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Assessing Patient Safety Culture in Hospital at Home Services Across Spain Through a National Survey

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ABSTRACT

Patient Safety Culture (PSC) is key to healthcare quality. While widely studied in hospitals, evidence on PSC in Hospital at Home (HaH)—a growing model delivering hospital-level care at home—remains scarce. This study evaluated PSC among professionals in Spanish public HaH units. A descriptive, cross-sectional survey was conducted using the Spanish-validated Hospital Survey on Patient Safety Culture 2.0. Participants were physicians, nurses, and other HaH professionals with ≥ 3 months' experience. A total of 199 responses were analyzed using non-parametric tests. Positive response rates identified strengths ($\geq 75\%$) and improvement areas ($\leq 50\%$). Teamwork Within Units achieved the highest positive responses, indicating strong collaboration, while Staffing and Work Pace scored lowest, reflecting workload concerns. Most rated unit safety as “good” or “very good,” though few as “excellent.” Nurses reported more favorable perceptions than other professionals. Significant differences appeared in teamwork, communication, and leadership support. Comments highlighted commitment despite workforce shortages and limited institutional recognition. HaH services demonstrate a generally positive PSC. Addressing staffing and workload challenges through stronger institutional support and safety protocols is crucial for sustainable, safe home-based care.

1 | Background

Over the past two decades, Patient Safety Culture (PSC) has emerged as a central component in the evaluation and improvement of healthcare systems worldwide. Numerous studies have demonstrated that a positive safety culture is directly associated with reduced adverse events, improved team communication, and higher patient satisfaction (Danielsson et al. 2019; Granel et al. 2025; Granel et al. 2020; Weaver et al. 2022). While much of the existing research has focused on hospital settings, less attention has been paid to alternative care models such as Hospital at Home (HAH) services.

HaH services provide hospital-level care in the patient's home and have expanded internationally, including in countries such as the United States, Australia, the United Kingdom, Italy,

France, and Singapore (Leal et al. 2024; Rossinot et al. 2019; Truong and Siu 2024). Originally conceptualized in the 1980s, HaH aims to deliver acute medical care outside traditional inpatient settings, relying on multidisciplinary teams—typically physicians, nurses, allied health professionals, and administrative staff—who work under conditions that differ substantially from hospital-based care. These include geographical dispersion, limited direct supervision, increased autonomy, and reliance on digital communication systems (Sammer et al. 2021). These contextual factors may influence both the perception and implementation of safety culture within HaH services.

Understanding how safety is perceived in Hospital at Home (HaH) settings is essential for identifying improvement needs and ensuring high-quality, equitable, patient-centered care. This study is based on the Agency for Healthcare Research and

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Summary

- The study provides the first comprehensive assessment of patient safety culture (PSC) in Hospital at Home (HaH) services across Spain, filling an important gap in healthcare research.
- It reveals that nurses consistently report more positive perceptions of PSC compared to physicians, highlighting differences in how professional groups experience and evaluate safety in HaH settings.
- The study identifies significant systemic challenges such as staffing shortages and high workload, emphasizing the need for targeted organizational and policy interventions to improve patient safety in HaH.

Quality's (AHRQ) definition of patient PSC as shared organizational values and norms regarding safety, including communication openness, non-punitive response to errors, teamwork, leadership, staffing, and learning from incidents (World Health Organization 2017; Singer et al. 2003). It also incorporates two complementary frameworks: Reason's model, which links safety risks to both human errors and organizational weaknesses—highly relevant for geographically dispersed HaH teams—and Donabedian's model, which shows how structures, processes, and outcomes interact to shape PSC. Together, these frameworks strengthen the interpretation of safety culture within the unique operational context of HaH services (Reason 2000; Anders 2025).

Although the concept of PSC has been extensively studied in acute and primary care settings, there is a limited but growing body of literature addressing PSC within HaH services (Etebarian Khorasgani et al. 2024; Shepperd 2016). The findings from the available studies suggest that HaH teams face both unique strengths and specific challenges regarding patient safety. Several studies indicate that interdisciplinary collaboration and flexibility in care delivery are perceived strengths in HaH environments, which may positively influence safety culture (Nieva and Sorra 2003; Lee et al. 2022; Larsson et al. 2022). Home-based care allows for greater personalization of treatment and stronger therapeutic relationships with patients, often leading to enhanced communication and patient engagement, key components of a positive PSC (Pfeiffer et al. 2010). At the same time, international analyses highlight difficulties related to staffing variability, communication barriers, and the lack of safety protocols adapted to home settings (Silverglow et al. 2023).

Despite the growing implementation of HaH units in Spain's public health system, there is limited scientific evidence about the current state of PSC among HaH teams. In Spain, a study by González (2019) found HaH to be a safe alternative for patients with chronic or acute decompensated conditions, emphasizing the importance of care coordination and caregiver education.

However, several challenges have been identified in HaH services, including difficulties in communication and coordination due to geographical dispersion of teams (Shepperd 2016), the absence of standardized protocols tailored to home settings, and limited feedback mechanisms regarding adverse

events. Additionally, professionals often perceive a lack of institutional support and recognition from hospital leadership (Shepperd 2016).

This study explicitly contributes to the international literature by offering the first national-level evaluation of PSC in Spanish HaH units, thereby addressing a gap in global safety culture research.

2 | Methods

Quantitative, descriptive, cross-sectional study. Physicians, nurses, health care assistants, and physiotherapists who were actively employed in HaH services during the study period were included. Inclusion criteria included being part of a HaH team for at least 3 months and providing voluntary and informed consent. Data collection was carried out between December 2024 and February 2025, following approval by the Clinical Research Ethics Committee of the UAB, research number CERec109.

The research team presented the project to the “Spanish Society of Hospital at Home (SEHAD)”, which formally endorsed the study and facilitated its dissemination. SEHAD distributed the survey to its members and other HaH professionals through internal mailing lists and institutional communication channels. An information sheet accompanied the questionnaire, providing details on the study's objectives, ethical guarantees, and contact information for the principal investigator. Participation was entirely voluntary, anonymous, and could be withdrawn at any time without consequence. Importantly, participants did not receive any incentive or compensation for participation, and SEHAD's role was limited exclusively to distributing the survey without accessing individual responses or study data.

The instrument used in this study was the Hospital Survey on Patient Safety Culture (HSOPSC) version 2.0, developed by the Agency for Healthcare Research and Quality (AHRQ) and validated in Spanish for use in healthcare environments (Agency for Healthcare Research and Quality 2025). It consists of 32 core items grouped into 10 composite dimensions of PSC. Each dimension corresponds to a validated grouping of items defined by the HSOPSC 2.0 structure, and the Results section presents the findings according to these dimensions to ensure clear alignment with the instrument's design and facilitate interpretability. Each item is rated on a 5-point Likert scale. Specifically, most items assess agreement levels (from “Strongly disagree” to “Strongly agree”), while others evaluate frequency (from “Never” to “Always”), depending on the nature of the question. Additional demographic variables, including professional category, years of experience, and region, were also collected.

To ensure internal validity, the use of a validated, standardized questionnaire and uniform, anonymous data collection minimized potential bias and enhanced reliability. Inclusion criteria also ensured that all participants had relevant professional experience. Regarding external validity, the national dissemination of the survey through the Spanish Society of Hospital at Home (SEHAD) promoted geographical and professional diversity, supporting the generalizability of the findings to other HaH services in Spain.

The survey was designed to minimize social desirability bias through several mechanisms, including anonymous self-administration, the absence of identifiable information, and the use of neutrally worded items and reverse-coded statements embedded in the HSOPSC 2.0 structure. The survey was administered online via Microsoft Forms using the institutional account of the principal investigator. The platform was configured to ensure full anonymity by not collecting names, email addresses, IP addresses, or any device-identifying information, and by preventing multiple submissions from the same participant. The personal data collected were limited exclusively to non-identifiable demographic characteristics (professional category, years of experience, and region), none of which allow direct or indirect identification of respondents. All responses were stored securely and were accessible only to the principal investigator, who conducted the data analysis. Personal data will be retained for 1 year to allow for review of results and potential publications, after which all responses and related documents will be permanently deleted. Data could be made available upon reasonable request. Participants will receive feedback on the findings.

2.1 | Data Analysis

Quantitative data were analyzed using R Studio, applying both descriptive and inferential statistics. Categorical variables were summarized using absolute and relative frequencies, while continuous variables were described using means and standard deviations or medians and interquartile ranges (IQR), depending on their distribution.

Normality was assessed using the Shapiro–Wilk test. As the data did not meet the assumption of normality, non-parametric methods were employed. Group comparisons were performed using the Kruskal–Wallis test, followed by post hoc analyses with the Dunn test. Bonferroni correction was applied to adjust *p*-values and minimize the risk of Type I error due to multiple comparisons. The significance level was set at $p \leq 0.05$.

The primary outcome variable was the positive response rate, calculated as the number of positive responses to each item within a dimension divided by the total number of responses to all items in that dimension. Negatively worded items were reverse-coded prior to analysis. A dimension was considered an area of strength when the percentage of positive responses was $\geq 75\%$, and an area requiring improvement when it was $\leq 50\%$.

Spider diagrams were used to visually represent the 12 dimensions assessed in the study, enabling a rapid and intuitive comparative evaluation also employed in previous research on PSC (Shepperd 2016).

3 | Results

The survey was sent to approximately 300 HaH professionals. A total of 199 healthcare professionals from HaH units across Spain participated in the survey (66.3%). The most represented professional group was nursing, accounting for (72.0%) of

responses, followed by physicians (26.0%), and a small proportion of nursing assistants and administrative staff (1.0% each). This distribution reflects the central role of nursing professionals within HaH teams.

In terms of geographical distribution, responses were received from 11 of the 13 autonomous communities in Spain that provide HaH services (out of 17 in total). Catalonia contributed the highest number of responses (46.2%), followed by Valencia (14.0%) and Madrid (10.0%). The remaining communities had lower representation, ranging between 2% and 5%.

Internal consistency of the HSOPSC 2.0 was assessed in the study sample ($n=199$) using Cronbach's alpha. Dimension-specific reliability estimates were as follows: Dimension 1 (3 items), $\alpha=0.16$; Dimension 2 (3 items), $\alpha=0.35$; Dimension 3 (3 items), $\alpha=0.45$; Dimension 4 (4 items), $\alpha=0.70$; Dimension 5 (3 items), $\alpha=0.49$; Dimension 6 (3 items), $\alpha=0.87$; Dimension 7 (4 items), $\alpha=0.52$; Dimension 8 (2 items), $\alpha=0.91$; Dimension 9 (2 items), $\alpha=0.37$; and Dimension 10 (3 items), $\alpha=0.67$. The overall internal consistency of the full 30-item scale was excellent ($\alpha=0.90$).

At the national level, the dimension that received the highest score was Teamwork (78.4%), indicating strong collaboration among HaH professionals. In contrast, the lowest-rated dimension was Staffing and Work Pace (66.2%), highlighting concerns related to workload and human resources. A similar pattern was observed in Catalonia and Madrid. In both regions, Teamwork was among the most positively rated dimensions, with scores of 78.56% in Catalonia and 77.40% in Madrid. Communication About Error also scored highly (76.22% in Catalonia and 79.40% in Madrid), suggesting a positive safety culture related to open dialog on mistakes. However, Staffing and Work Pace received the lowest scores in both regions (Catalonia: 64.46%, Madrid: 67.00%), pointing to shared challenges regarding workforce and work overload. In contrast, Valencia achieved the highest overall scores across most dimensions. Particularly high ratings were recorded for Reporting Patient Safety Events (81.40%), Communication About Error (79.80%), and Teamwork (80.80%). Even its lowest-rated dimension, Staffing and Work Pace (67.00%), scored higher than in Catalonia and Madrid, suggesting comparatively better perceptions of staffing conditions.

Figure 1 presents a comparative spider graph of the 10 PSC dimensions for the three regions with the highest number of participants (Catalonia, Madrid, and Valencia). This visual representation facilitates the identification of key strengths and areas needing improvement across regions in Home Hospitalization teams.

As shown in Table 1, La Rioja reported the highest overall average score (4.10 ± 0.43), while Euskadi presented the lowest (3.37 ± 0.19). Statistically significant differences between regions were observed in the following dimensions: Organizational Learning—Continuous Improvement, Response to Error, Communication Openness, and Hospital Management Support for Patient Safety.

Figure 2 shows the positive response rate for the 10 dimensions and professional group. It visually highlights how nurses

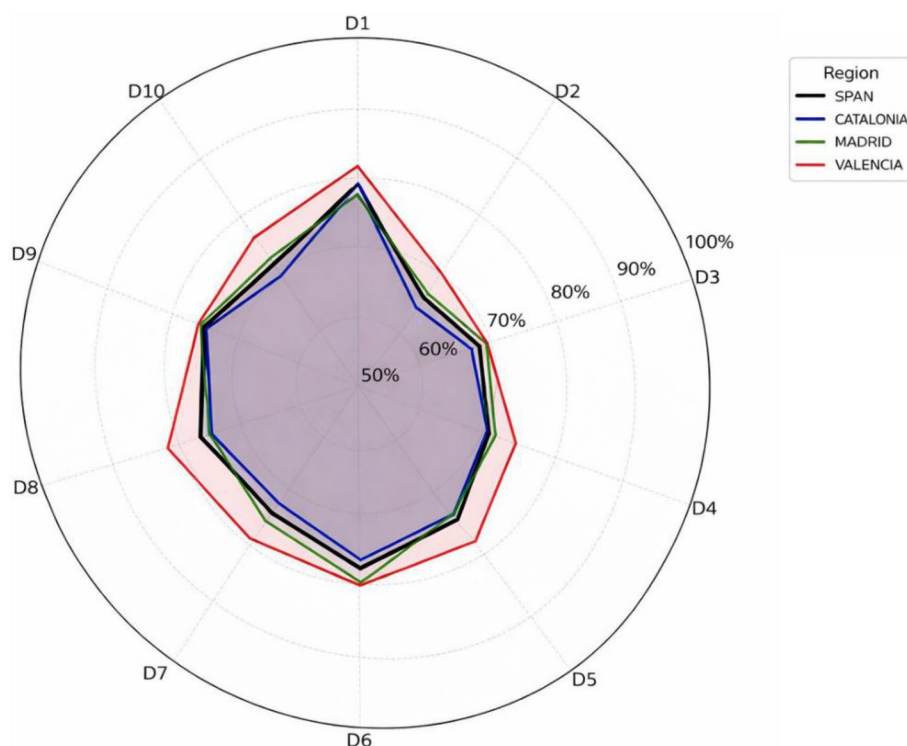


FIGURE 1 | Comparison of patient safety culture dimensions by regions.

consistently rate patient safety dimensions higher than physicians and other healthcare professionals (supervisors or clinical managers).

Independent samples *t*-tests revealed several statistically significant differences in perceptions of PSC across professional groups. Nurses and physicians differed significantly in most of the dimensions: Teamwork (D1), Organizational Learning–Continuous Improvement (D3), Response to Error (D4), Supervisor/Manager Support for Patient Safety (D5), Communication Openness (D7), Hospital Management Support (D9), and Handoffs and Information Exchange (D10) ($p < 0.05$). No significant differences were observed between these two groups in Staffing and Work Pace (D2), Communication About Error (D6), and Reporting Patient Safety Events (D8) ($p > 0.05$), suggesting alignment in these areas.

When comparing nurses with other healthcare professionals (supervisors or clinical managers), significant differences emerged in Staffing and Work Pace (D2), Response to Error (D4), Supervisor/Manager Support (D5), and Handoffs and Information Exchange (D10) ($p < 0.05$), reflecting discrepancies in perceptions related to workload management, error handling, leadership, and information transfer. However, the remaining dimensions—Teamwork (D1), Organizational Learning (D3), Communication About Error (D6), Communication Openness (D7), Reporting Events (D8), and Hospital Management Support (D9)—did not show statistically significant differences ($p > 0.05$), indicating areas of greater agreement.

In contrast, no statistically significant differences were found between physicians and other healthcare professionals across any of the 10 dimensions assessed ($p > 0.05$), suggesting a high level of consistency in their perceptions of PSC within Home

Hospitalization teams. The *p*-values for all comparisons are presented in Table 2.

A total of 70.4% of respondents (140 out of 199) rated the overall perception of patient safety in their HaH unit as “good” or “very good,” while only 31.2% (62 out of 199) considered it “excellent.”

When analyzed by professional group, notable differences emerged. Among nurses, 61.5% (88 out of 143) rated patient safety as “excellent,” and an additional 37.1% (53 out of 143) rated it as “good” or “very good,” resulting in a combined positive perception of 98.6%. Only two nurses (1.4%) rated patient safety as “poor.”

In contrast, among physicians and other healthcare professionals only 21.2% (11 out of 52) considered patient safety to be “excellent,” while 78.8% (41 out of 52) rated it as “good” or “very good.” No respondents in this group rated it as “poor.”

The open-ended responses from the staff revealed a complex interplay of dedication and significant challenges affecting patient care, which align closely with the quantitative findings of the questionnaire. While many respondents expressed strong professional commitment and pride in ensuring patient safety, several critical issues were consistently highlighted. Staffing shortages, including insufficient nursing, technical, and administrative personnel, were frequently cited as major contributors to increased workload and potential safety risks. Personnel instability due to frequent rotations and high turnover further undermined care continuity and quality. Excessive workload limited time for individualized patient attention, potentially compromising safety and care standards. Additionally, many staff felt undervalued and inadequately supported by management, with their concerns

TABLE 1 | Patient safety culture scores by regions: summary statistics and *p*-values.

	Andalucía		Aragon		Cantabria		Catalonia		Madrid		Navarra		Valencia		Galicia		Illes Balears		La Rioja		Vasc country	
	(N=4)		(N=10)		(N=8)		(N=92)		(N=20)		(N=6)		(N=27)		(N=5)		(N=5)		(N=8)		(N=10)	<i>p</i>
Dimension_1																						
Mean	4.08 (±0.42)		3.87 (±0.53)		4.04		3.93		3.87		4.06		4.04		3.53 (±0.38)		3.63 (±0.69)		4.21		3.5 (±0.53)	0.39
(SD)					(±0.72)		(±0.67)		(±0.62)		(±0.74)		(±0.64)						(±0.53)			
Median	4 [3.92–4.17]		3.67 [3.67–4]		3.67		4		3.83		4.33		4		3.67		3.67 [3.33–4]		4 [3.92–4.5]		3.67	
[IQR]					[3.58–4.75]		[3.33–4.33]		[3.58–4.33]		[3.58–4.33]		[3.5–4.33]		[3.33–3.67]						[3.33–3.92]	
Dimension_2																						
Mean	3.12 (±0.43)		3.33 (±0.81)		3.66		3.22		3.35		3 (±0.42)		3.51		3.4 (±0.38)		3 (±0.53)		3.88		3.11 (±0.43)	0.57
(SD)					(±0.81)		(±0.69)		(±0.84)				(±0.94)						(±0.94)			
Median	3.25		3.12 [3–3.25]		3.38		3.25		3.12		2.88		3.75		3.5 [3–3.75]		3 [2.75–3.5]		4 [3–4.75]		3 [2.81–3.31]	
[IQR]	[3.06–3.31]				[3.12–4.5]		[2.75–3.5]		[2.75–4]		[2.75–3.38]		[2.71–4]									
Dimension_3																						
Mean	3.83 (±0.19)		3.37 (±1.09)		3.62 (±0.7)		3.38		3.5		3.72		3.51		2.93 (±0.64)		2.57 (±0.28)		4 (±0.47)		3.43 (±0.55)	0.03
(SD)							(±0.77)		(±0.66)		(±0.53)		(±0.79)									
Median	3.83 [3.67–4]		3.33		3.5		3.33		3.67		3.5 [3.33–3.92]		3.33		3 [2.67–3.33]		2.5		4		3.67	
[IQR]			[2.5–3.92]		[3–3.92]		[2.92–4]		[3–4]				[3.17–4]				[2.33–2.67]		[3.83–4.33]		[3.08–3.67]	
Dimension_4																						
Mean	3.94 (±0.31)		3.3 (±0.89)		3.59		3.5 (±0.93)		3.56		3.89		3.73		3.52 (±0.23)		3.03 (±0.43)		3.98 (±0.76)		2.58 (±0.57)	0.01
(SD)					(±0.93)				(±0.76)		(±0.75)		(±0.69)									
Median	4 [3.88–4.06]		3 [2.62–4]		3.25		3.62		3.62		4		4 [3.12–4.12]		3.5		3 [2.75–3]		4		2.5	
[IQR]					[2.75–4.56]		[2.75–4]		[3–4.06]		[3.75–4]				[3.33–3.75]				[3.94–4.38]		[2.06–2.94]	
Dimension_5																						
Mean	4 (±0)		3.23 (±1.13)		3.79		3.66		3.65		3.94		3.91		3.6 (±0.76)		3.53 (±0.18)		4.08		3.52 (±0.44)	0.20
(SD)					(±0.64)		(±0.66)		(±0.64)		(±0.33)		(±0.77)						(±0.39)			
Median	4 [4–4]		3.67 [2.08–4]		3.67		3.67		3.83		4 [4–4]		4		3.33 [3.33–4]		3.67		4 [4–4]		3.67	
[IQR]					[3.33–4.08]		[3.33–4]		[3.33–4]				[3.33–4.5]				[3.33–3.67]				[3.33–3.67]	

(Continues)

TABLE 1 | (Continued)

	Andalucía		Aragon		Cantabria		Catalonia		Madrid		Navarra		Valencia		Galicia		Balears		La Rioja		Vasc	
	(N=4)		(N=10)		(N=8)		(N=92)		(N=20)		(N=6)		(N=27)		(N=5)		(N=5)		(N=8)		(N=10)	p
Dimension_6																						
Mean	3.92 (±0.57)		3.8 (±1)		3.46		3.81		3.97		4 (±0)		3.99		3.6 (±0.86)		4.2 (±0.65)		4.17		3.9 (±0.67)	0.89
(SD)					(±1.19)		(±0.91)		(±0.83)				(±0.71)						(±0.36)			
Median	3.83		4 [3.17-4.5]		3.33		4		4		4 [4-4]		4 [3.67-4.33]		3.67 [3.33-4]		4 [4-4.67]		4 [4-4.08]		4 [3.42-4.25]	
[IQR]	[3.58-4.17]				[2.58-4.25]		[3.33-4.33]		[4-4.67]				4.33]									
Dimension_7																						
Mean	3.56 (±0.59)		3.75 (±0.65)		3.62		3.58		3.75		3.46		3.94		3.6 (±0.38)		3.8 (±0.21)		4.03		3.38 (±0.34)	0.04
(SD)					(±0.91)		(±0.55)		(±0.58)		(±0.1)		(±0.65)						(±0.47)			
Median	3.75 [3.31-4]		4 [3.31-4]		3.25		3.5		3.75		3.5		4		3.5 [3.25-4]		3.75 [3.75-4]		4		3.25	
[IQR]					[3-4.06]		[3.25-4]		[3.5-4]		[3.5-3.5]		[3.5-4.12]						[3.88-4.06]		[3.25-3.5]	
Dimension_8																						
Mean	3.62 (±0.75)		3.6 (±1.17)		3.69		3.71		3.72		3.67		4.07		3.5 (±1.41)		3.75 (±0.96)		4.12		3.95 (±0.96)	0.82
(SD)					(±0.96)		(±0.82)		(±1.19)		(±0.61)		(±0.78)						(±0.64)			
Median	3.5 [3-4.12]		4 [2.5-4]		3.5		4 [3-4]		4 [2.88-4.62]		4		4 [4-5]		3 [2.5-5]		3.5 [3-4.25]		4 [4-4.25]		4 [3.62-4.75]	
[IQR]					[3-4.25]						[3.62-4]											
Dimension_9																						
Mean	3.67 (±0.47)		3.8 (±0.93)		4.08		3.74		3.78		3.67		3.8		3.87 (±0.69)		3 (±0.54)		4.38 (±0.74)		3.2 (±0.28)	0.01
(SD)					(±0.73)		(±0.61)		(±0.73)		(±0.52)		(±0.82)									
Median	3.83 [3.5-4]		3.67 [3-4.75]		4.17		4 [3.33-4]		4 [3.33-4.08]		4		4 [3.33-4]		3.67 [3.33-4]		3.33		4.5 [4-5]		3.33 [3-3.33]	
[IQR]					[3.58-4.5]						[3.25-4]						[2.5-3.33]					
Dimension_10																						
Mean	3.08 (±0.32)		3.53 (±0.95)		3.75		3.5 (±0.66)		3.62		4.06		3.81		3.67 (±0.67)		3.27 (±1.04)		4.12		3.18 (±0.67)	0.05
(SD)					(±0.75)				(±1.14)		(±0.14)		(±0.83)						(±1.36)			
Median	3.17		3.33 [2.75-4]		3.83		3.58 [3-4]		3.67		4 [4-4]		4 [3.17-4]		4 [3.33-4]		3 [2.67-3.33]		4.5 [4-5]		3 [2.67-3.92]	
[IQR]	[2.92-3.33]				[3.25-4.08]				[2.92-5]													
Dimension_Global																						
Mean	3.68 (±0.27)		3.56 (±0.72)		3.73		3.62		3.68		3.75		3.85		3.52 (±0.53)		3.38 (±0.3)		4.1 (±0.43)		3.37 (±0.19)	0.14
(SD)					(±0.68)		(±0.51)		(±0.55)		(±0.2)		(±0.57)									
Median	3.66		3.67		3.57		3.66		3.53		3.79		3.91		3.27		3.33		4.19		3.43	
[IQR]	[3.58-3.76]		[2.96-3.81]		[3.2-4.19]		[3.22-3.99]		[3.22-4.17]		[3.63-3.82]		[3.34-4.27]		[3.17-3.86]		[3.17-3.54]		[3.8-4.42]		[3.28-3.52]	

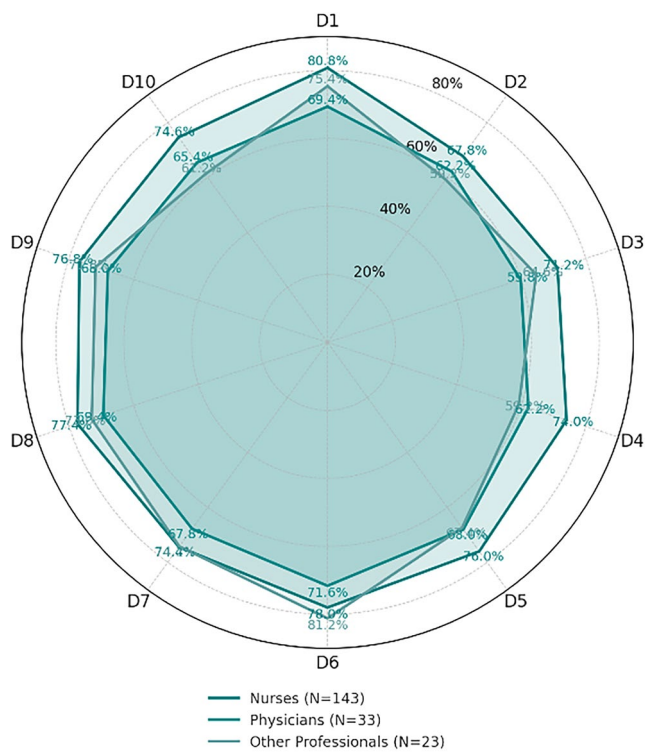


FIGURE 2 | Positive response rate by dimension and professional group.

often overlooked. The need for ongoing training—particularly for managing complex cases—and the implementation of standardized protocols were emphasized to improve safety practices. Communication gaps within teams and between hospital services and administration were also reported as barriers to effective and safe care delivery. Although some units have begun introducing incident reporting systems and fostering a safety culture, respondents identified the need to strengthen these initiatives through more consistent reporting and follow-up mechanisms. Despite these challenges, positive aspects included growing awareness of safety issues, active efforts to improve reporting and team discussions, and reports of supportive work environments in some units. Overall, while HaH staff demonstrate strong dedication to patient safety, addressing workforce shortages, enhancing communication, and increasing institutional recognition and support remain essential to advancing quality and safety in home hospitalization services.

4 | Discussion

The findings of this study provide valuable insights into the current state of PSC in HaH units across Spain. The predominance of nursing professionals among respondents reflects their central role in care coordination, risk management, and frontline clinical leadership—positions that place them at the core of patient safety efforts (Granel et al. 2020; Weaver et al. 2022).

The positive results in communication, teamwork, and nonpunitive responses are consistent with international and national literature on safety culture in healthcare settings, offering

TABLE 2 | Patient safety culture significant differences by groups: *p*-values.

Comparison	Dimen- sion_1	Dimen- sion_2	Dimen- sion_3	Dimen- sion_4	Dimen- sion_5	Dimen- sion_6	Dimen- sion_7	Dimen- sion_8	Dimen- sion_9	Dimen- sion_10	Dimension_ Global
Nurses-Physicians	<0.001	0.41	<0.001	<0.001	0.002	0.13	0.007	0.07	<0.001	0.007	> 0.001
Nurses-Other professionals	0.08	0.02	0.09	<0.001	<0.001	1.00	1	0.48	0.09	> 0.001	0.01
Physicians-Other professionals	0.25	0.74	0.94	1	1	0.14	0.07	1.00	0.84	0.80	1

valuable insights into how organizational context shapes safety perceptions and practices such as smaller teams, interdisciplinary collaboration, and proximity to patients create favorable conditions for cultivating a positive safety culture.

The high rating for Teamwork Within Units (Dimension 6) aligns with previous multicenter studies across Europe that identified intra-unit teamwork as a strong dimension in hospital settings (Lee et al. 2022). In the context of HaH, where teams are often small, interdisciplinary, and work closely together, the nature of the care delivery may naturally foster strong collaboration and mutual trust. This result suggests that the decentralized and patient-centered structure of HaH may enhance communication, coordination, and collective responsibility, contributing to a positive team dynamic.

Similarly, the positive evaluation of Open Communication about Errors (Dimension 1) is noteworthy, especially given that this domain is often reported as a challenge in traditional hospital environments in Spain (Larsson et al. 2022). The fact that HaH teams feel empowered to discuss mistakes or concerns without fear of blame reflects a potentially less hierarchical, more psychologically safe environment that facilitates transparency and a learning-oriented approach to error reporting.

In HaH, professionals often operate autonomously but rely heavily on each other's support and coordination, which could explain the openness and transparency reported in this study. The positive perception of Nonpunitive Response to Errors (Dimension 8) further strengthens this interpretation. Literature has shown that a punitive climate often inhibits error reporting and limits learning from adverse events (Silverglow et al. 2023). In contrast, a nonpunitive culture, as observed in this study, encourages the reporting of near misses and incidents as opportunities for improvement. In HaH services, this may be particularly critical, given the challenges of delivering complex care in the patient's home with limited direct supervision.

These findings contrast with many hospital-based studies in Spain, which often report lower scores in Dimensions 1 and 8 (Larsson et al. 2022; Agency for Healthcare Research and Quality 2025). This suggests that the unique characteristics of HaH—such as its multidisciplinary nature, reduced bureaucracy, continuity of care, and patient-centered philosophy—may foster an inherently safer and more trusting work culture.

The results indicate a generally positive perception of PSC among Home Hospitalization teams in Spain, with some regional differences. The consistently high scores in the Teamwork dimension across all regions suggest that collaboration and mutual support among staff are well established in this care model. Valencia's particularly high scores suggest that this region may have more mature safety practices in place, especially related to open communication and learning from error. These findings may reflect well-developed protocols, strong team cohesion, and possibly better resource allocation. In contrast, Catalonia and Madrid presented more moderate scores, especially in the dimensions related to staffing and workload. These results may indicate resource limitations or operational pressures that impact staff perceptions of safety, especially in a decentralized care environment such as home hospitalization.

The national average showed a marked weakness in the perception of Supervisor/Manager Support for Patient Safety. This discrepancy, compared to the higher regional scores, could suggest a gap between local leadership efforts and broader institutional or systemic management support. A consistent concern across all regions was the perception of inadequate staffing and high workload, which emerged as the lowest-scoring dimension overall. This points to a systemic challenge in ensuring adequate human resources in the home hospitalization context, which may affect not only safety culture but also the quality and sustainability of care. These findings underscore the need to strengthen leadership visibility and support for safety initiatives, ensure adequate staffing levels, and promote ongoing communication and learning. Addressing these areas could further enhance the culture of safety in Home Hospitalization services and support the scalability of this model across diverse healthcare systems.

Conversely, dimensions such as Response to error (D4) and staffing and work pace (D2) received the lowest scores. These deficiencies have also been reported in other studies on safety culture in hospital and HaH settings (World Health Organization 2017; Singer et al. 2003). Particularly concerning is the fact that 61.8% of respondents reported not having submitted any error reports in the previous 12 months, which may suggest a culture of fear or lack of trust in the system, hindering learning from adverse events (Reason 2000).

Previous research has shown that a well-established PSC significantly reduces adverse events and improves quality of care (Anders 2025; Waterson et al. 2019). In HaH, where professionals often work with greater autonomy and limited real-time support, ensuring effective communication, standardization, and institutional support becomes even more critical (Vikan et al. 2023). Studies such as Dainty et al. (2021), Agency for Healthcare Research and Quality (2025), González (2019), and Nieva and Sorra (2003) have highlighted the importance of tailored safety protocols and incident reporting systems for home care, reinforcing the relevance of this study's findings.

Our results may reflect meaningful differences in the roles and responsibilities of nurses and physicians within HaH teams. Nurses are often more directly involved in continuous patient monitoring, home visits, and the daily coordination of care—roles that position them as key agents in maintaining safety and continuity. Importantly, nursing education and practice in Spain are strongly rooted in person-centered care, emphasizing holistic assessment, communication, and individualized care planning, rather than focusing exclusively on clinical procedures. This orientation may explain why nurses tend to perceive dimensions such as teamwork, communication openness, and feedback on errors more positively. At the same time, shared perceptions between nurses and physicians in areas such as supervisor support (D2), non-punitive response to errors (D6), and staffing (D8) may reflect common organizational challenges and cultural dynamics within HaH services. In the Spanish context, qualitative studies have identified barriers frequently reported by nurses, including excessive workload, limited institutional support, and fear of blame—factors known to negatively influence safety culture perceptions. Notably, “staffing” and “non-punitive response

to errors” were among the lowest-rated dimensions in our study, mirroring trends observed in other research and highlighting the need to better support the leadership role of nurses in home-based care delivery.

In home hospitalization settings, teams are typically small and closely integrated, often leading to role overlap between clinical supervisors and physicians. It is common for a senior physician to also act as the team supervisor, resulting in shared responsibilities and leadership. This structural characteristic likely contributes to the lack of statistically significant differences in perceptions of PSC between these two groups observed in our study. A similar pattern was reported in a Spanish study (Tomás Vecina and Astier Peña 2024), where no significant differences were found between managers and physicians in their perceptions of safety culture. The authors suggested that this might be due to greater proximity and collaboration in primary care settings, fostering more consistent views on patient safety. Taken together, these findings suggest that smaller, interdisciplinary teams with overlapping leadership roles—such as those in home hospitalization—may foster greater alignment in safety culture perceptions, particularly between supervisors and physicians who work closely in day-to-day clinical decision-making.

When interpreted through established safety frameworks, the results align closely with both Reason’s model of organizational accidents and Donabedian’s structure–process–outcome framework. According to Reason’s Swiss cheese model, patient harm emerges from the interaction of latent system conditions rather than individual failures (Dainty et al. 2021). In this study, consistently high scores in teamwork, communication about error, and nonpunitive response—particularly in regions such as Valencia—suggest the presence of effective defensive layers that support error detection, recovery, and learning. Conversely, the uniformly low ratings for staffing and work pace across regions represent latent conditions that may erode these defenses, especially in decentralized HaH settings where professionals work with high autonomy. From Donabedian’s perspective, the findings reflect strong care processes but weaker structural elements, notably staffing levels and managerial support (NHS 2020). Regional and professional-group differences further indicate that while positive processes may sustain a favorable safety culture in the short term, unresolved structural constraints risk undermining its long-term stability. Together, these models highlight that improving patient safety in HaH requires not only reinforcing teamwork and open communication but also addressing systemic workforce and leadership factors at the organizational and policy levels.

To enhance the practical utility of these findings, the implications of this nationwide evaluation can be considered at both policy and practice levels. From a policy perspective, the results underline the importance of strategic workforce planning, sufficient staffing, and stronger institutional integration of HaH safety governance. Reinforcing managerial accountability and ensuring consistent resource allocation may help address the systemic challenges identified across regions. From a clinical practice perspective, the study highlights opportunities to build on existing strengths—particularly teamwork, communication

openness, and nurse-led coordination—to reinforce daily safety routines, promote non-punitive learning environments, and strengthen handoff and incident-reporting processes. Structuring the implications along these two complementary axes clarifies how these findings can support decision-makers while guiding HaH teams in implementing realistic, context-sensitive improvements.

Future strategies should prioritize creating blame-free environments for incident reporting, expanding training in safety culture principles, and investing in workforce planning to reduce workload pressure. These actions are essential to ensure safe, patient-centered care in home settings.

While these results are promising, several limitations must be acknowledged. First, the cross-sectional design limits the ability to draw causal inferences, as the relationships observed cannot establish temporal ordering or causality. Second, perceptions of safety culture may not always translate directly into behaviors. Previous research has shown that staff may report high levels of teamwork or communication on surveys while actual practices reveal gaps (Granel et al. 2020; Alabdullah and Karwowski 2024). Third, this study relies on self-reported data, which may be influenced by social desirability bias. Additionally, response bias must be considered, as the survey was distributed through SEHAD—a professional association—which may have introduced membership-related or professional self-selection bias. This may limit the representativeness of the sample since professionals more engaged with HaH practice or more motivated to participate in safety-related initiatives could have been more likely to respond. Future research should incorporate qualitative methods—such as interviews or focus groups—to explore the lived experiences of HaH professionals and to validate and deepen understanding of the survey findings.

Geographic disparities were notable, with Catalonia representing nearly half of the total responses. While this high regional participation reinforces the visibility and development of HaH services in that area, it limits the representativeness of the results on a national scale. Nonetheless, participation from 11 autonomous communities signals growing professional interest in patient safety within this care model.

Moreover, while HSOPSC 2.0 is a validated instrument for measuring hospital safety culture, the HaH context may require adapted tools that account for the specific challenges of home-based care, including patient autonomy, family involvement, geographic dispersion, and emergency response logistics.

5 | Conclusion

Hospital at Home (HaH) services in Spain demonstrate a generally favorable PSC, shaped by their interdisciplinary, decentralized, and patient-centered model. This structure appears to support open communication, effective teamwork, and a less punitive approach to error, features that distinguish HaH from traditional hospital environments.

At the same time, the study identifies persistent challenges, particularly regarding staffing levels and workload pressure, which

can undermine safety and care continuity. While some of these issues require broader institutional responses, HaH teams can take an active role in strengthening safety culture by reinforcing clinical leadership, especially nurse-led coordination, enhancing team self-management, and embedding safety thinking into individualized care planning. These strategies are realistic, context-sensitive, and directly aligned with the operational strengths of HaH.

6 | Relevance for Clinical Practice

The study highlights that HaH teams can enhance patient safety through interprofessional collaboration, open communication, and team-based self-management. Empowering nurses to lead coordination, foster peer learning, and integrate safety thinking into care plans may strengthen safety culture more effectively than top-down interventions alone. Persistent challenges, including staffing shortages and limited managerial support, require targeted strategies such as structured safety protocols and nonpunitive reporting. These findings provide practical guidance for delivering patient-centered, safe, and effective home-based healthcare.

Author Contributions

Rebeca Gomez-Ibáñez: writing – original draft. **Carolina E. Watson:** conceptualization, investigation, methodology, project administration. **Mireia Subirana-Casacuberta:** validation, writing – review and editing, supervision, resources. **Nina Granel:** conceptualization, investigation, writing – original draft, methodology, software, formal analysis, project administration, data curation. **Ester Risco:** validation, visualization, writing – review and editing, project administration, supervision, resources. **Eva Angels Sanchez Martos:** writing – review and editing, validation, investigation, supervision, resources.

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The authors have nothing to report.

Ethics Statement

This study was approved by the Ethics Committee of the Universitat Autònoma de Barcelona (Reference no. PT-2024-045). All procedures performed were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki Declaration and its later amendments.

Consent

Informed consent was obtained from all individual participants included in the study.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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Supporting Information

Additional supporting information can be found online in the Supporting Information section. **Data S1:** STROBE Statement—Checklist of items that should be included in reports of cross-sectional studies.