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Assessing Patient Safety Culture: A Pioneering Exploratory Study in a Mozambican Tertiary Hospital

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Abstract

Background

Patient safety culture is essential for delivering high-quality healthcare, including in low- and middle-income countries. This study aimed to assess the patient safety culture of a public tertiary hospital in Mozambique, identifying institutional strengths and weaknesses to inform appropriate interventions.

Methods

An observational, cross-sectional, exploratory, questionnaire-based study targeting all health professionals working at the hospital was conducted using the Hospital Survey on Patient Safety Culture (HSOPSC) version 1.0. The sample comprised healthcare professionals with more than six months' service. Because the data distribution was markedly non-normal ($p < 0.01$ in the Shapiro–Wilk test), dimensions and individual items were analysed using medians and interquartile ranges, while percentages of positive responses were retained for benchmarking. Instrument reliability was estimated with McDonald's omega (ω). Dimensions with low reliability ($\omega < 0.55$) were subjected to item-level analysis.

Results

Of 300 questionnaires distributed, 154 responses were returned (response rate 51.3%). Six of the twelve dimensions exhibited low reliability (ω range: 0.41–0.54), prompting item-level analysis. Teamwork emerged as the sole institutional strength (77.1% positive responses). Twelve items were identified as critical, scoring below the 50% positivity threshold. The lowest scores related to supervisory pressure to work faster (25.4% positive; Median = 2.00; IQR 2.00–3.75), lack of feedback on changes implemented after event reporting (25.7% positive) and working in "crisis mode" (27.3% positive). A managerial paradox was observed: supervisors were perceived as receptive to suggestions (79.3% positive) yet also as prioritizing speed over safety under pressure. Additionally, 60.9% of staff believed that the absence of serious errors was attributable solely to chance.

Conclusions

The institution demonstrates strong local operational cohesion among frontline staff although considerably undermined by systemic barriers. Production pressure, an informal punitive culture, and inadequate feedback cycles are the principal barriers. Targeted interventions focused on leadership and communication are required to advance a just, learning-oriented patient safety culture.

Background

The pursuit of safer healthcare delivery has emerged as one of the foremost global public health priorities. Patient safety is increasingly recognized as a fundamental pillar in the provision of high-quality

and sustainable health services, given the substantial impact and costs associated with adverse events and other systemic harms within healthcare organizations. The burden is particularly pronounced in low- and middle-income countries, where an estimated 134 million adverse events occur annually, resulting in approximately 2.6 million deaths over the past decade (1–3).

Adverse events affect not only patients, who are the primary victims, but also healthcare professionals involved, often referred to as “second victims.” Addressing this phenomenon requires an organizational culture that emphasizes reduced judgment and punitive responses, while fostering structural adjustments that promote a just culture, workforce satisfaction, and retention (4–6).

Healthcare workers play a pivotal role in generating evidence on the strengths and weaknesses of patient safety culture, frequently through validated instruments such as the Hospital Survey on Patient Safety Culture (HSOPSC), which has been widely applied across diverse contexts to characterize safety culture and guide improvement strategies (7–9).

Although limited in number, studies conducted in African countries reveal that teamwork and organizational learning are often perceived as strengths, whereas inadequate staffing and the lack of a non-punitive response to errors remain significant barriers. These findings underscore the need for multifaceted approaches and systematic monitoring to accelerate the transition toward a learning-oriented safety culture ((3, 10, 11).

In Mozambique, a local survey assessing patient perceptions and satisfaction with care quality highlighted concerns regarding doctor–patient relationships, communication, and medical information (12), pointing to weaknesses in dimensions of patient safety culture. Research on patient safety in the country remains scarce, and this study represents a pioneering effort to conduct an exploratory assessment of safety culture at the local level, thereby establishing a foundation for future investigations.

Thus, the objective of this study was to evaluate patient safety culture in a tertiary hospital in Mozambique, identifying areas of strength and weaknesses requiring immediate intervention.

Methods

Study Design and Setting

This was an observational, cross-sectional, and exploratory questionnaire-based study targeting all health professionals working at the hospital, initially developed for a master’s dissertation. The study was conducted in a public, tertiary-level hospital located in southern Mozambique. The institution has approximately 198 inpatient beds and a total workforce of 332 employees. Data collection took place in June 2024.

Participants and Sample Size

Following a census, the entire healthcare workforce present at the hospital was deemed eligible, corresponding to 300 staff members across all hospital departments. Professionals with less than six months of service were excluded. In line with the recommendation of the Agency for Healthcare Research and Quality (AHRQ), the developer of the survey instrument. A census approach was adopted for populations under 500 individuals. Considering an average response rate of approximately 50% and a confidence interval of ± 5%, this strategy was deemed appropriate to have enough study participants (13).

Variables and Measurement

Data were collected using the Hospital Survey on Patient Safety Culture (HSOPSC, version 1.0, 2004). The questionnaire in paper format was provided to participants to be self-completed, comprising 51 items distributed across 12 dimensions, along with a section on sociodemographic characteristics. Items were rated on a five-point Likert scale ranging from 1 (strongly disagree/never) to 5 (strongly agree/always).

The HSOPSC version applied in this study was translated and validated in Portuguese (14) and provided robust evidence of content validity and internal structure based on external measures. Minor modifications were made and restricted to those permitted by AHRQ, specifically updates to the nomenclature of work units/areas and staff positions to align with the organizational context of Mozambique.

Although a formal cross-cultural adaptation process was not undertaken in Mozambique, a brief semantic evaluation was conducted by three intentionally selected healthcare professionals, who reported no need for linguistic adjustments. Portuguese is the official language of Mozambique, a country that gained independence from Portugal half a century ago (15, 16).

To mitigate potential biases, questionnaire completion was strictly anonymous, and completed questionnaires were returned directly to an external investigator with no institutional affiliation or administrative ties to the hospital. To increase the response rate, a second round of data collection was implemented following an awareness campaign consisting of institutional lectures delivered to clinical and administrative department heads.

Patient and Public Involvement

Patients and the public were not involved in the design, conduct, reporting, or dissemination of this study.

Statistical Analyses

Data were processed using SPSS (version 25), with double entry performed independently by two data clerks, followed by verification and data consolidation. Additionally, Jamovi (version 2.3) was employed for complementary analyses. The analytical approach was predominantly descriptive, aimed at identifying areas of strength within dimensions and items with a percentage of positive responses (PPR) > 75%, moderate or neutral areas with PPR between 50–74%, and opportunities for improvement with PPR < 50%, following AHRQ criteria, which facilitate comparison with findings from other studies.

Normality of distribution was assessed using the Shapiro–Wilk test. Absolute and relative frequencies were calculated for sociodemographic variables. Given the markedly non-normal distribution of the data ($p < 0.001$), characterization of dimensions and items was based on medians and interquartile ranges (IQR).

Sample adequacy for dimension grouping was evaluated using the Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity. Internal consistency was assessed using McDonald's Omega coefficient (ω). Dimensional analysis was considered acceptable for KMO values > 0.5 and $\omega \geq 0.55$. Dimensions with low reliability were analyzed item-by-item. Missing data were treated using pairwise deletion to maximize sample utilization.

Results

The final response rate was 51.3%, as illustrated in Fig. 1. A second round of sensitization was required to encourage completion and submission of questionnaires, conducted over the course of one week.

The sociodemographic profile revealed a predominantly female sample, with approximately two-thirds reporting more than three years of experience at the hospital (Table 1). A considerable rate of non-response was observed in demographic variables, ranging between 13.2% and 26.4%.

Table 1
Sociodemographic and Professional Profile of Health Workers (n = 144)

Characteristic	Category	n	%
Gender*	Female	74	51.4
	Male	44	30.6
	No Response (NR)	26	18.1
Age Group	< 30 years	29	20.1
	30–34 years	36	25.0
	35–39 years	21	14.6
	40–44 years	12	8.3
	45 + years	19	13.2
	No Response (NR)	27	18.8
Education Level	Bachelor's degree or higher	17	11.8
	Mid-level or Basic Technical	57	39.6
	Mid-level or Basic General	32	22.2
	No Response (NR)	38	26.4
Professional Role	Nursing	47	32.6
	General Services Assistant	23	16.0
	Administrative Technician	11	7.6
	Laboratory Technician	10	6.9
	Medicine (Physicians)	6	4.2
	Other Roles	28	19.5
	No Response (NR)	19	13.2
Work Experience	6 months – 1 year	8	5.6
	1–2 years	17	11.8
	3–7 years	44	30.6
	8–12 years	18	12.5
	13–20 years	20	13.9

* Percentage sum to 101.1% due to rounding

Characteristic	Category	n	%
	21 + years	14	9.7
	No Response (NR)	23	16.0
Work Unit (Sector)	Wards (Inpatient)	52	36.1
	Outpatient Clinics	17	11.8
	Administration and Finance	15	10.5
	Laboratory	11	7.6
	Other Units	20	13.9
	No Response (NR)	29	20.1
* Percentage sum to 101.1% due to rounding			

Analysis of sampling adequacy and internal consistency confirmed the feasibility of the dimensional structure, albeit with notable variations. The overall KMO value was 0.60, and Bartlett's test of sphericity was significant ($p < 0.001$, except for D7 $p = 0.002$ and D11 $p = 0.054$), indicating acceptable global adequacy for exploratory health studies. However, dimension-specific KMO values revealed instability in certain constructs, ranging from 0.44 to 0.67. Similarly, while overall reliability was high ($\omega = 0.88$), individual dimensions showed heterogeneous reliability (ω ranging from 0.41 to 0.74). These variations justified individualized exploratory analysis of items within dimensions with lower psychometric stability, ensuring precision in identifying weaknesses in patient safety culture.

From this perspective, two dimensions demonstrated robust grouping (D1 and D10), four dimensions showed acceptable grouping (D3, D4, D9, and D12), while the remaining dimensions exhibited weak grouping (D2, D5, D6, D7, D8, and D11). Consequently, half of the dimensions were considered only for item-level analysis, as presented in Table 2. Dimension D11, "Overall Perceptions of Patient Safety," proved unstable, with Bartlett's test yielding $p = 0.054$.

In terms of the percentage of positive responses (PPR), only Dimension D1, "Teamwork" [PPR 77.1%, Md = 4.00 (IQR 3.25–4.25)], emerged as a strength within the hospital. Dimension D3, "Organizational Learning" [PPR 71.3%, Md = 4.00 (IQR 3.67–4.33)], approached this level and was also considered a relative strength. All dimensions with acceptable grouping achieved PPR > 50% (Table 2). However, item-level variations within these dimensions warrant attention, particularly in D9 "Inter-unit Collaboration," D12 "Frequency of Event Reporting," and D4 "Feedback and Communication about Error."

In D9, although the overall perception was neutral, item F2R (PPR 48.9%) stood out negatively, with a median of 3.00 (IQR 2.00–4.00), indicating that nearly half of respondents perceived failures in coordination across different services.

In D12, results varied according to perceived severity of events. Reporting of near-miss events (item D1) yielded only 42.4% PPR, contrasting with a higher propensity to report events with potential harm (item D3: PPR 65.4%). In both cases, medians ranged between 3.00 and 4.00.

In D4, item C1, concerning information on implemented changes, recorded the lowest performance within this dimension, with only 25.7% PPR. The median of 3.00, with quartiles concentrated between 3.00 and 4.00, confirmed that most professionals did not perceive institutional feedback following error reporting, despite feeling comfortable questioning authority (C5: PPR 68.8%).

Table 2
Internal validation and descriptive indicators by HSOPSC dimension

Dimension (HSOPSC)	n	KMO	McDonald's Ω	Percentage of Positive Responses – PPR (%) [1]	Shapiro–Wilk	Median[2] (P25–P75)	Analytical Approach (A/I)[3]
D1. Teamwork	131	0.59	0.72	77.1	p < 0.001	4.00 (3.25–4.25)	A
D10. Transitions/Shift Handoffs	128	0.67	0.74	65.2	p < 0.001	3.75 (3.25-4.0)	A
D3. Organizational Learning	129	0.56	0.62	71.3	p < 0.001	4.00 (3.67–4.33)	A
D9. Inter-unit Collaboration	137	0.54	0.60	59.4	0.004	3.67 (3.00–4.00)	A
D12. Frequency of Event Reporting	128	0.51	0.65	56.5	p < 0.001	3.67 (3.00–4.00)	A
D4. Feedback and Communication about Error	135	0.56	0.56	52.3	p < 0.001	3.67 (3.00–4.00)	A
D8. Management Support (Unit)	129	0.61	0.54	64.9	0.008	3.67 (3.33–4.33)	I
D2. Supervisor Expectations	128	0.59	0.53	54.7	p < 0.001	3.5 (3.00–4.00)	I
D5. Communication Openness	133	0.55	0.52	42.1	0.001	3.33 (2.67–3.67)	I
D7. Non-punitive Response to Error	127	0.44	0.46	47.8	0.005	3.33 (2.67–3.67)	I
D6. Staffing	119	0.6	0.41	42.6	0.021	3.00 (2.75–3.50)	I
D11. Overall Perceptions of Patient Safety	119	0.48	0.41	53.4	0.109	3.33 (3.00-3.75)	I

[1] Refers to the original Likert scale (1 to 5). [2] Refers to the percentage of positive responses (dichotomized) multiplied by 100. [3]A: Aggregated; I: Individualized.

The items identified as critical outcomes were most evident within dimensions analysed individually, such as D7 “Non-punitive Response to Error” (PPR 47.8%), D5 “Communication Openness” (PPR 42.1%), and D6 “Staffing” (PPR 42.6%), making these hospital culture domains the most critical for patient safety. Except for dimensions D1, D10, and D3, all other dimensions contained at least one item classified as critical (Table 3 and Table 1).

Individualised analysis of dimensions with lower psychometric stability revealed 12 critical items (PPR < 50%), distributed across six domains (Table 3). Within the domain of general perceptions, item A10R recorded a PPR of 39.1%, indicating that most respondents did not disagree with the notion that the absence of serious errors may be attributed to external factors such as luck.

Regarding management relations, although listening to suggestions performed well (B2: PPR 79.3%), item B3R yielded the lowest score in the institution (PPR 25.4%; Median = 2.00; IQR: 2.00–3.75), reflecting the perception that task speed is prioritized over safety under pressure. Additionally, item F9R received a PPR of 48.2%, indicating that management’s actions were predominantly reactive to adverse events.

In items related to staffing, a prevalence of crisis-mode work was observed (A14R: PPR 27.3%) along with excessive workloads (A5R: PPR 33.3%). The use of temporary staff (A7R) was positively evaluated by only 41.6% of respondents, in contrast to the perception that sufficient human resources are available to meet service demands (A2: PPR 68.7%).

For items linked to communication openness, low frequencies were noted in questioning decisions made by superiors (C4: PPR 34.6%) and reporting irregularities (C6R: PPR 29.7%). In these indicators, medians were fixed at 3.00 (Neutral), with the first quartile (Q25) at 2.00.

Finally, items related to non-punitive response to error highlighted weaknesses such as the use of errors against professionals (A8: PPR 36.1%) and an emphasis on individual blame rather than systemic issues (A12: PPR 41.6%). Conversely, the item concerning fear of formal documentation in personal records performed better (A16: PPR 67.4%).

Table 3
Positive Performance by Items in Dimensions with Low Internal Consistency

DIMENSIONS / ITEMS	Positive Response Rate (PRR) in Dimensions/Items[1] (%)	Median[2] (P25-P75)
8. Management Support for Patient Safety	**64.9**	
F1 Hospital management provides a work environment that promotes patient safety	71.4	4.00(3.00–4.00)
F8 Hospital management's actions show that patient safety is one of their priorities	73.3	4.00(3.00–5.00)
F9R Hospital management seems interested in patient safety only when an adverse event occurs	48.2	3.00(2.00–4.00)
2. Supervisor/Manager Expectations and Actions Promoting Patient Safety	**54.7**	
B1 My supervisor/manager gives me positive feedback when I follow established patient safety procedures	44.3	3.00(2.00–4.00)
B2 My supervisor/manager seriously considers staff suggestions for improving patient safety	79.3	4.00(4.00–4.00)
B3R When under pressure to get more work done, my supervisor/manager wants us to work faster, even if it means taking shortcuts	25.4	2.00(2.00-3.75)
B4R My supervisor/manager overlooks patient safety problems that happen repeatedly	68.3	4.00(3.00–5.00)
5. Open Communication	**42.1**	
C2 Staff feel free to speak up if they see something that negatively affects patient care	61.5	4.00(3.00–4.00)
C4 Staff feel free to question the decisions or actions of those with more authority	34.6	3.00(2.00–4.00)
C6R Staff are afraid to ask questions when something doesn't seem right	29.7	3.00(2.00–4.00)
7. Nonpunitive Response to Error	**47.8**	
A8 Staff worry that mistakes they make are held against them	36.1	3.00(2.00–4.00)
A12 When an event is reported, it seems like the person is being targeted, not the problem in the system	41.6	3.00(2.00–4.00)
A16 Staff worry that mistakes they make are documented in their personnel file	67.4	4.00(3.00–4.00)

DIMENSIONS / ITEMS	Positive Response Rate (PRR) in Dimensions/Items[1] (%)	Median[2] (P25-P75)
8. Management Support for Patient Safety	**64.9**	
6. Staffing and Work Pace	**42.6**	
A2 We have enough staff to handle the workload	68.7	4.00(3.00–4.00)
A5R Staff work longer hours per shift than is desirable for providing quality care	33.3	3.00(2.00–4.00)
A7R We use more temporary staff for patient care than is desirable	41.6	3.00(2.00–4.00)
A14R We are working in "crisis mode," trying to do too much, too quickly	27.3	3.00(2.00–4.00)
11. Overall Perceptions of Patient Safety	**53.4**	
A10R It is just luck that more serious mistakes have not happened in this unit/service	39.1	3.00(2.00–4.00)
A15 Patient safety is never sacrificed because there is too much work	66.2	4.00(3.00–4.00)
A17R We have problems with patient safety in this unit/service	50.7	4.00(2.00–4.00)
A18 Our procedures and systems are effective in preventing errors from happening	56.1	4.00(3.00–4.00)

Discussion

This study sought to provide a descriptive and pioneering exploration of patient safety culture in Mozambique, based on evidence from a tertiary hospital. The response rate was considered both expected and acceptable, consistent with AHRQ standards and findings from other studies, which reported variations ranging from 4.2% to 100%, with a mean of 66.2% and SD (Standard Deviation) = 21. (13, 17)

The sample size was insufficient to generate robust evidence of validity for HSOPSC Portuguese version 1.0, limiting the analysis to internal consistency across dimensions. Results revealed very low reliability, as indicated by McDonald’s Omega values, in six of the twelve dimensions. This finding partially corroborates the rationale behind the development of HSOPSC version 2.0, which eliminated 21 items, removed two dimensions, and reformulated 25 items from the earlier version (18, 19). Multivariate statistical literature emphasizes that variations in construct reliability and marginal covariance matrices require methodological caution in factor structuring and data analysis (20).

In this study, the majority of respondents were female. This profile is a common finding among similar studies (21), although a review conducted in a region of Ethiopia reported a contrasting and unusual male majority (22), suggesting socio-cultural variations in access to education and healthcare professions. On the other hand, studies have reported an association between female gender and positive outcomes in specific dimensions of patient safety culture (21, 23).

Despite systemic challenges inherent to a public tertiary hospital in a low-income country, teamwork and organizational learning emerged as institutional strengths. Conversely, items related to staffing, non-punitive response to error, and communication openness contributed to very low scores. The considerable omission of sociodemographic data suggests fear of identification and potential punishment. This dynamic indicates that, at the operational frontline, respect, mutual support, and internal cooperation form a protective core that serves as the primary barrier against patient harm (13). Similar findings have been reported internationally, where resilience based on collaboration and learning coexists with structural barriers such as staff shortages and cultural barriers including punitive practices, weak communication, and underreporting of adverse events (21, 24, 25).

Two paradoxes were observed. First, regarding leadership behaviour, although professionals perceived that managers listened to their suggestions, data revealed supervisory practices oriented toward rapid task completion under pressure, often tolerating shortcuts and demonstrating a predominantly reactive stance, with leadership interest in safety only after harm occurred. Second, while staff theoretically recognized that human resources were sufficient to meet demand, daily clinical practice translated into perceptions of excessive workloads and frequent crisis-mode operations. Patient safety literature conceptualizes this scenario as “production pressure,” where demands for productivity and speed undermine formal safety policies, resulting in reactive leadership focused on crisis resolution rather than systematic prevention (24, 26, 27).

This context of high workload and fatigue—driven more by work pace than by absolute staff shortages—contributes for the perception of deteriorating working conditions and is accompanied by failures in coordination and integration of care across services. Evidence from low- and middle-income countries (LMICs) consistently shows that fatigue among health professionals is associated with adverse consequences at the individual, organizational, and patient levels(28, 29). Studies warn that fatigue-driven operational regimes critically disrupt information transfer during handoffs and interconsultations, with deleterious effects on overall safety (25, 30, 31).

The hospital also exhibits gaps in its efforts to achieve an effective just culture. A prevailing belief persists that errors are used against professionals and that investigative focus targets individuals rather than systemic problems. In parallel, low openness to questioning decisions by superiors and reluctance to report irregularities were observed, accompanied by significant inhibition in reporting near-miss incidents. Furthermore, the absence of serious patient harm was often attributed to chance or luck rather than effective processes, normalizing daily vulnerability. Other studies highlight that fear of

retaliation obstructs transparent communication, preventing structural analysis and resolution of problems as opportunities for improvement rather than evidence of blame (22, 32, 33).

Study limitations

The study has several limitations. First, the relatively small sample size and data collection during a period of healthcare worker strikes that occurred while the study was ongoing. This situation partially disrupted hospital activities and may have affected participant recruitment and the representativeness of the findings. In addition, a substantial proportion of missing sociodemographic data limited our ability to examine potential associations with participant characteristics. Why study participants fail to report on they personal data is not well known and my merit future studies. Finally, the study employed an earlier version of the Hospital Survey on Patient Safety Culture (HSOPSC), as it was the only version with established evidence of content and construct validity in Portuguese at the time of data collection for this study. Although a newer version has since become available, the use of the validated Portuguese instrument ensured the methodological rigor of the assessment carried out within this

Conclusion

The assessment of patient safety culture enabled the identification of both opportunities for improvement and areas of strength, based on healthcare workers' perceptions. Overall, patient safety culture in the study hospital faces significant challenges but cannot be considered entirely negative.

As in many hospitals worldwide, teamwork and organizational learning emerged as key strengths. Other dimensions remained in a neutral or transitional stage, interspersed with critical weaknesses in items reflecting just culture, non-punitive practices, and communication openness—placing adverse event reporting as a prominent challenge.

Paradoxes characterize the hospital's patient safety culture, on one hand, managers are perceived as receptive to suggestions, yet staff feel pressured to use shortcuts and work excessively, often relegating safety to a secondary priority. On the other hand, despite perceptions of sufficient staffing, professionals reported excessive workloads and frequent crisis-mode operations.

Abbreviations

HSOPSC
Hospital Survey on Patient Safety Culture
AHRQ
Agency for Healthcare Research and Quality
PSC
Patient Safety Culture
PPR

Percentage of Positive Responses

Declarations

Ethics Approval and Consent to Participate

Ethical approval was obtained from the Scientific Committee of Eduardo Mondlane University (UEM) and the Interinstitutional Bioethics Committee (Approval No. CIBS FM&HCM/078/2023). Following ethical clearance, implementation was authorized by the National Health Service and the issuance of the corresponding credentials. Oral informed consent was obtained from study participants prior to data collection. To ensure participant privacy, the study was conducted under strict anonymity. This research adhered to national standards, institutional ethical policies, and the principles of the Declaration of Helsinki.

Consent for Publication

Not applicable.

Availability of Data and Materials

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

Competing Interests

The authors declare no competing interests.

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Authors' Contributions

All authors contributed substantially to the reported work. All authors agreed on the journal to which the article will be submitted and provided final approval for publication.

Supplementary Information

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Figures

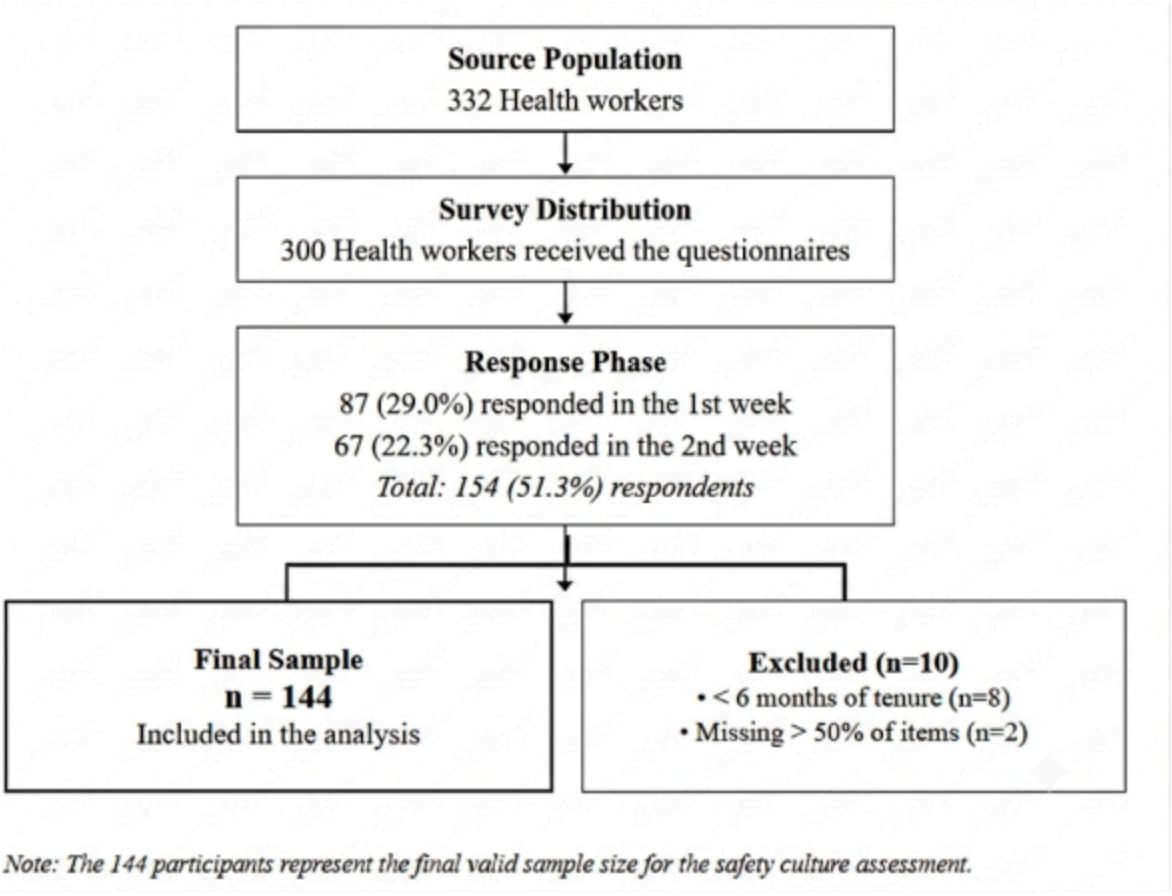


Figure 1

Flowchart of participant recruitment and selection process.