Research Square

Preprints are preliminary reports that have not undergone peer review.
They should not be considered conclusive, used to inform clinical practice,
or referenced by the media as validated information.

The Work Process of Nurses in Timor-Leste: Factor Analysis of Organization, Focus of Care, and Resource Shortages

Aureo Frutalegio da Costa Freitas

aureofreitas422@gmail.com

PhD Candidate in Nursing, University of Porto

Maria Manuela Martins

University of Porto

Maria João Oliveira

University of Porto

Research Article

Keywords: Nurses, Health Services Organization, Work Process, Needs for Improvement, Lack of Resources

Posted Date: August 28th, 2026

DOI: https://doi.org/10.21203/rs.3.rs-10116728/v1

License: This work is licensed under a Creative Commons Attribution 4.0 International License.
Read Full License

Additional Declarations: No competing interests reported.

Abstract

Introduction:

There is limited quantitative evidence on how nurses in Timor-Leste perceive work organization and clinical work processes despite ongoing efforts to strengthen the country's health system. This study sought to address this knowledge gap.

Objective

To examine nurses' perceptions of work organization and clinical work processes and explore the relationship between perceived improvement needs and organizational dynamics in Timor-Leste.

Methods

A quantitative, descriptive cross-sectional study was conducted with 310 nurses working in hospital, community, and educational settings in Timor-Leste. Data were collected using a structured questionnaire comprising sociodemographic variables and items assessing perceived needs for improvement and work processes, rated on a 5-point Likert scale. Data analysis included exploratory factor analysis and non-parametric statistical tests to identify underlying dimensions and examine associations between variables.

Results

Participants were predominantly female, under 29 years of age, had fewer than five years of professional experience, and worked primarily in community settings. Factor analysis identified three dimensions: work organization and clinical processes, perceived areas for improvement, and resource constraints. Perceptions of work organization and clinical work processes were significantly associated with the perceived availability of human and material resources. Resource scarcity emerged as a central structural constraint, influencing both care delivery and organizational functioning. Participants reported high ratings for core components of the nursing process, including assessment, diagnosis, planning, implementation, and evaluation of care, suggesting strong recognition of evidence-based nursing practice despite contextual resource limitations. Perceptions differed significantly according to resource availability ($p<.001$).

Conclusions

Work organization was closely associated with the perceived availability of human and material resources, highlighting the influence of structural conditions on nursing practice in Timor-Leste. The

predominance of early-career nurses with less than five years of experience represents both a characteristic of the current workforce and a potential opportunity for health system strengthening. These findings support investment in mentorship, continuing professional development, and organizational support to strengthen the nursing workforce in Timor-Leste.

Introduction

Nursing care quality is strongly influenced by how work processes are organized and implemented in clinical settings. Nursing practice encompasses activities aimed at promoting, maintaining, and restoring health, integrating scientific knowledge, technical competencies, and ethical principles. These activities are shaped by contextual factors such as working conditions, resource availability, and health policy frameworks.

The nursing process provides a structured, systematic, and scientific framework for clinical practice, comprising five interrelated stages: assessment, planning, implementation, evaluation, and documentation (1). Its consistent application supports patient-centered, evidence-based care and has been associated with improvements in care quality and patient safety (2).

Digital health technologies, such as Computerized Nursing Processes (CNP), can further strengthen clinical practice by integrating nursing assessment, diagnoses, interventions, and outcomes within structured information systems. According to (3) computerized systems enhance clinical reasoning, support standardized documentation, and improve the integration of theoretical knowledge and clinical decision-making. By facilitating the systematic organization of patient information, CNP may contribute to safer, more efficient, and evidence-based care.

Work organization models also play an important role in shaping nursing outcomes. Evidence suggests that structured, evidence-based approaches to organizing nursing work can improve care quality and professional performance (4). Nursing practice is commonly organized through task-based, team-based, primary nursing, and case management models, each reflecting different approaches to care delivery.

The functional or task-based model emphasizes task fragmentation and standardized procedures, prioritizing technical efficiency, although it may compromise continuity and holistic care (5). In contrast, the primary nursing model assigns responsibility for comprehensive patient care to a single nurse, promoting continuity, accountability, and therapeutic relationships, with positive effects on care quality and reductions in missed care (6). The team nursing model encourages collaborative practice, shared responsibilities, and the integration of complementary skills, and has been associated with improved clinical outcomes and workflow efficiency (7); (4).

In low-resource settings such as Timor-Leste, health information systems remain largely dependent on paper-based clinical records. This reliance limits timely access to patient information, reduces continuity of care, and constrains the availability of data for clinical and managerial decision-making. Although digital health initiatives have been promoted by national authorities and the World Health Organization,

paper-based documentation continues to predominate, contributing to inefficiencies, duplication of records, and limitations in data quality limitations (8), (9), (10).

These systemic constraints require nursing work organization to be adapted to local contexts and available resources. Community-based care generally relies on collaborative models involving nurses, midwives, and community health workers, whereas nurses practicing in remote areas often assume multiple responsibilities within an individual practice setting. In hospital task-based models are frequently adopted to address workload pressures and resource constraints. Although case management remains underdeveloped in many healthcare systems, it represents a promising strategy for improving care coordination and the management of chronic and complex conditions.

Primary health care is the main entry point to the health system in Timor-Leste and is supported by community-based initiatives such as the Servisu Integradu Saude Comunitaria (SISCa), which aim to expand access to essential services in remote populations and reduce geographical barriers to care (9) , (11). The health system is organized through a decentralized network of community health centers, health posts, and SISCa units distributed throughout the country, with the goal of bringing prevention, health promotion, and treatment services closer to people living in isolated rural areas (12), (11).

Despite these efforts, access to care remains constrained by logistical and structural challenges. Approximately three-quarters of the population live in rural and hard-to-reach areas, and many households must travel two hours or more to reach the nearest health facility, reflecting persistent infrastructure limitations (13). These conditions directly influence nurse's work processes and perception of clinical practice. In remote setting with limited human and material resources, nurses frequently assume multiple roles, ranging from direct clinical care to health education and community care coordination, adapting to local needs and the limited availability of specialized professionals (13), (9).

Taken together, these structural, organizational, and care-related challenges highlight the importance of understanding nurses' perceptions of work organization and clinical work processes in the Timorese context, where barriers to access and resource constraints remain significant challenges for daily practice.

Improving the health system in Timor-Leste requires investment in professional education, healthcare infrastructure, and collaborative models of care. Adapting theoretical approaches to local realities, while acknowledging cultural and structural challenges, is essential for ensuring effective and accessible healthcare delivery.

Therefore, this study aimed to analyze nurses' perceptions of work organization and work processes and to examine the relationship between the improvement needs identified by nurses in Timor-Leste and these organizational and care-related dimensions. The research question was: How do nurses in Timor-Leste perceive their work organization and processes?

Methodology

This quantitative descriptive study was conducted between January 10 and September 20, 2024, in Timor-Leste. The target population comprised 1,276 nurses who were actively practicing in the country. A non-probabilistic convenience sample was used, with participants recruited according to their availability at their workplaces during the data collection period. After applying the inclusion and exclusion criteria, the final sample consisted of 310 nurses, corresponding to a response rate of 24.3%. Although convenience sampling may limit representativeness and increase the risk of selection bias, the achieved sample size was sufficient to provide an estimated 95% confidence level with a 5% margin of error. Eligible participants were nurses actively practicing in hospital, community, and educational settings. Nurses who were inactive on extended leave, or who submitted incomplete questionnaires were excluded from the study.

The study variables included sociodemographic characteristics (gender and age) and professional characteristics (workplace, length of service, academic background, and continuing education). Continuing professional education was characterized according to the year of completion, duration, and type of the most recent training undertaken, allowing a more detailed description of the participants' professional development trajectory.

Work process variables were analyzed across several dimensions, including community capacity building (teaching and training), community care, community education, person-centered education, treatments, health promotion, shortages of human resource, and shortages of material resources.

The *"work organization method"* variable comprised three dimensions: (1) task-based organization of nurses' daily work; (2) organization centered on the provision of care to patients and their families; and (3) organization in which care is provided by a nurse responsible for the patient and/or family.

The *work process* variable covers: health, social, and psychological assessment at admission; development of nursing diagnoses based on data collected from the person and family; care planning; use of the best available resources and the scientific evidence; daily evaluation of the results of interventions; assessment of the satisfaction of the person and their family at the end of the care process; and recording the progression of the problems of the people being cared for.

An ad hoc questionnaire was developed following a review of the literature on nursing work processes, work organization methods, and the nursing process, incorporating elements from the Standards of Quality in Nursing Care and previous studies by Ventura-Silva et al.

The questionnaire items were developed through a three-stage process. First, an extensive review of the scientific literature on nurses' work processes and professional perceptions was conducted to identify relevant dimensions and internationally validate instruments. Second, a panel of experienced nurses and health researchers assessed the proposed items for relevance, clarity, and appropriateness to the professional context, leading to adjustments and the removal of redundant items. Third, the

questionnaire underwent cultural and linguistic adaptation into Portuguese and Tetum through translation, back-translations, and consensus among bilingual translators and nursing experts to conceptual equivalence and comprehensibility for the target population.

Data were collected using a self-administered paper-based questionnaire. A schedule of visits to participants' workplaces was established to facilitate questionnaire distribution and collection. Nurses completed the questionnaire during the visit and completed forms were collected on the same day. The final questionnaire included 24 items covering the study variables and their respective dimensions.

When the 19 scale items were analyzed as a single measure, a Cronbach's alpha of 0.940 indicating excellent internal consistency. Total scores ranged from 19 to 95 points, with responses rated on a five-point Likert scale: 1 = Not important; 2 = Somewhat important; 3 = Important; 4 = Very important; 5 = Essential.

The study was approved by the Unit of Ethical Research and Development, National Institute of Public Health of Timor-Leste (Reference No. 01INSP-TL/UEPD/I/2024). All procedures involving human participants were conducted in accordance with the ethical standards of the approving institutional ethics committee and with the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards. Written informed consent was obtained from all participants prior to data collection. Participants were assured of the confidentiality and anonymity of their responses and were informed of their right to withdraw from the study at any time without any consequences.

Results

Participants were predominantly female (58.1%), younger than 29 years of age (51.9%), had fewer than five years of professional experience (57.4%), and worked mainly in community setting (50.6%). Nearly half of the participants (49,0%) reported having completed continuing professional education after 2020, reflecting the recent expansion of educational opportunities within the nursing workforce. The sample presented the characteristics shown in Table 1.

Table 1 - Sample Characteristics

Variables	Dimensions	No.	%
Gender	Female	180	58.1
	Male	130	41.9
Ages	under 29	161	51.9
	30 to 39	90	29.0
	40 to 49	35	11.3
	50 to 59	22	7.1
	over 60	2	.6
Length of service	less than five	178	57.4
	6 to 15	89	28.7
	16 to 25	20	6.5
	26 to 35	18	5.8
	over 36	5	1.6
Areas of work	Education	36	11.6
	Hospital	113	36.5
	Community	157	50.6
	Other	4	1.3
Continuing education	before 1990	7	2.3
	1991 to 1999	4	1.3
	2000 to 2010	10	3.2
	2011 to 2020	137	44.2
	after 2020	152	49.0

The 19-item scale developed for this study yielded a mean total score of 73.23 (SD = 11.92). As shown in Table 2, mean scores for all items exceeded the midpoint of the response scale, indicating generally positive perceptions across all domains. The highest scores were observed for “Using data collected from the patient and their family, nursing diagnoses are made” (M = 4.09) and “The results of interventions are evaluated daily” (M = 4.00). Greater variability in responses was found for “Specialized consultations” (SD = 1.05), “Shortage of human resources” (SD = 1.03), and “Lack of materials” (SD = 1.07), suggesting more heterogeneous perceptions regarding these aspects of nursing practice.

Table 2 - Descriptive statistics of the scale.

Mean		Standard Deviation	Analysis N
1 Community capacity building (teaching and training)	3.66	.933	310
2 Community care	3.71	.851	310
3 Specialized Consultations	3.73	1,051	310
4 Community education	3.69	.928	310
5 Teaching people	3.70	.964	310
6 Treatments	3.94	.862	310
7 Health Promotion and Healthy Lifestyles	3.97	.868	310
8 Shortage of human resources	3.76	1,025	310
9 Lack of materials	3.81	1,070	310
10 The daily organization of nurses' work is the task	3.77	.942	310
11 The daily organization of nurses' work is centered on patients and their families.	3.91	.877	310
12 The daily organization of nurses' work is carried out by the nurse responsible for the patient and/or family.	3.752	.9028	310
13 When a person is admitted for care, a health, social, and psychological assessment is conducted.	3.90	.865	310
14 Using the data collected from the person being cared for and their family, nursing diagnoses are made.	4.09	.833	310
15 A care plan is developed for each person receiving care and/or their family.	3.96	.848	310
16 In the care process, the best available resources are used available and best evidence from scientific knowledge.	3.92	.812	310
17 The results of interventions are evaluated daily.	4.00	.842	310
18 At the end of the care process, the satisfaction of the person and their family is assessed.	3.99	.816	310
19 Regarding the care provided, a record of the progression of problems is maintained.	3.98	.824	310

Exploratory factor analysis supported a three-factor solution (Table 3), confirming the multidimensional structure of the instrument. The first factor, "Organization of the Work Process", comprised items describing the planning, implementation, documentation, and evaluation of nursing care, including nursing diagnosis, care planning, the use of scientific evidence, and outcome evaluation. The second

factor, “Focus of the Work Process”, included items related to direct clinical and community-based interventions, such as community capacity building, health education, consultations, treatments, and health promotion. The third factor, “Resource Shortages”, encompassed items addressing the availability of human and material resources, representing structural conditions that may influence nursing practice. Overall, the findings indicate that nurses' perceptions of their work are organized around three interrelated dimensions: work organization, focus of care, and resource availability.

Table 3 - Rotational component matrix

		Component		
Items	Statements	1	2	3
Focus of the work process	1 Community capacity building (teaching and training)	.230	.739	.215
	2 Community care	.246	.751	.238
	3 Specialized Consultations	.131	.706	.064
	4 Community education	.349	.679	.221
	5 Teaching people	.251	.741	.187
	6 Treatments	.290	.678	.249
	7 Health Promotion and Healthy Lifestyles	.318	.696	.179
Resource shortages	8 Shortage of human resources	.199	.239	.864
	9 Lack of materials	.171	.342	.829
Organization of the work process	10 The daily organization of nurses' work is the task	.598	.331	-.030
	11 The daily organization of nurses' work is centered on patients and their families.	.644	.457	-.097
	12 The daily organization of nurses' work is carried out by the nurse responsible for the patient and/or family.	.555	.509	-.041
	13 When a person is admitted for care, a health, social, and psychological assessment is conducted.	.558	.430	-.019
	14 Based on the data collected from the person being cared for and their family, nursing diagnoses are made.	.775	.229	.103
	15 A care plan is developed for each person receiving care and/or their family.	.779	.197	.167
	16 In the care process, the best available resources and the best evidence from scientific knowledge are used.	.792	.146	.317
	17 Evaluates the results of interventions on a daily basis.	.784	.254	.250
	18 At the end of the care process, the satisfaction of the patient and their family is assessed.	.808	.250	.193
	19 Regarding the care provided, a record of the progression of problems is maintained.	.781	.226	.296

Descriptive statistics for the overall scale and its dimensions are presented in Table 4. Total scores ranged from 19 to 95 (M = 73.24, SD = 11.92), with values distributed approximately normally. Scores

ranged from 19 to 95, the minimum and maximum possible values, and it was found that, across the entire scale, the mean (73.24) is higher than the midpoint of the scale (47.5). The data show that, for all components, the variation fell within each component's minimum and maximum range, with the mean always above the midpoint, which was, respectively, for Focus on the Work Process (17.5); Organization and Work Process (25); and Lack of Resources (5).

Table 4 - Descriptive and Correlational Analysis

Focus of the work process			Organization and work process	Resource of Resources	Total shift
Average		39.26	26.40	7.57	73.2387
Median		40.00	27.00	8.00	75.0000
Mode		40	28	8	76.00
Error Deviation		6,662	5,096	2.002	11.92402
Minimum		10	7	2	19.00
Maximum		50	35	10	95.00
Percentiles	25	35.00	23.00	6.00	67.0000
	50	40.00	27.00	8.00	75.0000
	75	44.00	30.00	9.00	81.0000

The distribution of total scores is illustrated in **Figure 1**. Most participants scored between 60 and 80, with the highest concentration between 70 and 80. Although a slight asymmetry was observed, the overall distribution was approximately normal.

Responses to individual items (Table 5) indicated that all dimensions were considered highly relevant to nursing practice. No single organizational approach predominated in the daily organization of nurses' work, as responses were distributed across the different levels of importance. Nevertheless, activities related to the nursing process-including assessment, diagnosis, care planning, implementation, evaluation of interventions, and documentation-were consistently rated as *very important* or *essential* by most participants.

Items describing the focus of nursing work also received high ratings. Community capacity building, community care, health education, treatments, and health promotion were predominantly classified as very important or essential, highlighting the value attributed to both individual and community-oriented interventions. Community capacity building was considered very important by 38.7% of participants and essential by 19.4%, while community care received corresponding ratings from 41.3% and 18.1% of

respondents. Similarly, health promotion and healthy lifestyles were rated as very important by 43.2% of participants and essential by 29.4%.

Resource availability also emerged as a prominent concern. Shortages of human resources were considered very important or essential by 64.5% of participants, while 67.5% reported similar ratings for shortages of material resources. These findings indicate that limitations in staffing and essential equipment are widely perceived as important factors influencing the organization of nursing work and the delivery of care.

Table 5 – Item distribution (Likert responses)

	Dimensions		Frequency	Percentage
Organization and Work Process	The daily organization of nurses' work is the task	Not important	7	2.3
		Not very important	16	5.2
		Important	90	29.0
		very important	124	40.0
		Essential	73	23.5
	The daily organization of nurses’ work is centered on patients and their families	Not important	5	1.6
		Not very important	11	3.5
		important	71	22.9
		very important	143	46.1
		Essential	80	25.8
	The daily organization of nurses’ work is carried out by the nurse responsible for the patient and/or family.	Not important	7	2.3
		Not very important	11	3.5
		important	99	31.9
		very important	128	41.3
		Essential	65	21.0
	When admitting a person for care, a health, social, and psychological assessment is conducted	Not important	5	1.6
		Not very important	14	4.5
		Important	60	19.4
		very important	158	51.0
		Essential	73	23.5
	Using the data collected from the caregiver and their family, nursing diagnoses are made.	Not important	2	.6

	Not very important	9	2.9
	important	56	18.1
	very important	136	43.9
	Essential	107	34.5
For each person who takes care of themselves and/or family member who provides care makes a care plan.	Not important	1	.3
	Not very important	14	4.5
	important	70	22.6
	very important	137	44.2
	Essential	88	28.4
In the care process, use the best available resources and the best evidence of scientific knowledge	Not important	1	.3
	Not very important	10	3.2
	important	80	25.8
	very important	142	45.8
	Essential	77	24.8
Assesses daily whether the results of interventions	Not important	3	1.0
	Not very important	9	2.9
	important	65	21.0
	very important	142	45.8
	Elementary	91	29.4
At the end of the care process, assess whether the person and their family are satisfied	Not important	3	1.0
	Not very important	8	2.6
	important	63	20.3

		very important	152	49.0
		Essential	84	27.1
	Regarding the care provided, it records the progression of caregivers' issues	Not important	2	.6
		Not very important	9	2.9
		important	69	22.3
		very important	143	46.1
		Essential	87	28.1
Focus of the work process	Community capacity building (teaching and training)	Not important	6	1.9
		Not very important	22	7.1
		important	102	32.9
		very important	120	38.7
		Essential	60	19.4
	Community Care	Not important	4	1.3
		Not very important	12	3.9
		important	110	35.5
		very important	128	41.3
		Essential	56	18.1
	Specific consultations	Not important	16	5.2
		Not very important	18	5.8
		important	74	23.9
		very important	128	41.3
		Essential	74	23.9

	Community education	Not important	8	2.6
		Not very important	14	4.5
		Important	106	34.2
		very important	120	38.7
		Essential	62	20.0
	Teaching people (to teach)	Not important	9	2.9
		Not very important	17	5.5
		important	99	31.9
		very important	118	38.1
		Essential	67	21.6
	Treatments	Not important	7	2.3
		Not very important	3	1.0
		important	74	23.9
		very important	144	46.5
		Essential	82	26.5
	Health Promotion and Healthy Lifestyles	Not important	6	1.9
		Not very important	3	1.0
		important	76	24.5
		very important	134	43.2
		Essential	91	29.4
Lack of resources	Lack of human resources	Not important	10	3.2
		Not very important	24	7.7

		important	76	24.5
		very important	120	38.7
		Essential	80	25.8
	Lack of materials	Not important	13	4.2
		Not very important	23	7.4
		important	65	21.0
		very important	118	38.1
		Essential	91	29.4

To further explore these relationships, Kruskal–Wallis tests were performed to examine differences in the dimensions of the scale according to perceived shortages of human and material resources (Table 6).

Table 6. Kruskal-Walli's test results

Null Hypothesis	Sig.[a,b]
The distribution of Organization and Work Process is equal in the categories of Lack of Human Resources.	<.001
The distribution of the focus of the work process is the same across the categories of "Shortage of Human Resources."	<.001
The distribution of Organization and Work Process is the same across the categories of Lack of Materials.	<.001
The distribution of "Focus on the Work Process" is the same across the "Lack of Materials" categories.	<.001

Statistically significant differences were identified for both Organization of the Work Process and Focus of the Work Process across categories of human resource shortages and material shortages (all $p < .001$), indicating that nurses' perceptions of work organization and clinical work processes varied according to the availability of organizational resources.

Discussion

The study sample consists predominantly of women (58.1%), aged under 29 years (51.9%), with less than five years of professional experience (57.4%), reflecting a relatively young nursing workforce in the

Timor-Leste healthcare system. Continuing professional development has expanded since 2020, with 49% of participants reporting participation in continuing education activities. These findings suggest ongoing efforts to strengthen the nursing workforce through continuous education, which is particularly important in developing health systems (14).

Participants generally perceived key components of the nursing process, including nursing diagnosis and the daily evaluation of intervention outcomes, as being consistently implemented. These findings are consistent with previous literature highlighting the continuous evaluation of nursing intervention as a key indicator of care quality (15).

However, the greater variability observed for the items “Specific Consultations,” “Lack of Human Resources,” and “Lack of Materials” suggests that hat nurses' experiences differ substantially across practice settings. This variability likely reflects contextual differences in the availability of healthcare resources, a challenge frequently reported in fragile health systems (16). Resource shortage therefore appear to influence both work organization and the capacity to respond effectively to population’s health needs.

The score distribution illustrated in graph 01, indicated that most participants scored between 60 and 80, suggesting overall positive perceptions of work organization and nursing practice despite persistent resource constraints. This interpretation is supported by the hypothesis testing, which demonstrated statistically significant differences in the dimensions "Work Organization and Process” and “Focus of the work process” showed statistically significant differences in the scores of the dimensions (X/Y) between levels of perceived lack of human and material resources, suggesting an association between these variables.

These findings reinforce evidence that resource availability is closely associated with the quality and organization of nursing care (17). Regarding work organization methods, similar response frequencies were observed for task-oriented, individual, and responsible nurse models. These patterns may indicate uncertainty regarding the conceptual distinction between these organizational approaches, as previously reported (4) rather than a clear predominance of any single model.

Participants also rated all stages of the nursing process as “very important” or “fundamental”, reflecting a strong recognition of the importance of systematic assessment, planning, implementation, and evaluation, even when resource limitation hinder their consistent application. These findings highlight the need for strategies that combine continuing professional development with improvement in workforce planning and resource allocation.

Overall, the findings emphasize that strengthening nursing work processes requires not only investment in professional development but also structural improvements to healthcare resources and infrastructure. Although this study does not identify a predominant model of nursing work organization, it clearly demonstrates that shortages of human and material resources remain significant barriers to high-quality nursing care. These findings should, however, be interpreted in light of several limitations.

The use of a convenience sample may have introduced selection bias and limits the generalizability of the results. Furthermore, although the ad hoc questionnaire demonstrated excellent internal consistency, additional psychometric evaluation is required to establish its measurement properties. Finally, because the study was conducted within the specific healthcare context of Timor-Leste, caution is warranted when transferring these findings to health systems with different organizational and resource characteristics. Nevertheless, the study provides important evidence on the relationship between work organization, resource availability, and nursing practice in a resource-constrained setting. Addressing the structural challenges identified will require coordinated investment in workforce capacity, healthcare infrastructure, and equitable resource distribution.

Conclusion

Work processes and work organization are key determinants of nursing care quality and patient safety. Persistent shortages of human and material resources remain a major structural constraint and are consistently associated with less favorable perceptions of care quality.

This study examined nurses' perceptions of work organization and clinical work processes in Timor-Leste. Although participants generally reported positive perceptions of nursing practice and organizational processes, these perceptions were consistently influenced by structural resource limitations.

The internal consistency of the ad hoc questionnaire supports its preliminary use as a measurement tool, although further psychometric evaluation is warranted. The findings provide insight into how nurses in Timor-Leste perceive the relationship between work organization, clinical practice and resource availability.

Nurses demonstrated a clear understanding of the importance of a structured, evidence-based nursing process, including assessment, planning, implementation, and evaluation. Nevertheless, translating these principles into routine practice remains challenging in contexts characterized by workforce shortages and limited material resources.

Continuing professional development has become increasingly established since 2020 and plays an important role in supporting clinical competence and adaptation to local healthcare needs. However, educational initiatives alone are unlikely to achieve sustained improvements unless accompanied investment in infrastructure, staffing, and equitable access to healthcare resources, particularly in rural and remote areas.

A notable findingwas the predominance of early-career nurses with less than five years of experience. Rather than representingsolely a workforce challenge, this demographic profile may also represent anopportunity for health system development. Early-career nursesare often more receptive to organizational innovation, evidence-based practice and technology-supported care. When supported

through structured mentorship, leadership development, and continuing professional development, this workforce may contribute substantially to the modernization of nursing services.

In conclusion, improving nursing care quality in Timor-Leste requires a coordinated approach's that combines workforce development with sustained investment in health system capacity. Policy initiatives should priorities equitable resource allocation, strengthening healthcare infrastructure, and the institutionalization of continuing professional development.

Future research should further examine how organizational models, leadership practices, and workforce characteristics influence nursing care delivery in resource-constrained health systems.

Declarations

Competing interests

The authors declare that they have no competing interests.

Ethics approval and consent to participate

This study was approved by the National Institute of Public Health of Timor-Leste (Ref: 01INSP-TL/UEPD/I/2024). Ethical principles, including informed consent, confidentiality, and the right to withdraw, were fully respected throughout the study.

Consent for publication

Not applicable.

Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Author Contribution

Author ContributionsAureo Frutalegio da Costa Freitas contributed to the study conception, methodological design, data collection, statistical analysis, interpretation of results, and manuscript writing.Co-authors:Maria Manuela Martins contributed to scientific supervision, critical revision of the manuscript for important intellectual content, and approval of the final version of the manuscript.Maria João Oliveira contributed to methodological supervision, critical revision of the manuscript, and validation of the final version for submission.All authors have read and approved the final manuscript

and agree to be accountable for all aspects of the work, ensuring the accuracy and integrity of any part of the study.

Acknowledgement

AcknowledgementsThe author would like to express sincere gratitude to the nursing professionals who participated in this study for their time, availability, and valuable contributions, without which this research would not have been possible.The author also acknowledges the support provided by the healthcare institutions in Timor-Leste during the data collection process.Special appreciation is extended to the supervisors of this work, whose guidance, expertise, and continuous support were essential throughout the development of this study.The author is also grateful to colleagues and informal reviewers who provided constructive feedback during the preparation of the manuscript.

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

References

1. Narayan MC et al. October. Nursing's Scientific Method. AJN, American Journal of Nursing 125(10):p 52–57, 2025. 2025:52–7.
2. Rossiter C, Levett-Jones T, Pich J. The impact of person-centred care on patient safety: An umbrella review of systematic reviews. Int J Nurs Stud. 2020;109:103658.
3. Dal Sasso GTM. Computerized nursing process: Methodology to establish associations between clinical assessment, diagnosis, interventions, and outcomes. Revista da Escola de Enfermagem da USP. 2013;47(1):242–9.
4. Ventura-Silva JMA. Working methods of nurses in hospitals: Scoping review. J Health NPEPS. 2021;6:278–95.
5. Parreira P, Santos-Costa P, Neri M, Marques A, Queirós P, Salgueiro-Oliveira A. Work Methods for Nursing Care Delivery. Int J Environ Res Public Health. 2021;18(4).
6. Gonçalves I, Mendes DA, Caldeira S, Jesus É, Nunes E. The Primary Nursing Care Model and Inpatients' Nursing-Sensitive Outcomes: A Systematic Review and Narrative Synthesis of Quantitative Studies. Int J Environ Res Public Health. 2023;20(3).
7. Goh PQL, Ser TF, Cooper S, Cheng LJ, Liaw SY. Nursing teamwork in general ward settings: A mixed-methods exploratory study among enrolled and registered nurses. J Clin Nurs. 2020;29(19–20):3802–11.

8. Martins N. Timor-Leste: a primary health care case study in the context of the COVID-19 pandemic World Health Organization: World Health Organization; 2023 [Available from: https://iris.who.int/handle/10665/372246
9. Timor-Leste WHOCOf. WHO Timor-Leste Country Cooperation Strategy: 2021–2025. New Delhi, India (Escritório Regional da OMS para o Sudeste Asiático); 2023.
10. Organization WH. Zooming in: Timor-Leste's case-based approach to health data. World Health Organization; 2024.
11. Timor-Leste Go. National health system Dili, Timor-Leste: Government of Timor-Leste. 2010 [Available from: https://timor-leste.gov.tl/?lang=en&n=1&p=3374
12. Organization WH. Timor-Leste launches a digital platform for TB, HIV, and Malaria surveillance: World Health Organization; 2023 [Available from: https://www.who.int/timor-leste/news/detail/22-11-2023-timor-leste-launches-a-digital-platform-for-tb--hiv--and-malaria-surveillance
13. Price JA, Soares AI, Asante AD, Martins JS, Williams K, Wiseman VL. I go I die, I stay I die, better to stay and die in my house: understanding the barriers to accessing health care in Timor-Leste. BMC Health Serv Res. 2016;16(1):535.
14. Silva IR, Mendes IAC, Ventura CAA. Strategic directions for strengthening nursing and midwifery: potentialities and connections in the complex perspective. Rev Lat Am Enfermagem. 2020;28:e3380.
15. Muller-Staub M, Needham I, Odenbreit M, Lavin MA, van Achterberg T. Improved quality of nursing documentation: results of a nursing diagnoses, interventions, and outcomes implementation study. Int J Nurs Terminol Classif. 2007;18(1):5–17.
16. Organization WH. WHO guideline on health workforce development, attraction, recruitment and retention in rural and remote areas Geneva, Switzerland: World Health Organization; 2021 [Available from: https://www.who.int/publications/i/item/9789240024229
17. Aiken LH, Sloane DM, Bruyneel L, Van den Heede K, Griffiths P, Busse R, et al. Nurse staffing and education and hospital mortality in nine European countries: a retrospective observational study. Lancet. 2014;383(9931):1824–30.

Figures

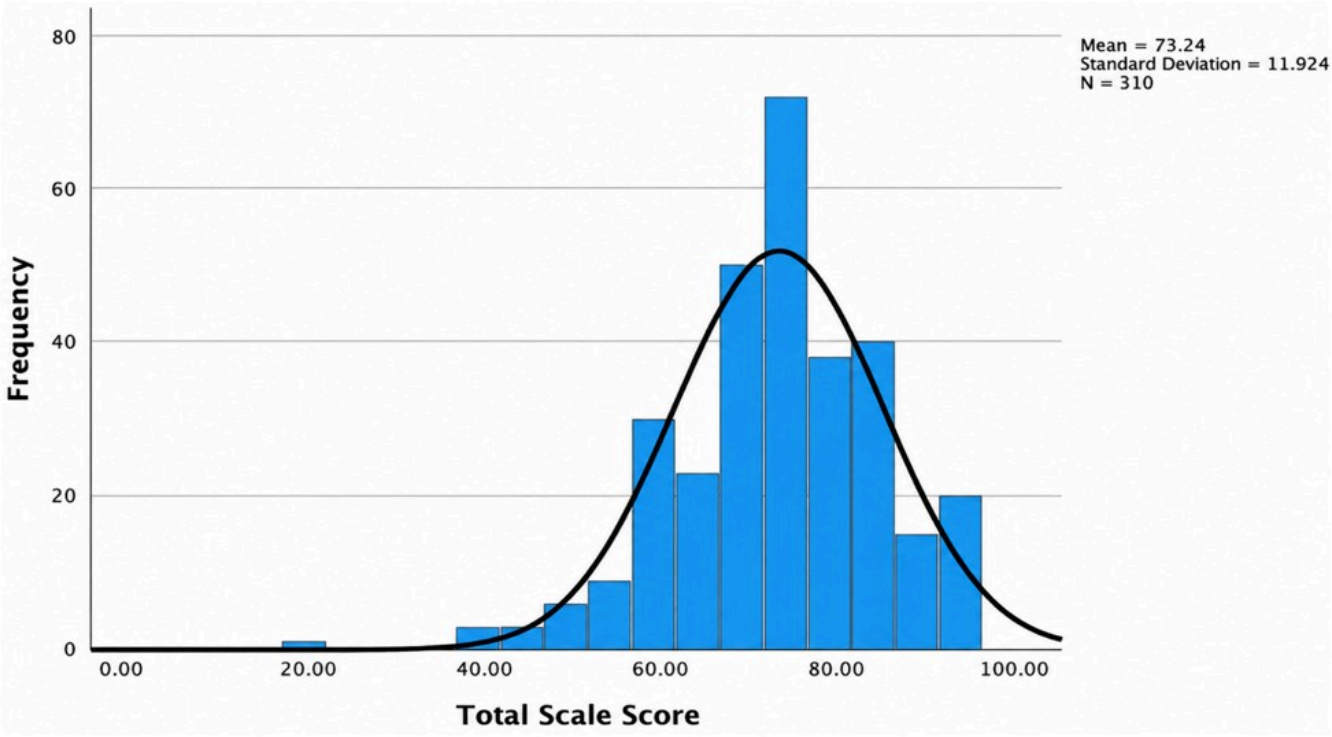

Figure 1

Distribution of scale items.