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Leadership and Organizational Climate in a Public Sector Organization: Evidence during the Later Phase of the COVID-19 Pandemic

Liderazgo y clima organizacional en una institución del sector público: Evidencia durante la fase avanzada de la pandemia de la COVID-19

Liderança e Clima Organizacional em uma Organização do Setor Público: Evidências durante a Fase Avançada da Pandemia de COVID-19

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Abstract:

Objective: To evaluate the association between leadership dimensions and employees' perceived organizational climate in a regional public health organization in Peru during the post-COVID-19 pandemic period. **Materials and Methods:** A quantitative, observational, cross-sectional study was conducted among 306 healthcare workers from the Regional Health Directorate of Callao (DIRESA Callao) in 2022. Participants were selected through convenience sampling. Data were collected using a previously validated questionnaire comprising 98 items assessing leadership (10 dimensions) and perceived organizational climate. Descriptive statistics were used to summarize participant characteristics. Spearman's rank correlation coefficients were calculated to examine bivariate associations. Multivariable logistic regression models were fitted to estimate adjusted odds ratios (aORs) and 95% confidence intervals (95% CIs), controlling for age, sex, occupation, length of service, and employment contract. **Results:** Positive correlations were observed between most leadership dimensions and organizational behaviour and organizational structure, whereas correlations with management style were generally weaker and less consistent. Vision (aOR = 3.36; 95% CI: 1.85–6.09), competencies (aOR = 1.18; 95% CI: 1.01–1.38), and ambition (aOR = 1.33; 95% CI: 1.05–1.67) were positively associated with a favorable perceived organizational climate. Conversely, commitment (aOR = 0.78; 95% CI: 0.65–0.94) and autonomous leadership (aOR = 0.58; 95% CI: 0.41–0.84) were inversely associated. Overall leadership was associated with higher odds of reporting a favorable perceived organizational climate (aOR = 1.09; 95% CI: 1.06–1.11). **Conclusions:** Leadership dimensions were significantly associated with employees' perceived organizational climate in this public health institution.

Keywords: Leadership; Organizational Climate; Health personnel, Peru.

Resumen:

Objetivo: Evaluar la asociación entre las dimensiones del liderazgo y la percepción del clima organizacional en trabajadores de una institución pública de salud del Perú durante el período posterior a la pandemia por COVID-19. **Materiales y métodos:** Se realizó un estudio cuantitativo, observacional y transversal en 306 trabajadores de la Dirección

Regional de Salud del Callao (DIRESA Callao) durante el año 2022. Los participantes fueron seleccionados mediante un muestreo por conveniencia. La información se recopiló utilizando un cuestionario previamente validado de 98 ítems que evaluó liderazgo (10 dimensiones) y percepción del clima organizacional. Se empleó estadística descriptiva para caracterizar a la población. Las asociaciones bivariadas se evaluaron mediante la correlación de Spearman y posteriormente se ajustaron modelos de regresión logística multivariada para estimar odds ratios ajustados (ORa) e intervalos de confianza del 95% (IC95%), controlando por edad, sexo, ocupación, tiempo de servicio y tipo de contrato. **Resultados:** Se observaron correlaciones positivas entre la mayoría de las dimensiones del liderazgo y el comportamiento y la estructura organizacionales, mientras que las correlaciones con el estilo de gestión fueron, en general, más débiles y menos consistentes. Las dimensiones visión (ORa = 3,36; IC95%: 1,85–6,09), competencias (ORa = 1,18; IC95%: 1,01–1,38) y ambición (ORa = 1,33; IC95%: 1,05–1,67) se asociaron positivamente con una percepción favorable del clima organizacional. Por el contrario, compromiso (ORa = 0,78; IC95%: 0,65–0,94) y liderazgo autónomo (ORa = 0,58; IC95%: 0,41–0,84) mostraron asociaciones inversas. El liderazgo global se asoció con una mayor probabilidad de reportar una percepción favorable del clima organizacional (ORa = 1,09; IC95%: 1,06–1,11). **Conclusiones:** Las dimensiones del liderazgo se asociaron significativamente con la percepción del clima organizacional en esta institución pública de salud.

Palabras clave: Liderazgo, Clima Organizacional, Personal de Salud, Perú.

Resumo:

Objetivo: Avaliar a associação entre as dimensões da liderança e a percepção dos funcionários sobre o clima organizacional em uma organização regional de saúde pública no Peru durante o período pós-pandemia de COVID-19. **Materiais e Métodos:** Foi realizado um estudo quantitativo, observacional e transversal com 306 trabalhadores da saúde da Direção Regional de Saúde de Callao (DIRESA Callao), em 2022. Os participantes foram selecionados por amostragem por conveniência. Os dados foram coletados por meio de um questionário previamente validado, composto por 98 itens que avaliaram a liderança (10 dimensões) e a percepção do clima organizacional. Foram

utilizadas estatísticas descritivas para resumir as características dos participantes. Foram calculados coeficientes de correlação de Spearman para examinar as associações bivariadas. Modelos de regressão logística multivariável foram ajustados para estimar odds ratios ajustados (aOR) e intervalos de confiança de 95% (IC 95%), controlando por idade, sexo, ocupação, tempo de serviço e vínculo empregatício. **Resultados:** Foram observadas correlações positivas entre a maioria das dimensões da liderança e o comportamento organizacional e a estrutura organizacional, enquanto as correlações com o estilo de gestão foram, em geral, mais fracas e menos consistentes. Visão (aOR = 3,36; IC 95%: 1,85–6,09), competências (aOR = 1,18; IC 95%: 1,01–1,38) e ambição (aOR = 1,33; IC 95%: 1,05–1,67) estiveram positivamente associadas a uma percepção favorável do clima organizacional. Por outro lado, compromisso (aOR = 0,78; IC 95%: 0,65–0,94) e liderança autônoma (aOR = 0,58; IC 95%: 0,41–0,84) apresentaram associação inversa. A liderança global esteve associada a maiores chances de relatar uma percepção favorável do clima organizacional (aOR = 1,09; IC 95%: 1,06–1,11). **Conclusões:** As dimensões da liderança estiveram significativamente associadas à percepção dos funcionários sobre o clima organizacional nesta instituição pública de saúde.

Palavras-chave: Liderança, Clima Organizacional, Pessoal de Saúde, Peru.

1. INTRODUCTION

Leadership is widely recognized as an essential organizational process associated with employees' attitudes, motivation, and perceptions of their work environment. Rather than representing a fixed individual characteristic, leadership encompasses a set of interpersonal and managerial competencies that facilitate communication, coordination, and decision-making within organizations (Teetzen et al., 2023). Previous research has consistently reported that leadership is associated with organizational outcomes, including employee engagement, job satisfaction, organizational commitment, and overall institutional performance (Bass y Avolio, 1994; Schneider et al., 2017; Yukl, 2013). Consequently, understanding how leadership relates to employees' perceptions of their work environment has become increasingly relevant for organizations seeking to

strengthen their institutional performance.

Organizational climate refers to employees' perceptions of organizational policies, practices, interpersonal relationships, and working conditions. In the present study, organizational climate was assessed at the individual level; therefore, the findings reflect employees' perceived organizational climate rather than a collective organizational-level construct. Unlike organizational culture, which reflects deeply rooted values and beliefs, organizational climate represents employees' current psychological appraisal of their workplace and is considered a measurable indicator of organizational functioning (Constantin, 2008; Schneider et al., 2017). Positive organizational climates have been associated with higher job satisfaction, better teamwork, improved communication, and increased organizational commitment, whereas unfavorable climates have been linked to burnout, turnover intentions, emotional exhaustion, and reduced productivity (Araya-Salgado y Medina-Giacomozzi, 2019).

Based on previous literature, we hypothesized that higher scores across leadership dimensions would be associated with more favorable perceptions of organizational climate among employees of a regional public health organization. The Regional Health Directorate of Callao (DIRESA Callao) is the public institution responsible for governing and coordinating healthcare services within the Callao region of Peru. As a decentralized public health authority employing multidisciplinary professionals, DIRESA Callao provides an appropriate setting for examining organizational processes during the post-pandemic recovery period. Therefore, the aim of this study was to evaluate the association between leadership dimensions and employees' perceived organizational climate of DIRESA Callao in 2022. Owing to its cross-sectional design, this study evaluates associations rather than causal relationships; however, its findings may contribute to identifying organizational factors relevant to leadership development and workplace management in public health institutions.

2. THEORETICAL FRAMEWORK

2.1 The relationship between Leadership and Organizational Climate

The relationship between leadership and organizational climate is supported by psychological theories suggesting that leadership behaviors shape employees' perceptions of trust, fairness, psychological safety, and organizational support (Ip et al., 2025). Leaders who promote participation, open communication, recognition, and collaborative decision-making create environments in which employees perceive greater psychological well-being and professional engagement. Conversely, ineffective leadership has been associated with increased occupational stress, reduced motivation, emotional exhaustion, and poorer perceptions of organizational climate (Edmondson, 1999; Cummings et al., 2018; Demerouti y Bakker, 2023). In this study, organizational climate refers to employees' individual perceptions of their work environment rather than a shared organizational property. Leadership behaviors are expected to shape these individual perceptions through mechanisms such as trust, communication, psychological safety, and organizational support.

2.2 Leadership and Organizational Climate in the healthcare context

Within healthcare organizations, these relationships acquire particular importance because healthcare professionals frequently work under conditions characterized by high workload, complex decision-making, emotional demands, and multidisciplinary collaboration (Moreno-Martínez y Sánchez-Martínez, 2025). These organizational characteristics require leadership capable of promoting teamwork, communication, resilience, and employee well-being. The COVID-19 pandemic further exposed the importance of leadership in health services, as healthcare organizations were required to rapidly reorganize their services while maintaining workforce motivation and continuity of care (Castelyn, 2024). During the post-pandemic period, leadership remained closely associated with organizational adaptation, recovery processes, and employees' perceptions of their work environment (Shanafelt et al., 2020; Kniffin et al., 2021;

Gröschke et al., 2022; Bieńkowska et al., 2022).

Despite the growing body of literature examining leadership and organizational climate, important knowledge gaps remain. Most published studies appear to be conducted in hospitals or private organizations, whereas evidence from decentralized public health institutions in Latin America remains limited. Furthermore, previous studies have frequently assessed leadership as a global construct, providing limited information regarding how individual leadership dimensions relate to employees' perceptions of organizational climate (Matheis et al., 2024, Williams et al., 2024). Because leadership comprises multiple behavioral competencies, evaluating specific dimensions may provide a more comprehensive understanding of leadership practices within public institutions.

The present study adopted a multidimensional approach to leadership by evaluating ten complementary dimensions encompassing interpersonal, managerial, strategic, and organizational competencies, adapted from Mancha et al. (2021), who administered the instrument to a similar healthcare sample. This approach allows leadership to be examined as a complex construct rather than as a single global characteristic, facilitating the identification of dimensions that show stronger associations with organizational climate. Additionally, organizational tenure was considered during the analyses because previous evidence suggests that employees with different lengths of service may develop distinct perceptions of leadership practices and organizational climate through their accumulated organizational experiences (Waterfield et al., 2021).

Leadership is a multidimensional construct encompassing interpersonal, cognitive, motivational, and managerial competencies. These dimensions may influence employees' perceptions of their work environment through different mechanisms. For example, vision and commitment may foster trust and organizational alignment, competencies and learning capacity may facilitate effective problem-solving, whereas self-awareness and leadership practice may promote supportive interpersonal relationships. Consequently, different leadership dimensions are expected to demonstrate varying strengths of association with employees' perceived organizational climate (González-Cánovas et al.,

2024; Santana-Martins et al., 2022).

3. METHODOLOGY

Study design and setting: A quantitative, observational, cross-sectional and exploratory study was conducted among healthcare workers employed at the Regional Health Directorate of Callao (DIRESA Callao), Peru, between January and March 2022. DIRESA Callao is the public institution responsible for coordinating healthcare services across three health networks (Ventanilla, Bepeca, and Bonilla–La Punta) and the central administrative office.

Study population and sampling: The study population consisted of approximately 1,500 healthcare and administrative workers employed by DIRESA Callao during 2022. The required sample size was calculated assuming a finite population, a 95% confidence level, a 5% margin of error, and maximum variability (p = 0.50), resulting in a minimum sample of 306 participants. To ensure institutional representation, the target sample was proportionally allocated across the three health networks and the central administrative office according to the number of employees in each organizational unit. Within each unit, participants were recruited using a non-probability convenience sampling strategy based on staff availability during the data collection period. Recruitment also sought to achieve a balanced representation of both sexes by considering an approximately equal male-to-female ratio. A convenience sampling strategy was selected because healthcare personnel were working under high service demands during the post-pandemic recovery period, limiting the feasibility of probability-based recruitment. Similar sampling approaches have frequently been adopted in organizational and health workforce research conducted under comparable operational constraints. Eligible participants included healthcare and administrative personnel working on-site under permanent contracts, administrative service contracts (CAS), CAS-COVID contracts, or service provision contracts who voluntarily agreed to participate and provided written informed consent. Employees who had performed remote work continuously or intermittently during the three months preceding data collection were excluded because their organizational

interactions differed substantially from those of on-site personnel.

Study variables and measurement instruments: The primary independent variable was leadership, whereas the dependent variable was employees' perceived organizational climate. Data were collected using a previously validated structured questionnaire developed by Mancha (2021) for healthcare personnel working in Peruvian public health institutions. In the original validation study, the leadership scale demonstrated high internal consistency (Cronbach's α = 0.962), while the organizational climate scale also showed high internal consistency (Cronbach's α = 0.964). These reliability coefficients correspond to the overall scales reported in the original validation study. The present study used the same instrument and dimensional structure, without additional cultural adaptation, given the comparability of the study population and institutional context. The leadership questionnaire comprised 48 items distributed across ten dimensions: interest, vision, ability to learn and act, competencies, commitment, sincerity, ambition, self-awareness, enthusiasm, and autonomous leadership. Leadership was assessed from the perspective of employees regarding the leadership demonstrated by their immediate supervisors. Depending on each participant's organizational position, supervisors included heads of administrative offices, health network coordinators, service chiefs, and unit managers. Therefore, leadership was evaluated through subordinate perceptions rather than self-assessment. The perceived organizational climate questionnaire consisted of 50 items grouped into three dimensions: organizational behaviour, organizational structure, and management style. Organizational climate was measured exclusively at the individual level; therefore, all analyses reflect employees' perceptions of their work environment rather than a shared organizational climate. All questionnaire items were rated using a five-point Likert response scale ranging from 1 (Never) to 5 (Always). Leadership scores ranged from 48 to 240 points, whereas perceived organizational climate scores ranged from 50 to 250 points, with higher scores indicating more favorable perceptions. Questionnaires were administered in person using paper-based forms during working hours by members of the research team. Participants were identified from the human resources registry provided by the Executive Office of Human Resource Management.

Statistical analysis: Data were entered into Microsoft Excel 2016 and analyzed using Stata version 18.0 (StataCorp, College Station, TX, USA). Continuous variables were summarized using means and standard deviations or medians and interquartile ranges according to their distribution, whereas categorical variables were described using frequencies and percentages. Spearman's rank correlation coefficient (ρ) was used to evaluate bivariate associations between leadership dimensions and perceived organizational climate because the variables were derived from ordinal Likert-scale responses and did not satisfy normality assumptions. Although individual Likert items are ordinal, aggregated scores were analyzed as continuous variables, which is widely accepted when scales demonstrate adequate psychometric performance. For descriptive purposes, leadership and perceived organizational climate scores were categorized into three effectiveness levels (effective, moderately effective, and ineffective) according to the classification proposed by Mancha et al. (2021), based on Pareto distribution criteria.

To examine independent associations, multivariable logistic regression models were constructed using perceived organizational climate as the binary outcome variable. Although the organizational climate score was originally available as a continuous measure, it was dichotomized at the sample median to distinguish participants with relatively higher versus lower perceived organizational climate. The median was selected as an objective, distribution-based cut-off because no validated clinical or normative threshold was available for this instrument in the study population. This approach also ensured an adequate number of observations in both outcome categories and facilitated the interpretation of the regression coefficients as the odds of having a higher level of perceived organizational climate. Two adjusted models were estimated. Model 1 simultaneously included the ten leadership dimensions, whereas Model 2 included the overall leadership score. Both models were adjusted for age, sex, occupation, length of service, and employment contract. Multicollinearity among leadership dimensions was assessed using variance inflation factors (VIFs), with values ≥5 considered indicative of potentially problematic multicollinearity. Results are presented as adjusted odds ratios (aORs) with corresponding 95% confidence intervals (95% CIs). Statistical significance

was established at $p < 0.05$.

Ethical considerations: The study was conducted in accordance with ethical principles for research involving human participants, adhered to the ethical principles outlined in the Declaration of Helsinki for medical research involving human subjects and complied with internationally accepted standards of good research practice (World Medical Association, 2013). All participants provided written informed consent prior to inclusion. Participant anonymity and confidentiality were ensured through questionnaire coding and restricted access to the database. Data collection was conducted between January and March 2022 by members of the research team using paper-based questionnaires administered in person. The study was initially approved by the Institutional Ethics Committee of the Regional Health Directorate of Callao (Registration No. 091-2022-COMITÉ DE ÉTICA/UI/DIRESA-CALLAO). Subsequently, an updated ethical approval (Registration No. 034-2023-COMITÉ DE ÉTICA/UI/DIRESA-CALLAO) was issued because the project remained active during the data analysis and dissemination stages.

4. RESULTS

A total of 306 health sector employees participated in the study. As shown in **Table N°1**, the most frequent age group was 30–59 years (58.17%). The sample was evenly distributed by sex, with equal proportions of female and male participants (50.0% each). The predominant professional group was registered nurses (34.31%), followed by medical technologists (12.42%) and administrative technicians (12.42%). Regarding length of service, 36.93% of participants reported one year or less at the institution, while 33.66% had more than two years of service. Most participants were assigned to the Bepeca Health Network (29.41%), and the predominant employment modality was the CAS-COVID contract (62.75%).

Table N°1. General characteristics of the sample studied (n=306).

Variables	n (%)
Age*	
18-29 years	95 (31.05)
30-59 years	178 (58.17)
≥60 years	33 (10.78)
Sex	
Female	153 (50)
Male	153 (50)
Occupation	
Medical technologist	38 (12.42)
Biologist	23 (7.52)
Laboratory technician	35 (11.44)
Assistant	31 (10.13)
Administrative technician	38 (12.42)
Nurse	105 (34.31)
Physician	36 (11.76)
Service time	
0-1 year	113 (36.93)
more than 1 to 2 years	90 (29.41)
more than 2 years	103 (33.66)
Place of service	
Main office	84 (27.45)
Bepeca Health Network	90 (29.41)
Bonilla-La Punta Health Network	56 (18.30)
Ventanilla Health Network	76 (24.84)
Type of agreement	
Permanent staff	50 (16.34)
CAS	53 (17.32)
CAS-COVID	192 (62.75)
Service provider	11 (3.59)

*Categories according to the Peruvian Ministry of Health reference

Source: prepared by the authors.

The **Table N°2** presents the distribution of effectiveness levels across the dimensions of leadership and organizational climate. Within the leadership construct, the highest proportions of effectiveness were observed for the dimensions ability to learn and do (83.33%) and sincerity (75.16%). In contrast, autonomous leadership showed the highest proportion of lack of effectiveness (19.61%), followed by competencies (11.76%).

Table N°2. Analysis of the frequencies of dimensions of the variable's leadership and organizational climate in the population of the Regional Health Directorate of Callao, 2022.

Leadership	Effectiveness	Moderate effectiveness	Lack of effectiveness
L1: Interest	177 (57.84%)	114 (37.25%)	15 (4.91%)
L2: Vision	214 (69.93%)	92 (30.07%)	0
L3: Ability to learn and do	255 (83.33%)	46 (15.03%)	5 (1.64%)
L4: Competencies	137 (44.77%)	133 (43.46%)	36 (11.77%)
L5: Commitment	71 (23.21%)	205 (66.99%)	30 (9.80%)
L6: Sincerity	230 (75.16%)	56 (18.30%)	20 (6.54%)
L7: Ambition	91 (29.74%)	199 (65.03%)	16 (5.23%)
L8: Self-awareness	200 (65.36%)	91 (29.74%)	15 (4.90%)
L9: Enthusiasm	174 (56.86%)	102 (33.33%)	30 (9.81%)
L10: Autonomous Leadership	101 (33.00%)	145 (47.39%)	60 (19.61%)
Organizational climate	**Effectiveness**	**Moderate effectiveness**	**Lack of effectiveness**
OC1: Organizational Behaviour	213 (69.61%)	88 (28.76%)	5 (1.63%)
OC2: Organizational Structure	111 (36.27%)	195 (63.73%)	0
OC3: Management Style	217 (70.92%)	86 (28.10%)	3 (0.98%)

Data expressed as absolute frequencies and percentages (%)

Source: prepared by the authors.

Regarding organizational climate, the highest proportions of effectiveness were observed for organizational behaviour (69.61%) and management style (70.92%), whereas organizational structure showed a lower proportion of effectiveness (36.27%). The proportion of lack of effectiveness was low across all three dimensions, ranging from 0% for organizational structure to 1.63% for organizational behaviour. Spearman correlation analysis revealed statistically significant associations between most leadership dimensions and perceived organizational climate dimensions (**Table N°3**). Moderate positive correlations were observed between several leadership dimensions, such as competencies, interest and enthusiasm and organizational behaviour and organizational structure (ρ ranging from 0.30 to 0.55; $p < 0.05$).

Table N°3. Correlation between leadership dimensions and organizational climate dimensions in total sample.

		Organizational Climate Dimensions		
		Organizational Behaviour	**Organizational Structure**	**Management Style**
Leadership Dimensions	**L1**	0.46 **<0.001**	0.26 **<0.001**	0.23 **0.001**
	L2	0.31 **<0.001**	0.47 **<0.001**	0.08 0.188
	L3	0.32 **<0.001**	0.30 **<0.001**	0.09 0.118
	L4	0.55 **<0.001**	0.39 **<0.001**	0.06 0.291
	L5	0.41 **<0.001**	0.01 0.954	-0.02 0.745
	L6	0.30 **<0.001**	0.32 **<0.001**	0.16 **0.005**
	L7	0.32 **<0.001**	-0.14 **0.011**	0.08 0.168
	L8	0.37 **<0.001**	0.37 **<0.001**	-0.09 0.098
	L9	0.46 **<0.001**	0.35 **<0.001**	0.07 0.212
	L10	-0.01 0.928	0.02 0.743	0.15 **0.007**

L1: Interest, L2: Vision, L3: Ability to learn and do, L4: Competencies, L5: Commitment, L6: Sincerity, L7: Ambition, L8: Self-awareness, L9: Enthusiasm, L10: Autonomous Leadership. First Spearman's rho value, followed by p-value (bold number).

Source: prepared by the authors.

Autonomous leadership was the only leadership dimension that did not show statistically significant correlations with most organizational climate dimensions, except for a weak positive association with management style (ρ = 0.15; p = 0.007). Spearman correlation analysis stratified by service time showed that most leadership dimensions were positively and significantly associated with organizational behaviour and organizational structure

across all service time categories (**Table N°4**). These associations were generally stronger among employees with more than one year of service, particularly for the dimensions interest, competencies, self-awareness and enthusiasm.

Table N°4. Correlation between leadership dimensions and organizational climate dimensions by service time categories.

Leadership Dimensions	Organizational Climate Dimensions by service time								
	0-1 year			more than 1 to 2 years			more than 2 years		
	OC1	OC2	OC3	OC1	OC2	OC3	OC1	OC2	OC3
L1	0.41	0.27	0.27	0.53	0.33	0.22	0.45	0.22	0.16
	<0.001	**0.005**	**0.002**	**<0.001**	**0.001**	**0.036**	**<0.001**	0.025	0.092
L2	0.26	0.53	0.07	0.38	0.47	0.09	0.31	0.37	0.02
	0.006	**<0.001**	0.418	**0.001**	**<0.001**	0.383	**0.001**	**0.001**	0.778
L3	0.30	0.39	0.05	0.49	0.28	0.18	0.19	0.22	0.03
	0.001	**<0.001**	0.591	**<0.001**	**0.006**	0.082	0.059	**0.027**	0.743
L4	0.51	0.41	0.09	0.54	0.39	0.06	0.59	0.37	0.02
	<0.001	**<0.001**	0.333	**<0.001**	**0.001**	0.558	**<0.001**	**0.001**	0.830
L5	0.30	-0.04	-0.05	0.49	-0.03	0.10	0.44	0.11	-0.08
	0.002	0.674	0.538	**<0.001**	0.739	0.348	**<0.001**	0.276	0.376
L6	0.22	0.42	0.19	0.32	0.24	0.21	0.37	0.29	0.08
	0.021	**<0.001**	**0.040**	**0.002**	**0.019**	**0.044**	**0.001**	**0.002**	0.388
L7	0.26	-0.10	0.03	0.37	-0.17	0.11	0.32	-0.16	0.09
	0.006	0.274	0.686	**0.001**	0.105	0.268	**0.001**	0.102	0.356
L8	0.33	0.42	-0.02	0.52	0.36	-0.05	0.28	0.35	-0.21
	0.001	**<0.001**	0.777	**<0.001**	**0.001**	0.612	**0.003**	**0.001**	**0.032**
L9	0.33	0.37	0.16	0.52	0.35	0.10	0.54	0.36	-0.05
	0.001	**<0.001**	0.088	**<0.001**	**0.001**	0.311	**<0.001**	**0.001**	0.550
L10	-0.02	-0.02	0.04	0.02	0.16	0.33	-0.02	-0.03	0.12
	0.846	0.829	0.643	0.872	**0.141**	**0.001**	0.847	0.710	0.217

L1: Interest, L2: Vision, L3: Ability to learn and do, L4: Competencies, L5: Commitment, L6: Sincerity, L7: Ambition, L8: Self-awareness, L9: Enthusiasm, L10: Autonomous Leadership. OC1: Organizational Behaviour, OC2: Organizational Structure, OC3: Management Style. First Spearman's rho value, followed by p-value (bold number). Three categories of service time: 0-1 year, more than 1 to 2 years, more than 2 years of service at the institution.

Source: prepared by the authors.

In contrast, correlations between leadership dimensions and management style were weaker and less consistent across service time categories. Autonomous leadership did not demonstrate statistically significant associations with organizational climate dimensions in most service groups, except for a weak correlation with management style among employees with more than two years of service.

In the multivariable analysis, higher scores in the vision dimension were associated with a better perceived organizational climate (aOR=3.36, 95% CI:1.85–6.09); competencies (aOR=1.18, 95% CI:1.01–1.38) and Ambition (aOR=1.33, 95% CI:1.05–1.67) also showed positive associations with organizational climate. In contrast, commitment (aOR=0.78, 95% CI:0.65–0.94) and autonomous leadership (aOR=0.58, 95% CI:0.41–0.84) were associated with a worse perceived organizational climate. When leadership was analyzed using the overall score (Model 2), it showed a positive association with organizational climate (aOR=1.09, 95% CI:1.06–1.11).

No significant associations were observed for age, sex, service time, or employment type. Compared with medical technologists, biologists showed lower odds of reporting a favorable organizational climate in both models (**Table N°5**). No evidence of problematic multicollinearity was observed among the leadership dimensions (all VIFs <5; mean VIF = 2.37).

Table N°5. Logistic regression models for the association between leadership (general or by dimension) and organizational climate.

Variables	Model 1			Model 2		
	OR	95%CI	p-value	OR	95%CI	p-value
Leadership				1.09	1.06-1.11	<0.001
L1: Interest	1.01	0.91-1.12	0.881			
L2: Vision	3.36	1.85-6.09	<0.001			
L3: Ability to learn and do	1.08	0.89-1.31	0.424			
L4: Competencies	1.18	1.01-1.38	0.039			
L5: Commitment	0.78	0.65-0.94	0.01			
L6: Sincerity	0.93	0.71-1.21	0.586			
L7: Ambition	1.33	1.05-1.67	0.018			
L8: Self-awareness	1.08	0.77-1.52	0.642			
L9: Enthusiasm	1.20	0.90-1.60	0.208			
L10: Autonomous Leadership	0.58	0.41-0.84	0.004			
Age						
18-29 years	Ref.			Ref.		
30-59 years	0.97	0.43-2.17	0.935	0.97	0.47-2.03	0.944
≥60 years	1.25	0.38-4.09	0.714	1.10	0.38-3.22	0.857
Sex						
Female	Ref.			Ref.		
Male	0.81	0.40-1.62	0.55	0.79	0.42-1.47	0.450
Occupation						
Medical Technologist	Ref.			Ref.		
Biologist	0.13	0.02-0.75	0.022	0.13	0.03-0.59	0.008
Laboratory technician	2.00	0.46-8.66	0.351	1.70	0.46-6.31	0.425
Assistant	1.57	0.40-6.18	0.514	1.46	0.41-5.22	0.56
Administrative technician	1.60	0.41-6.14	0.491	1.03	0.33-3.28	0.956
Nurse	0.50	0.17-1.47	0.209	0.45	0.18-1.15	0.097
Physician	1.03	0.29-3.74	0.959	0.77	0.23-2.58	0.674
Service time						
0-1 year	Ref.			Ref.		
more than 1 to 2 years	1.29	0.55-3.03	0.554	1.42	0.66-3.06	0.37
more than 2 years	1.41	0.53-3.72	0.486	1.15	0.48-2.74	0.751
Type of agreement						
Permanent staff	Ref.			Ref.		
CAS	0.58	0.17-1.99	0.389	0.63	0.22-1.82	0.399
CAS-COVID	1.03	0.31-3.36	0.962	0.86	0.32-2.30	0.766
Service provider	1.92	0.25-14.75	0.530	1.16	0.19-6.89	0.868

OR: odds ratio. Ref.: Reference. Model 1 included the ten leadership dimensions simultaneously, Model 2 included the overall leadership score and were adjusted for age, sex, occupation, service time, and type of employment.

Source: prepared by the authors.

5. DISCUSSION

This study examined the association between leadership and employees' perceived organizational climate among healthcare workers of the Regional Health Directorate of Callao during the post-COVID-19 period. Overall leadership and several leadership dimensions were significantly associated with employees' perceived organizational

climate after adjustment for relevant occupational characteristics. These findings support the hypothesis that leadership behaviors are closely related to how employees perceive their work environment within public health organizations.

The positive association observed between overall leadership and perceived organizational climate is consistent with previous theoretical and empirical evidence suggesting that leadership contributes to employees' perceptions of organizational support, communication, collaboration, and workplace functioning (Bass y Avolio, 1994; Schneider et al., 2017). Although causal relationships cannot be established due to the cross-sectional design, the findings reinforce the importance of leadership as an organizational factor associated with employees' perceptions, particularly in public healthcare settings facing organizational recovery following the COVID-19 pandemic (Shanafelt et al., 2020; Kniffin et al., 2021).

One of the principal contributions of this study is the multidimensional assessment of leadership. Rather than examining leadership as a single global construct, individual leadership dimensions were analyzed separately. Vision demonstrated the strongest positive association with perceived organizational climate, suggesting that leaders capable of communicating clear organizational goals and future direction may contribute to more favorable employee perceptions (Li et al., 2025). Competencies and ambition were also positively associated with perceived organizational climate, supporting previous literature indicating that managerial competence, professional development, and goal orientation are important characteristics of effective leadership (Yukl, 2013; Cummings et al., 2018).

Conversely, commitment and autonomous leadership were inversely associated with perceived organizational climate after multivariable adjustment (Backhaus y Vogel, 2022). Although these findings may initially appear counterintuitive, they may reflect contextual characteristics of public health organizations during the post-pandemic recovery period. For example, leadership behaviors emphasizing individual autonomy or rigid personal commitment may be perceived differently in highly regulated organizational environments

where collaborative decision-making and institutional coordination are essential (Jacobsen, 2024). Because similar findings have rarely been reported, these associations should be interpreted cautiously and warrant confirmation in future longitudinal studies.

Correlation analyses also showed that the strength of the associations varied across leadership dimensions, indicating that leadership is not a homogeneous construct. Several dimensions, particularly competencies, enthusiasm, self-awareness, and interest, demonstrated moderate correlations with organizational behaviour and organizational structure, whereas autonomous leadership showed weak or inconsistent associations. These results support theoretical models proposing that different leadership competencies influence employees' perceptions through distinct psychological and organizational mechanisms rather than through a single leadership process.

Previous studies conducted in healthcare settings have similarly reported positive relationships between leadership and organizational climate. Vigo-Young (2023) observed high levels of leadership effectiveness together with heterogeneous perceptions of organizational climate among healthcare workers. Rojas-Sánchez et al. (2022) found that leadership training was associated with more collaborative leadership behaviors and more favorable organizational climate perceptions. Likewise, Castillo-Saavedra et al. (2019) reported that transactional leadership was positively related to organizational climate among Peruvian healthcare professionals. Collectively, these findings are consistent with the present study, although differences in study populations, leadership models, and measurement instruments should be considered when making direct comparisons.

This study provides additional evidence from a decentralized regional public health institution in Peru, a context that remains underrepresented in the international literature. While numerous studies have evaluated leadership in hospitals or private organizations, fewer investigations have examined public regional health authorities during the post-pandemic period. Furthermore, the use of multivariable regression models allowed adjustment for demographic and occupational characteristics, strengthening the

interpretation of the observed associations beyond simple bivariate correlations.

The strengths of this study include the multidimensional evaluation of leadership, the use of previously validated instruments, adjustment for relevant occupational characteristics through multivariable regression models, and the inclusion of healthcare workers from different organizational units during the post-pandemic recovery period.

Several limitations should also be acknowledged. First, the cross-sectional design precludes establishing temporal relationships or causal inference. Second, the use of convenience sampling may have introduced selection bias and may limit the generalizability of the findings beyond the study population. Third, both leadership and perceived organizational climate were assessed through self-reported questionnaires, making the results susceptible to reporting and social desirability bias. Fourth, perceived organizational climate was analyzed at the individual level rather than as a shared organizational construct because no within-group agreement analyses or multilevel modeling were performed. Therefore, the findings should be interpreted as employees' individual perceptions rather than organizational-level climate.

Finally, the large number of correlation tests performed in the exploratory analyses increases the risk of type I error due to multiple comparisons. No formal adjustment for multiple testing was applied; therefore, individual statistically significant correlations, particularly those with p-values close to the conventional significance threshold, should be interpreted cautiously and considered exploratory until confirmed in future studies.

In conclusion, leadership dimensions were significantly associated with employees' perceived organizational climate in this public health institution. These findings highlight the relevance of leadership assessment as part of organizational management and workforce development strategies. Organizations may consider routinely evaluating leadership practices together with employees' perceived organizational climate to identify opportunities for organizational improvement and strengthen workplace environments.

Future longitudinal and multilevel studies are needed to clarify the temporal relationships between leadership and perceived organizational climate, examine potential causal pathways, and determine how leadership behaviors influence organizational climate across different healthcare organizational contexts during the continuing post-pandemic recovery.

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Author contributions

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