MEASURING EXPOSURE TO WORKPLACE BULLYING AMONG MALAYSIAN JUNIOR DOCTORS: PSYCHOMETRIC PROPERTIES OF THE NEGATIVE ACTS QUESTIONNAIRE-REVISED

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Abstract

Background: The Negative Acts Questionnaire (NAQ-R) is a widely used measure of workplace bullying. However, studies examining its psychometric properties for use among Malaysian junior doctors have not been published. The study aims to determine its validity and reliability in assessing bullying among a Malaysian sample.

Methods: The NAQ-R was administered to 1,119 junior doctors working in twelve government hospitals accredited for housemanship training within the central zone of Malaysia. A subset of participants (n=50) completed the NAQ-R twice at an interval of two weeks. Exploratory factor analysis was conducted to assess construct validity, using polychoric factor analysis with varimax rotation. To determine reliability, Cronbach's alpha was computed to assess internal consistency reliability, while intraclass correlation coefficient was calculated to examine test retest reliability.

Results: Analysis yielded a one-factor structure of the NAQ-R, consistent with the interpretation of factors provided by the original instrument. The factor was labelled "workplace bullying" and accounted for 68.0% of the variance in the junior doctor group. Factor loadings ranged from 0.68 to 0.90. The Cronbach's alpha for the NAQ-R items ranged from 0.96 to 0.97, and the Cronbach's alpha for the overall scale was 0.97. Meanwhile, the ICC for the NAQ-R items ranged from 45.6% to 93.7%, and the ICC for NAQ-R total score was 93.4%. These indices denote high internal consistency reliability and excellent test-retest reliability respectively.

Conclusion: The NAQ-R has adequate psychometric properties and can be used to measure workplace bullying among Malaysian junior doctors.

Keywords: Negative Acts Questionnaire-Revised, Psychometric properties, Validity, Reliability, Junior doctors

Introduction

The findings of a meta-analysis examining the prevalence of workplace bullying indicate that one out of seven employees are targets of some form of workplace bullying (1). This suggests that globally, millions of employees are exposed to some level of workplace bullying. Defined as "situations where an employee is persistently exposed to negative and aggressive behaviours at work primarily of a psychological nature with the effect of humiliating, intimidating, frightening or punishing the target" (2), workplace bullying has become an increasingly recognised occupational hazard. Research has shown that it has detrimental consequences for not only individuals, but for organisations as well. In terms of individual outcomes, existing literature has indicated that exposure to bullying is strongly related to mental and physical health disorders, somatic problems, irritability, symptoms of post-traumatic stress, burnout, and sleep difficulties (3-7). In terms of organisational outcomes, workplace bullying has been shown to lead to job dissatisfaction, high rates of absenteeism and staff turnover, reduced productivity, increase in compensation claims, and reduced organizational commitment (3, 8, 9). Indeed, workplace

bullying has been described as a more crippling problem for workers than all other kinds of work-related stressors put together (10).

Across occupations, junior doctors have been shown to be frequently targets of workplace bullying in many parts of the world. A recent systematic review indicated that 30 to 95% junior doctors experience bullying at work, and that this had led to undesirable health and work outcomes, as well as increasing their likelihood of accidents and making serious medical errors (11). In Malaysia, the prevalence of junior doctors exposed to persistent bullying has been estimated to be 13% (12). Given this perturbing trend, there is a glaring need to manage workplace bullying among junior doctors. In order to achieve that, a context-specific valid and reliable instrument to measure workplace bullying is required to enable the identification of this phenomenon.

One of the most extensively used instrument for measuring workplace bullying is the Negative Acts Questionnaire (NAQ-R) (13, 14). The NAQ-R was devised by Einarsen et al. (2) as a bullying inventory to measure exposure to negative actions that can be categorized as work-related bullying, person-related bullying, and physically intimidating bullying. The three dimensions of workplace bullying were defined by the authors in reference to the workplace setting, where work-related bullying refers to actions such as giving a person too many, too few or too simple tasks or persistently criticizing them or their work, person-related bullying refers to actions such as slander and social isolation, and physically intimidating bullying refers to actions such as physical violence or threat of violence (2). The validation study conducted by Einarsen et al. confirmed a three-factor structure of the NAQ-R, although the authors reported that the instrument may also be used as a single factor measure. In addition, the instrument was described as having excellent internal consistency (Cronbach's alpha 0.90) and good criterion validity (2). However, studies examining its psychometric properties among Malaysian junior doctors have not been published. Thus, this study aims to determine its validity and reliability in assessing bullying among a Malaysian junior doctor sample.

Methods

Participants and study setting

For the purpose of this study, the term junior doctor is operationally defined as "qualified doctors in clinical training" (15), and will be used throughout to represent house officer (HO) and medical officers (MO). The study was conducted in government hospitals accredited for housemanship training (GHAHT) to enable the sampling of HO. The central zone of Malaysia was selected for sampling because it is the most populated zone and houses the largest number of GHAHT, as well as all types of GHAHT, including state, major specialist, university, and military hospitals (16). Following ethical approval from the National Medical Research Register [NMRR-17-1360-36338 (IIR)]

and Medical Ethics Committee of university hospitals involved, permission to conduct the study was granted for 12 of the 16 GHAHT located within the central zone of Malaysia. MO and HO working for at least 6 months in the general medicine, general surgery, orthopaedic, obstetrics and gynaecology, paediatrics, emergency medicine, and anaesthesiology departments of these hospitals were universally sampled. A 6-month clinical experience cut-off was chosen as workplace bullying is defined as a persisting phenomenon in which exposure to negative actions has been described to have had occur for at least 6 months (17, 18). Those who declined to participate in the study, did not return their questionnaires, or were on end of posting, maternity or medical leave were excluded. Informed consent was retrieved from all study participants. Data collection commenced on 27 November 2017, and was completed on 17 May 2018.

Instrument

The NAQ-R was devised by Einarsen et al. (2) to measure exposure to negative actions in the workplace. This instrument is a 22-item scale measuring exposure to items that encompasses work-related bullying, person-related bullying and physical intimidation within the past six months (2). Response categories were coded from 1 to 5 with the alternatives "never", "now and then", "monthly", "weekly", and "daily" (19). Total score range from 22 to 110, with higher scores indicating more frequent exposure to negative actions.

Data analysis

Initial data analysis was performed to ensure that all assumptions of factor analysis was met. These assumptions include data having an interval level structure, multivariate normality, factorability, and sufficient sample size (20). As data was collected using binary responses or Likert-type scale responses, data was interval or approximate interval level and thus the first assumption was met. Next, multivariate normality was assessed using the Doornik-Hansen, Henze-Zikler, and Mardia's kurtosis and skewness test (21). The null hypothesis that data has multivariate normality was rejected if p was less than 0.05 (21). All tests indicate non-normality of data distribution (p<0.001), which was to be expected as study data included responses collected via Likert-type scale. Thus, polychoric factor analysis was chosen to extract factors instead of conventional factor analysis as in these instances, polychoric factor solution produces more accurate solutions for factor analysis compared to Pearson correlations (22). Following that, factorability was assessed using Bartlett's Test of Sphericity (BTS) and Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy. The BTS tests the null hypothesis that a set of measures is unrelated and therefore unsuitable for structure detection, whereas the KMO is a measure of the proportion of variance among variables that might be caused by underlying factors and assesses the sampling adequacy for each variable in the model and for the complete model (23). A statistical significance of less than 0.05 for the BTS test and KMO

index of more or equal to 0.50 were deemed to be acceptable for factor analysis (24, 25). As significant BTS (p<0.001) and KMO index of 0.970 was observed, analysis indicated acceptable factorability for the NAQ-R. Finally, the general rule of thumb for sample size follows those of Hatcher (26), who argues that sample size should be at least 100 or 5 times the number of variables to be included in the analysis. For this study, the number of items that was included in the factor analysis was 22, thus the minimum sample size was 110. The study sample size for factor analysis was 1,119, therefore, this assumption was met.

Next, construct validity was assessed via exploratory factor analysis (EFA), which was used to identify the optimal factor structure based on observed data. The criteria for determining the number of components to be extracted from factor analysis include the following: Kaiser's criterion (27), the Cattell's Scree test (28), Horn's parallel analysis (PARA) (29), and Velicer's minimum average partial correlation procedure (MINAP) (30). Kaiser's criterion recommends retaining all components with eigenvalues of more than 1.0 (27). The Scree test involves visually examining the graph of the eigenvalues and locating the break point or natural bend in the data where the curve flattens out, and choosing the number of factors to retain by the number of data points above the break point (28). PARA compares actual eigenvalues with random order eigenvalues and states that common factor eigenvalues which are greater than their respective common factor parallel analysis with eigenvalues from the random data would be retained (29). Finally, MINAP is based on the average partial correlations between the variables after successively removing the effects of the factors, and the number of factors which minimizes the average partial correlations should be retained (30). The order of extraction criterion taken into consideration when deciding how many factors were to be extracted were as following: PARA, followed by minimum average partials (MAP), scree test, and lastly Kaiser's criterion. This is in keeping with the order of criteria's efficacy based on the literature on previous Monte Carlo simulation (31-34). The total variance explained by the factors extracted was examined. For the interpretation of the factor(s), varimax rotation was applied. The factor solution was examined by observing the factor loadings between observed indicators and extracted components, considering factor loadings with absolute values of 0.50 or above. In cases where there were conflicting results between the different criteria, to decide on how many factors to retain, the following was applied: the factors extracted should account for at least 50% of the total variance explained (35), the factor loadings should be at least 0.50 or above, and the factors interpretation should correlate with the factors in the original instruments. Finally, the factors were named and defined.

To assess reliability, internal consistency reliability was examined using Cronbach's alpha while test retest reliability was determined using intraclass correlation coefficient (ICC). The ICC quantifies the strength and direction of the relationship between test-retest scores by estimating their linear relationship (36). Cronbach's alpha values less than 0.5 were considered to indicate unacceptable reliability, values between 0.5 and 0.75 moderate reliability, and values above 0.75 high reliability (37). ICC values less than 0.40 were deemed to indicate poor reliability, values between 0.40 and 0.59 fair reliability, values between 0.60 and 0.74 good reliability, and values between 0.75 and 1.00 excellent reliability (38). All statistical analysis was performed using Software for Statistics and Data Science (STATA) Version 14.0.

Results

Sociodemographic and employment characteristics

The overall response rate of this study was 58%. A total of 1,119 junior doctors working in twelve government hospitals accredited for housemanship training within the central zone of Malaysia was included. The majority of study participants were HO (n=1,074), with MO making 4% of the study population. The mean age of the study participants was 27.1 ± 1.8 years. Female and Malay respondents made the majority of study population, tallying up to 65% and 66% respectively. Most of the study participants had graduated from local medical schools (52%) and had good English proficiency (54%). They were approximately equally distributed among the medical specialties, ranging from 13% to 17%, with the exception of anaesthesiology, which made 7% of the study population. The bulk of the study participants worked in major specialist hospitals (60%), whereas some worked in state hospitals (25%) and others in university hospitals (15%). The mean working duration for study participants was 17.7 ± 13.9 months. The characteristics of study participants are outlined in Table 1.

Table 1: Characteristics of study participants (n=1,119)

Variable	Mean ± S.D. or n (%)
Age (years)	27.1 ± 1.8
Gender	
Male	389 (34.8%)
Female	728 (65.2%)
Ethnicity	
Malay	739 (66.5%)
Chinese	171 (15.4%)
Indian	184 (16.5%)
Others	18 (1.6%)
Academic graduation by region	
Local	569 (52.4%)
Western Europe	67 (6.2%)
Eastern Europe	110 (10.1%)
Australasia	14 (1.3%)

Table 1: Characteristics of study participants (n=1,119) (continued)

Variable	Mean ± S.D. or n (%)
Middle East	183 (16.9%)
East Asia	2 (0.2%)
South Asia	57 (5.2%)
Southeast Asia	84 (7.7%)
English proficiency	
Poor	5 (0.5%)
Fair	288 (26.1%)
Good	597 (54.2%)
Excellent	212 (19.2%)
Job position	
House officer	1,074 (96.0%)
Medical officer	45 (4.0%)
Duration working (months)	17.7 ± 13.9
Medical specialty	
General medicine	184 (17.2%)
General surgery	146 (13.6%)
Orthopaedics	176 (16.4%)
Paediatrics	191 (17.8%)
Obstetrics and gynaecology	156 (14.5%)
Emergency medicine	143 (13.3%)
Anaesthesiology	77 (7.2%)
Type of hospital	
State hospital	281 (25.1%)
Major specialist hospital	675 (60.3%)
University hospital	163 (14.6%)

Table 2: Factor loadings and communalities for NAQ-R

NAQ-R Item	Factor 1	Communality
Item 1	0.68	0.47
Item 2	0.78	0.60
Item 3	0.69	0.47
Item 4	0.76	0.58
Item 5	0.77	0.59
Item 6	0.82	0.67
Item 7	0.84	0.70
Item 8	0.81	0.66
Item 9	0.85	0.72
Item 10	0.85	0.72
Item 11	0.84	0.71
Item 12	0.89	0.80
Item 13	0.90	0.81
Item 14	0.88	0.78
Item 15	0.87	0.75
Item 16	0.85	0.72
Item 17	0.88	0.77
Item 18	0.83	0.69
Item 19	0.77	0.59
Item 20	0.89	0.80
Item 21	0.81	0.66
Item 22	0.83	0.69
Eigenvalues	15.0	
Total variance explained (%)	68.0	

Note: Using polychoric factor analysis with varimax rotation

Exploratory factor analysis

Data from all study participants (n=1,119) were included in the EFA. PARA, scree test and Kaiser's criterion suggested that two factors should be derived from the 22 items. However, two of the items cross-loaded onto both factors. In addition, the interpretation of the factors did not correlate with the factors in the original instrument. MAP suggested that three factors should be derived from the 22 items. Again, the analysis produced a two-factor solution with two items that cross-loaded onto both factors and interpretation of the factors did not correlate with the factors in the original instrument. Next, one factor was derived, which produced items with factor loadings of 0.50 and above and a variance explained of 50% and above. In addition, interpretation of the factor correlated with the factor in the original instrument. Based on the observed data, a one-factor solution was derived from the 22 items. The factor was defined as 'workplace bullying'. The factor described 68.0% of the variance among the items. Factor loading of items ranged from 0.68 to 0.90. The result of exploratory factor analysis is outlined in Table 2.

Internal consistency reliability testing

Data from all study participants (n=1,119) were included in the calculation of Cronbach's alpha. The Cronbach's alpha for the NAQ-R items ranged from 0.96 to 0.97, and the Cronbach's alpha for the overall scale was 0.97 (Table 3). According to these indices, the NAQ-R items and NAQ-R overall had high internal consistency reliability.

Table 3: ICC and Cronbach's alpha for NAQ-R

NAQ-R	ICC (%)	Cronbach's α
Items		
Item 1	46.8	0.97
Item 2	65.7	0.97
Item 3	76.6	0.97
Item 4	58.8	0.97
Item 5	83.7	0.97
Item 6	78.1	0.97
Item 7	80.9	0.97
Item 8	90.2	0.97

Table 3: ICC and Cronbach's alpha for NAQ-R (continued)

NAQ-R	ICC (%)	Cronbach's α
Item 9	93.7	0.97
Item 10	79.1	0.97
Item 11	62.6	0.97
Item 12	87.2	0.97
Item 13	73.7	0.96
Item 14	67.8	0.97
Item 15	45.6	0.97
Item 16	53.9	0.97
Item 17	61.2	0.97
Item 18	79.9	0.97
Item 19	74.5	0.97
Item 20	67.5	0.97
Item 21	70.7	0.97
Item 22	77.1	0.97
Total score	93.4	
Overall Scale		0.97

Test-retest reliability testing

Data from a subset of study participants that completed the questionnaire twice at an interval of two weeks (n=50) were included in the measurement of ICC. The ICC for the NAQ-R items ranged from 45.6% to 93.7%, and the ICC for NAQ-R total score was 93.4% (Table 3). According to these indices, the NAQ-R items had fair to excellent test-retest reliability, and the NAQ-R overall had excellent test-retest reliability.

Discussion

Drawing upon the need for a valid and reliable method to examine workplace bullying, the present study aims to examine the psychometric properties (construct validity, internal consistency reliability and test-retest reliability) of the NAQ-R in a Malaysian junior doctor sample. The analyses performed indicate that the NAQ-R has satisfactory levels of validity and reliability among Malaysian junior doctors.

The EFA conducted showed that a one-factor solution of the NAQ-R was the most adequate, accounting for a large percentage of the total variance. This is consistent with the interpretation of the factors of NAQ-R, as Einarsen et al. (2) reported that the NAQ-R may be used as a single factor measure. In relation to previous research, validation study of the NAQ-R conducted among other study population described mixed findings. Similarly, to our findings, Tsuno et al. (39) and Aydin and Öcel (40) examined the construct validity of the NAQ-R among a Japanese and Turkish sample respectively and concluded that a one-factor structure fitted their data better, as it explained most of the variance among their study population. On the other hand, Silva et al. (41), Jiménez et al. (42), Giorgi et al. (43), and Makarem et al. (14) conducted factor analysis of NAQ-R data collected from a Brazilian, Spanish, Italian, and Lebanese sample respectively and reported the emergence of a two-factor solution denoting "person-related bullying" and "work-related bullying". Alternatively, Gupta et al. (13), Takaki et al. (44) and López et al (45) reported that a three-factor model resulted from their analysis of NAQ-R data collected from an Indian, Japanese and Spanish sample respectively. Despite these disparities, as the one-factor solution found in this study was able to explain 68% of the variance among Malaysian junior doctors, workplace bullying can be thought of as a composite variable and measured as such within the Malaysian healthcare setting.

Reliability indices also indicate that the NAQ-R has high internal consistency reliability and excellent test retest reliability among Malaysian junior doctors. Cronbach's alpha coefficient for NAQ-R items and overall scale were high, i.e. 0.96 to 0.97 and 0.97 respectively. This is consistent with the findings of Tsuno et al. (39), Jiménez et al. (42), Makarem et al. (14), Gupta et al. (13) and Takaki et al. (44), and is compatible with the original NAQ-R scale (2). In relation to test retest reliability, the findings of Aydin and Öcel (40) and Yang and Zhou (46) also indicate the NAQ-R to have excellent test retest reliability among Turkish and Chinese sample, with retest correlation coefficient of 0.80 and 0.88 respectively. Such findings provide support for NAQ-R as a reliable measure for workplace bullying among Malaysian junior doctors.

To summarise, the NAQ-R is shown to have adequate psychometric properties, and can be considered a sound measure to assess workplace bullying among Malaysian junior doctors. However, limitations of the present study should be pointed out. Given that our data was drawn from a particular occupational group, the findings should be generalized to other occupational groups with caution. It may be necessary for future validation study among Malaysian workers to extend the sample to include other groups and occupations in order to confirm the scale structure. Despite this, previous research has reported observing only minor differences in responses to NAQ-R among various different occupational groups (47). Thus, the NAQ-R may be able to provide accurate assessments for all Malaysian workers with reasonable certainty.

Conclusion

Workplace bullying is ranked on the top among all forms of stressors present at work (10, 48), and is suggested to be three times more prevalent than sexual harassment (49). Given this, identifying a suitable instrument to measure this phenomenon and providing accurate estimates would be fundamental in understanding its nature, preponderance, and associated factors. This ultimately enables a greater appreciation of workplace bullying and facilitates the development and implementation of effective intervention strategies to prevent and manage bullying at work. The present study provides evidence that the NAQ-R may

accurately and reliably measure workplace bullying among Malaysian junior doctors. Considering the gravity of this occupational hazard and its implication on junior doctors' medical training and ability to provide safe patient care, it is important that we identify it to begin immediate actions towards reducing junior doctors' exposure to such undesirable behaviours.

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Competing interests

The authors declare no competing interests.

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