



ORIGINAL ARTICLE

**ORGANIZATIONAL CLIMATE AND CULTURE:
IMPLICATIONS FOR PRACTICE OF EXTRA-HOSPITAL NURSES****HIGHLIGHTS**

1. Organizational culture and climate play a pivotal role in healthcare.
2. Research acknowledges the need to assess their impact on organizations.
3. This paper explores the organizational climate and culture collectively.
4. Support, objectives, rules, innovation - integral to organizational climate and culture.

Márcio Daniel Dias de Almeida e Silva¹ José Fernando da Silva Monteiro Oliveira de Magalhães¹ Guilherme Eça Guimarães Gonçalves Azevedo¹ Cristina Queirós² Elisabete Borges³ **ABSTRACT**

Aim: This study aims to identify the organizational climate and culture among nurses working in Immediate Life Support Ambulances (ILSA). **Methods:** A descriptive, quantitative, and cross-sectional study was conducted with 81 Portuguese nurses working in Immediate Life Support Ambulances at the National Medical Emergency Institute (INEM). The data was analyzed using the Principal Component Analysis (PCA) method, followed by a Varimax rotation, and the models were validated using the Kaiser-Meyer-Olkin test and Bartlett's test of sphericity. **Findings:** Factorial analysis yielded four factors, namely: Support (24.5%), Objectives (13.6%), Rules (9.7%), and Innovation (8.01%), associated with organizational climate and culture. Nurses with an undergraduate degree perceived significantly more support than those with higher qualifications. Support also varied according to relationship status, revealing that married nurses had a higher perception than those cohabiting. **Conclusion:** Organizational climate and culture unequivocally contribute to developing a healthy and safe work environment and are decisive for the quality of nursing care.

Keywords: Emergency Nursing; Organizational Culture; Nursing Care; Prehospital Emergency Care; Nursing Occupational Health.

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INTRODUCTION

In Portugal, the National Medical Emergency Institute (INEM) coordinates all the integrated medical emergency systems nationwide, using diversified numbers and types of emergency vehicles with different healthcare professionals. Immediate Life Support Ambulances (ILSA) are staffed and led by nurses who provide advanced emergency care to accident and emergency victims in extra-hospital settings. With the implementation of a nursing career and the creation of a manager nursing position, it is important to investigate and critically think about organizational climate and culture, aiming to implement a continuous improvement strategy based on their dynamics and subjective nature.

In Portugal's nursing career, nurses could practice with a Bachelor's degree (3 years of technical preparation). However, after successive changes in Higher Education, nurses needed 4-year degrees to be accepted and registered in the Portuguese Order of Nurses. The sample characterization must be distinguished since both situations allow a nurse to practice. Moreover, the nursing career enables one to be a specialist nurse and a manager nurse, and Nursing schools offer Master's degrees focused on some specializations, such as Pediatrics, Mental Health, Rehabilitation, etc.

However, the relationship and impact of organizational culture and climate still need clarification¹⁻³. Thus, climate pertains to the prevailing situations, feelings, and behaviors among organizational members, while culture encompasses broader aspects such as context, history⁴, employees' feelings towards the organization, as well as involvement and commitment⁵. There is a strong variability when defining the organizational climate and culture, involving multiple subjects, contexts, and researchers. This variability creates additional challenges and complexities to research in this field², resulting in inaccurate narratives about these concepts¹. It is also important to note that a literature review indicates that the study of organizational culture is more recent than the research about organizational climate, initially referred to as a factor influencing organizational productivity based on leadership styles⁶.

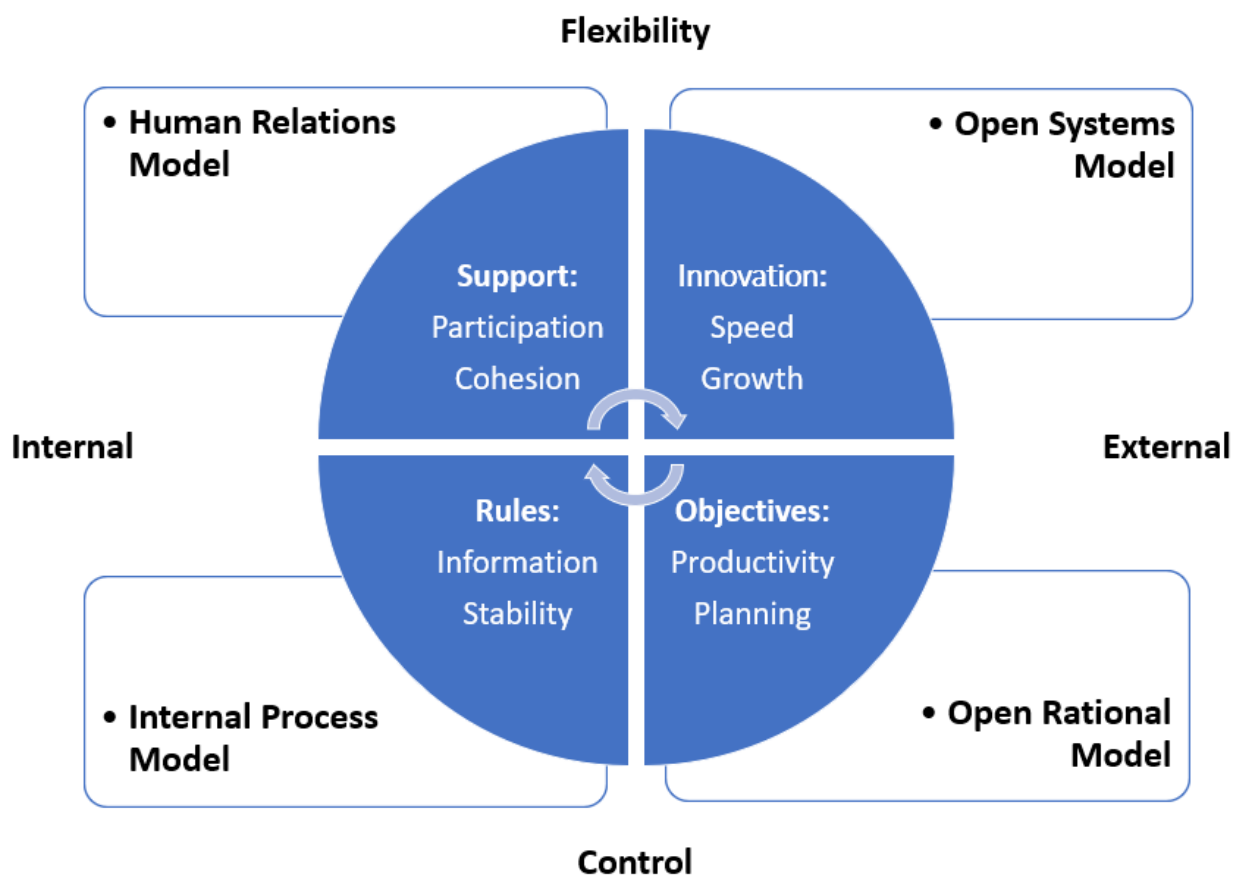
Furthermore, organizational climate and culture can serve as indicators of workplace quality. Organizational climate attempts to assess the perceptions of workers regarding their workplace, whereas organizational culture strives to establish a connection with climate by integrating the norms, directives, and values of the institution⁷.

In a recent study⁸, climate was defined as the workers' understanding of events, politics, practices, procedures, and behaviors that have been acknowledged, rewarded, or penalized. On the other hand, culture was described as the outcome of shared values that elucidate the mission and purpose of organizations⁸⁻¹⁰.

Besides, the current concept of culture has undergone a profound transformation, adopting a structure pillared on a cognitive pattern system that assists people in the process of learning, feeling, and acting, considered a differential factor for the success of organizations¹. Organizational culture is defined as the shared values, beliefs, attitudes, and behaviors among the members of an organization⁸. In contrast, organizational climate represents feelings or emotions associated with the workplace⁸. This direct relationship between culture and climate poses a challenge to understanding these concepts and justifies more investigation on this subject. A brief review identified 21 evaluation scales for organizational culture, 18 of which presented adequate internal validity. Similarly, 36 evaluation scales for organizational climate were identified, 31 of which were categorized as "good"⁸. Despite these results, efforts are required to assess the scales' sensitivity to the investigation process and the specificities of various workplace contexts¹¹.

The systematization of the organizational climate and culture allows the identification of six layers that vary over time and facilitate comprehension of the reality of organizations, including organizational and individual attributes, artifacts, patterns, standards, behaviors, values, and underlying beliefs that enable understanding how people behave, feel, and think¹. The first two layers are directly related to organizational climate, and the latter to organizational culture. There is a relationship between organizational climate and culture, particularly from the cultural perspective concerning education on organizational climate¹. Quinn's theoretical model of contrasting values allows for comprehending the organizational working model, explaining management challenges and the imperative for decision-making (Figure 1)¹. This model is depicted through two axes around three dimensions, resulting in four quadrants¹.

Figure 1 - Quinn's contrasting values model¹. Porto, Portugal, 2024



Source: Authors (2024).

Quinn's theoretical model allows a broader understanding of organizational culture, safeguarding against different interpretations and ambiguities historically linked with these concepts¹. However, healthcare organizations present a unique scenario, given their pivotal role as essential resources for people, and the way they operate impacts the satisfaction of clients and care providers.

Organizations are key elements in increasing and promoting a positive and effective culture and climate and, therefore, service quality². As a principle, managers within the organization strive to motivate their workers towards attaining specific objectives, considering the unique skills inherent to each professional category and worker. A recent study conducted in China revealed a correlation between organizational climate and the humanistic practice ability of Chinese nurses, suggesting that this could enhance the quality of care¹².

The study of organizational climate and culture is necessary for managers, serving as a basis for diagnosing, planning, and improving management strategies. Studying organizational climate allows one to describe the situations, while organizational culture enables one to elucidate what happened¹. Following this premise, researchers often opt to analyze these variables separately, although they recognize their direct relationship in clinical practice settings. Effective management structures should integrate and synergize these concepts, adhering to the five fundamental principles: individualized manager management based on reflection; organizational management guided by analytical principles; management of context; management of relationships in a collaborative perspective; and management based on change supported by action and behavior¹³. Leadership styles and organizational cultures based on the relationships and connections between professionals pave the way for improving the quality of care provided to clients¹³.

This study aims to identify the organizational culture and climate among nurses working in ILSA, using factor analysis according to the contrasting values model. Additionally, it seeks to verify if the results vary according to the sociodemographic and professional characteristics of the sample.

METHODOLOGY

A descriptive, quantitative, cross-sectional, and correlational study was performed. The paper followed the STROBE guidelines (Strengthening the Reporting of Observational Studies in Epidemiology Statement). The study was conducted with a convenience sample of nurses working in the ILSA managed by INEM.

Data was collected through an online questionnaire between March and May 2021. The questionnaire consisted of three sections. The first section gathered sociodemographic and professional information (age, gender, marital status, children, academic qualification, professional experience, time working at INEM, job perception, and leisure activity), while sections two and three collected information about organizational climate and culture following the First Organizational Climate and Culture Unified Survey (FOCUS)¹.

The sample size was determined based on the number of nurses available and willing to participate during the data collection period, corresponding to 43.5% of the total nurses at INEM.

The online data was analyzed using the Statistical Package for Social Sciences (SPSS) version 26. A descriptive analysis was conducted employing absolute and relative (%) frequencies, localization statistics (mean, median, mode, maximum, and minimum), and dispersion (standard deviation).

The exploratory factorial analysis (EFA) used the Principal Component Analysis Method followed by a Varimax rotation. These analyses were applied to all items referring to organizational climate and culture, from which contrasting factors emerged.

The explored models were validated using the Kaiser-Meyer-Olkin (KMO) test and Bartlett's test of sphericity. Score estimation for each factor was conducted utilizing Bartlett's method (minimum alternating square method). The retained factors in each part were further validated using Cronbach's alpha coefficient.

Finally, a correlational analysis was conducted between the factors retained by the EFA and the sociodemographic and professional variables to characterize the sample. Pearson's linear correlation coefficient was used for quantitative variables (age, professional experience, and INEM experience) and the retained factors. A one-way MANOVA was performed to assess the influence of qualitative variables on the factors retained by the EFA. When statistically significant effects were detected by MANOVA, the ANOVA test was employed for each retained factor, followed by Tukey post hoc HSD. To validate the MANOVA, the Kolmogorov-Smirnov univariate test or the Shapiro-Wilk normality multivariate test was employed on the retained factors. The Box's M-test was used to test the homogeneity of variance-covariance. In the ANOVA (or t-Student test) for normality, the Kolmogorov-Smirnov univariate test or the Shapiro-Wilk multivariate test was utilized. Additionally, the Levene test was used for homogeneity.

Statistically significant results were determined if the p-value was below 5% ($p < 0.05$), while partially significant values were considered if the p-value was below 10% ($p < 0.1$).

All ethical requirements were followed throughout the investigation. Authorization was obtained from the INEM Medical Emergency Department (minute no. 75/2019) and the Ethical Commission from the Nursing School of Porto (no. 3/2021).

RESULTS

The study sample comprised 81 nurses working in INEM's Immediate Life Support Ambulances. The mean age was 40.6 years ($SD = 6.1$), and the majority of nurses were male (58%), married (56.8%), or with children (76.5%). An undergraduate degree in Nursing was the most common academic qualification (72.8%) (Table 1).

Table 1 - Sociodemographic and professional variables. Porto, Portugal, 2024

Sociodemographic and professional variables (n=81)	n (%)	Mean (SD)
Age (years)	---	40.6 (6.1)
Gender		
Female	34 (42)	---
Male	47 (58)	
Marital status		
Single	16 (19.8)	
Married	46 (56.8)	---
Divorced	4 (4.9)	
Widowed	1 (1.2)	
Cohabiting	4 (17.3)	
Children		
No	19 (23.5)	---
Yes	62 (76.5)	
Academic qualification		
Bachelor	2 (2.5)	---
Undergraduate	59 (72.8)	
Master	20 (24.7)	
Professional experience (years)	---	15.4 (6.4)
Time working at INEM (years)	---	8.7 (4.2)
Perception of a stressful job		
No	28 (34.6)	---
Yes	53 (65.4)	
Leisure activity		
No	21 (25.9)	---
Yes	60 (74.1)	

Source: Authors (2024).

The exploratory factorial analysis (EFA) of organizational culture and climate identified four factors, obtained using the main components method, followed by a Varimax rotation. The Kaiser-Meyer-Olkin (KMO) for sample adequacy was 0.53, indicating adequacy for EFA. Bartlett's sphericity test showed a significant correlation between the climate and culture variables ($p < .001$). Using the Kaiser criteria, eigenvalues greater than 1 were considered, and a total of 16 common factors were retained, explaining the 79.59% total variance.

Following the EFA, four factors were retained, explaining 55.84% of the total variance of climate and culture items. According to the importance of each item, it is possible to relate the retained factors with different types of climate/culture: Support (factor 1); Objectives (factor 2); Rules (factor 3); and Innovation (factor 4). The first factor, Support, integrates 28 items of climate/culture, explaining 24.5% of the total variance. The second factor, Objectives, encompasses 14 items and explains 13.6% of the total variance. The third factor, Rules, shows high factorial weight in 6 items, explaining 9.7% of the total variance. Finally, the fourth factor, Innovation, exhibits high factorial weight in 6 items from climate/culture and explains 8.01% of the total variance.

Cronbach's alpha values for the climate/culture factors were examined, indicating good internal validity for all factors (Support: $\alpha = 0.97$; Objectives: $\alpha = 0.95$; Rules: $\alpha = 0.89$) except for factor 4, Innovation ($\alpha = 0.66$), revealing moderate internal consistency. Additionally, Cronbach's alpha values and factor independence ensured factor content validity.

The correlation analysis between organizational climate and culture factors and sociodemographic and professional variables showed no statistically significant relationship between organizational climate and culture factors and age ($r = 0.108$ and $p = 0.339$); ($r = 0.009$ and $p = 0.934$); ($r = 0.072$ and $p = 0.525$); ($r = 0.096$ and $p = 0.392$) (Table 2). Similarly, no statistically significant relationship was identified between gender (*Pillai's trace* = 0.01; $F(4.76) = 0.22$; $p = 0.92$; $\eta^2_p = 0.01$; *strength* (π) = 0.096); children (*Pillai's trace* = 0.004); $F(4.76) = 0.84$; $p = 0.5$; $\eta^2_p = 0.04$; *strength* (π) = 0.26); working overtime ($\lambda = 0.06$; $F(4.6) = 0.92$; $p = 0.46$; $\eta^2_p = 0.06$; *strength* (π) = 0.27); perception of a stressful job (*Pillai's trace* = 0.07; $F(4.8) = 1.37$; $p = 0.25$; $\eta^2_p = 0.07$; *strength* (π) = 0.41); leisure activities (*Pillai's trace* = 0.05; $F(4.76) = 1.02$; $p = 0.4$; $\eta^2_p = 0.05$; *strength* (π) = 0.31), and the outcome variable.

However, when analyzing the relationship between age and organizational climate and culture separately, a weak positive correlation with objectives and a weak negative correlation with innovation and climate factors were observed.

Table 2 - Relationship of culture and climate factors with age. Porto, Portugal, 2024

	Support	Objectives	Rules	Innovation
Age Climate/Culture	$r=0.108$ $p=0.339$	$r=-0.009$ $p=0.934$	$r=0.072$ $p=0.525$	$r=0.096$ $p=0.392$
Age Climate	$r=0.130$ $p=0.246$	$r=0.096$ $p=0.392$	$r=0.062$ $p=0.581$	$r=-0.212$ $p=0.058$
Age Culture	$r=-0.124$ $p=0.271$	$r=0.190$ $p=0.090$	$r=0.075$ $p=0.503$	$r=0.179$ $p=0.129$

Source: Authors (2024).

Regarding the relationship status, the MANOVA revealed *partially significant results* (*Pillai's trace* = 0.19; $F(8.14) = 1.82$; $p = 0.08$; $\eta^2_p = 0.09$; *strength* (π) = 0.76). The univariate ANOVA analysis for each dependent variable showed partially significant values for Support ($F(2.73) = 2.67$; $p = 0.08$) and Objectives $F(2.73) = 2.47$; $p = 0.09$). The Tukey *post hoc* HSD test revealed partially significant values between married and cohabiting nurses (C.I. at 95%] – 0.02; 1.37[; $p = 0.06$). In the Support factor, married nurses showed a higher mean perception (*married* $M = 0.15$ and $SD = 0.99$; *Cohabiting* $M = -0.05$ and $SD = 1.01$). In the Objectives factor, partially significant differences were observed between single and cohabiting nurses (C.I. at 95%] – 0.08; 1.67[; $p = 0.08$). Additionally, single nurses exhibited a higher mean perception of Objectives (*single* $M = 0.42$ and $SD = 0.74$ *Cohabiting* $M = -0.37$ and $SD = 1.07$) (Table 3).

Table 3 - Main statistics on organizational climate and culture according to marital status. Porto, Portugal, 2024

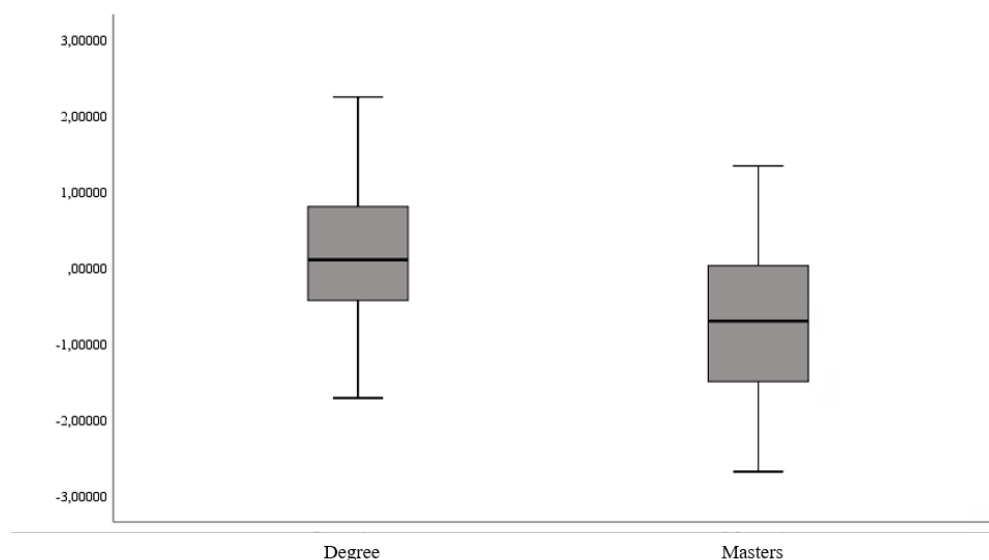
		Support	Objectives	Rules	Innovation
Single	M	-0.02	0.42	-0.17	-0.16
	N	16	16	16	16
	SD	0.80	0.74	1.33	0.83
Married	M	0.15	-0.05	-0.06	0.11
	N	46	46	46	46
	SD	0.99	1.05	0.82	1.03
Cohabiting partners	M	-0.52	-0.37	0.36	-0.08
	N	14	14	14	14
	SD	1.01	1.07	0.84	1.15
Total	M	-0.01	-0.01	-0.01	0.02
	N	76	76	76	76
	SD	1.98	1.02	0.96	1.01

Note: M (mean), n (sample size), SD (standard deviation).

Source: Authors (2024).

When the MANOVA was applied to the study of academic qualification, it showed statistically significant values (*Pillai's trace* = 0.19; $F(4.74) = 4.43$; $p = 0.003$; $\eta^2_p = 0.19$; *strength* (π) = 0.92), indicating that academic qualification had a significant impact on at least one of the climate or culture factors.

The ANOVA test revealed different results for the Support factor ($F(1.77) = 14.10$; $p < 0.001$). Thus, nurses with an undergraduate degree exhibited a higher perception than those with a Master's degree (degree $M = 0.2$ and $SD = 0.88$; master's $M = -0.70$ and $SD = 1.04$). Values in the Support factor were higher among those holding the first degree (Figure 2).

Figure 2 - Support factor's boxplot according to academic qualifications. Porto, Portugal, 2024

Source: Authors (2024).

The relationship between nurses' professional experience (total and at INEM) and climate/culture types was investigated. Results showed partially significant correlations, namely a weak positive correlation between professional practice and the Objective factor ($r = 0.21$ and $p = 0.06$) and also a weak positive correlation between the INEM professional experience and the Innovation factor ($r = 0.21$ and $p = 0.06$).

DISCUSSION

In this study, the use of EFA retained four factors that explain the variability of all items related to organizational climate and culture. Aligned with the contrasting values model, four factors were identified: Support, Objectives, Rules, and Innovation, presenting a variance of 24.5%, 13.6%, 9.7%, and 8.01%, respectively.

It was also found that nurses with an undergraduate degree exhibited a stronger association with the Support factor and, consequently, with participation and cohesion, compared to those with a Master's degree. In the Support factor, married nurses showed a higher perception than those cohabiting. In the Objectives factor, single nurses revealed a higher average perception compared to those cohabiting, suggesting greater planning capacity and productivity. Moreover, as professional experience increased, so did the level of commitment to organizational objectives.

These results highlight the complexity of the relationship between organizational and individual variables, emphasizing the need for detailed and systematic analysis. Support and Objectives factors showed a closer relationship between sociodemographic and professional variables, and organizational climate and culture, to the detriment of the Innovation and Rules factors.

The social and cultural identity of organizations forms the basis for their operation, development, and global success. Considering that the work of managers and local circumstances are pivotal for establishing a safe and trusty organizational culture and climate, the appreciation, empowerment, and education of workers stand as pillars of corporate structure. Following the contrasting values model, a profound analysis of organizational climate and culture enables the identification of their impact on organizational efficiency, quality improvement, team building, and professional and patient satisfaction^{1-2,13}.

In contrast with these research findings, a study involving 102 organizations aimed at evaluating the inclusive effect of organizational climate as a positive factor in organizational innovation and sustainable development and concluded that the workers' aging process reinforces the positive effect of an inclusive climate on knowledge management, subsequently leading to incremental and radical innovation¹⁴. A study focused on pharmacists identified the relationship between age and cordiality, structure, and identity, contributing directly to organizational climate and workplace dynamic¹⁵.

In line with these results, gender was not associated with organizational climate and culture, possibly because over the past decades the equal inclusion of women in the workplace has been a widely publicized topic (although significant inequalities persist)¹⁶. Additionally, the similarity in the percentage of men and women in our sample may explain the absence of this association.

In our findings, a greater experience within the INEM resulted in a higher perception of the Innovation factor. This is supported by a study conducted in Brazil that associates experience with professional satisfaction and organizational climate¹⁷.

Perception of stress associated with the workplace by registered nurses is not likely related to organizational climate and culture. However, other researchers found a negative correlation between stress and organizational climate in a sample of pharmacists¹⁵. Regarding the Support factor, married registered nurses showed a higher perception than those cohabiting, possibly because cohabitation implies fewer formal vincula among the partners, resulting in a variation in the support provided. In the Objectives factor, single professionals exhibited a higher average perception when compared with those cohabiting, which may be explained by the focus on their careers, without demand for partner's activities. When comparing our results with another study, married pharmacists revealed more interpersonal relationships than single pharmacists¹⁵, who identified this as a Support factor. The relationship between undergraduate nurses and the Support factor, based on action, involvement, and cohesion, may be attributed to the legal requirement for Portuguese nurses to possess a valid Nursing degree to practice and be registered in the Order of Nurses.

Despite the scarcity of studies showing the contrasting values model, its four factors are useful for studying nurses' workplaces, demonstrating that organizational climate and culture are considered workplace quality indicators. Also, they play crucial roles in shaping the work environment, influencing employee behavior, impacting overall organizational performance, and characterizing crucial dimensions for nursing practice and patient quality of care delivery.

Despite our results, it is important to acknowledge the limitations of this study. Firstly, the utilization of a convenience sample may restrict the generalizability of the findings. The cross-sectional design of the study precludes the possibility of inferring causality between organizational climate, culture, and the observed outcomes. Furthermore, self-reported data may be susceptible to response biases, such as social desirability influence bias. It would be beneficial for future research to consider longitudinal designs, for a deeper understanding of the causal relationships, and to investigate the impact of organizational interventions on climate and culture. Additionally, expanding the sample size and including a more diverse range of healthcare settings could enhance the generalizability of the findings.

CONCLUSION

A comprehensive examination of the organizational climate and culture enables managers a deeper understanding of their organizations and personnel. Such knowledge allows the formulation and implementation of more structured changes aligned with the company's strategy. This will contribute to professional satisfaction, improvement of the workplace environment, and, ultimately, refinement of nursing care. However, it is crucial to understand the dynamic evolution of these concepts and their dependence on variables that change over time (sociodemographic, professional, and others).

The organizational climate and culture within INEM have significant implications for innovation, support, and professional satisfaction among nurses. Our findings highlight the importance of experience, marital status, and educational qualifications in shaping perceptions of organizational climate and culture.

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