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Original Article

A Japanese version of the stressors in nursing students (SINS) scale

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ABSTRACT

Objectives: To translate and study the factor structure of a Japanese version of the Stressors in Nursing Students scale.**Methods:** The Stressors in Nursing Students scale was translated into Japanese and administered to a large cohort ($N = 1298$) of female Japanese nursing students across five universities and across all four years of the nursing programme. The data were analysed using exploratory factor analysis.**Results:** Exploratory factor analysis revealed four factors: 'Clinical'; 'Conflict and confidence'; 'Education'; and 'Free time'. The relationship between the total score on the Stressors in Nursing Students scale and the demographic aspects of the sample was weak but there was a significant increase in the perception of stressors between first and second year students.**Conclusions:** There were similarities and differences between the perception of stressors by nursing students in Japan compared with, for example, the United Kingdom and China mainland. While a four-factor structure was found here, the distribution of items in the Stressors in Nursing Students scale differed from previous studies in the United Kingdom and China with the 'Free time' factor being unique to this study. Stress is an issue for nursing students and is related to the specific stressors they encounter in the process of their work and study. Findings can inform the development of strategies to reduce such stressors among nursing students in multiple, global contexts.© 2018 Chinese Nursing Association. Production and hosting by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

1. Introduction

Few occupations are without stress, but the caring professions tend to be more emotionally exhausting than most with consequences for staff health – physical and mental – absence from work, burnout and attrition from the workforce [1]. As the largest occupational group in hospitals and health services generally, stress in nursing is of particular interest, both out of concern for nurses in the workforce and for the workforce and patient care generally. Attrition from the nursing workforce and the consequent turnover

of staff have serious consequences for patient care and for the finances of the health systems involved [2]. Nurses are expensive to educate and their loss from the workforce leads to the need to educate more or, at considerable expense, to employ them from outside of the health system, often from overseas [3].

Nurses are also lost to the workforce before they enter it due to the stress that is experienced by nursing students [4]. Clearly, some of the stress associated with working as a nurse will not be – or should not be – as acute in nursing students. For example, while they are immersed for considerable periods of their education in the clinical areas, they are not fully responsible for the patients they are working with and have no management responsibility for other staff. However, they do work with patients and this is inherently stressful, and they will encounter distressing episodes and difficult situations with patients, relatives and colleagues. Moreover, they are students and they will have additional sources of stress and the educational aspect of their programme will be a prime source of

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stress [2]. The educational component will be inherently stressful because students have to learn and be assessed on new material and there is a possibility of failure and consequently the prospect of not registering as a nurse. Students tend to receive poor financial support for their studies and may have educational fees and living costs to accommodate. In addition, students often live away from home for the first time and the consequent isolation from family coupled with limited disposable income to spend on social pursuits may exacerbate other sources of stress.

Therefore, we can safely assume that nursing students suffer from stress but what is important is to understand the sources of stress – so called ‘stressors’ – and to see how these are perceived by students and if the perception of these stressors alters over the course of a programme of study. We know from previous research that nursing students’ perceptions of empowerment change throughout their studies, in relation to their experiences on clinical placement [5]. Increasing levels of empowerment as they progress are associated with the knowledge and confidence gained. As yet however, a fuller picture of the stressors that impact on their whole programme of study is missing. Understanding such stressors is necessary however, to support nursing students in adapting to their programme of study and, of great importance, to help them to cope with the programme, to survive the stressors and complete the programme. The importance of this lies in the unacceptable levels of attrition from nursing programmes before nursing students have even entered the workforce as Registered Nurses [6].

Stress in nurses and nursing students has been studied but stressors *per se* have mainly been overlooked. The present study is focused on stressors and, towards that end, it makes use of the Stressors in Nursing Students (SINS) scale. The SINS was developed in English but has since been translated into several languages. The SINS is a 43-item instrument with questions on a range of stressors that nursing students are liable to encounter including academic, clinical, financial and confidence stressors. Items are responded to on a five-point Likert type scale from: ‘not stressful at all’ (1 point) to ‘very stressful’ (5 points). Higher total scores represent stressors that are more stressful.

Indeed, when the SINS was developed, and exploratory factor analysed, these four dimensions were apparent: academic; clinical; financial; and confidence [2] and this structure has been observed in a cohort of Hong Kong nursing students [1], using the English version and also in a version of SINS translated into Chinese and used in China Mainland [7]; a sample which was also confirmatory factor analysed. However, a Chinese version adapted for use in Taiwan and used with a cohort of nursing students in Taiwan showed no apparent underlying structure (Unpublished results) and the same phenomenon has appeared in a version translated into Urdu and used with a cohort of nursing students in Pakistan [8]. Clearly, it is important to continue to translate and study the SINS in different populations and in different languages as the structures may provide insight into how stressors in nursing students are perceived in different countries and in different cultures. It is also important to speculate why the structure of the SINS, as an indicator of the underlying perception of the structure of stressors, differs between countries and cultures and to propose further study to test theories about stressors in nursing students.

Towards that end, the present study was designed to translate and test a Japanese version of the SINS (the SINS-J) with a cohort of nursing students in Japan. Like other countries, Japan sees stress, burnout and attrition amongst its nursing students [9]. This is a serious issue in Japan where the demographics of the population have made a serious and significant shift in recent decades towards an older population (<https://www.nurse.or.jp/jna/english/nursing/employment.html>; retrieved 5 January 2017). This is in common

with other countries, but the effect has been very severe in Japan. This, so-called, ageing of the population necessitates more healthcare and more staff in healthcare – especially nurses – as older people experience more disease and disability and also, with age, increasing multi-morbidity. Therefore, in addition to efforts to recruit more nurses into the workforce, which requires the recruitment of greater numbers of nursing students, efforts must be made to retain nursing students in education. A crucial step in that process is to study stress and the sources of stress, which we know can lead to student nurses leaving the programme.

2. Methods

Data were collected anonymously using a Japanese version of the SINS (SINS-J) between July 2013 and August 2014. The inclusion criteria for the study were to be a female nursing student in one of five Japanese universities (four national and prefectural universities and one private university) engaged in years 1, 2, 3 and 4 of their programme. Male students (approximately 9% of the nursing students at these universities) were excluded as we decided to take a homogeneous sample of female students as the absolute number of male students was likely to be very small and might be better studied separately with a larger sample. Data were obtained from 1298 female undergraduate nursing students. The Japanese version of the SINS (SINS-J) was developed using the back-translation method as follows: 1) SINS was translated into Japanese by Japanese researchers; 2) the Japanese translation was translated into English by native English speaking teachers teaching at the above-mentioned universities; and 3) British and Japanese researchers discussed each item with a focus on words until they reached an agreement. In addition, the 12-item version of the General Health Questionnaire (GHQ-12) was administered.

Students were given written information on the survey and its purpose, and then received questionnaires, which they were asked to complete, place in a sealed envelope and return the envelope to a data collection box located at each school with the help of a representative appointed there to assist with the project. In addition to the SINS data, we gathered data on psychological morbidity (using the GHQ-12), age, university and year of study.

Data were entered into an SPSS version 22 for Windows database. Data were explored using principal components analysis (PCA). To identify the number of factors to be rotated a combination of eigenvalues greater than 1, the scree slope method and Monte Carlo parallel analysis for PCA (http://download.cnet.com/Monte-Carlo-PCA-for-Parallel-Analysis/3000-2053_4-75332256.html; retrieved 5 January 2017) was used. Various solutions were derived by running the data and removing cross-loading items until a simple solution was derived – one where loadings on putative factors were maximized and minimized for other loadings. Then scores on the SINS-J were correlated with age and the GHQ-12 scores, and one-way ANOVA was used to study the relationship between year of study and institution of study.

2.1. Ethics

After permission was obtained from the department heads, students were informed about the study and that returning the questionnaire meant they gave informed consent. They were also informed about protection of private information, voluntary participation in the study and that non-participation in and withdrawal from the study would be without consequences. This study was approved by the Research Ethics Committee of Okayama Prefectural University.

3. Results

Five-hundred and one students (38.6%) responded to the questionnaire, their mean age was 20.0 (SD 2.6). The number of students in each year was very similar (range 116–130). The solution obtained by principal components analysis is shown in Table 1. The Kaiser-Meyer-Olkin and Bartlett's test indicated that the sample was suitable for factor analysis. Four factors were identified and labelled: 'Clinical' (e.g. 'Dealing with unco-operative, anxious, abusive or otherwise difficult patients or relatives' and 'Speaking to patients' relatives'); 'Conflict and confidence' (e.g. 'Personal problems other than health' and 'Conflicts with peers'); 'Education' (e.g. 'Examinations and placement gradings' and 'The amount of class-work material to be learned'); and 'Free time' (e.g. 'Having no time for entertainment' and 'Having no money for entertainment'). The Cronbach's α coefficient for the total scale was 0.94 and the Cronbach's α coefficients for the subscales identified are shown at the foot of Table 1.

There was no correlation between age and total score on the SINS and only a small (0.20; $P=0.001$) correlation between the total score on the SINS and the total score on the GHQ-12. A one-way ANOVA revealed a significant difference among the scores across the years of the study. The SINS total score significantly increased ($P=0.041$) between years 1 (141.93) and year 2 (150.64) but, while there was a significant difference ($P=0.021$) between year 1 and year 3 (151.03) there was no significant difference between year 2 and year 3 and between year 4 (139.71) and any of the other years.

4. Discussion

We set out in this study to investigate the structure of the SINS-J, a Japanese translation of the SINS which ask respondents – nursing students – to rate the extent to which they find aspects of their nursing programme stressful. Data were gathered from over 500 Japanese nursing students and one of the first issues to address in factor analysis is the sample size relative to the number of items in the questionnaire being studied. While a specific and absolute ratio of respondents to items is not recommended by any practitioners of factor analysis, Kline [10] recommends a ratio of between five to ten respondents per item and we have achieved this in the present study. Therefore, the sample may be considered sufficient for the present analysis. The analysis was carried out using PCA which, strictly speaking, is not factor analysis but, as explained by Watson and Thompson [11], solutions obtained by PCA are very similar to those obtained from factor analysis. Moreover, PCA is probably the most widely applied method used in nursing research – and other fields – to investigate underlying structures in multivariate datasets [11].

Previous published studies on the original English version and translations – and some in the process of being published – provide a range of solutions for PCA of the SINS. These range from no apparent structure [8] to an almost identical structure to the original English version. In the present study we found that the simplest structure had a factor structure with some similarities and differences to the original English version. Specifically, there were four factors and two of these – Clinical and Education – have been

Table 1
Principal components analysis of the SINS-J.

Item	Communality	First Principal Unrotated component	Factor loadings			
			1	2	3	4
21	0.644	0.649	0.759	0.124	–0.055	0.220
20	0.573	0.632	0.714	0.193	–0.047	0.153
11	0.512	0.573	0.678	–0.040	0.195	0.118
39	0.531	0.691	0.647	0.260	0.141	0.156
40	0.463	0.602	0.623	0.257	0.096	–0.001
24	0.494	0.668	0.607	0.228	0.120	0.244
14	0.454	0.621	0.602	0.209	0.215	0.031
8	0.476	0.492	0.594	0.020	0.307	–0.168
23	0.512	0.617	0.591	0.090	0.068	0.390
9	0.522	0.624	0.579	0.102	0.420	0.009
15	0.416	0.602	0.575	0.201	0.084	0.194
34	0.434	0.644	0.516	0.199	0.286	0.214
13	0.425	0.599	0.511	0.330	0.232	–0.040
12	0.486	0.556	0.507	0.118	0.451	–0.105
43	0.428	0.615	0.507	0.394	0.112	0.063
31	0.518	0.506	0.156	0.693	0.107	0.047
42	0.437	0.486	0.215	0.621	0.016	0.071
41	0.442	0.493	0.189	0.611	–0.001	0.181
38	0.368	0.355	0.010	0.597	0.088	0.063
16	0.333	0.397	0.088	0.556	0.113	0.056
36	0.435	0.577	0.254	0.556	0.156	0.195
17	0.368	0.492	0.217	0.549	0.116	0.073
27	0.421	0.561	0.248	0.510	0.092	0.300
5	0.316	0.413	0.078	0.462	0.308	0.037
7	0.537	0.477	0.242	0.065	0.688	0.023
4	0.545	0.487	0.131	0.116	0.683	0.218
33	0.413	0.440	0.065	0.206	0.562	0.225
6	0.407	0.500	0.193	0.333	0.508	0.009
1	0.356	0.408	0.107	0.073	0.470	0.344
29	0.391	0.509	0.249	0.090	0.413	0.388
35	0.541	0.401	0.009	0.099	0.242	0.757
25	0.641	0.465	0.154	0.213	0.001	0.757
22	0.612	0.493	0.279	0.059	0.065	0.725
28	0.415	0.429	0.029	0.280	0.252	0.522
Cronbach's α			0.906	0.803	0.730	0.779

Loadings on putative factors are shown in bold; for item labels see Appendix.
Kaiser-Meyer-Olkin test = 0.92; Bartlett's test of sphericity $P < 0.001$.

previously identified [2,7,12]. The next factor – Conflict and Confidence – reflects the ‘Confidence’ factor identified in these previous studies. ‘Free time’ is a novel factor; while the items are included in all the previous version of the SINS, they have either been spread across other factors or have been omitted from the final solutions due to cross-loading with other items.

Of course, there is an element of art to labelling factors. The mathematical aspects of factor analysis provide us with solutions based on maximised loadings of items on putative factors and minimised loadings of other items on these factors; a co-called ‘simple’ structure (Kline, 2004). Labelling factors is an essential step in factor analysis as it involves trying to make sense of the items that are clustered under each of the factors. It is not a perfect process and further work is always required to establish factor structures more firmly. One of these steps is confirmatory factor analysis (CFA) which involves hypothesizing a structure and then testing that using structural equation modelling. This has been done for one version of the SINS (the SINS-C, a mainland Chinese translation [7]) but in the present study the sample size was inadequate for CFA.

Nevertheless, it is possible to speculate what the structure obtained in the present study tells us about the structure of stress in Japanese nursing students. It makes sense that the first factor – the one with the most items loading on it – is ‘Clinical’. Being in clinical practice is the novel aspect of being a nursing student and in addition to the general stress associated with this there is the regular exposure and adaptation to new clinical areas. ‘Confidence’ is a factor identified in previous studies and this makes sense in light of the fact that the clinical and other aspects of the programme will challenge the confidence of the nursing students. However, in the present study, this is clearly associated with items related to conflict and, while the factor could, possibly, simply be labelled ‘Confidence’ we considered that the conflict items revealed a novel aspect of being a nursing student. Conflict items are associated with the items related to confidence and this also has face validity; conflict during the nursing programme with people in authority and with experience in both the educational and the clinical settings is likely to have an impact on and be related to confidence. With respect to the development of confidence in nursing students, it is well known that nurses’ assertiveness plays an important role in forming a good relationship with patients and medical staff and reduces their stress. In basic nursing education, Japanese nursing students need to be aware of the importance of self-expression in terms of their future careers as well as their friendships [13].

Clearly, the fact that ‘Education’ was identified as a factor makes sense in light of the fact that the educational component of the nursing programme will be considerable and achieving registration as a nurse is predicated on achievement in the educational component of the programme. The novel finding here is the identification of ‘Free time’ as a factor. This suggests that having enough time to enjoy life outside of the nursing programme is particularly important to these Japanese nursing students.

Using the total score on the SINS-J it is clear, for these students that their response to stressors increases between the first and second year of the programme. Thereafter, the score does not increase. Unlike some previous studies [1,2] the SINS score was not strongly related to the GHQ which is a measure of psychological morbidity.

Comparing and contrasting nursing students in United Kingdom and Japan, it is evident that they are exposed to different educational and clinical environments, but their experiences of empowerment and disempowerment in clinical practice are similar [9] and this may explain the prominence of the Clinical factor in this Japanese and previous UK studies. For nursing students in both countries, learning in practice, team membership and power are

associated with either empowerment or disempowerment; depending on the context [9]. Identifying the stressors that might be associated with disempowerment is therefore crucial.

United Kingdom students are aware of the importance of acting as patient advocates, although they cannot always find the voice to perform this. Japanese students however, appear to be unaware of the concept of advocacy. Previous studies have pointed out the need for further cross-cultural exploration into the association between advocacy and empowerment and particularly to explore the issue of voice among Japanese nursing students [9]. Future studies that investigate the impacts of stressors on Japanese nursing students’ ability to have a voice may therefore be warranted.

5. Conclusion

We successfully translated the SINS into Japanese and administer it to a large cohort of Japanese nursing students. A particular strength of the study is the adequacy of the sample size for the analysis that was applied. EFA revealed possible similarities and differences between the perception of stressors by nursing students in Japan compared with, for example, the United Kingdom and mainland China. Findings can inform the development of strategies to reduce such stressors among nursing students in multiple, global contexts.

Further work should focus on replicating the present study and also on confirmatory work to test the robustness of the putative structure obtained here. Further work is also required to study the development of the perception of stressors across the nursing programme in Japan and how the perception of stressors relates to demographic and situational factors.

Author contributions

RW, FI, CB-J conceived the study; KW, MY, AY supervised the conduct of the translation and data collection. RW provided statistical advice on study design analysed the data; KW supervised the overall research project, supported the design of the study, and helped to draft the manuscript. KW, AY provided feedback on the draft. All of the authors proofread and finalised the manuscript. RW takes responsibility for the paper as a whole.

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Appendix A. Supplementary data

Supplementary data related to this article can be found at <https://doi.org/10.1016/j.ijnss.2018.04.005>.

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