Developing a Scale for Evaluating Stressors on Teachers of Nursing Schools

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stress
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validity

ABSTRACT

The present study was undertaken to develop a stressor scale for evaluating stressors to which teachers at nursing schools are occupationally exposed. The author prepared a conceptual framework of stressors for nurse teachers by analyzing and reviewing the literature. In a pilot study using this framework, the author asked 50 nursing-school teachers to describe answers to each item. Then, the author prepared a questionnaire on stressors and conducted a questionnaire survey to investigate stressors to which the teachers were exposed. The questionnaire was prepared with a scale of four choices to measure the degree of the 169 stressor items for nurse teachers.

The survey involved 450 teachers working at nursing schools across the country. Responses were collected from 227 teachers. The average age of the responders was 41.9 years (SD=7.1). On the basis of the results from factor analysis, the author created a stressor scale for nurse teachers composed of 9 factors and 57 items. The 9 factors were "dealing with students", "work environments", "teachers' qualifications", "workload", "dealing with problems", "educational methods", "relationships among teachers", "research resources" and "improving teaching skills". This scale was highly reliable (α=0.82～0.96). The validity of this scale had a close correlation with the other related scales (r=0.54 with anxiety scale and r=0.56 with burnout scale).

I. Introduction

Basic Nursing Education is an official program to provide a solid foundation of nursing covering a wide range, in order to develop the practical and characteristic skills of nursing. Nurse teachers engaged in basic nursing education have a role in elevating the nursing profession, and they are required to understand the necessary skills for the nursing profession. They are also required to have skills as professional nurses and nurse educators, for educational engagement with nurse students. However, if nurse teachers are not confident or confront dilemmas with their qualifications or skills, this might cause major stress among the teachers.

Examples of stressors (stress factors) among nurse teachers are the following concerns associated with teaching methods in nursing education: which area of academic skill is necessary for nurse students; which basic knowledge should be provided for them to learn the skills and attitudes in order to obtain such academic skills; how application methods of the knowledge and skills can be taught; how to educate nurse students to establish therapeutic relationships between nurse students and patients; how to understand mutual reactions in the student-patient relationships; and how to evaluate educational effects from the educational contents and methods after planning and performing. According to the Japanese Nursing Association Research Report, some situations or conditions becoming stressors for nurse teachers are as follows: nurse teachers have many students for whom they have responsibility; there are many tasks other than teaching; and they feel a lack of skills and qualifications.[1)] In addition, the previous studies of the author identified concerns of beginning nurse teachers about: educational skills; mutual trust; *time availability*; educational qualifications; profession; and student guidance.[2) 3)]

Depending on their strength and quality, those concerns and stressors can cause nurse teachers to decrease their activities, lose motivation toward nursing education, and have more feelings of inferiority about their educational skills. This would limit the growth of the nursing profession. Therefore, identifying the job-related stressors among nurse teachers would help to establish preventive measures of stress. Studies of stress among nurse teachers; however, have not been found, although some studies reported regarding the measurement method and scale of stress in general,[4)] and occupational stress among staff members in nursing facilities such as nurses and health nurses.[5)-7)]

The purpose of this study is to identify factors of occupational stress among nurse teachers, using a questionnaire, and to develop a stressor scale which measures the stress factors of nurse teachers in nursing schools.

II. Presumption of a conceptual framework of stress based on a literature review

(1) Previous studies of stress among nurse teachers

The concept of stress was first used to describe hardship, straits, adversity, and affliction in the 14th century.[8)] According to Cannon (1932), stress is a condition of disruption in the body's homeostasis. Selye(1936) has described stress as the General Adaptation Syndrome(GAS), which is a response of the body to harmful stimuli for its protection, and this is explained as a physiological reaction and its process generated by stressors.

A central role in the theoretical study of stress is currently the stress theory of Lazarus et al, in which stress is a rubric consisting of many variables and processes, not one variable, and an individual's cognitive appraisal of stress determines whether a relationship between the person and the environment is stressful.[9)10)] According to the definition of stress, stress varies in the extent to which they emphasize stressful stimulus and events, individual appraisals of situations, or stress responses.[11)] The present study focuses on stressful stimuli and events, which are stressors.

Occupational stressors are broadly divided into the following six concepts: 1. Work itself, 2. Role in organization, 3. Interpersonal relationships at work, 4. Issues in career

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development, 5. Issues of organizational structure and climate, and 6. Common problems at home and work.[12] Referring to those, concepts of possible stressors for nurse teachers are suggested below.

1. Stressors from work itself

Stressors caused from the work itself are considered to be associated with ① Job contents, and ② workload.

① Job contents of nurse teachers:

The primary role of nurse teachers is to perform educational activities such as lectures and practical training. In the study by Kumagai, 89 % of the nurse teachers who participated in the survey had concerns about lectures and training, and the major concerns are listed below in descending order.[13]

Concerns about lectures: "difficulty of teaching to facilitate deeper thinking by students", "not knowing teaching methods to motivate students", "difficulty of teaching a small group", and "not knowing course contents and structures"

Concerns in the practical training: "a large number of students", "difficulty of enhancing nurse students' learning and thinking through the nursing process", "no joy or satisfaction in nursing practice", "no actual scene for training", and "difficulty of adjustment with students and instructors"

The conditions associated with the number of students, levels of skills and qualifications as teachers, and insufficiency of studying teaching materials interfere with nurse teachers' primary educational activities. Those are considered to be stressors, since nurse teachers cannot sufficiently plan, perform, or evaluate their educational activities.

② Workload of nurse teachers:

The survey report by the Japanese Nursing Association Research Department, has pointed out the issue of heavy workload in all nursing training programs, such as a large number of students for whom teachers have responsibility, heavy workload, overtime work, and no time for class preparation.[1]

Because of the limited number of nurse teachers, and the workload for supporting a large number of students and doing tasks other than their educational activities, they cannot complete their work. This is causing nurse teachers to suffer from dilemmas and frustration.

2. Stressors associated with roles in organizations

The institutions to provide basic nursing education are workplaces of nurse teachers, and they are various schools such as universities, junior colleges, vocational schools, and high schools. Depending on the institutional entity and educational philosophy of the school organizations where nurse teachers belong, stressors can occur from ① role, ② future and prospect, ③ autonomy, and ④ research activities.

① Roles in nursing school:

There are particular stressors in nursing schools. Stressors associated with their roles in the organizations are generally classified into role ambiguity and role conflict.

With respect to role ambiguity, while educational performance and attractiveness of schools are often asked for, the improvement of the education contents and methods are required of nurse teachers by changes in social needs and amendments of the curriculum. As a result, the associated conferences, education plan, and evaluation lead to role ambiguity from the complexity, and the situation is not sufficiently organized for nurse teachers to accommodate the increase in work. In the latter case of role conflict, because of the characteristics of nursing schools, which are educational institutions and develop medical professionals, nurse teachers are required to have roles as nurses and educators. However, their experience and skills of teaching may not be enough yet for them to build education and careers to meet the roles.

② Future and Prospects of Nursing Schools:

The trend for university education of basic nursing has accelerated. There were 9 nursing universities in 1991 and 91 schools in 2001.[14] The master's and doctoral programs have been also increasing. On the other hand, there has been a reduction of nursing schools, which involves consolidating and closing schools, and stopping recruiting new students. Those changes in education form and schools give nurse teachers concerns about aptitude, future, and prospect, which have been their occupational stressors.

③ Autonomy of nurse teachers:

Autonomy is required as one of the conditions of profession. Some nurse teachers; however, seem to be low in autonomy although studies reporting the fact cannot be found. According to the related study by Hamada et al, differences in active and passive involvement in nursing educational activities reflect their awareness of work performance.[15-17] This indicates that passive teachers have concerns about educational activities, while active teachers have concerns about aspects of education management such as guidance and support for junior faculty. Despite nurse teachers having the same roles in nursing schools, universities and colleges, it is assumed that nurse teachers in nursing schools face various issues and their autonomy is suppressed.

④ Research activities of nurse teachers:

Research activities are not clearly put up as nurse teachers' work in nursing schools. However, when the future of nursing education is looked into, research efforts are expected. When the nurse teachers conduct research, the following issues are thought to be stressors: no budget, insufficient support system for research activities, lack of teachers' research abilities, etc. It is also said that nurse teachers even in university have challenges in making time for research and progressing in research.[18]

While nurse teachers engage in educational activities with their own roles and responsibilities, 90% of them have anxieties, and many teachers fall into burnout.[19] According to Inaoka, burn-out rates of nurse teachers are 6.2 % in nursing universities, 10.2% in nursing colleges, and 16.3% in nursing schools, and the high burnout rate in nursing schools is caused from the issues in the schools such as vague education, organizational issues, and ambiguous roles of teachers.[20] Stressors resulting from nurse teachers' work

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itself and their roles within the organizations mentioned above are considered to be factors of burnout.

3. Stressors from interpersonal relationships at work

As for stressors of interpersonal relationships, relationships with students are raised at first. Issues seen in students are: poor social development; few interpersonal experiences to develop mind and ability to make their living; attitude to choose enjoyment, rather than effort toward their goals; lack of patience for accomplishment; blaming others, rather than reflecting on themselves; poor emotional control, etc.[21]

In that case, those students need personal development before professional education, and this brings difficulty for the involvement of nurse teachers, which can become educational stressors for nurse teachers. It is time consuming to solve those associated issues, and this would become a pain for the nurse teachers, which can also be educational stressors.

Secondly, relationships with their bosses and colleagues at work can be stressors. It is considered that the difference in education background could enhance nurse teachers' competitive consciousness, and there is a lack of cooperation and unity among them. Although nurse teachers are involved in professional education, many do not have university education. They feel a sense of inferiority and inadequacy, and it is difficult for them to receive continuous education for career development, which is causing stressors. In addition, stressors can be associated with whether nurse teachers have bosses or seniors as role models for nurse teachers, and receive their guidance and support. Relationships with doctors, as well as patients and instructors in nursing practice facilities can also become stressors. Stressors would be stronger if nurse teachers have more students with problems.

4. Stressors from career development issues

Even a nurse teacher who has a good career as a nurse can have significant stress. Michael mentions that first-year teachers may experience reality shock in an unknown world.[22] It is considered that beginning teachers are shocked by the difference in demands and roles between a nurse teacher and a nurse, when becoming a nurse teacher from a being only a nurse. Marcy states that, in reality, beginning teachers receive limited protection from the management side and instructional supports related to skill development, despite the reality shock of entering the academic world from the clinical field.[23] Suzuki has pointed out some beginning teachers' complaints, such as "Less salary", "Less free time", and "Frustration from being behind medical development by being away from clinical areas".[24]

The problems of students related to nursing education are found in "the Heisei 13 year (2001) Nursing Education Workshop", and they are: "inadequate skill acquisition in nursing practice"; "undeveloped basic knowledge to be a medical professional"; "undeveloped basic knowledge to be an advocate for a patient"; and "lack of communication skills with patients ", etc.[25]

Needless to say, the basic solution to solve those issues is enhancement of nurse teachers' own skills and qualifications to establish nursing educational activities. Ito et al have inductively identified skills and capabilities required to be nurse teachers, which are associated with: curriculum design; class performance; practical training guidance; educational improvement; study of teaching materials; research guidance; educational guidance; dealing with issues; teacher's role performance; coordination with other occupations; and clarifying perspectives on education.[26] Although those skills are necessary requirements for nurse teachers, from another perspective, nurse teachers face pressures from those many requirements, which can be stressors. Hayashi has found that nurse teachers who feel job satisfaction are 75.2% in universities; 62.3% in colleges; 59.2% in nursing high schools; 56.7% in two-year nursing schools; and 51.3% in three-year nursing schools, and nurses who were more motivated to become nurse teachers tended to have higher satisfaction.[27] It would appear to be necessary for nurse teachers to contemplate how they will develop their careers.

5. Stressors from issues of organizational structure and climate

A survey from the Japanese Nursing Association research department produced 21 items related to issues on educational activities to ask nurse teachers, and reported the 8 items which more teachers in any nursing training courses pointed out: "a large number of students", "shortage of school budget", "teachers' requests are not reflected on school budget", "lack of research funding for teachers", "no time for own research and training", "too many tasks other than teaching and the related educational tasks", "low salary for nurse teachers", and "lack of skills and qualifications as teachers".[1] Many other issues were also described in the comment space on the survey. Nurse teachers in universities and colleges raised more issues about curriculums and systems that were related to educational contents. On the other hand, teachers in the two-year, three-year, and nurse assistant courses, raised more issues associated with school management as well as their own concerns and complaints. The combination of organizational structure and climate, and personal issues is suggested to be stressors among nurse teachers in nursing schools.

6. Stressors from common problems at home and work

By becoming a nurse teacher from being a nurse, a low salary with the workload and increase in self-pay burden has been pointed out as their distress associated with working conditions and salary.[28]

After the review on the six concepts of stress among nurse teachers, the following conceptual frameworks of 10 factors are presumed to be reasonable: ① Work content, ② Workload, ③ Role, ④ Future and Prospects, ⑤ Autonomy, ⑥ Research activities, ⑦ Relationship, ⑧ Career development, ⑨ Work climate, and ⑩ Working condition and Salary.

III. Research Method

After the presumption of the conceptual framework based on the literature study, a pilot study was conducted to prepare the draft of stress items, and the main survey was further taken to develop a stressor scale (Table 1).

1. Pilot study

1) Preparation of draft questions

In June 2001, the conceptual framework of the 10 factors

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Table1. 3 stages for developing a stressor scale

Stage	Purpose	Method	Result
1	Presumption of conceptual framework of stress	Literature review	Presumption of 10 stressor factors
2	Pilot study for drafting stress items	Open questionnaire survey about 10 factors (100 nurse teachers, 50 responses from university, college, and vocational school across the country)	13 factors 212 items selected
		Content validity and surface validity assessments	13 factors 169 items selected
3	Main study for developing a stressor scale	Questionnaire survey among nurse teachers across the country[stressor questionnaire, Burnout scale, STAI, Attribute] (450 nursing teachers in nursing schools across the country,	
		Assessment of: Factor analysis Response distribution bias Discriminant validity Criterion-related validity Reliability of scales	9 factors, 57 items determined for a stressor scale

listed above was presented to 50 nurse teachers (employees of the basic nursing educational institutions: universities, colleges, and vocational schools across the country). They were asked to describe and itemize stress matters corresponding to each factor, and a total of 636 responses were obtained. By reviewing the responses, 13 component factors of stressors were suggested to be more reasonable than 10 factors. The factors were further subdivided as follows:

① educational content, 13 items, ② teaching methods, 15 items, ③ faculty organization, 21 items, ④ educational environment, 10 items, ⑤ qualifications and skills as teachers, 31 items, ⑥ future and prospects of nursing education, 14 items, ⑦ autonomy, 7 items, ⑧ research, 14 items, ⑨ workload and work quality, 13 items, ⑩ relationships with students, 18 items, ⑪ relationships among teachers, 29 items, ⑫ relationships with patients and instructors, 7 items, ⑬ working condition and salary, 18 items. The draft questionnaire consisted of 210 items.

2) Assessment of content validity

Two researchers in the nursing field examined the contents of the 210 items to find any duplication of contents, deficiencies in measurement items, and ambiguities in the descriptions. As a result, the draft containing the 210 items was revised to have the 13 factors consisting of 169 items.

3) Assessment of surface validity

Using the revised draft, the stress survey was conducted among three nurse teachers with more than 10 years of nursing education experience (one teacher in age 30s and two teachers in age 40s, who attended the teacher training session). During the survey, they were asked to find similar items, and contents and descriptions difficult to understand, in order to evaluate the usability of the survey. The average time spent to answer the questions in the entire survey was 25 minutes.

Based on their findings, the question items were further revised, and the final version of the questionnaire contained 13 factors consisting of 169 items. To measure the degree of concern about each item, a scale of four choices to select answers was also added into the questionnaire, and the choices were: “strongly agree”, “somewhat agree”, “slightly agree”, and “do not agree at all”. When the data was being processed, up to 4 points were scored based on the strength of agreement. The scores ranged from 1 point for “do not agree at all” to 4 points for “strongly agree”.

2. Main study

1) Distribution of questionnaire

Subjects for the survey were nurse teachers working in nursing schools across the country. A stratified random sampling *method* was used from the ratio of three-year and two-year nursing schools. The questionnaires were distributed to 450 nurse teachers in 208 facilities out of 884 nursing schools.

2) Ethical considerations

A written request for the survey was sent to the school executives and nurse teachers in nursing schools. In the request, the following items were addressed: the purpose of the study; the survey method; voluntariness of participation; anonymity of participants by removing all names to ensure privacy protection; and publication of the study. Based on their agreement with the contents, the potential participants were asked to complete the survey and return their answer sheet in the enclosed envelope.

3) Background survey of the subjects

To understand the background of the participants, questions about the following items were asked: age; gender; course section; institutional entity; job title; final education (general, professional); attendance of the training session(yes or no); years of clinical nursing experience; and years of nursing education experience.

4) Burnout scale and STAI (State Trait Anxiety Inventory)

In addition to the stressor questionnaire, Burnout scale and STAI surveys were conducted to examine criterion-related validity. A burnout questionnaire was used to measure burnout, and this was developed by Tao, based on the Maslach Burnout Inventory (MBI), consisting of 2 factors (“emotional exhaustion factor” and “personal accomplishment factor”)

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with 21 items.[29) 30)] It has a 7-point Likert scale with response options ranging from "Always" to "Never", and a score of more than 4 points indicates burnout. STAI is a Japanese version of Spielberger's State-Trait Anxiety Inventory (STAI), developed by Shimizu et al.[31) 32)]

The STAI is designed to measure the temporary or circumstantial condition of "state anxiety", associated with the arousal of the autonomic nervous system, and, "trait anxiety" which is referred to as the tendency to perceive stressful situations. Because of the long-standing personality characteristics related to anxiety, the trait scale of the STAI was used in this present study. In the trait scale, emotional states are evaluated from 20 anxiety-related items, and the response options with scores are: Never, 1 point; Sometimes, 2 points; Often, 3 points; and Always, 4 points. Higher scores indicate a tendency to feel anxiety. In order to use those scales, permission from the authors was obtained.

5) Survey period and method

From October 18 to November 20 in 2001, a mail survey was conducted.

6) Analytical method

(1) Assessment of factorial validity

Factor analysis (Principal Factor Method, maximum likelihood method, principal component method, each varimax rotation) was used to examine the factorial validity of the stressor items. The process was repeated until an acceptable and interpretable factor structure was obtained. The criterion for determining the items was the interpretability of the factor with a minimum required eigenvalue of 1 and factor loading of 0.4.

(2) Assessment of response distribution bias

In order to exclude the items having extreme response distributions, the response distribution for each item was assessed. In addition, normality of distribution for the stressors scores of the nurse teachers was tested using kurtosis and skewness.

(3) Assessment of discriminant validity

For assessment of discriminant validity, good-poor analysis (GP analysis) was used to determine item discrimination of each stressor item. Based on the total scores of the stress scale, the items were divided into four groups, and the difference in the averages of scores for good and poor groups was examined for every item.

(4) Assessment of criterion-related validity

In the present study, three types of scores were obtained from the stressor scale in this study, the burnout scale and the trait scale of STAI, which had been developed based on a similar theory of the conceptual framework in this study. In order to find correlation between the scores from the scales, the Pearson's correlation coefficient was used to assess the criterion-related validity.

(5) Assessment of reliability of scales

Internal consistency was assessed by calculating the Cronbach α coefficients for every overall scale and subscale.

7) Statistical processing

In order to analyze the data results, statistical software SPSS (Ver.10 for Windows) was used to calculate the factor analysis, Pearson's product-moment correlation coefficient, Cronbach's α coefficient, etc.

IV. Results

1. Background of the subjects

Out of the total of 450 nurse teachers who were sent the questionnaires, 227 of them responded to the survey (response rate 50.4%). The average age of the research subjects was 41.9 years (SD = 7.1). Their average years of clinical nursing experience and nursing education experience were 9.9 years and 8.7 years, respectively (Table 2).

2. Assessment of factorial validity

A factor analysis for the total 169 items of responses from the 227 nurse teachers was conducted. Since the 13 factors were predicted previously, the number of factors was set up at 13 for the factor analysis. The analysis was repeated accordingly by decreasing the number of factors. The following criteria for determining the validity of the items were applied: eigenvalues ≥ 1, factor loadings ≥ 0.4, and interpretability.

From the results of assessment using the primary factor method and varimax rotation, 9 stress factors were considered *reasonable*. By excluding the residual items from further assessment, the factor structure was determined to be the 9 factors (Table 3).

The 9 factors were found to comprise of a total of 57 items: 1st factor, 8 items; 2nd factor, 8 items; 3rd factor, 8 items; 4th factor, 7 items; 5th factor, 6 items; 7th factor, 5 items; 8th factor, 5 items; and 9th factor, 4 items. The cumulative contribution rate for the 57 items was 59.5% of the all items (169 items) included in the survey questionnaire.

The 1st factor had contents related to student guidance, and it was named the "dealing with students" factor from the 8 item contents such as "guidance to self-centered students", "guidance to difficult students", "lifestyle guidance to students who do not have social skills", and "dealing with students who have problems".

The 2nd factor was related to the social environment at the workplace, and named the "work environment" factor from the 8 items such as "work environment to speak freely and openly", "obtaining guidance and advice from boss in case of issues at work", "being recognized and evaluated by boss", and "having opportunities to demonstrate own abilities and skills".

The 3rd factor had contents essential to teachers' qualifications such as empathy, heart, enthusiasm, sense of mission. This was named the "teachers' qualification" factor from the 8 items such as "accepting and understanding students' feeling and thought", "teaching students with heart,"

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Table 2. Background of the subjects

N=227

Attribution classification		Number of people	Rate(%)
Age	Below 30	6	(2.6)
	31~40	97	(42.7)
	41~50	93	(41.0)
	51~60	30	(13.2)
	61 or over	1	(0.4)
Sex	Female	216	(95.2)
	Male	11	(4.8)
Course Classification	3-year course	162	(71.4)
	2-year course	64	(28.2)
	N/A	1	(0.4)
Institutional Entity	National government	29	(12.8)
	Prefectural and city governments	61	(26.9)
	Municipal Government	37	(16.3)
	Japanese Red Cross	3	(1.3)
	Social Welfare Organization, Welfare Federation of Agricultural Cooperative,and Hokkaido Social Work Association	16	(7.0)
	Employees' Pension Welfare Corporation Seamen's Insurance Association National Federation of Health Insurance Societies, and Mutual Aid Association, and Federation of Social Insurance Association	9	(4.0)
	Medical association	19	(8.4)
	Medical corporation	6	(2.6)
	School Corporation	27	(11.9)
	Others	20	(8.8)
Job title	President	0	(0)
	Vice President	4	(1.8)
	Dean and Director of Academic Affairs Office	30	(13.2)
	Full time teacher	189	(83.3)
	Others	4	(1.8)
Final education			
General	High school graduate	152	(67.0)
	Junior college graduate	29	(12.8)
	University graduate	42	(18.5)
	Master's graduate	2	(0.9)
	N/A	2	(0.9)
Professional	Nursing schools	157	(69.2)
	Junior college	28	(12.3)
	University graduate	11	(4.8)
	Health sciences, Midwifery degree	28	(12.3)
	Master's graduate	2	(0.9)
	Others	1	(0.4)
Attendance of training session	Yes	195	(85.9)
	No	32	(14.1)
Clinical nursing experience(years)	Below 5	45	(19.8)
	6~10	101	(44.6)
	11~20	75	(33.0)
	21 or over	6	(2.6)
Nursing education experience (years)	Below 2	12	(5.3)
	2~3	33	(14.5)
	4~5	34	(15.0)
	6~10	85	(37.4)
	11~20	50	(22.0)
	21 or over	13	(5.7)

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Table 3. Factor Analysis Result of Stressor Scale for Nurse Teacher

Factors	Items	1	2	3	4	5	6	7	8	9
1st Factor: Dealing with students	1. guidance to self-centered students	.715	.008	.223	.108	.009	.182	.123	.001	.155
	2. guidance to difficult students	.715	.106	.294	.130	.010	.107	.296	-.006	.008
	3. lifestyle guidance to students who do not have social skills	.705	.139	.007	.198	.271	.163	.141	.008	.100
	4. dealing with students who have problems	.684	.118	.282	.114	.139	.180	.234	-.000	.005
	5. guidance to students who need counseling	.620	.140	.003	.179	.330	.132	.137	.118	.007
	6. guidance to students who do not respond to teachers' effort	.618	.196	.264	.009	.112	.115	.158	-.002	.005
	7. guidance to passive students	.586	.147	.008	.217	.263	.139	.199	.220	.136
	8. guidance to students who have a low tolerance for stress	.579	.164	.103	.174	.294	.193	.008	.009	.118
2nd Factor: Work environment	1. work environment to speak freely and openly	.007	.698	-.006	.006	.189	-.000	.227	.002	.010
	2. obtaining guidance and advice from boss in case of issues at work	.005	.656	.169	.128	.010	.008	.008	.115	.131
	3. being recognized and evaluated by boss	.008	.645	.112	.008	.007	.010	.008	-.002	-.003
	4. having opportunities to demonstrate own abilities and skills	.168	.639	.256	.223	.121	.000	.106	.003	.142
	5. understanding and respecting between teachers	.112	.627	.137	.005	.010	.008	.102	.009	-.004
	6. giving and receiving positive feedback and support between teachers	.005	.614	.008	.006	.002	.204	.156	.105	.108
	7. being assigned for work based on own Skills	.199	.606	.186	.207	.140	.003	.010	.002	.168
	8. having own role and contributing at Work	.253	.455	.250	.280	.199	.007	.010	.004	.212
3rd Factor: Teachers' qualifications	1. accepting and understanding students' feeling and thought	.220	.224	.685	.110	.192	.137	.010	.004	-.005
	2. teaching students with heart	.228	.222	.681	.169	.205	.110	.008	.006	-.008
	3. having enthusiasm about nursing education	.187	.166	.602	.191	.008	.119	.002	.272	.138
	4. paying attention to students' responses in class	.304	.252	.590	.173	.118	.166	.130	-.003	.178
	5. cultivating the essence of nursing	.007	.006	.578	.167	.160	.179	.006	-.000	.299
	6. performing discipline as teacher	.212	.008	.544	.292	.197	.193	.158	.130	.296
	7. having confidence in own physical strength	.119	.325	.456	.173	.005	-.001	-.005	.213	.006
	8. having awareness of own role as teacher and possessing a sense of mission	.317	.124	.416	.340	.287	.008	.218	.009	.244
4th Factor: Workload	1. completing tasks during regular working hours	.141	.108	.009	.701	.005	.009	.009	.005	-.002
	2. preparing for lectures and practice training during regular working hours	.008	.003	.124	.639	.005	.139	.180	.151	.126
	3. doing endless work with patience	.180	.208	.269	.597	.202	.235	-.000	.105	-.004
	4. having necessary time to complete Work	.006	.150	.002	.571	.007	.124	.002	.009	.146
	5. over time working and working not during regular working hours	.222	.116	.203	.563	.008	.001	.001	.009	-.001
	6. preparing for satisfying educational contents and methods	.126	.144	.210	.543	.108	.145	.206	.132	.193
	7. always balancing between workload and quality	.201	.265	.299	.478	.234	.009	.135	.228	.008
5th Factor: Dealing with problems	1. being responsible in case of trouble from temporary instructors assigned to give guidance and instruction in nursing practice	.180	.312	.146	.104	.784	.183	.003	.003	.003
	2. identifying causes of students' troubles during training	.205	.239	.010	.132	.770	.191	.008	.102	.009
	3. dealing with problems in case of misdirection in nursing practice from clinical side	.198	.148	.237	.227	.707	.110	.160	.114	-.003
	4. Dealing with disagreement with head nurse	.316	.111	.146	.005	.583	.149	.162	.004	.181
	5. promptly dealing with problems caused by students during practice training	.288	.000	.215	.148	.541	.210	.127	.007	.229
	6. dealing with disagreement between students and training instructors	.275	.112	.191	.006	.508	.292	.151	-.004	.009
6th Factor: Educational methods	1. guidance leading students to deep thinking	.185	.006	.010	.114	.168	.818	.003	.001	.165
	2. guidance motivating students	.251	.006	.010	.010	.182	.804	-.001	.000	.009
	3. guidance developing independency of students	.213	.005	.005	.140	.009	.783	.007	-.007	.106
	4. guidance for activities in small group	.108	.133	.124	.126	.141	.715	.008	.005	.005
	5. studying educational contents before class	.001	.149	.220	.360	.007	.448	.135	-.001	.003
	6. guidance for gaining nursing Skills	.008	.137	.162	.147	.240	.439	.106	.158	.006
7th Factor: Relationships among teachers	1. interacting with teachers having emotional responses	.260	.206	-.000	.133	.008	.007	.829	.008	.005
	2. cooperating among teachers having different goals and values	.235	.213	.009	.008	.172	.007	.802	.167	.104
	3. dealing with teachers having various tendencies	.240	.139	.007	.118	.189	.005	.742	.226	.128
	4. dealing with assertive teachers	.173	.197	.009	.164	.009	.009	.684	.002	.006
	5. considering relationships with Colleagues	.146	.367	.254	.009	.003	.009	.449	.007	-.001
8th Factor: Research Resources	1. having advisers for research	-.002	.004	.006	.007	.005	-.001	.008	.915	.006
	2. research fund is being distributed to conduct research	.003	.004	.009	.148	.005	-.002	.119	.800	.004
	3. having a research field	.006	.002	.006	.004	.005	-.004	.005	.793	.104
	4. receiving support and guidance system for teacher's career progress	.006	.227	.006	.310	.125	.190	.157	.423	.007
	5. Participating in seminar and academic conference as business trip	.007	.010	.009	.199	.001	.101	.008	.410	-.196
9th Factor: Improving teaching skills	1. evaluating educational activities	.258	.257	.172	.146	.007	.197	.157	.008	.665
	2. using theory in practical training guidance	.177	.195	.268	.008	.135	.239	.007	.009	.594
	3. evaluating curriculum	.299	.309	.004	.247	.223	.135	.131	-.000	.479
	4. planning to expand concepts and theories in class	.153	.007	.107	.368	.269	.229	.143	.002	.400
Contributing rate		9.0	8.0	7.0	7.0	6.8	6.7	6.0	5.3	3.6
Cumulative contribution rate (%)		9.0	17.0	24.1	31.0	37.9	44.6	50.6	55.9	59.5

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Table 4. GP Analysis of Stressor Items for Nurse Teachers

	Number of respondents who "strongly feel stress"				
	Subscale	Good group N=56 (average score)	Poor group N=56 (average score)	Comparison of difference t test	testing
Dealing with students	1	1(2.39)	38(3.64)	11.860	***
	2	2(2.30)	44(3.75)	13.316	***
	3	5(2.43)	46(3.82)	12.552	***
	4	1(2.39)	46(3.79)	13.932	***
	5	5(2.48)	49(3.88)	12.522	***
	6	4(2.41)	44(3.77)	11.979	***
	7	0(2.29)	42(3.75)	15.959	***
	8	4(2.32)	35(3.63)	11.534	***
Work environment	1	2(2.00)	17(3.02)	7.234	***
	2	1(1.95)	23(3.25)	9.554	***
	3	2(1.93)	16(3.02)	7.402	***
	4	0(2.00)	15(3.13)	10.688	***
	5	1(2.05)	14(3.04)	7.805	***
	6	2(1.96)	16(3.05)	7.755	***
	7	1(2.09)	15(3.14)	9.314	***
	8	1(2.23)	29(3.48)	11.568	***
Teachers' qualifications	1	0(1.61)	13(2.89)	9.646	***
	2	0(1.55)	12(2.89)	10.191	***
	3	0(1.98)	24(3.21)	9.270	***
	4	0(2.11)	25(3.38)	11.343	***
	5	2(2.09)	20(3.05)	6.247	***
	6	0(1.95)	24(3.34)	12.316	***
	7	0(2.02)	22(3.13)	7.735	***
	8	0(1.96)	27(3.43)	14.011	***
Workload	1	6(2.48)	39(3.66)	9.389	***
	2	8(2.46)	45(3.77)	9.194	***
	3	3(2.36)	44(3.71)	11.583	***
	4	11(2.66)	41(3.64)	6.639	***
	5	3(2.25)	29(3.39)	8.198	***
	6	3(2.20)	33(3.52)	10.496	***
	7	1(2.04)	30(3.48)	12.707	***
Dealing with problems	1	0(1.88)	36(3.54)	12.775	***
	2	0(1.86)	32(3.46)	12.276	***
	3	0(1.91)	31(3.41)	11.114	***
	4	5(2.41)	46(3.79)	11.133	***
	5	5(2.34)	37(3.61)	9.246	***
	6	3(2.02)	33(3.50)	10.897	***
Educational methods	1	3(2.36)	36(3.54)	8.837	***
	2	5(2.43)	38(3.64)	9.122	***
	3	11(2.63)	40(3.66)	7.319	***
	4	2(2.18)	20(3.23)	7.800	***
	5	4(2.30)	26(3.36)	7.269	***
	6	1(2.00)	20(3.07)	7.335	***
Relationships with teachers	1	13(2.64)	42(3.73)	7.687	***
	2	7(2.48)	41(3.73)	9.717	***
	3	6(2.30)	38(3.66)	10.212	***
	4	13(2.59)	36(3.64)	7.401	***
	5	4(2.20)	21(3.23)	7.909	***
Research resources	1	13(2.41)	33(3.29)	4.276	***
	2	8(2.20)	31(3.25)	5.398	***
	3	11(2.41)	31(3.25)	4.400	***
	4	4(2.20)	36(3.52)	8.594	***
	5	5(1.70)	13(2.59)	4.695	***
Improving teaching skills	1	2(2.21)	28(3.48)	11.208	***
	2	3(2.30)	30(3.50)	9.600	***
	3	1(2.34)	33(3.54)	10.436	***
	4	6(2.41)	34(3.61)	9.494	***

t test ***p<.001

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"having enthusiasm about nursing education", and "paying attention to students' responses in class".

The 4th factor was related to time, workload, work quality, and endless work, and it was named the "workload" factor from the 7 items such as "completing tasks during regular working hours", "Preparing for lectures and practical training during regular working hours", "doing endless work with patience", and "having necessary time to complete work"

The 5th factor was related to dealing with problems, and this was named the "dealing with issues" factor from the 6 items such as "being responsible in case of trouble from temporary instructors assigned to give guidance and instruction in nursing practice", "identifying causes of students' troubles during training", "dealing with problems in case of misdirection in nursing practice from clinical side".

The 6th factor was associated with the educational methods, and it was named the "educational methods" factor from the 6 items such as "guidance leading students to deep thinking", "guidance motivating students", and "guidance developing autonomy of students"

The 7th factor was particularly about relationships between teachers, and this was named the "relationships among teachers" factor, from the 5 items such as "interacting with teachers having emotional responses", "cooperating among teachers having different goals and values", and "dealing with teachers having various tendencies".

The 8th factor was named the "research resources" factor from the 5 items such as "having advisers for research", "research fund is being distributed to conduct research", and "having a research field".

The 9th factor was named the "improving teaching skills" factor from the 4 items such as "evaluating educational activities", "using theory in practical training guidance", "evaluating curriculum", and "planning to expand concepts and theories in class".

3. Response distribution bias

Regarding the 57 items extracted by the factor analysis, the highest possible score indicating maximum stress intensity and the lowest possible score indicating minimum stress intensity for all the items were 228 points and 57 points, respectively. As for the results of this study, the highest and the lowest scores for the 57 items were 223 points and 77 points, respectively. The average score was 160.6 (SD=27.2) points. In addition, the kurtosis was -0.194 and the skewness was -0.092. Kurtosis is the degree of peakedness of a distribution, and skewness quantifies how symmetrical the distribution is compared with the normal distribution. When both the absolute values exceed 10, the distribution is not within the acceptable range of a normal distribution. Both the values in this study, however, were less than 10. Therefore, it was decided to exclude no items, and all of the 57 items were accepted.

4. Assessment of discriminant validity

To assess discriminant validity, good-poor analysis (GP analysis) was conducted on each stressor item which was obtained from the factor analysis. The result has shown that the level of significant difference was 1% among all the 57 items, which indicated adequate discriminative power, and all the items cannot be rejected (Table 4).

5. Assessment of criterion-related validity

A high positive correlation was observed between the scores from the 57 stressor items and both scales: the burnout scale r=.558(p<.001), and trait scale of STAI r=.542(p<.001). The burnout result was the following: no burnout with scores < 3 (72 teachers, 31.7%); mild burnout with scores ≥3 or < 4 (81 teachers, 35.7%); and burnout with scores > 4 (74 teachers, 32.6%)

6. Assessment of reliability

Reliability coefficient (Cronbach α factor) for each stressor factor was in the range of 0.82 to 0.92, and this showed sufficient internal consistency for each of the 9 factors (Table 5).

V. Discussion

1. Reliability and validity of the developed stressor scale

In this study, a stressor scale was developed to measure work stress factors among nurse teachers in nursing schools. In the process of preparing a questionnaire consisting of 13 factors and 169 items, the literature review, pilot study on 50 nurse teachers, and assessment of internal validity and external validity were performed, in order to select the final items. Through the process, appropriate stress items for nurse teachers were obtained. The questionnaire was distributed to 450 nurse teachers, and responses were obtained from 227 nurse teachers. As a result of assessment using factor analysis, 9 factors, 57 items (4 to 8 items for each factor) were determined to be valid.

In the factor analysis, while the criteria were set at: eigenvalues ≥ 1, factor loadings ≥ 0.4, the eigenvalues for more than 10 factors were lower than 1, and those factors were excluded. In addition to the process of factor analysis, 9 factors were considered to be reasonable from the interpretability of the number of items in each factor and their contents. The cumulative contribution rate of 9 factors with 57 items was 59.6%, and this indicates that the scale finds approximately 60% of the stress conditions for nurse teachers.

This scale was found to be related to the Maslach Burnout Inventory (MBI) and State-Trait Anxiety Inventory (STAI). The MBI scale is used to measure burnout. Burnout is caused by long-term stress beyond the coping capacity of an individual, and it is an emotional and physical condition marked by tiredness and loss of interest after the tension is loosened. The high positive correlation between stressors and burnout was

Table 5. Factor Analysis Result of Stressor Scale and reliability

Items		Factors	Cronbach α factor
1st	Factor:8	Dealing with students	0.92
2nd	Factor:8	Work environment	0.88
3rd	Factor:8	Teachers' qualifications	0.89
4th	Factor:7	Workload	0.86
5th	Factor:6	Dealing with problems	0.90
6th	Factor:6	Educational methods	0.88
7th	Factor:5	Relationships among teachers	0.90
8th	Factor:5	Research Resources	0.82
9th	Factor:4	Improving teaching skills	0.82

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observed, and this indicates that nurse teachers who have strongly recognized stressors are more likely to suffer burnout.

The measurement of trait anxiety of the STAI is to examine the arousal of anxiety under the stress conditions. The positive correlation between trait anxiety and stressors found in this study implies that nurse teachers with high anxiety would strongly feel stressed. Thus, since the stressor scale developed in this study was correlated with the burnout and trait anxiety measurements, this scale appears to be a valid measurement for stress.

In addition, the Cronbach's α coefficients of each stress factor obtained in this study were 0.82 to 0.92. This indicates high internal consistency between the items included in each of the 9 factors, and ensures reliability. Therefore, the stressor scale consisting of the 9 factors and 57 items in the questionnaire is proposed as a measurement for stressors among nurse teachers.

2. Stress factors in the stressor scale and challenges

Although 13 factors was originally proposed as stress factors among nurse teachers, 9 factors were identified as a result of the factor analysis. The 9 factors are: ① dealing with students, ② work environment, ③ teachers' qualification, ④ workload, ⑤ dealing with problems, ⑥ educational methods, ⑦ relationships among teachers, ⑧ research sources, ⑨ improving teaching skills. The other 3 factors of "educational contents", "future and prospects of nursing education", and "relationship with patients and instructors" were excluded, and the rest of the original 10 factors were reorganized and integrated into the 9 factors.

First, the three excluded factors can be analyzed. The factor of "education contents" contained only one item, "studying educational contents before class", but this item fit into the 6th factor "educational methods" (Table 3).

Educational content is the basis for nurse teachers' educational activities, and studying educational contents is the most important for nurse teachers.

The reason for the "educational contents" factor not showing enough in the survey is, however, unknown. Perhaps it was not remarked on because the nurse teachers did not highly recognize the importance of educational contents, or they were much more concerned about classroom management and relationships with students.

The "future and prospects of nursing education " factor seems not to be identified as a stressor factor, probably because the prediction of the future was uncertain; the nurse teachers have the possibility of returning to the clinical field; or they do not have enough work motivation to continue working as nurse teachers and leading nurse education.

With respect to the "relationships with patients and instructor" factor, patient care and support for nursing practice instructors would be less likely to be new stressors, since the nurse teachers used to be practical nurses.

Secondly, the 9 factors are analyzed. The two factors of ① dealing with students, and ⑥ educational methods are stressors from nurse teachers' work itself. Those factors correspond to the findings in Sasaki's study which has shown nurse teachers' concerns about educational methods and guidance to students having problems.[33] Factor ① and ⑥ are also immediate requirements for becoming nurse teachers. When they were practical nurses, patient support and nursing care were actual practices. As nurse teachers, however, they are required to deal with and teach students while understanding and corresponding to each individual student. This comes to educational activities for everyday, which can be stressors. Similar items were causing great stress to teachers in general.[34] It is pointed out that the popularization of universities led to lower the quality of students,[35] and teachers in any educational institution cannot avoid the effort required in dealing with students and developing teaching methods to correspond to each individual student, although this is challenging.

The two factors of ③teachers' qualifications, and ⑨improvement of teaching skills are personal and internal factors for nurse teachers, and nurse teachers are under pressure to develop and improve their qualifications and skills. By following "Guidelines for managing nursing training schools", the qualifications required for nursing school teachers are: licensed nurse, more than five years of clinical experience, and attendance of the nurse teacher training session. The session is 8 to 12 months nursing education training of nurse teachers, and this is useful for establishing a basis to become a nurse teacher from being a nurse. When selecting enrollees, it would be necessary to find whether she or he has qualifications and abilities as nurse teachers.

After the session, further continuing education as nurse teachers is necessary while finding a way for self-development, in order to improve their qualifications as nurse teachers. This would be an immediate challenge.

The factors of ② work environment, ④ workload, ⑤ dealing with problems, ⑦ relationships among teachers, and ⑧ research resource are external factors surrounding nurse teachers, and they are situational and environmental factors. The preferred work environment would be where nurse teachers can have their own philosophy and passion for nursing education; build respect and trust each other; and have warm and open atmospheres to face individual students closely. However, their work environment is assumed to be still inadequate.

This indicates that basic nursing education is influenced by the management idea of the business owners, due to the historical background in which basic nursing education was vocational education in the apprentice system, although basic nursing education is said to be education for a special profession. It may be necessary to recognize the uniqueness of the nursing education system and culture in developing a nurse teacher. Some nurse teachers may also need to improve their work environment on their own, in order to respect and develop each other. Teachers in general also have concerns about relationships with their colleagues,[38] and this could be influenced by the characteristics of the teaching job.

3. Use of the stressor scale for nurse teachers

The use of the stressor scale is described as follows. The stressor scale would be useful for each nurse teacher to identify their stressor factors and measure the strength of their stress. By doing this, nurse teachers can be objectively aware of their stress; prevent the stressors; or challenge the stressors positively. In this study, the burnout group has been found at a high rate of 32.6%, and this is much higher than one in the prior literature. Before their burnout becomes serious,

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some effort could be made by using the information gained from the stressor scale. In addition, the scale would also be useful to support beginning nurse teachers. When beginning nurse teachers are assigned to the basic nursing educational fields, their bosses can use the stressor scale to understand possible stressors among the beginning nurse teachers. Their bosses and senior teachers can also use the scale for stress release and guidance support for beginning nurse teachers. In terms of usefulness for recognition of stressors and support for beginning nurse teachers, the scale is usable.

4. Limitations and challenges

The cumulative contribution rate was approximately 60%, and this indicates that the scale found only 60% of all the stressors among nurse teachers. The social conditions dramatically change, and this also influences the basic nursing education. Because of that, nurse teachers are exposed to change over time, and they will have new stress. Thus, a revision of the stressor scale will be necessary. In addition, a new stressor scale by adding specific issues for nurse teachers in universities and colleges may be necessary, since the nurse teachers in nursing schools were the subjects for the stressor survey in this study. If the stressor scale is further developed, this will be the objective indicator to identify and differentiate stressors among nurse teachers in universities and nursing schools. In the future, the stressor scale would need to be developed in order to enhance inclusiveness and be applicable to all nurse teachers.

VI. Conclusion

The stress survey consisting of 169 items was conducted on 450 nurse teachers in nursing schools across the country. As a result of factor analysis of the data from 227 teachers' responses, 9 stressor factors consisting of 57 items (4 to 8 items for each factor) were obtained. The 9 factors are: "dealing with students", "work environment", "teachers' qualifications", "workload", "dealing with problems", "educational methods", "relationships among teachers", "research resources", and "improving teaching skills". The questionnaire was prepared with a scale of four choices to measure the degree of the 57 stressor items for each nurse teacher, and this was proposed as a stressor scale for nurse teachers.

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