A cross-sectional study of factors associated with intentions to leave among newly graduated nurses in eight advanced treatment hospitals: job stressors, job readiness, and subjective health status

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Objectives This study was performed to examine job stressors, job readiness, and subjective health status as factors associated with intentions to leave among newly graduated nurses (NGNs) in advanced treatment hospitals in Japan.

Methods From June to August 2007, anonymous self-administered questionnaires were distributed to all NGNs in nine advanced treatment hospitals. The questionnaire items addressed individual attributes, employment characteristics, organizational characteristics, the 22-item Job Content Questionnaire, a novel job readiness scale, and scales for subjective health status (cumulative fatigue and psychological distress) and intentions to leave. The response rate was 73% (n＝414), and 377 completed questionnaire data sets from eight hospitals were analyzed. A hierarchical multiple regression analysis was performed to investigate the factors associated with intentions to leave and subjective health status.

Results The results of hierarchical multiple regression analysis showed 55% of the variance in intentions to leave. "orientation as nurse," subjective health status influenced by psychological job demand, and "supervisor support" were important independent factors of intentions to leave. Psychological job demand and job readiness were also important factors of subjective health status.

Conclusion To intervene in early resignation of NGNs, job stressors should be minimized to improve subjective health status, while simultaneously raising job readiness.

Key words: advanced treatment hospitals, intentions to leave, job readiness, job stressors, newly graduated nurses, subjective health status

I Introduction

Recently in Japan, the demand for nurses has been increasing in various areas because of a medical reform bill and amendments to the government's medical service payment structure. The Ministry of Health, Labour and Welfare estimate that there will be a shortage of about 15,900 nurses by 2010[1]. With this background, the early resignation of newly graduated nurses (NGNs) is becoming a significant issue[2,3].

High employee turnover negatively affects organizations through the cost of recruitment, reduced productivity, and physical and psychological burdens on employees[4~6]. This problem is particularly serious for organizations that employ professionals working under potentially high demand conditions, such as nurses[7,8].

Although previous studies investigating nurse turnover have revealed some related factors (e.g., burnout[9~11], poor social support[12,13], and decreased job satisfaction[14~16]), it has been pointed out that there are different factors affecting the rapid turnover of NGNs[17]. Furthermore, a previous study indicated that veteran nurses and NGNs have differing views on job satisfaction and turnover[18].

According to a research study concerning NGNs, 18.6% of the 1,219 hospitals surveyed responded that "the early resignation of NGNs will increase in the near future," while 42% of advanced treatment hospitals had the same response[3]. Also, more than 53% (n＝66) of the advanced treatment hospitals responded that the number of NGNs who resign due to health problems, especially psychological health problems, is expected to increase in the near future[3].

Concerning the physical and psychological health of nurses, several studies have revealed influence of job stressors on subjective health[19~22]. While some investigations indicated that employees' intentions to leave are the greatest predictor of turnover[4,23], previous findings for NGNs indicated a major effect of psychological distress, related to job stressors, on such intentions[24,25].

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Moreover, another previous study suggested that lack of job readiness among NGNs can result in "reality shock"[26], which becomes a factor in turnover as well as in negative feelings about their career choice[27]. Although nurses' work is becoming more demanding and complicated because of various changes in medical procedures (e.g., the increasing emergence and application of high-tech medical equipment), the duration of practical preparation for nursing students is becoming more limited for ethical and safety reasons[2,3]. This situation will cause a bigger discrepancy between the competence of NGNs and workplace requirements, especially in advanced treatment hospitals.

Thus, in order to intervene against the early resignation of NGNs in advanced treatment hospitals, further studies on intentions to leave, examining not only the effects of job stressors and job readiness but also subjective health status, are needed in Japan. While there have been attempts to examine how these factors affect turnover and intentions to leave among NGNs in multiple advanced treatment hospitals, one study study (n=116) did not consider work stressors and job readiness[25], and another (n=923) did not consider chronic job stressors and job readiness[17].

Therefore, we conducted the present investigation to examine job stressors, job readiness, and subjective health status (psychological distress and cumulative fatigue signs) as factors associated with intentions to leave among NGNs in multiple advanced treatment hospitals. The results should help employers and managers in advanced treatment hospitals in Japan improve their management style to benefit NGNs.

II Materials and Methods

In this study, we defined "newly graduated nurses (NGNs)" as nurses who had no prior nursing work experience after graduating from a nursing education institution. We defined "early resignation" as leaving their first job in a medical institution within one year after starting to work.

1. Subjects

This study used a cluster sampling method. Out of 148 advanced treatment hospitals, mostly university hospitals listed on the website of the University Hospital Medical Information Network, we selected 34 hospitals at random according to their location (N=4 out of 12 hospitals in the Hokkaido and Tohoku area, N=12 out of 72 hospitals in the Kanto and Koshinetsu area, N=4 out of 17 hospitals in the Tokai and Hokuriku area, N=6 out of 20 hospitals in the Kinki area, and N=8 out of 27 hospitals in the Tyugoku, Shikoku, and Kyusyu area). Then we asked the director of the nursing services department in each hospital for their co-operation in this research. Finally, nine hospitals agreed to co-operate. The subjects of this study were NGNs in these nine hospitals (n=567).

Among the nine hospitals, four are in the Kinki area, and seven are located in medium-sized cities with a population greater than 100,000. Also, about thirty percent of the hospitals had introduced new regulations regarding nursing staff and shifts, and the remainders were planning to introduce them. Ninety percent of the hospitals were larges-ized, with a capacity of more than 500 beds, while sixty percent of the hospitals had more than 500 nursing staff members. Ninety percent of the hospitals used mixed shift work: a two-shift system and a three-shift system.

Seventy percent of the hospitals had NGNs start out on the night shift from April to June. During the training period for NGNs, half of the hospitals introduced mental health education as a measure to prevent the early resignation of NGNs.

2. Ethical considerations and data collection

Approval for this study was obtained from the institutional ethics committee at the University of Tsukuba (#360). Participating nurses were not required to sign consent forms; their returning the questionnaire implied consent.

Participants were informed about the voluntary nature of participation and confidentiality in handling the data.

As the first increase in intentions to leave among NGNs generally occurs around the beginning of summer[3,25], we distributed the anonymous self-administered questionnaires between June and August 2007 to all the NGNs through their nursing departments, and collected them within a few weeks.

3. Measures

The questionnaire consisted of items concerning individual attributes (sex, age, marital status, and educational level), employment characteristics (having personal sentiment toward or association with the current hospital where they work, use of scholarships at current hospital, desired ward, shift work with night shifts, frequency of night shifts per month, average working hours per week, and mean time of working on days off per month), and organizational characteristics (size of the hospital's location city, bed capacity of the hospital, number of nurses on the staff at the hospital, conditions of the break facilities and amount of permitted rest time in the hospital, mean start time of the night shift for NGNs, nursing modalities, mental health education as a measure for preventing the early resignation of NGNs, and the introduction of new nursing staff and shift regulations).

The questionnaire also included a job readiness scale, a job stressors scale, two subjective health status scales (psychological distress and cumulative fatigue), and an intentions to leave scale.

4. Job readiness scale

Recently in Japan, nurses' work is becoming more demanding and complicated because of various changes in medical procedures[2,3]. In addition, with the increasing number of college-educated nurses whose

practical nursing experience is limited, the competence of NGNs has been changing[2]. Considering the current situation, we devised a novel job readiness scale to assess NGNs' readiness to act as medical professionals. To create item pools for the job readiness scale, we referred to previous reports[28,29] and conducted individual interviews with the directors of the nursing services departments of two hospitals. As a result, we devised 22 job readiness items (e.g., "I am well-equipped and highly motivated to learn."). The 22 items of this job readiness scale were evaluated using a four-point response scale and scored with Likert-type scoring from 1 (lowest job readiness) to 4 (highest job readiness). After principal component analysis using Valimax rotation, one item was excluded and four sub-scales of 21 job readiness items emerged. The four sub-scales were categorized as variables for "basic nursing skills and abilities," "relationship skills," "clinical practical expertise and confidence," and "orientation as a nurse." We used combined total scores of the four sub-scales (see Table 2) to estimate the job readiness of the participant.

5. Job stressors scale

We employed the self-administered Job Content Questionnaire (JCQ), which was developed by Karasek[30] and whose validity has been demonstrated in nursing-related studies[21,22]. We used the 22-item Japanese version of the JCQ, which has been confirmed as reliable and valid for Japanese workers[31]. The JCQ-22 includes questions on "skill discretion," "decision authority," "psychological demand," "supervisor support," and "coworker support"[30,31]. In this study, we used the combined scores for "skill discretion" and "decision authority" to indicate the level of "job control"[31]. There were four possible answers to each question: "strongly disagree," "disagree," "agree," and "strongly agree." Each item was scored following the JCQ-22 scoring method.

6. Subjective health status

General Health Questionnaire

Psychological distress was assessed using the Japanese version of the 12-item General Health Questionnaire (GHQ-12), which has demonstrated high concurrent validity, internal consistency, and reliability in Japanese workers[32,33]. Participants were asked whether they had recently experienced particular symptoms or behavior related to depression or anxiety. The GHQ-12 items were scored using 0-1-2-3 Likert scoring in order to assess the impairment level. The higher the total score, the greater the psychological distress the participant had.

7. Cumulative Fatigue

Participants' cumulative fatigue signs were assessed with the 13-item Cumulative Fatigue Index (CF-13), which was developed by the Japanese Ministry of Health, Labour and Welfare as a "self-checklist of fatigue accumulation" and has been validated[34].

Participants were asked whether they had recently experienced particular symptoms related to cumulative fatigue (e.g., "I get tired a lot more easily than previously."). Responses were scored with a three-point Likert-type scale. The higher the total score, the more cumulative fatigue symptoms the participant had.

8. Intentions to leave

Intentions to leave were assessed using a 6-item scale developed by the chief author and a colleague, using qualitative data and demonstrating a high internal consistency and reliability in Japanese IT workers[35,36]. Each item asked about the subject's thoughts or behavior related to resignation from their job (e.g., "I am fed up with my job at the present hospital and am earnestly gathering information to find a new job."). Responses were scored on a four-point Likert-type scale. The higher the total score, the stronger was their intention to leave.

9. Data analysis

We performed principal component analysis using Valimax rotation for 22 items of the job readiness scale, and calculated Cronbach's alphas for each factor. Next, we calculated descriptive statistics and Cronbach's alphas for intentions to leave, GHQ-12, CF-13 and dependent variables. We also calculated correlation coefficients for all the variables which had significant relationships with the GHQ-12, CF-13, and "intentions to leave." Finally, hierarchical multiple regression analyses using a random-coefficient model for the GHQ-12, CF-13, and "intentions to leave" were performed to attempt to determine the factors affecting each dependent variable, controlling for individual attributes, employment characteristics, and organizational characteristics.

In the equations of both "Subjective Health Status" (GHQ-12 and CF-13) and "Intentions to Leave", individual attributes, employment characteristics, and organizational characteristics were entered as control variables, and job readiness sub-scales and the JCQ-22 sub-scales were also entered as independent variables. In the equations of "Intentions to Leave", two variables of subjective health status were also entered as independent variables.

Statistical tests were two-tailed, and the limit for statistical significance was set at $p < 0.001$. All of the data analyses were conducted using SPSS version 15.0.

III Results

Among the 567 NGNs in the nine hospitals, 417 returned the completed questionnaire. The final response rate was 73% (n=414, from eight hospitals) after eliminating the data on three respondents from one hospital that had some distribution problems. After eliminating 37 with missing data, we used the data from 377 NGNs for analysis. About 93% (n=352) were female, and the mean age of these female nurses was 22.6 years (SD=2.83).

Table 1 Demographic characteristics of the sample (n=377)

Variables		N	%
Individual attributes			
1. Sex	Male	25	6.6
	Female	352	93.4
2. Mean age ±SD	Male	24.3±3.02	
	Female	22.6±2.83	
3. Marital status	Single	364	96.6
	Married	13	3.4
4. Education	Junior college or vocational school equivalency degree	236	62.6
	College graduate or higher	141	37.4
5. Residential style	Living with family or a partner	104	27.6
	Living alone in dormitory	198	52.5
	Living alone in apartment	75	19.9
Employment characteristics			
6-1. Personal sentiment or association with current hospital	Hospital which is located in my hometown	139	36.9
	Hospital where my alma mater is located	123	32.6
	Hospital with which I don't have any association but which I love	45	11.9
	Hospital for which I have no personal sentiment	70	18.6
6-2. Personal sentiment or association with current hospital	Hospital for which I have sentiment or association	307	81.4
	Hospital for which I have no personal sentiment	70	18.6
7. Scholarship system of current hospital	Used	43	11.4
	Not used	334	88.6
8. Desirable position (in a ward)	Yes	264	70.0
	No	113	30.0
9. Shift work	Shift work with night shifts	326	86.5
	Without night shifts	51	13.5
10. Average working hours per week	≦40	9	2.4
	41-45	96	25.5
	46-50	91	24.1
	51-55	105	27.9
	≧56	76	20.2
11. Frequency of working on days off per month	None	309	82.0
	One to two days per month	34	9.0
	Three to four days per month	27	7.2
	Five or more days per month	7	1.9
12. Mean time of night shifts per month ±SD (range)	4.22±1.93	(1-12)	
Organizational characteristics			
13. Hospital and location	a (in the Kinki area)	80	21.2
	b (in the Kinki area)	51	13.5
	c (in the Tyugoku, Shikoku, Kyusyu area)	71	18.8
	d (in the Tyugoku, Shikoku, Kyusyu area)	26	6.9
	e (in the Kinki area)	57	15.1
	f (in the Kanto and Koshinetsu area)	15	4.0
	g (in the Hokkaido and Tohoku area)	24	6.4
	h (in the Kanto and Koshinetsu area)	53	14.1
14. Size of the hospital's location city	A big city that is government-ordinance designated	0	0.0
	A medium-sized city with a population greater than 100,000	306	81.2
	A small-sized city with a population less than 100,000	71	18.8
15. Bed capacity of the hospital	Fewer than 499 beds	53	14.1
	More than 500 beds	324	85.9
16. Number of nurses in staff at the hospital	Fewer than 499 nursing staff	181	48.0
	More than 500 nursing staff	196	52.0
17. Break facilities and amount of permitted rest time in the hospital	Appropriate	252	66.9
	Not appropriate	125	33.1
18. Measures to prevent early resignation of newly graduated nurses (e.g., mental health education)	Have	198	52.5
	Do not have	179	47.5
19. Mean start time of night shift (months) ±SD (range)	1.77±0.74	(0-4)	

Table 2　Results of job readiness scores, principle component analysis and Cronbach's alphas (n＝377)

Job Readiness Items	Mean	SD	Factor 1	Factor 2	Factor 3	Factor 4
Basic nursing skills and abilities (Chonbach's alpha＝0.75)	13.48	2.62				
1 I can appropriately observe patients and make judgments in the nursing process.	2.26	0.59	0.698	0.212	0.017	−0.047
2 I have sufficient ability for assessment in the nursing process.	2.04	0.53	0.668	0.075	0.141	−0.110
3 I can make nursing records appropriately in the nursing process.	2.37	0.60	0.634	0.157	0.065	−0.014
4 In my engagement as a medical professional, I have no problem regarding safeth for myself and my surroundings.	2.31	0.65	0.610	−0.060	0.063	0.138
5 I don't feel there is a gap between the required skills at my current work place and the basic nursing skills I attained in my educational	2.23	0.73	0.604	−0.136	−0.037	0.174
6 I do not feel a difference in ability from my co-worker nurses due to differences in our educational backgrounds.	2.27	0.78	0.562	0.196	−0.237	−0.007
Interpersonal relationships (Cronbach's alpha＝0.75)	10.51	1.75				
7 I can maintain interpersonal relatioships in the workplace.	2.54	0.63	−0.063	0.782	−0.037	0.135
8 I can have good interpersonal relationships with the patients and their family members.	2.71	0.54	0.090	0.772	−0.156	0.041
9 I have sufficient communication skills to engage with staff and patients in the workplace.	2.44	0.62	0.048	0.643	0.178	−0.052
10 I can act appropriately at work with consideration for privacy and ethics.	2.83	0.54	0.195	0.522	−0.100	0.053
Clinical practical expertise and confidence (Cronbach's alpha＝0.79)	17.36	3.48				
11 I have confidence that I will not to cause a near-miss incident in the workplace.	1.89	0.77	0.144	0.305	0.679	−0.235
12 I am well-equipped and highly motivated to learn.	2.49	0.70	−0.056	0.094	0.652	−0.105
13 I have enough skills to respond appropriately in medical emergency situations.	1.57	0.69	0.363	−0.359	0.650	−0.058
14 I can take expected actions at the current medical institution as one of the staff members.	2.33	0.62	0.001	0.290	0.582	−0.077
15 I have a good sense of time when I work.	2.53	0.63	0.049	0.218	0.553	−0.201
16 I can appropriately take expected actions as a member of society.	2.46	0.63	−0.095	0.360	0.534	0.033
17 I work by myself with enough confidence.	2.00	0.71	0.101	0.002	0.521	0.135
18 In my work, I have sufficient confidence in my psychological and physical strength.	2.08	0.73	−0.069	0.185	0.418	0.386
Orientation as nurse (Cronbach's alpha＝0.62)	7.56	1.74				
19 I utterly hate nursing work.	2.86	0.78	−0.019	0.200	−0.033	0.712
20 The actual work of a nurse is very different from the work I had imagined.	2.33	0.79	0.329	−0.212	−0.108	0.692
21 I don't have an aptitude for nursing work.	2.36	0.74	−0.127	0.302	0.110	0.615
22 I use awareness and consideration well in my work.	2.25	0.59	0.364	0.311	0.172	0.074
Eigenvalue			7.080	1.532	1.403	1.158
% Variance explained			32.184	6.963	6.377	5.263
cumulative % variance explained			32.184	39.147	45.524	50.788

Principle component analysis using Valimax rotation.
Gray area shows that the primary factor loading was greater than 0.40. and the eigenvalue was greater than 1.0.

Table 1 shows a summary of the participants' individual attributes, employment characteristics, and organizational characteristics. Sixty-three percent of the female participants were college-educated nurses. About 19% indicated that they were working for hospitals for which they had no personal sentiment and 70% were working in a desirable position (e.g., in a ward). Twenty percent worked more than 56 hours a week, which means they did more than 60 hours of overtime work on a monthly basis, and 82% did not

Table 3 Descriptive statistics and Cronbach's alphas of intentions to leave, GHQ-12, CF-13 and dependent variables (n=377)

Variables	Mean	SD	Items	Range	Cronbach's Alphas
Intentions to leave	12.51	5.47	6	6–24	0.92
GHQ-12	21.82	4.95	12	9–36	0.82
CF-13	26.94	5.20	13	13–39	0.86
Psychological demand	37.25	4.94	5	26–48	0.61
Job control	68.84	6.95	9	38–88	0.41
Supervisor support	12.46	2.11	4	4–16	0.89
Coworker support	12.11	2.01	4	4–16	0.83

Table 4 Correlation coefficients of intentions to leave, GHQ-12, CF-13 and variables of individual attributes, employment and organizational characteristics[1] (n=377)

Variables	Intentions to leave	GHQ-12	CF-13
Individual attributes, employment and organizational characteristics			
Sex	−0.068	−0.113*	−0.099†
Education[2]	−0.159**	−0.161**	−0.219***
Personal sentiment or association with current hospital[3]	0.087	0.136**	0.113*
Shift work[4]	0.106**	−0.019	0.039
Working hours[5]	0.113*	0.126*	0.200***
Frequency of working on days off[6]	0.115***	0.015	0.000
Break facilities and amount of permitted rest time in the hospital[7]	0.260***	0.240***	0.276***
Mental health education as a measure to prevent early resignation[3]	0.225***	0.139**	0.222***
Job readiness			
Basic nursing skills and abilities	−0.274***	−0.350***	−0.386***
Interpersonal relationships	−0.368***	−0.412***	−0.413***
Clinical practical expertise and confidence	−0.314***	−0.466***	−0.454***
Orientation as nurse	−0.607***	−0.515***	−0.496***
JCQ-22			
Psychological demand	0.304***	0.359***	0.394***
Job control	−0.250***	−0.086†	−0.116*
Supervisor support	−0.447***	−0.209***	−0.288***
Coworker support	−0.472***	−0.291***	−0.315***
GHQ-12	0.553***	1.000	0.745***
CF-13	0.583***	0.745***	1.000
Intentions to leave	1.000	0.553***	0.583***

Notes: Symbols indicate level of significance: † $P<0.10$, * $P<0.05$, ** $P<0.01$, *** $P<0.001$.

1) Each score showed the correlation coefficients of variables of individual attributes and employment characteristics which have a significant relationship with the GHQ-12, CF-13, and intentions to leave.

2) 0=Other, 1=College or graduate degree or higher.

3) 0=None, 1=Have.

4) 0=Without night shifts, 1=With night shifts.

5) 0=Less than 55 hours in an average workweek, 1=More than 56 hours in an average workweek.

6) 0=None, 1=More than 1 day/month.

7) 0=Adequate, 1=Inadequate.

work on their allocated days off.

Table 2 shows the results of the factor analysis, means, standard deviations, and Cronbach's alpha coefficients for each sub-scale of the job readiness scale. The values were in the range of 0.62–0.79.

Table 3 shows the descriptive statistics and Cronbach's alpha coefficients for "intentions to leave," GHQ-12, CF-13 and dependent variables in this study. The JCQ-22 values were 0.41–0.89 and for the "intentions to leave," GHQ-12, and CF-13 were 0.92, 0.82, and 0.86, respectively.

Table 4 shows the correlation coefficients of "intentions to leave," GHQ-12, CF-13, and variables for individual attributes and employment characteristics that had a significant relationship with "intentions to leave," GHQ-12, and CF-13. The highest positive correlation scores with "intentions to leave" were CF-13 (r＝0.58) and GHQ-12 (r＝0.55). The highest negative correlation scores with "intentions to leave" were "orientation as nurse" (r＝－0.61) and "coworker support" (r＝－0.47).

Table 5 shows the results of the hierarchical multiple regression analysis of GHQ-12 and CF-13, adjusted for individual attributes (e.g., sex, age, and education). The adjusted R2 of the GHQ-12 score was 0.418, and that of CF-13 score was 0.445.

In the results of hierarchical multiple regression analysis, GHQ-12 score was significantly higher in those who had personal sentiment or association with the current hospital where they were working; those who had less "orientation as nurse," "interpersonal relationships," and "clinical practical expertise and confidence"; and those who felt stronger "psychological demand."

In the results of hierarchical multiple regression analysis for CF-13, scores were significantly higher in those who were working more than 56 hours per week; those who responded that the break facilities and amount of permitted rest time in their hospital were not appropriate; those who had less "orientation as nurse," "interpersonal relationships," and "clinical practical expertise and confidence"; and those who felt stronger

Table 5 The results of hierarchical multiple regression analysis for GHQ-12 and CF-13[1,2,3] (n＝377)

	GHQ-12				CF-13			
	β	95%CI		*P* value	β	95%CI		*P* value
Employment and organizational characteristics								
Working hours[4]	0.034	－0.574	1.416	0.406	0.097	0.237	2.280	0.016
Break facilities and amount of permitted rest time in the hospital[5]	0.078	－0.074	1.722	0.072	0.071	－0.141	1.703	0.097
Mental health education as a measure to prevent early resignation[6]	－0.027	－1.161	0.627	0.558	0.027	－0.636	1.199	0.547
Personal sentiment or association with current hospital[6]	0.098	0.245	2.254	0.015	0.072	－0.070	1.993	0.067
Job readiness								
Basic nursing skills and abilities	－0.009	－0.211	0.177	0.866	－0.065	－0.328	0.071	0.205
Interpersonal relationships	－0.132	－0.678	－0.067	0.017	－0.132	－0.706	－0.079	0.014
Clinical practical expertise and confidence	－0.200	－0.440	－0.130	*P*＜0.001	－0.158	－0.396	－0.077	0.004
Orientation as nurse	－0.303	－1.130	－0.594	*P*＜0.001	－0.243	－1.000	－0.450	*P*＜0.001
JCQ-22								
Psychological demand	0.170	0.083	0.259	*P*＜0.001	0.195	0.115	0.296	*P*＜0.001
Job control	0.081	－0.005	0.120	0.070	0.055	－0.023	0.105	0.209
Supervisor support	0.069	－0.124	0.448	0.265	－0.069	－0.464	0.122	0.252
Coworker support	－0.097	－0.556	0.080	0.142	－0.017	－0.370	0.283	0.793
R	0.665			*P*＜0.001	0.684			*P*＜0.001
R^2	0.442				0.467			
Adjusted R^2	0.418				0.445			

Notes: [1] Hierarchical multiple regression analysis adjusted for individual attributes (e.g., sex, age, and education).
[2] All varialbes entered in a single step.
[3] β indicates standard partical regression coefficient, and 95%CI indicates the 95% confidence interval.
[4] 0＝None, 1＝More than 56 hours per week.
[5] 0＝Adequate, 1＝Inadequate.
[6] 0＝None, 1＝Have.

Table 6 The results of hierarchical multiple regression analysis for intentions to leave[1,2,3] (n=377)

	β	95%CI		*P* value
Employment and organizational characteristics				
Shift work[4]	0.066	−0.152	4.879	0.065
Working hours[5]	−0.013	−1.152	0.801	0.724
Frequency of working on days off[6]	0.042	−0.573	2.157	0.255
Break facilities and amount of permitted rest time in the hospital[7]	0.022	−0.629	1.131	0.576
Mental health education as a measure to prevent early resignation[8]	0.103	0.253	2.010	0.012
Job readiness				
Basic nursing skills and abilities	0.075	−0.034	0.346	0.107
Interpersonal relationships	−0.071	−0.522	0.079	0.149
Clinical practical expertise and confidence	0.074	−0.037	0.270	0.138
Orientation as nurse	−0.351	−1.377	−0.823	$P<0.001$
JCQ-22				
Psychological demand	0.032	−0.053	0.123	0.433
Job control	−0.060	−0.108	0.014	0.132
Supervisor support	−0.127	−0.612	−0.048	0.022
Coworker support	−0.078	−0.522	0.099	0.182
Subjective health status				
CF-13	0.206	0.098	0.336	$P<0.001$
GHQ-12	0.167	0.063	0.306	0.003
R	0.756			$P<0.001$
R^2	0.572			
Adjusted R^2	0.549			

Notes: [1] Hierarchical multiple regression analysis adjusted for individual attributes (e.g., sex, age, and education).
[2] All varialbes entered in a single step.
[3] β indicates standard partical regression coefficient, and 95%CI indicates the 95% confidence interval.
[4] 0=Without, 1=With night shifts.
[5] 0=None, 1=More than 56 hours per week.
[6] 0=None, 1=More than 1 day/month.
[7] 0=Adequate, 1=Inadequate.
[8] 0=None, 1=Have.

"psychological demand."

Table 6 shows the results of hierarchical multiple regression analysis of "intentions to leave," adjusted for individual attributes (e.g., sex, age, and education). The adjusted R2 of "intentions to leave" score was 0.549. In the results of hierarchical multiple regression analysis, the "intentions to leave" score was significantly higher among those who worked at a hospital that had introduced mental health education as a measure to prevent early resignation; those who had less "orientation as nurse" and less "supervisor support"; and those who felt more psychological distress and cumulative fatigue.

IV Discussion

1. Intentions to leave their jobs among newly graduated Japanese nurses

In this study, we found that "orientation as nurse" showed the biggest standardized partial regression coefficient in "intentions to leave" factors. This suggested that "orientation as nurse" is the most important factor of NGNs' intentions to leave their jobs three to five months after they started working as nurses in advanced treatment hospitals. This relates to the previous study findings that lack of motivation in selecting a career leads to NGNs leaving their jobs at an early stage[27]. Previous studies have indicated that this is because of an over-emphasis on derived scores in making career choices, and a gap between nurses' preconceptions and the reality of the job[3,27].

There is an indication that the greater the similarity between job requirements and vocational interests, the lower the turnover rate is, and the separation rate decreases correspondingly[4]. Furthermore, regarding intentions to stay on the job among Japanese nurses, motivational factors (e.g. work as specialists) proved very important[37]. Thus, regardless of the students' motivations for entering an institution which provides basic nursing training, it is necessary to provide support that recognizes the value of nursing students and

NGNs and raises their intrinsic motivation towards work, as a measure for preventing NGNs from leaving their jobs early[2].

Important factors for NGNs' intentions to leave their jobs were problems with a low degree of physical and psychological health caused by psychological job demand. This finding corresponded with those of previous studies concerning hospital-based nurses[38], computer-related professionals and Japanese nurses[36].

Regarding cumulative fatigue, which was the biggest standardized partial regression coefficient in particular, a relationship to fatigue was also reported from previous research on burnout and the turnover of nurses[10]. With a view of preventing burnout in NGNs, measures against cumulative fatigue caused by job demand, beginning with systematic interventions, are desirable.

Additionally, we identified an important influence of support from superiors on NGNs' intentions to leave. This is in line with previous studies which indicated social support as an important factor in NGNs' turnover[27,39]. Since supervisors' management style had an effect on staff leaving their jobs[4,25,38] and their leadership is related to staff nurses' job stress[40], it is desirable to introduce education programs for nurse managers, which can reduce job stressors and support NGNs in coping with job stress.

In terms of the relationship between facilities which have implemented "mental health education as a measure to prevent early resignation" and nurses' actual intentions to leave, there might be influence of peculiar organizational characteristics of the hospitals. Thus, in addition to the variables we examined this time, further investigation of the effect of organizational characteristics is needed.

2. Subjective health status of NGNs

While psychological job demand was an important factor influencing subjective health status, all job readiness subscales except for "basic nursing skills and abilities" were important factors of both subjective health status variables. This suggests that a problem with job readiness is important not only in turnover but also in the subjective health status of NGNs at early stages of employment. This finding greatly expands our knowledge concerning the aptitude for a job[41] and the psychological distress, which is related to job stressors, on intentions to leave of NGN[25].

Thus, advanced treatment hospitals need to support NGNs and increase their skills and confidence. To improve job readiness, it is necessary to provide NGNs with opportunities for in-house training before or after they begin work at an advanced treatment hospital. Additionally, for the basic training and education nurses receive prior to commencing work, class content and instructional methods should be improved to reflect the actual conditions of the hospital working environment.

Moreover, cumulative fatigue symptoms were pronounced during working hours, and psychological distress was also pronounced in conjunction with "personal sentiment or association with the current hospital." This suggests that matters associated with selfp-erception may markedly affect psychological stress.

Regarding the number of working hours affecting NGNs' cumulative fatigue, half of the subjects were working more than 51 hours per week. When compared with the national statistic that 18% of all nurses worked on average more than 24 hours of overtime per month in 2005[42], this finding clearly shows that there is a tendency among NGNs to work long hours[3].

Due to the relationship between nurses' overwork and patient safety[32] and health management[33], it is vital to implement systematic measures to help NGNs cope with long working hours in advanced treatment hospitals.

3. Limitations of this study and future research directions

This study has some limitations. First, as the participants were NGNs in eight advanced treatment hospitals located in medium-sized cities, problems unique to the particular hospitals that agreed to cooperate in our research may have influenced the results. In the future, it would be useful to conduct a large-scale survey encompassing hospitals located in both small- and large-sized cities. Also, the reliability and validity of the 21-item job readiness scale devised by the authors would benefit from further testing.

Additionally, the Cronbach's alpha for Job control (a subscale of JCQ-22) was here not satisfactory. There are indications that it is difficult to confirm that hospitals bestow a high degree of discretionary power upon their nurses[42], and in particular it is hard to say that NGNs receive a high level of decision latitude. Further research of NGNs using the Job Content Questionnaire is needed.

Another limitation is that this study was cross-sectional and thus could not detect causal relationships. To establish such causal links and complement our findings, it is necessary to conduct longitudinal surveys, qualitative studies using interviews, and case studies in the future.

Finally, since the dependent variable ("intentions to leave") was based on self-reported data, further studies using more objective measures would be helpful.

On the other hand, our study had high coefficients of determination (adjusted R-squared) for all dependent variables (see Tables 5 and 6). Furthermore, given the limited information in the literature on factors influencing intentions to leave among NGNs in early stages of employment in multiple advanced treatment hospitals in Japan, our findings do provide meaningful new insights. They should help employers and managers in the medical industry to find ways to improve their management style to benefit NGNs in Japan.

Acknowledgements

This study was supported by a Grant-in-Aid for Scientific Research from the Japan Society for the Promotion of Science (#19592552).

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(Received 2008.7.28; Accepted 2009.2.25)