Occupational health, well-being and ability to work in a sample of Portuguese Nurses

Diana Lucas[1], Hugo Senra[1,2], Vitor Rodrigues[1], Pedro Sá-Couto[1,3], Marco Ramos[4]

[1] Department of Mathematics (DMAT), University of Aveiro, Portugal.
[2] School of Health and Social Care, University of Essex, U.K.
[3] Center for Research and Development in Mathematics and Applications (CIDMA), University of Aveiro, Portugal
[4] School of Health Sciences (ESSUA), University of Aveiro, Portugal.

ABSTRACT

Background/Objective: Occupational health is a multidisciplinary activity aiming to keep people mentally and physically well and safe at work. In nurses, it has deserved a particular attention, considering the complexity and demanding nature of the job. The current study aims to investigate the association between psychosocial variables, including coping with work (BriefCOPE) and psychosocial factors of work (COPSOQ-II), and ability to work (WAI) among Portuguese nurses.

Methods: An observational cross-sectional study with 111 Portuguese nurses was conducted and the outcome measures include socio-demographical variables, COPSOQ, BriefCOPE and WAI. To study the variables presented in the original database, a sociodemographic characterization was performed, followed by an exploratory factor analysis (EFA) to the COPSOQ and BriefCOPE dimensions. To quantify, test and confirm the results obtained in the previous analyses, a confirmatory factor analysis (CFA) was performed.

Results: Key coping dimensions were closely associated with better ability to work among nurses, particularly the use of instrumental support, planning, quantitative demands, and emotional demands. The EFA for BriefCOPE suggested a 5-factor structure, which is a slightly different factor structure for the corresponding 3 theoretical dimensions, and the CFA results show that the model is not fit to the data. Regarding the COPSOQ-II scale, the EFA suggested the same 8-factor structure of the original scale's theoretical model. For this scale, most of values obtained in CFA are consistent with the cut-off values, so a fit of the model to the data is possible.

Conclusions: The current study focus on potential factors playing a role in key well-being and coping with work outcomes on the psychosocial characterization of Portuguese nurses.

Introduction

Occupational health is a multidisciplinary activity aiming to keep people mentally and physically well and safe at work. Occupational health in nurses has deserved particular attention, considering the complexity and demanding nature of the job [1-4]. These studies have addressed issues related to professionals' coping styles and well-being at work [3,4]. Key outcome measures in occupational health nursing include the Copenhagen Psychosocial Questionnaire (COPSOQ), which assessed the psychosocial factors in relation to work and work conditions; the Coping Orientation to Problems Experienced Inventory (BriefCOPE), which is a measure of coping styles; and the Work Ability Index (WAI), measuring the ability to work.

In general, studies have found good levels of work ability among nurses, based on the WAI instrument [5-8], which is in contrast with other negative outcomes found in this professional group, particularly the high prevalence of burnout and occupational stress, and poor to moderate job satisfaction [9-11]. Studies using the COPSOQ measure in nurses have highlighted different work issues, particularly intense burden related to nursing care, high emotional and quantitative demands, need to hide emotions, work-privacy conflicts, role conflicts, quality of leadership, lack of support at work, lack of recognition, intention to leave profession, and burnout [12-16]. According to studies using the BriefCOPE in nurses, key coping strategies in relation to stress at work included active coping and planning, and positive reframing [9-11].

Based on the characterization of a Portuguese sample of nurses, and an exploratory and confirmatory factor analysis of the BriefCOPE and the COPSOQ-II dimensions, the current work aims to investigate the association between psychosocial variables, including coping with work (BriefCOPE) and psychosocial factors of work (COPSOQ-II), and ability to work (WAI) among Portuguese nurses.

Methods

Study Design and Sample

A cross-sectional observational study with 111 Portuguese nurses was carried out. Nurses were invited by email with the help of Portuguese Nurses Associations (and professional societies). All details on study protocol, including ethical approval, eligibility criteria and procedures are described in a previous publication [13].

Data Collection

The assessment was undertaken by online digital questionnaires, previously validated to the Portuguese population, including: a general socio-demographic questionnaire; the Copenhagen Psychosocial Questionnaire (COPSOQ) [17], which assessed the psychosocial factors in relation to work and work conditions; the Coping Orientation to Problems Experienced Inventory (BriefCOPE) [18], which is a measure of coping styles; and the Work Ability Index (WAI), measuring the ability to work [19].

Data Analysis

Initially, a sociodemographic characterization of the variables presented in the original database was performed. We evaluated the levels of WAI in three categories: "Poor to Moderate", "Good", and "Excellent", which showed to have an unequal distribution, with a higher number of cases classified as "Good" (N=63, 56.8%) in comparison to cases of "Poor to Moderate" or "Excellent". For several reasons, including the relatively small sample size in the WAI subgroups analyzed (Poor to Moderate=10; Good=63; Excellent=38); absence of normal distribution (Shapiro Test with $p<0.05$) for the dependent variables (WAI; COPSOQ-II and BriefCOPE dimensions) a non-parametric test (Kruskall-Wallis) was used to compare medians of WAI levels for each demographic variable. Follow-up tests (multiple comparisons among work ability levels) were performed using the Wilcoxon Rank test, with the Benjamini & Hochberg adjusted p-value. Fisher's exact test was used to compare proportions between demographic variables and WAI levels.

Sample characterization was also performed for the COPSOQ-II and BriefCOPE scales in relation to levels of WAI. For both scales, the non-parametric Kruskal-Wallis test was used due to the sample size in the levels of WAI (particularly the moderate level with N=10, very unbalanced in relation to the other levels) and because the absence of normality of distribution was verified for the variables in question, with the Shapiro test reporting a $p>0.05$.

Subsequently, an exploratory factor analysis (EFA) was performed for the BriefCOPE scale and the COPSOQ-II scale. We validated the assumptions for both scales by performing the Bartlett's test of sphericity, the Kaiser-Meyer-Olkin (KMO) test and the positive determinant of the matrix. Regarding the BriefCOPE scale, all assumptions were verified, and so the scree plot was visualized, showing that 5 factors should be extracted by the eigenvalue criterion. The principal components analysis with Oblimin factor rotation was used and only loadings above 0.40 were considered relevant [20]. Later, to compare the analysis, the procedure was repeated for 3 factors since in the original model, the author has divided the BriefCOPE scale into 3 theoretical dimensions.

Similarly, in the COPSOQ II scale, all assumptions were verified and after visualization and scree plot analysis, 8 factors were extracted by the eigenvalue criterion. The principal components analysis with Varimax factor rotation was used, considering only loadings above 0.40 as relevant [20].

Finally, a confirmatory factor analysis was performed to quantify and confirm the proposed structure of the relationships between the measures considered for the COPSOQ II and BriefCOPE scales, and also the theoretical models presented in Marco Ramos' work [13]. For the BriefCOPE scale the Maximum Likelihood (ML) estimator was used for the theoretical model and the WLS estimator was used for the best model, while for the COPSOQ II scale the WLSM estimator was used since it seemed the most appropriate, however the sample size is too small to guarantee reliable results [12,13]

Results

Characterization of Study Sample

Table 1 presents a sociodemographic characterization of our study sample. This was composed only of nurses, most of whom were female (64.9%), married (76.6%) and graduated (71.2%). The mean age of the sample is 45.08 ± 11.34 years, and the mean of work years is 20.34 ± 11.55 years.

The scores for each instrument's dimension (COPSOQ-II; BriefCOPE) in relation to ability to work scores (WAI) is described in supplementary Tables A and B. The Kruskal-Wallis test (Table A – supplementary materials) suggested significant greater scores on BriefCOPE's dimensions Planning ($\chi^2(2) = 6.36$, $p = 0.04$) and Use of instrumental support ($\chi^2(2) = 8.86$, $p = 0.01$), in nurses with better ability to work (WAI good or excellent).

Table 1 - Characterization of study sample

Categorical variables	Total (%)	Work Ability Index			Statistical tests
		Poor/Mod (n=10)	Good (n=63)	Excellent(N=38)	
			Frequency		Fisher's Exact test
Sex					
Female	72 (64.9)	6 (60%)	45 (71.4%)	21 (55.2%)	p = 0.26
Male	39 (35.1)	4 (40%)	18 (28.5%)	17 (44.7%)	
Age					
18-35	34 (30.6)	7 (70%)	17 (27%)	10 (26.3%)	
36-55	58 (52.3)	2 (20%)	36 (57.1%)	20 (52:6%)	p = 0.10
56-90	19 (17.1)	1 (10%)	10 (15.9%)	8 (21.1%)	
Years working					
0-10	28 (25.2)	5 (50%)	13 (20.6%)	10 (26.3%)	
11-20	25 (22.5)	2 (20%)	17 (27%)	6 (15.8%)	p = 0.26
>20	58 (52.3)	3 (30%)	33 (53.4%)	22 (57.9%)	
Civil status					
Single/Wid/Sep/Div	20 (18.0)	3 (30%)	11 (17.5%)	6 (15.8%)	p = 0.56
Married/Union	91 (82.0)	7 (70%)	52 (82.5%)	32 (84.2%)	
Educational level					
Up to BSc	79 (71.2)	8 (80%)	45 (71.4%)	26 (68.4%)	p = 0.81
MSc and above	32 (28.8)	2 (20%)	18 (28.6%)	12 (31.6%)	
Continuous variables	**Median [P25%, P50%, P75%]**				**Kruskal Walli's test**
Age	[35, 47, 55]	[30, 34, 49]	[35, 46, 54]	[36, 51.5, 55]	$\chi^2(2) = 3.3$ $p = 0.19$
Years of experience	[10.5, 21, 30]	[5.5, 10.5, 25]	[11.5, 21, 29.5]	[10, 25.5, 30]	$\chi^2(2) = 2.4$ $p = 0.29$

Regarding the COPSOQ-II scale, Kruskal-Wallis test (Table B – supplementary materials) suggested statistically greater scores on dimensions Quantitative requirements ($\chi^2(2) = 10.14$, $p = 0.006$), and Emotional requirements ($\chi^2(2) = 6.54$, $p = 0.04$), in nurses with better ability to work (WAI scores good or excellent). Significantly lower scores on COPSOQ-II dimensions Influence at work ($\chi^2(2) = 7.07$, $p = 0.03$), Work meaning ($\chi^2(2) = 10.41$, $p = 0.005$), Rewards (acknowledgement) ($\chi^2(2) = 9.28$, $p = 0.009$), Role clarity ($\chi^2(2) = 17.16$, $p < 0.001$), Work satisfaction ($\chi^2(2) = 19.12$, $p < 0.0001$), Self-efficacy ($\chi^2(2) = 9.72$, $p = 0.007$), and General health ($\chi^2(2) = 25.51$, $p < 0.0001$) were found in nurses with poorer ability to work (WAI poor or moderate).

Factor Analysis

For the exploratory factor analysis, the 8-factor analysis was computed for COPSOQ-II, which can be compared against the the original 8-factor theoretical model. The results are presented in Table 2 (reporting only loadings above 0.40 as appropriate) and suggest the same 8-factor structure included in the original scale's model.

During the EFA of the COPSOQ II scale, outliers (>2 sd) were identified and removed, in order to meet the assumption of multivariate normality. Following this, EFA analyses were performed with 8 and 9 factors, since PC9 had an eigenvalue of 0.99. As the 9-factor extraction did not prove to be an adequate model for our data, the 8-factor extraction was regarded to be the most suitable approach. Some components showed variations in the associated items and, therefore, other methods and rotations were performed to obtain the best possible model, namely, the Maximum Likelihood Method, the Least Residuals Method, and the Weighted Least Squares Method. These, even with applied rotations, demonstrated an even less adequate model than the model with Varimax rotation. Based on this information, we chose the 8-factor extraction model with Varimax rotation, since it showed the best results.

In the EFA of the BriefCOPE scale, different analyses were performed, considering 4 and 5 factors, since the PC5 had an eigenvalue of 1.09 and could lead to doubt in his inclusion. The first analyses with 4 factors showed not to be completely adequate to the data, and therefore, the 5-factor analyses were prioritized in contrast to the 3-factor theoretical model. It is worth mentioning that components 1 and 2 were a mixture of items belonging to the dimensions "Problem-focused strategies" and "Emotion-focused strategies", which belong to the more general Adaptive Coping dimension.

The results obtained in the confirmatory factor analysis for the BriefCOPE scale show that the model can be possibly fit to the data, since most of the values are in accordance with the cut-off values [12], namely, the chi-square p-value, the Root mean square error of approximation (RMSEA) and its 90% CI, the Comparative fit index (CFI) and the Tucker-Lewis index (TLI), as we can see from Table 4. The best model showed better results in comparison with the theoretical model.

In contrast, in the COPSOQ II scale, even though the best model showed slightly better results than the theoretical model, most of the values obtained for both models are not consistent with the cut-off values, which shows that they are not fit for the data. These results may be explained by the small sample size.

Table 2 - Exploratory factor analysis results for COPSOQ II with Varimax rotation

Dimensions	Cronbach's Alpha	Best Model								Theoretical Model							
		Extracted Factors								Extracted Factors							
		F1	F7	F3	F8	F5	F4	F2	F6	F1	F7	F3	F8	F5	F4	F2	F6
Dimension 1	0.64				0.77					X							
Dimension 2	0.62				0.72					X							
Dimension 3	0.61	0.53								X							
Dimension 4	0.62							0.76		X							
Dimension 5	0.60	0.61													X		
Dimension 6	0.59	0.62													X		
Dimension 7	0.60	0.81													X		
Dimension 8	0.61	0.69													X		
Dimension 9	0.60	0.51	0.60									X					
Dimension 10	0.60	0.47	0.53									X					
Dimension 11	0.60	0.54										X					
Dimension 12	0.65							0.51				X					
Dimension 13	0.61		0.85									X					
Dimension 14	0.59		0.64									X					
Dimension 15	0.59	0.40							0.47			X					
Dimension 16	0.65						0.82								X		
Dimension 17	0.61	0.58													X		
Dimension 18	0.63				0.51										X		
Dimension 19	0.64		0.60			-0.51								X			
Dimension 20	0.65					0.59								X			
Dimension 21	0.64					-0.45								X			
Dimension 22	0.60		0.60											X			
Dimension 23	0.63	0.50			-0.53												X
Dimension 24	0.63								0.84		X						
Dimension 25	0.65			0.77							X						
Dimension 26	0.64			0.75							X						
Dimension 27	0.65					0.79					X						
Dimension 28	0.65			0.60							X						
Dimension 29	0.65					0.58							X				
Eigenvalue		4.30	3.42	2.62	2.53	2.39	2.05	1.61	1.46	-	-	-	-	-	-	-	-
Explained Variance (%)		15	12	9	9	8	7	6	5	-	-	-	-	-	-	-	-
Cronbach's Alpha		0.82	0.86	0.82	0.69	0.65	0.65	0.52	0.36	-	-	-	-	-	-	-	-

COPSOQ II dimensions: D1 Quantitative demands; D2: Work pace; D3: Cognitive demands; D4: Emotional demands; D5: Influence; D6: Possibilities for development; D7: Meaning of work; D8: Commitment to the work place; D9: Predictability; D10: Rewards (recognition); D11: Role clarity; D12: Role conflicts; D13: Quality of leadership; D14: Social support from superiors; D15: Social support from colleagues; D16: Job insecurity; D17: Job satisfaction; D18: Work/family conflict; D19: Trust regarding management; D20: Mutual trust between employees; D21: Justice and respect; D22: Social inclusiveness; D23: Self-efficacy; D24: Self rate health; D25: Stress; D26: Burnout; D27: Sleeping troubles; D28: Depressive symptoms; D29: Bullying

Table 3 - Exploratory factor analysis results for BriefCOPE with Oblimin rotation

Dimensions	Cronbach's Alpha	Best Model					Theoretical Model		
		Extracted Factors					Extracted Factors		
		F1	F2	F3	F4	F5	F1	F2	F3
Dimension 1	0.62	0.62					X		
Dimension 2	0.61	0.74					X		
Dimension 3	0.61	0.73						X	
Dimension 4	0.63	0.74						X	
Dimension 5	0.61				0.80			X	
Dimension 6	0.63		0.63					X	
Dimension 7	0.61		0.76					X	
Dimension 8	0.59		0.79				X		
Dimension 9	0.63				0.50				X
Dimension 10	0.62			0.78					X
Dimension 11	0.59								X
Dimension 12	0.63		-0.43	0.49					X
Dimension 13	0.61					0.74			X
Dimension 14	0.61			0.58	-0.52				X
Eigenvalue		2.34	2.10	1.58	1.31	1.09	-	-	-
Explained Variance (%)		17	15	11	9	8	-	-	-
Cronbach's Alpha		0.71	0.65	0.39	0.23	0.61	-	-	-

BriefCOPE dimensions: D1: Active coping; D2: Planning; D3: Positive reinterpretation; D4: Acceptance; D5: Humor; D6: Religion; D7: Use of emotional support; D8: Use of instrumental support; D9: Self-distraction; D10: Denial; D11: Feeling expression; D12: Substance use; D13: Behavioral disinvestment; D14: Self-blaming

Table 4 - Confirmatory factor analysis

Statistical Parameters	χ² (p-value)	SRMR	RMSEA	CI 90% RMSEA	RMSEA (p-value)	CFI	TLI
Cut-off values	>0.05	≤ 0.08	≤ 0.08	≤ 0.08	>0.05	≥ 0.95	≥ 0.95
BriefCOPE: Theoretical model	0.000	0.116	0.092	(0.068; 0.115)	0.802	0.598	0.505
BriefCOPE: Best model	0.201	0.099	0.043	(0.000; 0.086)	0.568	0.968	0.952
COPSOQ-II: Theoretical model	0.000	0.110	0.101	(0.088; 0.115)	0.994	0.716	0.672
COPSOQ-II: Best model	0.000	0.102	0.095	(0.080; 0.108)	0.954	0.754	0.715

Discussion

The current study provides key insights on psychosocial factors of well-being at work in a sample of Portuguese nurses. The topic of research has been widely studied, although with paucity of research examining potential cultural and contextual specificities of Portuguese nurses [21-23]. Key coping dimensions were closely associated with better ability to work among nurses, particularly the use of instrumental support, planning, quantitative demands, and emotional demands. Furthermore, the current study also provides additional contributions to the construct of coping COPSOQ-II and BriefCope to the Portuguese population of nurses (EFA and CFA). Such studies are key to inform future observational and interventional studies conducted with Portuguese nurses, on what might be the best factor structure for each instrument.

The lack of similar studies on nurses (with Portuguese samples and internationally) using the same type of measures considerably limits the comparability of our study. Regarding the characterization of the sample, in all tests performed the p-value was greater than 0.05, suggesting that there were no statistically significant differences between groups of subjects (socio-demographic variables) for the levels of WAI (column "Statistical Test" of Table 1). This finding highlights a relative homogeneity within our sample and the absence of socio-demographic factors for variables of well-being and coping with work, which is not consistent with previous research suggesting greater risk of burnout among younger nurses and high vulnerability in older nurses, with social support playing a protective role for this professional group [3].

In comparison with previous studies conducted in other countries, our model showed discrepancies with prior models. This may be due to the complex nature of psychosocial risks and coping, particularly in different regions of the world that might be explained by different cultures, types of stresses, research populations, rate of stigmatization towards mental illness and social-economic status. This may also be due to the use of different versions of BriefCOPE and COPSOQ II scales and analytical methods used. An article done by Rahman [24] reports some BriefCOPE models constructed based on samples of nurses around the world, for example a 9-factor model explaining 71.2% of the total variance in Malaysia, 6-factor model in China, which explained 55.5% of total variance, a 5-factor model accounting 41.5% of the total variance in India and a 4-factor model in Uruguay. The same study [24] also constructed a 2-factor (22-items) model that explained 37.0% of the total variance, examining a sample of 423 nurses in the UAE which all show discrepancies in comparison with our 5-factor model explaining 60% of total variance.

One of the limitations of our study is our small sample size which may limit the generalizability of our results. Kaiser–Meyer–Olkin (KMO) result and the determinant calculation were performed, and a KMO value of 0.74 and a non-negative determinant value was achieved, which indicate that the sample size is adequate, but despite this, our results still have to be evaluated with caution.

Another limitation of our study is the paucity of literature investigating Portuguese nurses which would allow comparability of study results more effectively. On the other side, this scarcity also demonstrates the originality of our article for understanding the BriefCOPE and COPSOQ II scales in the context of Portuguese nurses.

Conclusion

In summary, the current study highlights key findings for the psychosocial characterization of a Portuguese sample of nurses, based on three standardized measures of well-being and coping. The scarce literature with Portuguese nurses limits the comparability of our results. Future larger-scale studies will provide a deeper psychosocial characterization of this professional group and clarify the role of psychological and socio-demographic factors for well-being at work.

References

1. Ramírez-Elvira S, Romero-Béjar JL, Suleiman-Martos N, Gómez-Urquiza JL, Monsalve-Reyes C, Cañadas-De la Fuente GA, Albendín-García L. Prevalence, Risk Factors and Burnout Levels in Intensive Care Unit Nurses: A Systematic Review and Meta-Analysis. Int J Environ Res Public Health. 2021 Oct 30;18(21):11432. https://doi.org/10.3390/ijerph182111432

2. Vargas-Martínez AM, Romero-Saldaña M, De Diego-Cordero R. Economic evaluation of workplace health promotion interventions focused on Lifestyle: Systematic review and meta-analysis. J Adv Nurs. 2021 Sep;77(9):3657-3691. https://doi.org/10.1111/jan.14857.

3. Molina-Praena J, Ramirez-Baena L, Gómez-Urquiza JL, Cañadas GR, De la Fuente EI, Cañadas-De la Fuente GA. Levels of Burnout and Risk Factors in Medical Area Nurses: A Meta-Analytic Study. Int J Environ Res Public Health. 2018 Dec 10;15(12):2800. https://doi.org/10.3390/ijerph15122800.

4. Gómez-Urquiza JL, Albendín-García L, Velando-Soriano A, Ortega-Campos E, Ramírez-Baena L, Membrive-Jiménez MJ, Suleiman-Martos N. Burnout in Palliative Care Nurses, Prevalence and Risk Factors: A Systematic Review with Meta-Analysis. Int J Environ Res Public Health. 2020 Oct 21;17(20):7672. https://doi.org/10.3390/ijerph17207672.

5. Garzaro G, Clari M, Ciocan C, Albanesi B, Guidetti G, Dimonte V, Sottimano I. Physical Health and Work Ability among Healthcare Workers. A Cross-Sectional Study. Nurs Rep. 2022 Apr 5;12(2):259-269. https://doi.org/10.3390/nursrep12020026.

6. Akodu AK, Ashalejo ZO. Work-related musculoskeletal disorders and work ability among hospital nurses. J Taibah Univ Med Sci. 2019 Mar 23;14(3):252-261. https://doi.org/10.1016/j.jtumed.2019.02.009.

7. van Dijk LM, Meulman MD, van Eikenhorst L, Merten H, Schutijser BCFM, Wagner C. Can using the functional resonance analysis method, as an intervention, improve patient safety in hospitals?: a stepped wedge design protocol. BMC Health Serv Res. 2021 Nov 13;21(1):1228. https://doi.org/10.1186/s12913-021-07244-z.

8. Danesh MK, Garosi E, Mazloumi A, Najafi S. Identifying factors influencing cardiac care nurses' work ability within the framework of the SEIPS model. Work. 2020;66(3):569-577. https://doi.org/10.3233/WOR-203199. PMID: 32623418.

9. Portero de la Cruz S, Cebrino J, Herruzo J, Vaquero-Abellán M. A Multicenter Study into Burnout, Perceived Stress, Job Satisfaction, Coping Strategies, and General Health among Emergency Department Nursing Staff. J Clin Med. 2020 Apr 2;9(4):1007. https://doi.org/10.3390/jcm9041007.

10. Cichoń J, Płaszewska-Żywko L, Kózka M. Emotional intelligence and coping strategies among intensive care unit nurses. Nurs Crit Care. 2022 Sep 1. https://doi.org/10.1111/nicc.12839.

11. Gillen P, Neill RD, Mallett J, Moriarty J, Manthorpe J, Schroder H, Currie D, McGrory S, Nicholl P, Ravalier J, McFadden P. Wellbeing and coping of UK nurses, midwives and allied health professionals during COVID-19-a cross-sectional study. PLoS One. 2022 Sep 21;17(9):e0274036. https://doi.org/10.1371/journal.pone.0274036.

12. Brown, T. A. (2015). Confirmatory factor analysis for applied research. Guilford publications.

13. Ramos, M. (2014). Coping, fatores psicossociais e capacidade para o trabalho. Tese de Doutoramento. Universidade Aveiro. http://hdl.handle.net/10773/12688.

14. Diehl E, Rieger S, Letzel S, Schablon A, Nienhaus A, Escobar Pinzon LC, Dietz P. The relationship between workload and burnout among nurses: The buffering role of personal, social and organisational resources. PLoS One. 2021 Jan 22;16(1):e0245798. https://doi.org/10.1371/journal.pone.0245798.

15. Diehl E, Rieger S, Letzel S, Schablon A, Nienhaus A, Escobar Pinzon LC, Dietz P. Burdens, resources, health and wellbeing of nurses working in general and specialised palliative care in Germany - results of a nationwide cross-sectional survey study. BMC Nurs. 2021 Sep 6;20(1):162. https://doi.org/10.1186/s12912-021-00687-z

16. Schulze S, Merz S, Thier A, Tallarek M, König F, Uhlenbrock G, Nübling M, Lincke HJ, Rapp MA, Spallek J, Holmberg C. Psychosocial burden in nurses working in nursing homes during the Covid-19 pandemic: a cross-sectional study with quantitative and qualitative data. BMC Health Serv Res. 2022 Jul 26;22(1):949. https://doi.org/10.1186/s12913-022-08333-3

17. Rosário S, Azevedo LF, Fonseca JA, Nienhaus A, Nübling M, da Costa JT. The Portuguese long version of the Copenhagen Psychosocial Questionnaire II (COPSOQ II) - a validation study. J Occup Med Toxicol. 2017 Aug 9;12:24. https://doi.org/10.1186/s12995-017-0170-9

18. Pais Ribeiro, J. L. & Rodrigues, AP (2004). Questões acerca do coping: A propósito do estudo de adaptação do Brief COPE. Psicologia, Saúde & Doenças, 5(1), 3-15.

19. Silva, C., Pereira, A., Martins Pereira, A., Amaral, V., Vasconcelos, G., Rodrigues, V., … Nossa, P. (2010). Work Ability Index in Portuguese workers: The role of demographic factors. International Journal of Behavioral Medicine, 17 (1) Abstracts book of the 11th Congress of Behavioral Medicine, Washington, DC, 220. https://doi.org/10.1007/s12529-010-9106-9

20. Hair, J.F., Black, W.C., Babin, B.J. and Anderson, R.E. (2010) Multivariate Data Analysis. 7th Edition, Pearson, New York.

21. Neves TMA, Parreira PMSD, Rodrigues VJL, Graveto JMGN. Impact of safe nurse staffing on the quality of care in Portuguese public hospitals: A cross-sectional study. J Nurs Manag. 2021;29(5):1246-1255. https://doi.org/10.1111/jonm.13263

22. Diehl E, Rieger S, Letzel S, Schablon A, Nienhaus A, Escobar Pinzon LC, Dietz P. Health and intention to leave the profession of nursing – which individual, social and organisational resources buffer the impact of quantitative demands? A cross-sectional study. BMC Palliat Care. 2020 Jun 17;19(1):83. https://doi.org/10.1186/s12904-020-00589-y

23. Kersten M, Kozak A, Wendeler D, Paderow L, Nübling M, Nienhaus A. Psychological stress and strain on employees in dialysis facilities: a cross-sectional study with the Copenhagen Psychosocial Questionnaire. J Occup Med Toxicol. 2014 Feb 5;9(1):4. https://doi.org/10.1186/1745-673-9-4

24. Abdul Rahman, H., Bani Issa, W. & Naing, L. Psychometric properties of brief-COPE inventory among nurses. BMC Nurs 20, 73 (2021). https://doi.org/10.1186/s12912-021-00592-5