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Development and psychometric properties of the stressor scale for emergency nurses

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ABSTRACT

Introduction: Emergency department nurses are exposed to specific stressors and report higher stress levels than nurses in other hospital departments. This study aimed to develop and test the psychometric properties of a questionnaire-based instrument for identifying stressors for emergency department nurses.

Methods: The instrument's content and face validities were examined by five experts and nurses in emergency nursing field. The test-retest reliability was examined on 30 emergency department nurses. The construct validity, including an exploratory and a confirmatory factor analysis, was tested on 405 emergency department nurses. Cronbach's alpha values and intra-class coefficients were calculated.

Results: The instrument's content and face validities were satisfactory. The exploratory factor analysis provided a five-factor solution, whereas the confirmatory factor analysis provided a final four-factor solution with 25 items distributed among the factors Life and death situations, Patients' and families' actions and reactions, Technical and formal support, and Conflicts. The Cronbach's alpha values ranged from 0.89 to 0.93 per factor, and the intra-class correlation coefficient was 0.89, indicating good homogeneity and stability.

Conclusions: The instrument's content, face, and construct validities were satisfactory, and the internal consistency and test-retest reliability were good. This instrument can be useful in the management of emergency departments.

1. Introduction

Nurses experience high levels of work-related stress [1]; however, nurses who work in different environments and contexts experience different stressors [2]. A stressor is defined as any factor or event that threatens an individual's health or reduces normal functioning [3]. In the workplace, stress occurs when the job requirements do not match the resources, capabilities, and needs of the workers [4].

Nurses who work in emergency departments (EDs) are exposed to specific stressors that are related to the work characteristics of the ED and report higher levels of stress than nurses who work in other hospital departments [5]. Patients arrive to the ED without prior notice, often by ambulance, at any time of the day and night [6]. The ED staff must provide initial treatment for a broad spectrum of conditions, which are occasionally life-threatening, that require immediate attention, causing stress [7]. Other stressors include experiencing the severe trauma or sudden death of a patient, inappropriate behaviors of patients and relatives (e.g., physical and verbal violence), overcrowding of patients [5], and complaint of patients and relatives due to misunderstandings about the triage system at the ED [8,9]. In addition, shortages of ED nursing staff, unavailability of physicians, shortages of necessary medical equipment [5], lack of adequate rest, low wages, and conflicts with colleagues are perceived as organization-related stressors [10]. ED nurses are also exposed to stressors related to working under high time pressure conditions with high job demands and low decision authority. They also occasionally receive unclear and inadequate information to perform their tasks and assignments in the work shift. Furthermore, receiving fewer rewards than nurses in other hospital department is

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reported as stressor to ED nurses [5].

In summary, the stress factors that are specific to ED nurses could be related to the work requirements; the characteristics of the department; the relationships with other caregivers, patients and their families; and the work organization. These stress factors may generate an imbalance between demands and control in the work situation [11,12].

The high level of stress in EDs causes physical and psychological problems, such as fatigue and burnout [8,13]. ED nurses have higher rates of absenteeism and sick leave than both general medicine nurses and pharmacists, which is presumably a consequence of occupational stress [14]. In addition, occupational stress contributes to job dissatisfaction in ED nurses and may cause these nurses to leave their jobs [15], which leads to a shortage of ED nurses. The identified sources of stress in an ED [5,7,10] may change over time due to improvements or deterioration in the work organization [11].

Various measurement instruments, such as the Nurse Stress Scale [16], the Medical Personnel Stress Survey [17] and Charge Nurse Stress Questionnaires [18], have been used to measure stressors and stress levels in general nurses and ED nurses. However, because certain items on these instruments are not related to the ED setting and certain ED-specific stressors are not included in the existing instruments, the sensitivity of these instruments may be low [19]. To the best of our knowledge, no established instrument that assesses the specific stress factors in ED nurses is available. A reliable and validated instrument for measuring the specific sources of stress that influence ED nurses could be helpful for organizations seeking to improve the work conditions in the ED and reduce the staff turn-over rate. Therefore, the aims of this study were to develop and test the psychometric properties of a questionnaire-based instrument that identifies specific stressors in nurses in EDs.

2. Methods

2.1. Study design

This study utilized a cross-sectional, correlational study design involving 1) item generation; 2) evaluation of content validity and test-retest reliability; and 3) evaluation of internal consistency and construct validity. The study was conducted between March 2015 and June 2017.

2.2. Development of the stressor scale for emergency nurses (SSEN)

In phase 1, the items were generated and a response format was chosen. The preliminary item pool for the SSEN was generated based on a scoping literature review as described by Davis, Drey, and Gould [20] and themes/categories or sub-themes/sub-categories related to ED nurses' experiences of work stress described in previous qualitative studies involving 36 interviews with ED nurses [8,9]. For the scoping literature review, the key search terms included "occupational stress OR work stress OR stress at work" AND "nurs∗" AND "emergency room OR emergency department OR accident and emergency department." In total, 25 studies (see Appendix I), including both qualitative and quantitative studies, were selected. The chosen response format was a six-point Likert scale ranging from 0 ('not at all') to 5 ('to a very high degree'). A six-point rating scale was chosen to prevent participants from choosing a neutral rating, which would have decreased the sensitivity of the measurement [19]. The ratings concerned the extent to which an item was perceived as stressful by the respondent.

In phase 2, the content and face validity and test-retest reliability of the questionnaire were examined. After constructing the first version of the questionnaire, five experts (one associate professor in nursing, two professional-level ED nurses, and two senior professional-level ED nurses), who had experience in conducting studies and a good understanding of the ED setting, performed the content validation. The experts were asked to rate the content validity of the items using the following four-point scale: 1 = not relevant, 2 = somewhat relevant, 3 = quite relevant, and 4 = highly relevant.

Table 1
Demographic characteristics of the participants in phases 2 (pilot test, n = 30) and 3 (n = 405).

Variables	N (%)		Mean (SD)	
	(n = 30)	(n = 405)	(n = 30)	(n = 405)
Age (years)			36.9 (8.4)	33.9 (8.7)
Sex				
Male	2 (7)	49 (12.1)		
Female	28 (93)	356 (87.9)		
Employment status				
Full time	29 (97)	402 (99.3)		
Part time	1 (3)	3 (0.7)		
Work position				
Practitioner level	27 (90)	357 (88.1)		
Management level	2 (7)	24 (5.9)		
Others	1 (3)	24 (5.9)		
Years of working as a nurse			14.5 (9.7)	11.4 (8.9)
Years of emergency care experience			11.8 (7.5)	9.4 (7.8)
Average number of working hours per month			258.4 (91.3)	253.3 (63.4)

The face validity was evaluated by the same five experts and four ED nurses (two from a public hospital and two from a private hospital). To determine the face validity, the following open-ended questions were added: "Please give your comments and reflections for each statement in this instrument (the SSEN) regarding clarity, layout, and readability" and "Is there anything that you think should be revised?" The first author (NY) delivered the instrument and instructions to the experts and ED nurses. After two to three weeks, NY met with each expert and ED nurse to discuss the content and face validity [19].

To evaluate the test-retest reliability, i.e., the correlation between two sets of response scores on the instrument, a pilot test was performed with a two-week interval between measurements [21,22]. A convenience sampling technique was used to recruit participants who were ED nurses employed in either a public (n = 16) or private (n = 14) hospital in Thailand with at least one year of emergency care experience. The details regarding the sample are provided in Table 1. A contact person at each hospital distributed the questionnaires to the participants and collected the completed questionnaires. Two weeks after the first measurement, the contact person distributed the questionnaire again to the participants. This procedure was employed to prevent the participants from remembering their initial responses. The participants were also asked how long it took them to complete the questionnaire.

In phase 3, the construct validity and internal consistency of the questionnaire were tested. A convenience sampling technique was used to recruit participants using the same inclusion criteria as those used in the pilot test (phase 2). EDs in hospitals located in four regions in Thailand were randomly selected. Fifty-three hospitals (38 public and 15 private hospitals) were contacted; 27 public hospitals and 8 private hospitals responded and agreed to participate in the study. In total, 491 questionnaires, including an information sheet and consent forms, were sent to a contact person at each selected hospital and distributed to the participants. In total, 422 questionnaires were returned, 405 of which were completed (see Table 1), yielding a response rate of 82%. No significant differences were observed in the parameters between the two samples in phase 2 and phase 3. A rule of thumb was applied to determine the appropriate sample size for a factor analysis, and a sample size of 200 was considered acceptable [23]. Hence, the data set was divided in half; the first 200 completed questionnaires were used for an exploratory factor analysis (EFA), and the remaining 205

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