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Hardy personality and associated factors in health professionals active in services that treat critical patients

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Abstract *This study aimed to identify factors associated with the hardy personality in health professionals working in hospital services that treat critically ill patients. This is an epidemiological, cross-sectional, and analytical study conducted with 469 health professionals. We used the Hardiness Scale (HS), coupled with a questionnaire to investigate sociodemographic, occupational, and health conditions. A descriptive and bivariate analysis was performed using the chi-square test and the multiple model through multiple logistic regression, using the Hosmer-Lemeshow and PseudoR² tests, estimating odds ratios. The classification of total scores in HS showed prevailing moderate hardiness (48.4%). Professionals with a fair or poor fantastic lifestyle (FL) were 74% less likely to show high hardiness than those with very good and excellent FL. Also, professionals who were not on leave, who had high satisfaction with compassion at work, low stress, and low burnout were more likely to show high hardiness. The hardy personality, directly and indirectly, influences the health and well-being of health professionals working in hospital services that treat critically ill patients.*

Key words *Psychological resilience, Health professionals, Worker's health*

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Introduction

Occupational stress is a worldwide phenomenon with a high impact on organizations, especially health services, as it compromises both the quality of life of professionals and patient care safety[1,2].

Stressful situations in hospital health professionals such as high workload, task overload, and life and death limit situations can occur over a considerable period over an individual who has no psychological condition to avoid or control them, which can result in physiological changes, emotional problems and other symptoms, developing stress[3].

On the other hand, the development of resistance and coping strategies are mechanisms to reduce or neutralize stressors among health professionals, and among the many internal human resources, resistance has been suggested as a solution to overcome various adverse situations[4].

Thus, personality features or traits have been studied to identify individuals who may be at higher risk for developing stress or are refractory. Research on hardiness stands out, and its concept was formulated in the 1970s in the U.S. It is defined by the presence of personality traits or individual characteristics that enable resistance to stressors[1]. Therefore, hardiness or hardy personality refers to a personal resource against the effects of adverse or stressful events on the health of professionals[4-6].

Thus, concepts such as rusticity, psychological resistance, resistant personality, resilience or stress resistance are used to represent the hardy personality construct, and three conceptual bases determine its essence: the model of individual differences in stress responses; Lazarus' model (1966) on stress assessment mechanisms, and the authors' contributions on the benefits of some personality dispositions in the stress process[5-7].

The hardy personality encompasses concepts in three realms: control; commitment and challenge, involving the belief that one can control or influence the events of own experience, the ability to feel fully involved or engaged in the activities of own life, and anticipating change as an exciting challenge to personal growth, respectively[8].

Factors associated with high levels of resistance are more frequent in individuals who manifest happiness, job satisfaction, life satisfaction, good physical and mental health, self-confidence, self-awareness, self-management, and motivation to improve outcomes, while those with low resistance are more susceptible to depression, anxiety and cardiovascular and neuroendocrine diseases[5,9-11].

Given this scenario and due to the importance of developing occupational resistance, the hardy personality appears as a resource that can be developed and remain reasonably stable over time. Resistance build-up training can be effective, and we have currently a massive industry built around resistance education[9-11].

It is essential to investigate the variables that influence resistance to work-related stress, as stressors have deleterious effects on the worker, and an individual's better psychological resistance can increase his/her ability to cope with work -related adversity[11,12]. Thus, this study aimed to identify factors associated with the hardy personality in health professionals working in hospital services that treat critically ill patients in Northern Minas Gerais, Brazil.

Material and methods

This is an epidemiological, cross-sectional and analytical study developed in the health services of the northern macro-region of Minas Gerais, Brazil, which consists of 86 municipalities and is a reference for a population of 1,670,268 inhabitants[13]. Health professionals (nurses, physical therapists, nutritionists, doctors, and nursing technicians) who provided direct patient care, working in sectors that serve critically ill patients were part of the research, namely: oncology, nephrology, neonatal intensive care and emergency room sectors, in the cities of Montes Claros, Pirapora, Janaúba, Brasília de Minas and Salinas.

A selection was carried out to build the sample size, which allowed the inclusion of only professionals with more than six months of work experience in the sector and who agreed to participate in the study, and excluded those who were away from work or on leave at the time of collection, besides those who refused to participate in the research and did not sign the informed consent form.

After the survey in all services that met the inclusion criteria, the total number of professionals working in such services during the data collection stood at 910 people, and a simple random sample with replacement was used to calculate the sample. The selection was by draw, using the Excel for Windows® program. A tolerable sampling error of 5%, with 95% confidence interval, 50% prevalence for the event, considering 20% of possible losses, were employed to estimate the sample size, totaling 450 individuals; thus, the

sample consisted of 469 health professionals included in the study.

Data were collected from May 2017 to April 2018. The variable hardy personality outcome was assessed by applying the Hardiness Scale (HS), which aims to assess how much hardy attitudes individuals have in coping with stressful situations. The HS has been adapted to the Brazilian Portuguese language, with satisfactory internal consistency and construct validity in the studied population, and is an open-access tool with registered intellectual property. It is a self-applicable 30-item Likert-type scale, with answers ranging from zero (not true) to three (completely true)[12].

The result is achieved by adding up the items, and scores of questions 3, 4, 5, 6, 8, 13, 16, 18, 19, 20, 22, 23, 25, 28 and 30 are inverted, so that they are added up, allowing the result by the total scale composition and the three realms: Commitment (1, 6, 7, 11, 16, 17, 22, 27, 28 and 30), Control (2, 3, 8, 9, 12, 15, 18, 20, 25 and 29) and Challenge (4, 5, 10, 13, 14, 19, 21, 23, 24 and 26). The scale score can range from 0 to 90 for the total scale composition; and from 0 to 30 for the composition of the realms, where low hardiness is when the individual has a percentile < 25%; a moderate hardiness is when the percentile is between 25% and 75%, and high hardiness when the percentile > 75%[14].

Self-administered questionnaires were used to identify factors associated with hardiness, which were given to participants and later collected by properly trained researchers. The instruments consisted of questions related to sociodemographic characteristics; workplace; behavioral (Fantastic Lifestyle (FL)); physical health and mental health-related, through the Job Stress Scale (JSS); Maslach Burnout Inventory-Human Services Survey (MBI-HSS); Beck Anxiety Inventory (BAI); Beck Depression Inventory (BDI), Professional Quality of Life (ProQOL), and Beck Hopelessness Scale (BHS)[15-20].

Data were tabulated using the Statistical Package Social Science (SPSS) software, version 20.0. Data were analyzed by descriptive analysis of all variables through their absolute (n) and relative (%) frequency distribution. In the bivariate analysis, the chi-square test was applied to verify the association between the dependent variable and the independent variables at the level of $p < 0.20$. Variables with $p < 0.20$ were selected for the multiple model, adopting a logistic regression model. The quality of the model fit was analyzed by the Hosmer-Lemeshow and PseudoR² tests, estimating odds ratios, with their respective 95% confidence intervals (95% CI). In this multiple stage, the variables with $p \leq 0.05$ were kept in the final model.

The study complied with the ethical principles proposed in resolution 466/12 and was approved by the Research Ethics Committee of the State University of Montes Claros – Unimontes.

Results

In total, 469 health professionals participated in this study. In the univariate descriptive analysis, we observed that, among the *sociodemographic data*, 65.7% of the participants were female, aged 30-39 years (48.8%), married or in common-law marriage (61.8%); with children (64.4%); 69.1% were Catholics, and 40.9% had an income of 3 to 6 minimum wages.

Regarding *work characteristics,* 31.6% worked in the nephrology sector, and 31.6% in the emergency room; 52.7% worked a 12-hour shift scale, with 36 hours of rest, and 73.1% had a weekly workload of 41-80 hours; 54.2% worked in the day shift, with a length of service in the area of 10-15 years (34.3%); with a length of service in the sector greater than or equal to 5 years (53.1%); and 63.1% worked in only one job. Most of the participants had a work contract/consolidated labor laws contract (67.0%). Concerning the profession, 66.3% were nursing technicians, 15.6% nurses, 8.1% doctors, and 10% other professionals.

Regarding *mental and physical health,* 89.3% of professionals had no anxiety, 97.2% had absent/mild depression and moderate/mild hopelessness, and 95.9% had low/medium depression, 51.8% reported high satisfaction with compassion; 63.3% had secondary traumatic stress, and 73.3% had low burnout scores. Concerning physical appearance, they were very satisfied (59.7%), and most of the respondents considered their health status to be good (64.1%), besides mentioning not being on sleep-inducing or continuous use medication (81.4%), and also showed medium levels of stress at work (48.8%).

Regarding behavior, FL was very good for 52.2% of professionals; 64.6% were not physically active (< 3 times/week), 57.6% reported a balanced diet, 70.6% considered themselves as being overweight, 97.4% non-smokers, none reported alcohol use and 55.9% said they had a good sleep.

Concerning the classification of total HS scores, 27.29% of health professionals surveyed had

high hardiness, 48.4% moderate, and 24.3% low. In Tables 1, 2 and 3, bivariate analysis was performed to verify the association of the hardiness outcome variable with the independent variables.

The following variables showed significance with the hardiness outcome: children ($p = 0.050$), weekly workload of 41 to 80 hours ($p = 0.006$), not taking leave/absence ($p < 0.001$), very good / excellent fantastic lifestyle ($p < 0.001$), active physical activity ($p = 0.016$), balanced diet ($p < 0.001$), good sleep ($p < 0.001$), mild/absent anxiety ($p < 0.001$), mild/absent depression ($p < 0.001$), mild/absent hopelessness ($p < 0.001$), low/medium satisfaction with compassion ($p < 0.001$), burnout ($p < 0.001$), stress ($p < 0.001$), excellent/good self-perceived health ($p < 0.001$), not using sleep-inducing medication ($p < 0.001$), no autoimmune ($p = 0.031$), sexual and reproductive ($p < 0.001$), mental ($p < 0.001$), and blood ($p = 0.074$) problems, and eating disorders ($p = 0.035$).

After adjustment, the multiple analysis in Table 4 showed the significance of five variables: fantastic lifestyle, leave/absence from work, satisfaction with compassion, stress at work, and burnout. Health professionals who had fair or poor FL were 74% less likely to show high hardiness compared to those who have very good/excellent FL. Professionals who have not been on leave are 3.32 times more likely to show high hardiness than those who have a history of leave.

Health professionals who were highly satisfied with compassion at work were 2.32 times more likely to have high hardiness. Professionals who had low stress at work were 2.52 times more likely to have high hardiness than those who had high stress. Health professionals who had low burnout were 3.06 times more likely to have high hardiness than those who had high chronic exhaustion due to work.

Discussion

The results of this study showed an association between hardy personality and certain factors such as sociodemographic, work environment, behavioral, mental health, and physical health factors.

The hardy personality plays a clear and relevant role in reducing vulnerability to stress and is, therefore, a protective factor for worker's health, as it allows to improve performance and promote a less stressful lifestyle[21].

In this study, we found that most health professionals had moderate/low total hardiness scores. Similar data were found in a study conducted in a hospital in Morocco in 2018, showing a relatively low rate of resistance of health staff, with 81% of professionals having low resistance, 16% moderate resistance and only 3% good resistance[22].

The statistically significant association between hardiness and sociodemographic characteristics in the psychological resistance of health professionals can be found in other studies. Gender, marital status, length of service, and working hours were identified as risk factors. Women are more resilient than men, single individuals are more vulnerable than married ones, and workers with shorter length of service are less resilient than older ones[22]. However, in this study, only the variable children ($p = 0.050$) was associated with the high hardiness outcome. Importantly, conducting studies on the relationship between sociodemographic variables, job stress factors and resistant personality are still rare[23,24].

Considering the factors related to the work environment, we observed a significant association of high hardiness with the variables weekly workload of 41-80 hours and not taking leave/absence. The workload is a critical factor for stress resistance since health professionals with extensive workloads had developed low stress resistance, while professionals who worked with a mean weekly workload of 40 hours showed higher resistance, which was considered a protective factor[22].

Thus, the studies describe and reinforce the psychological damage that the shift hours and excessively long hours can bring to health professionals, especially those who treat critically ill patients, because work overload has been mentioned in the literature as one of the primary stress sources[25].

Research has shown that longer-term professionals evidence a relationship with high hardiness, as they have developed coping strategies that allow them to deal with job-derived stressful situations[26,27].

The path of transformation for coping-resistant individuals involves wanting to change stressful life events or thinking about them optimistically. Another complementary action is the improvement of personal health practices as a consequence of their beliefs about their health behaviors[28].

In this study, we could verify an association between high hardiness and professionals who had a very good/excellent Fantastic Lifestyle. Corroborating these findings, studies state that, in general, resistance tends to be associated with better health-related behaviors, such as maintai-

Table 1. Association of hardy personality classification of health professionals working in hospital services that treat critically ill patients in Northern Minas Gerais, Brazil, with the sociodemographic variables, 2018 (n = 469).

Variable	Classification of hardiness at work			p-value
	High%	Medium%	Low%	
Gender				
Female	28.2	47.1	24.7	0.714
Male	25.5	50.9	23.6	
Age group (years)				
20-29	25.0	44.8	30.2	
30-39	28.8	50.2	21.0	0.718
40-49	26.7	47.7	25.6	
≥ 50	26.7	50.0	23.7	
Marital status				
With partner	29.0	49.0	22.1	0.302
Without partner	24.6	47.5	27.9	
Religion				
None	14.3	47.6	38.1	
Catholic	27.2	50.3	22.5	0.619
Evangelical	29.4	43.1	27.5	
Other	33.3	46.7	20.0	
Household income (in minimum wages)				
≤ 3	30.1	47.7	22.2	
3-6	27.6	45.8	26.6	0.90
6-9	21.3	59.0	19.7	
> 9	25.4	47.6	27.0	
Children				
Yes	27.5	51.7	20.9	0.050
No	26.9	42.5	30.5	

ning a healthy regular exercise regime, adequate nutritional intake, and a balanced approach to work and life[29-31].

It is noteworthy that the hardy personality is pointed out in the adaptation or adjustment of diseases, indicating a strong association between illness and psychological resistance. Among the physical variables analyzed, the absence of autoimmune, sexual and reproductive, mental, and blood problems, and eating disorders showed a statistical association. However, the significance of the association was not confirmed after adjustment in the multiple model. Similar results were also found in another study, in which physical problems lost their significance[22].

Nevertheless, resistance is considered by most researchers as a relevant construct for the study of health, and there is a consensus on the protective effects of resistance on physical health. Brooks[32] presented a comprehensive review of such studies and results. However, the way it exerts this influence has not yet been sufficiently established.

Concerning mental health, an association was found between hardy personality with mild/absent levels of anxiety, depression, hopelessness, satisfaction with compassion, burnout, stress, and self-perceived excellent/good health.

Several studies negatively correlate psychosomatic symptoms with psychological resistance realms. Outcomes indicate that resistance can serve as a buffer against stress and is a protective factor. In another study, the results link hardiness to mental and physical health, and further suggest that mental health connotes a pathway through which hardiness influences physical health[33,34].

Research conducted with students in technical nursing courses found a low-intensity, statistically significant negative correlation between BDI versus Commitment, Control, and Challenge, which allows inferring that students

Table 2. Association of hardy personality classification of health professionals working in hospital services that treat critically ill patients in Northern Minas Gerais, Brazil, with variables physical and mental health, 2018 (n = 469).

Variable	Classification of hardiness at work			p-value
	High	Medium	Low	
Health problems (physical)				
Heart				
No	126	214	109	0.175
Yes	2	13	5	
Blood				
No	125	216	104	0.074
Yes	13	11	10	
Autoimmune				
No	114	198	89	0.031
Yes	14	29	25	
Endocrine				
No	118	214	105	0.660
Yes	10	13	9	
Bone				
No	109	181	90	0.370
Yes	19	46	24	
Digestive				
No	114	186	95	0.200
Yes	14	41	19	
Renal/Urinary				
No	116	212	105	0.639
Yes	12	15	9	
Hepatic				
No	126	221	110	0.629
Yes	2	6	4	
Respiratory				
No	124	218	106	0.300
Yes	4	9	8	
Reproductive/Sexual				
No	119	208	89	< 0.001
Yes	9	19	25	
Mental				
No	120	190	77	< 0.001
Yes	8	37	37	
Eating Disorders				
No	128	221	108	0.035
Yes	0	6	6	
Eye/Visual				
No	96	164	78	0.521
Yes	32	63	36	
Neurological				
No	119	204	100	0.381
Yes	9	23	14	
Hearing				
No	124	211	102	0.073
Yes	4	16	12	
Malignant tumors				
No	127	226	113	0.868
Yes	1	1	1	
Acute pain				
No	117	204	102	0.858
Yes	11	23	12	
Chronic pain				
No	120	208	104	0.716
Yes	8	19	10	
Health problems (mental)				
Anxiety				
Absent/Mild	122	210	87	< 0.001
Moderate/Severe	6	17	27	
Depression				
Absent/Mild	128	223	99	< 0.001
Moderate/Severe	0	4	15	
Hopelessness				
Absent/Mild	128	223	105	< 0.001
Moderate/Severe	0	4	9	
Satisfaction with compassion				
Low/Medium	35	122	66	< 0.001
High	93	105	28	
Physical appearance				
Very satisfied/ Satisfied	79	142	59	
Indifferent	7	23	14	0.142
Dissatisfied/Very dissatisfied	42	62	41	
Use of psychotropic drugs				
Never	120	182	80	< 0.001
Yes	11	27	12	
Self-perceived health				
Excellent/Good	112	187	76	< 0.001
Fair/Poor/Very poor	16	40	38	
Secondary traumatic stress				
Low	107	137	39	< 0.001
Medium/ High	21	90	75	
Burnout				
Low	120	180	44	< 0.001
Medium	8	47	70	

it continues

Table 3. Association of hardy personality classification of health professionals working in hospital services that treat critically ill patients in Northern Minas Gerais, Brazil, with variables related to workplace and behavior, 2018 (n = 469).

Variable	Classification of hardiness at work			p-value
	High	Medium	Low	
Work Environment				
Sector				
Emergency room	43	78	27	
Nephrology	40	70	38	0.370
Oncology	27	46	34	
NICU	18	33	15	
Workload				
Less than 40	20	49	37	
41-80	106	164	72	0.006
> 80	2	13	5	
Work shift				
Day	67	123	64	0.712
Night	38	57	25	
Day/Night	23	47	25	
Length of service in the health area (years)				
< 5	27	45	26	
5-10	38	73	39	
10-15	33	55	26	0.975
15-20	14	30	11	
Length of service in the sector (years)				
< 5	77	118	54	
5-10	29	66	41	0.206
> 10	22	43	19	
Multiple professional relationships				
One job only	87	138	71	
Two jobs	35	71	36	0.638
Three or more jobs	6	18	7	
Leaves/Absence from work				
No	123	205	92	< 0.001
Yes	5	22	22	
Behavioral characteristics				
Fantastic lifestyle				
Fair/Must improve	2	11	18	
Good	10	61	53	
Very good/Excellent	116	155	43	< 0.001
Tobacco use				
No	128	219	110	0.099
Yes	0	8	4	
Bom padrão de sono				
Não	36	101	70	
Sim	92	126	24	< 0,001
Prática de atividade física				
Não	75	142	86	0,016
Sim	53	85	28	
Alimentação balanceada				
Não	42	93	64	
Sim	86	134	50	
Ideal weight				
No	88	165	78	0.623
Yes	40	62	36	

Table 4. Logistic regression of the relationship between high hardiness and variables fantastic lifestyle (FL), leave/absence from work, satisfaction with compassion at work, stress at work (SW) and burnout in health professionals working in hospital services that attend critical patients in Northern Minas Gerais, Brazil, 2018 (n = 469).

Variable	Classification of high hardiness		p-value
	OR	CI	
Fantastic Lifestyle			
Very good / Excellent	1.00	(0.08 – 1.63)	
Good	0.35	(0.13 – 0.53)	0.181
Fair / Poor	0.26		< 0.001*
Leave			
Yes	1.00		
No	3.32	(1.20 – 9.16)	0.021
Satisfaction with compassion			
Low/ Medium	1.00		
High	2.32	(1.42 – 3.79)	0.001
Stress			
Medium/ High	1.00		
Low	2.52	(1.58 – 4.00)	< 0.001
Burnout			
Medium	1.00		
Low	3.06	(1.35 – 6.92)	0.007

* Values of tests: Hosmer-Lemeshow p = 0.47 and pseudo r^2 = 0.302.

with hardy characteristics do not have depressive symptoms[35].

The association between hardiness and hopelessness can be confirmed in a study conducted with Iranian nurses showing that hardiness is a protective factor against perceived stress and a facilitator for happiness in nurses. Furthermore, professionals with low stress levels were more likely to report greater endurance and happiness[36].

It is noteworthy that a study in a sample of nurses in Spain on predictive capacity of hardy personality and general self-efficacy on the perception of general health status revealed that they were statistically positively related[37]. This influence probably occurs via multiple aspects of mental health, such as subjective distress, coping/evaluation, burnout, healthy practices, and stress-related hormonal differences[34].

The multivariate analysis showed an increased likelihood of developing high hardiness among health care professionals with high satisfaction with compassion (SC) (p < 0.001, OR 2.32 [1.42-3.79]); low burnout (p < 0.0007, OR 3.03 [1.35-6.92]) and low stress at work (p < 0.001, OR 2.52 [1.58-4.00]).

Studies point to the relationship between low level of resistance and its extent with problems related to mental health and its components. Thus, hardy personality mitigates the likelihood of developing burnout. The results showed that resistance explains 35% of the variance of burnout in a sample of nurses. And, more specifically, the same research group confirmed the positive effects on increased stress resistance in the nursing staff[28-31,34].

Thus, it is clear that hardy personality has been analyzed with a strategy of strengthening other personal characteristics, such as performance, self-efficacy, sense of control and reduced stress effects, reinforcing the assertion that hardiness facilitates actions that modify interpretation of stressful circumstances, maintaining or even increasing the health of individuals in the face of stressors and their effects[38].

Given the relevance of the hardy personality to health promotion and healthy lifestyle, health services should be directed to establish programs where resistance can be developed and, consequently, reduce the likelihood of being involved with disease[4,5,9,39].

Concerning the healthcare institution, the benefits of having hardy people on staff contribute to effectiveness and efficiency, quality of services provided, lower levels of sick leave and sick leave costs, absenteeism and staff turnover[40].

Conclusion

The results of this study showed that hardy personality, directly and indirectly, influences health and well-being, promoting the use of social resources and changing self-perceived stress, thus reducing health work stress.

Mental and physical well-being were also related to the presence of resistant personality. The likelihood to have high hardiness was associated with leave/absence from work, high satisfaction with compassion at work, low stress at work, and low burnout, corroborating the findings in the literature indicating the presence of hardy personality as a protective factor for health. Moreover, studies are needed to clarify the relationship between the hardy personality and socioeconomic factors such as gender, age, income, and its influence on the genesis of physical diseases.

It is necessary and challenging to develop psychological resistance in health professionals, especially in services that treat critically ill patients to maintain and improve their ability to sustain personal and professional well-being, facilitating transformational coping in the face of continuous stress at work and adversity.

Collaborations

ECS Alves, RFS Junior, SP Santos, HA Barbosa, JDPRV Torres, and CSO Silva conceived, designed, implemented, analyzed, and interpreted the study data. KO Santos and LG Siqueira contributed to the analysis and interpretation of the data. All authors drafted and participated in the final review of the manuscript.

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