Sensitivity and Specificity of a Short Scale for Assessing Psychological Violence in Peruvian Health Professionals

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Research note

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Abstract

Objective:

Psychological violence at work is becoming more acute in the health sector due to the precariousness of psychosocial work conditions at a global scale. To date, there have been no psychometric studies to classify this situation. The objective of the study was to determine the sensitivity and specificity of the psychological violence scale in health professionals (PVS-Health) among the Peruvian population.

Results: The study included 188 professionals from ten care centres in Peru. Two groups of 94 subjects were formed: subjects who had experienced psychological violence at work (PVW) and subjects who had not experienced. The average age was 36.8 ± 10.5 years; 59% of the sample were women. The subjects' work experience ranged between 1 to 35 years. The analysis based on the receiver operating characteristic (ROC) curve concludes significantly: a) area under the curve, AUC $\times 0.974$; standard error, SE $\times 0.10$; $p < 0.0003$ (95% CI – 0.954 – 0.994), showing adequate randomness; b) cut-off point for maximum sensitivity (S $\times 0.94$) and specificity (E $\times 0.89$) was 35 out of 73 as the maximum score; and c) PVS-Health effectively distinguish subjects with PVW from those without PVW (89% with PVW, 94% of those without).

Introduction

Psychological violence at work (PVW) is an intentional action through which workers are verbally attacked, threatened, and/or humiliated during their professional practice [1, 2]; PVW does not include external violence [3]. PVW is exacerbated in the health sector due to precarious work conditions, which are common psychosocial risk factors [4–6], and there are no differences in PVW between developed and underdeveloped countries or between different groups of health professionals [7–10]; however, at the individual level, the effects of PVW may vary based on individual resilience [6, 11].

At the global level, there are a large variety of instruments to assess and monitor the prevalence of PVW and its impact [3, 10]. In Peru, PVW studies conducted by internal agents (i.e., superiors or colleagues) related to interpersonal conflicts or motivational demands are scarce for health professionals [9, 12]. This scarcity is due, at least in part, to the fact that some analysis tools (e.g., structured instruments or the Aggressive Behaviour Scale [10, 13, 14]) have been validated for Spain, Mexico, Colombia, Ecuador, Chile, and Bolivia but not for the Peruvian population.

In three different Latin American countries, diagnostic scales have been established to validate instruments that measure violence (including external violence) and psychological harassment in service providers and industry, commerce, and education workers [15, 16]. A convergent validation was also carried out on the 12-item General Health Questionnaire, but the sensitivity and specificity of the diagnostic scales used were not established.

The instruments used in Peru to assess PVW at different levels of health care are limited because they do not assess utility or classification, which hinders the achievement of optimal standards for psychological tests [17, 18].

These limitations lead to the necessity of an instrument that exhibits utility, good discriminatory capability, and randomness to classify workers exposed to PVW [19]. In addition, it is necessary to standardize criteria for the interpretation of results to identify, evaluate, and compare the prevalence of PVW; determine corrective actions; and establish baselines for mental health at work. The lack of tools with baseline references and discriminatory capability makes standardized evaluations of PVW difficult.

This report is complementary to the psychological violence scale in health professionals (PVS- Health) instrument, a brief scale to assess psychological violence in health professionals and allows a determination of the best cut-off point of the instrument to classify individuals who have and have not experienced psychological violence. Our objective is to determine the sensitivity and specificity properties of the Peruvian version of the PVS - Health instrument.

Methods

From a population of 263 health professionals who agreed to participate in the study, a total of 75 professionals were excluded due to their omission of answers in two instruments. A total of 188 health professionals from 10 health centres in different Peruvian cities were finally included in this study, 94 of whom had experienced psychological violence at work (PVW) and 94 of whom had not (NPVW); 59% of the total sample were women (Table 1).

The participants' average age was 36.8 ± 10.5 years, and their work experience ranged from 1–35 years. The predominant occupational group was care providers (80.3% of the total sample), who mainly worked in emergency services (18.6% of the total).

The study design was cross-sectional and was based on surveys conducted at two stages: a) first, a classification of groups with and without PVW and assess their job satisfaction (JS) using the Overall Job Satisfaction scale (OJS), which was applied as an external criterion; b) second, an evaluation of the sensitivity and specificity of the PVS-Health in both groups.

In terms of the sample size and sampling method, the surveys were conducted with the entire target population between November 2019 and February 2020, with a health care professional being responsible for the survey administration in each health care centre. To be eligible, the participants had to have completed all the answers on both evaluation scales (the PVS-Health and OJS), which took a maximum of nine minutes.

Instruments

PVS-Health (a brief scale to assess psychological violence in health professionals)

The PVS-Health

For this study, a scale was developed consisting of 22 items referring to four types of violence in the Peruvian health context (loss of prestige, isolation, repression, and intimidation). Each item corresponds to a 4-point Likert-type scale (ranging from 1, "never", to 4, "always") (See Additional file 1). The scale exhibited good reliability and validity in a population of 316 health care professionals, showing the following properties:

- a) Good content validity, which was evaluated by five experts (doctors, nurses, and teaching psychologists), with a Kendall rank coefficient exceeding the minimum values ($W = 0.509$; $p < 0.026$) [20];
- b) Appropriate construct validity, as shown by the clustering of elements that explained up to 67.4% of the total variance and exceeded the minimum value (40%) [21], confirmatory factors that indicated a need for moderate adjustment ; a root mean square error of approximation and standardized residual of the root mean square that were both over the acceptability limit; acceptable Tucker-Lewis and comparative fit indices (0.60), and the good convergent validity of the PVS-Health with the OJS = ($r = -0.769$; $p < 0.0003$);
- c) Good internal consistency reliability, with a global Cronbach's alpha coefficient of $\alpha = 0.842$ and an item coefficient of $\alpha = 0.841$ (the acceptable values were $\alpha = 0.70-0.80$) [18];
- d) PVS-Health indices based on percentiles indicating the grouping of the frequency and intensity of PVW into three levels (with low PVW ranging from 22 to 34 points).

Overall job satisfaction scale

This scale consists of 15 items grouped into two subscales: a) intrinsic satisfaction, linked to factors related to the content of tasks, i.e., recognition, responsibility, and promotion (7 items), and b) extrinsic satisfaction, related to satisfaction within the organization, i.e., schedules, wages and physical work conditions (8 items). Each item corresponds to a 7-point Likert-type scale (where 1 is "very dissatisfied" and 7 is "very satisfied"). The scale exhibited good reliability and validity with 518 Spanish nurses [14]; the global reliability was $\alpha = 0.75$. This construct reflects experiences and emotional responses at work [15].

Procedure

The study subjects were informed about the objectives of the research, and their voluntary participation was recorded through a letter of consent in which the participants' anonymity and the confidentiality of

the data were guaranteed. The simultaneous collection of data was carried out by organizational psychologists and health professionals.

Statistic analysis

To evaluate the sensitivity and specificity of the PVS-Health instrument in groups with and without PVW, we performed a receiver operating characteristic (ROC) curve analysis; we determined the area under the curve (AUC), the standard error (SE), and the cut-off point indicating the maximum sensitivity and specificity of the instrument [22, 23]. To confirm the agreement between PVW and JS, Cohen's kappa coefficient was calculated. The data were processed in IBM © SPSS © Statistics v26.

The datasets generated and analysed during the current study are available in the [Figshare] repository, [Persistent web link to datasets], DOI [10.6084/m9.figshare.14308937.v1]

Ethics

The study was approved according to resolution 292/2018-D-FCEA of Universidad Nacional Agraria de la Selva (Peru). Informed consent was obtained from all study participants respecting their privacy and free will.

Results

Sensitivity and specificity

The results showed a statistically significant ROC curve, with an AUC = 0.899 (which is higher than the suggested minimum value AUC = 0.70) [22, 23] and an SE = 0.02, for $p < 0.01$ (95% CI = 0.855–0.942); these values demonstrated that individuals can be randomly identified using the PVS-Health scale. The scale exhibited a good ability to discriminate between those with and without PVW: detecting 89% of those with PVW versus 94% of those without (Fig. 1). The cut-off point indicating maximum sensitivity ($S = 0.94$) and 1 - specificity ($E = 0.89$) was 35 out of a maximum score of 73 on the scale, which reflected a good position of the predictive coordinates (ROC curve ≥ 0.80) [22]. The maximum Youden index ($J = 0.83$) indicated adequate the predictive limit and discriminative capability [23].

Job satisfaction as an external criterion

The magnitude of concordance or reproducibility of JS (generated in categorical scores) regarding the PVW of the health professionals was good ($k = -0.7669$; “adequate” values are $k = 0.61–0.80$ (Table 2).

Although the normal distribution of scalar scores was limited, the degree of nonparametric negative correlation between PVW and JS was high ($\rho = -0.850$; $p < 0.0001$), which confirms that when the PVW

levels increase, the perception of JS decreases, and vice versa. Up to 81.7% of the changes in JS were explained by PVW.

Discussion

This work confirms that the PVS-Health scale shows good randomness for classifying individuals with and without PVW and establishes a cut-off point for maximum sensitivity and specificity (89% and 94%, respectively). We also found that PVW explains up to 81.7% of changes in the "criterion factor" of extrinsic and intrinsic JS.

Considering the evidence gaps described above, which are related to the usefulness of the instruments for evaluating PVW in the health sector (which is an area that is as specific as it is contextual [12]), we highlight three indirectly associated topics:

- a) The PVS-Health scale, which assesses violence perpetrated by internal agents [1-3], differs from the inventory developed by Diaz et al. [16] because the cut-off scores for high violence and psychological harassment are different (45 in their inventory versus 35 in the PVS-Health) and because the inventory by Diaz et al. [16] assessed physical-verbal violence generated by both internal and external agents. In theory, these types of violence are hierarchical violence [2, 3], horizontal violence (type III), and external violence or "type II" violence [12].
- b) The results on ROC curves reported in other studies [3, 19] provide conclusive support for the PVS-Health scale because of the discriminative capability ($AUC = 0.89$ versus limit $AUC > 0.80$) [19] and because of the randomness of selection, which are adequate in both studies [3, 19].
- c) Compared to a Pakistani stress questionnaire ($AUC = 0.64$; $kappa = 0.84$ [6] versus $k = -0.766$; $AUC = 0.89$), the use of the PVS-Health scale in clinical and legal settings is stronger given the convergence of stress as an underlying factor [6]. Because decreased JS negatively affects organizational commitment [5] and increases levels of stress and exhaustion in health workers [2, 10], PVW often leads to job resignation [12].

To our knowledge, this is the first study to evaluate the practical use and prospects for using the PVS-Health instrument, which classifies PVW based on uniform criteria [3, 4] and allows the establishment of a baseline and the follow-up of responses within the framework of clinical and organizational psychology [3, 6].

Conclusion

ROC curve analysis indicates the good randomness of the PVS-Health instrument and establishes that the cut-off point for maximum sensitivity and specificity is 35 (out of a maximum score of 73). The scale can be used in different health centres in the country. The PVS-Health exhibits a good ability to

discriminate between individuals with PVW and those without PVW (detecting 89% of those with PVW and 94% of those without PVW).

Limitations

The limitations of this study are related to the heterogeneity of the distribution of scores of the variables under study; the low level of quality control in the interviewers' application of the instrument; and the heterogeneity of the sample in terms of the sample size and participants' origins, occupations, and employment status. The AUC estimation was performed with 94% of the required clinical sample size ($n = 188/200$) [12]. However, as our comparison groups had the same sample sizes, the coordinates of the determined ROC curve maintained their current positions [12, 22], which increases the usefulness of the PVS-Health scale. Future studies may address the interaction of resilience and perform stratified analysis.

Abbreviations

EPVS-Health: Scale for assessing psychological violence in healthcare

PVW: Psychological violence at work

ROC: Receiver operating characteristic

AUC: Area under the curve

SE: Standard error

S: Sensitivity

E: Specificity

JS: Job satisfaction

OJS: Overall job satisfaction scale

Declarations

Ethics approval and consent to participate

The study was approved according to resolution 292/2018-D-FCEA from Universidad Nacional Agraria de la Selva (Perú). Participants gave written informed consent respecting their identity and willingness.

Consent for publication

Not applicable

Availability of data and materials

The data set used and/or analysed during the study is available upon reasonable request to the author.

Competing interests

The author declare that they have no competing interests.

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This study was self-funded.

Authors' contributions

The author conceived the idea, conceptualized the study design, performed and reviewed the statistical analysis, and wrote the manuscript.

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Not applicable

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Tables

Due to technical limitations, tables are only available as a download in the Supplemental Files section.

Figures

Figure 1

ROC curve for psychological violence at work evaluated using the PVS-Health scale

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [Additionalfile1.PVSHealth.pdf](#)
- [Additionalfile2.Datasetonvariables.xlsx](#)
- [TABLES1edited.pdf](#)
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