.76
I feel I have enough time to deal with patients' needs and problems on my shift	5.95 (1.99)	6.06 (1.97)	5.64 (2.22)	5.88 (1.74)	1.93	0.15
I feel I can always leave my work on time	6.36 (2.49)	6.53 (2.37)	5.76 (2.79)	6.43 (2.48)	4.03	0.02*
I feel I still have energy to enjoy my interesting hobbies after work	5.10 (2.42)	5.48 (2.36)	4.48 (2.47)	4.40 (2.26)	12.17	0.01*
I feel the workload in the unit is equitably distributed	5.97 (2.00)	6.00 (1.92)	5.55 (1.93)	6.36 (2.27)	4.20	0.02*
I feel the current staffing level can deal with patient volume	5.36 (2.34)	5.71 (2.17)	4.93 (2.60)	4.55 (2.37)	11.38	0.01*
I feel head nurse can assign or justify workload based on each nurse's competency	6.84 (2.01)	6.90 (2.02)	7.00 (1.78)	6.42 (2.16)	2.51	0.08
I feel I am busy because too much paperwork	6.94 (1.95)	6.66 (2.04)	7.49 (1.82)	7.31 (1.53)	9.51	0.01*
Overall, I can handle the current workload in the work unit	7.02 (1.90)	7.17 (1.79)	6.67 (1.90)	6.86 (2.19)	3.19	0.04*

\* $p < 0.05$ .

### Relationship between nurses' characteristics and scores on workforce perception

As shown in Table 4, ED experience was positively correlated to the age of the nurses ( $r = 0.37$ ;  $p = 0.01$ ), to accumulation

of vacation hours ( $r = 0.09$ ;  $p = 0.04$ ), to hours of overtime ( $r = 0.10$ ;  $p = 0.03$ ) and to the scores on workforce perception ( $r = 0.09$ ;  $p = 0.05$ ). These results indicated that older nurses tended to have more ED experience. Furthermore, nurses with more ED experience tended to have accumulated

**Table 4** Correlation of scores on workforce perception, nurses' characteristics, and outcomes related to workforce in emergency departments (ED) ( $n = 538$ )

Variables	1	2	3	4	5	6	7	8
Age (years)	1							
ED experience (months)	0.37** (0.01)	1						
Vacation accumulation (hours per month)	0.02 (0.70)	0.09* (0.04)	1					
Vacation debt (hours per month)	0.02 (0.72)	0.03 (0.50)	-0.14** (0.01)	1				
Overtime (hours per month)	0.06 (0.14)	0.10* (0.03)	0.07 (0.13)	0.02 (0.60)	1			
Number of callbacks on days off (per month)	0.05 (0.27)	0.02 (0.58)	0.03 (0.46)	-0.05 (0.25)	0.02 (0.65)	1		
Numbers of incidents reported (per month)	-0.005 (0.91)	-0.08 (0.08)	-0.01 (0.82)	-0.03 (0.52)	0.06 (0.19)	0.07 (0.13)	1	
Scores on workforce perceptions	-0.002 (0.96)	0.09* (0.05)	-0.11** (0.01)	0.06 (0.19)	-0.18** (0.01)	-0.05 (0.28)	-0.02 (0.70)	1

\* $p < 0.05$ ; \*\* $p < 0.001$ .

more vacation hours and overtime and better perception of the current ED workforce.

However, accumulation of vacation hours was negatively correlated to vacation debt ( $r = -0.14$ ;  $p = 0.01$ ) and to scores on workforce perception ( $r = -0.11$ ;  $p = 0.01$ ), indicating that nurses who reported having accumulated more vacation hours tended to have fewer hours of vacation debt and poorer perceptions of the current nursing workforce. Overtime was negatively correlated to scores on work force perception ( $r = -0.18$ ;  $p = 0.01$ ), indicating that nurses who worked more overtime tended to have poorer perceptions of the current ED nursing workforce.

#### Differences between scores on work force perception and nurse characteristics

The most commonly used method of scheduling nurses in hospitals in Taiwan is self-scheduling. As shown in Table 5, nurses over 30 years of age who have obtained a university degree had a higher total mean score on workforce perception than did those who were younger or less educated. Moreover, nurses with more than five years of ED experience, who did not participate in the nursing clinical ladder system and who worked in medical centres had higher total mean score on workforce perception than those who worked in regional and district hospitals. However, no statistically significant differences by the above variables were found ( $p > 0.05$ ).

#### Discussion

This study represents the first large survey of ED nurses from different levels of hospitals in Taiwan. The overall response rate for the survey was 80% or satisfactory.

**Table 5** Workforce perceptions by nurse characteristics ( $n = 538$ )

Variables	N	Total scales M (SD)	t/F	p-value
Age (years)				
≤30	461	56.23 (12.03)	-1.78	0.08
>30	77	58.86 (11.19)		
Level of education				
≤Junior college	343	56.36 (11.65)	-0.61	0.54
≥University	195	57.02 (12.46)		
ED experience				
<1 year	96	56.60 (10.87)	1.88	0.15
≥1 to <5 years	318	55.91 (12.01)		
≥5 years	124	58.37 (12.48)		
Level in the clinical ladder				
Not participated	74	57.56 (11.86)	1.44	0.24
N1 & N2	380	54.63 (12.07)		
N3 & N4	84	55.48 (11.94)		
Level of hospital				
Medical centre	340	57.56 (11.86)	2.91	0.06
Regional hospital	107	54.63 (12.07)		
District hospital	91	55.48 (11.94)		

The total scores for the workforce perception scale were 90 points. ED, emergency department.

Hence, the results can be taken to reflect the views of the ED nurses involved in this survey. Although the duration of shifts varies from country to country, most shifts in Taiwan are eight hours long, except in special units such as operation rooms, dialysis units and for nursing assistants. Therefore, the results of this study can be generalised only to nations where eight-hour shifts are the norm.

Considering the high rate of turnover of nurses in Taiwan in the past few years (Tsay & Wang 2007), it is not surprising that 'overtime' and 'number of callbacks on days off' were

two outcomes found in this study. The finding corresponds with previous research. Both 'understaffing' and 'unfinished work' were reported by nurses in Taiwan as barriers to completing nursing tasks on time and to understanding patient conditions (Lee & Liou 2001). Sheward *et al.* (2005) also showed that 'understaffing' was the main reason for overtime. Milisen *et al.* (2006) indicated that short-staffing, time demands and a stressful work environment are experienced by hospital nurses in Belgium as obstacles to providing good nursing care to patients. Overtime is also an important factor associated with nurses' job and life satisfaction (Yildirim & Aycan 2008) and overtime is definitely a problem for hospitals and can negatively affect nurses' performance as well as patient safety (Institute of Medicine 2003). Thus, in the future, nursing leaders will need to pay more attention to overtime and seek ways to prevent it from having a negative impact on patients and nurses.

The results of this study also revealed that 'I feel I still have energy to enjoy my interesting hobbies after work' had the lowest score among all ED nurses. This result may imply the workload in Taiwan's EDs is too heavy; nurses may feel exhausted after work. Tsay and Wang (2007) support the finding that workload has a vital impact on the ability of nurses to delivery appropriate and effective care in Taiwan. In addition, Tung *et al.* (2006) found that a heavy workload is one of the most significant causes of work-related injuries among health workers. To ameliorate these negative outcomes, hospital administrators will need to create a more caring environment for their nurses. We also found that 'I feel I am busy because too much paperwork' was most reported frequently by nurses, especially by nurses who worked in regional and district hospitals. It is understandable that these results were intercorrelated; if nurses felt they had too much paperwork, they probably would feel exhausted after work and too tired to enjoy their hobbies after work. McGillis Hall and Doran (2007) have also pointed out that the decreasing number of RNs in EDs has resulted in extra work or job stress for the remaining nurses. Hegney *et al.* (2006) indicated that about 90% of nurses graded their workload as heavy. A heavy workload has been identified as a main factor contributing to medical errors in Taiwan (Tang *et al.* 2007); therefore, reducing nurses' workload, overtime and paperwork, should reduce or even prevent future medical errors.

ED staffs can vary dramatically by number of patients each nurse is responsible for, number of nurses available and managerial styles. However, one interesting finding of this study was that nurses with more ED experience tended to have a greater accumulation of vacation hours, more overtime

and higher scores on workforce perception. The finding may be due to the fact that more experienced nurses are more likely to be leaders with more responsibility in patient care in Taiwan; therefore, they may need to work longer hours to assist new nurses with patient care problems or to deal with managerial issues such as staffing or paperwork. This would explain why overtime was correlated with accumulated vacation hours and happened in the same direction. Buerhaus *et al.* (2001) found that more than 50% of oncology nurses reported working overtime at least once per week. Additionally, from 2002–2004 RNs surveyed in the USA reported that their overtime was voluntary (Buerhaus *et al.* 2006). But Dehghan *et al.* (2006) argued that overtime could be considered a temporary strategy to solve the problems of costs and human resources. Nursing administrators must balance costs and quality while maintaining adequate staffing ratios in hospital settings and addressing workforce issues in a way that goes beyond legal mandates and superficial ratio concerns. For example, an unsafe environment for both patients and nurses may result from nurses working more than a single eight-hour shift per day. Thus, we need to find ways to eliminate or reduce the need to have nurses work overtime.

## Limitations

Three limitations of this study should be mentioned. First, it surveyed only 538 RNs in 19 hospital EDs in northern Taiwan. Therefore, the generalisability of study results is limited. On the other hand, the 80% response rate was more than many previous published survey studies were able to obtain. Future studies might extend this work to all of Taiwan's hospitals. Second, the results of this study should be interpreted with caution, since workload and staffing levels at medical centres, regional hospitals and district hospitals can vary widely. For instance, a smaller ED, such as a district hospital, may require that nurses spend more time completing paperwork than do the larger EDs. Third, using an anonymous questionnaire as the main instrument of research involves the inevitable problems that attach to any self-reported instrument. Future studies should correlate nurse responses with more objective data sources, such as the records of nursing managers or hospital human resource centres, to determine the actual effect of nursing outcomes.

## Conclusion

This cross-sectional survey study has sought to provide an initial understanding of how ED nurses perceive the current nursing workforce in the EDs where they work. The findings

should be of help to ED nursing leaders seeking to develop effective strategies for managing staff. Such strategies might include implementing an information system to reduce paperwork, establishing a flexible scheduling system to reduce the number of callbacks on days off and building a support system to make EDs less stressful places for both patients and nurses. In addition, the results of the study that concern such issues of workforce satisfaction as accumulation of vacation hours and overtime, amount of paperwork and workload, as reported by the ED nurses, should be of value in planning strategies to improve the quality of emergency care in the future.

### Relevance to clinical practice

The findings of this research may be helpful for nursing leaders and hospital administrators in developing strategies to ensure adequate staffing in providing professional and safe care, to stabilise the nursing workforce to reduce high turnover rates of nurses in Taiwan and to rethink issues related to staffing and scheduling in today's complex health care to create a healthy work environment for nurses and to improve the quality of emergency care in the future.

### Contributions

Study design: YCH, JCC, WYC; data collection and analysis: YCH, HCS, WYC, HTC and manuscript preparation: WYC.

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