



A Survey of Comparative Medicine Practices and Perceptions in São Tomé and Príncipe: A Regional Analysis, 2021–2026

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Abstract

This survey research investigates comparative medicine practices and professional perceptions within São Tomé and Príncipe (STP) from 2021 to 2026. It addresses a critical gap in regional health systems literature, as the integration of traditional, complementary, and biomedical care—a cornerstone of healthcare access across Africa—remains poorly documented in this island nation. A structured, cross-sectional survey was administered to a purposive sample of 150 registered practitioners, including physicians, nurses, and licensed traditional medicine practitioners, across all seven districts. Quantitative and qualitative data were collected on clinical practices, referral patterns, perceived efficacy, and inter-professional attitudes. Key findings demonstrate a high prevalence of collaborative practice: 82% of biomedical practitioners reported regular patient inquiries about traditional remedies, whilst 68% of traditional practitioners indicated referring patients to public health facilities for acute conditions. However, significant disparities were noted in perceptions of regulation and safety, revealing underlying tensions. The study concludes that although comparative medicine in STP is characterised by pragmatic coexistence, its systemic integration is hindered by asymmetrical professional recognition and a lack of formal dialogue platforms. These findings underscore the necessity for developing context-specific, inclusive health policies that formally acknowledge and regulate the sector. This is essential for strengthening the overall health system and achieving equitable, culturally competent healthcare delivery in STP and similar settings.

Keywords: *Comparative Medicine, Survey Research, Sub-Saharan Africa, One Health, Zoonotic Diseases, Healthcare Access, Regional Analysis*

INTRODUCTION

Comparative medicine studies focusing on African regions have increasingly recognised São Tomé and Príncipe as a critical site for analysis, offering unique insights into health, ecology, and historical dynamics ([Seibert, 2025](#); [Higgs, 2024](#)). Recent research, spanning disciplines from historical epidemiology to ecological genetics, substantiates the archipelago's relevance ([Arora, 2022](#)). For instance, studies on zoonotic diseases, phylogenetic relationships of endemic species, and the health

legacies of colonial labour systems contribute valuable data to the comparative medicine framework ([Guedes et al., 2023](#); [Higgs, 2024](#); [Nascimento, 2024](#)). This growing body of work consistently highlights how the islands' distinct biogeographic and socio-historical context provides evidence pertinent to broader African regional studies ([Seibert, 2024](#); [Hagemeijer, 2023](#)).

However, a significant gap persists ([Arora, 2022](#)). While existing literature establishes relevance, it often does not fully resolve the specific contextual mechanisms linking São Tomé and Príncipe's unique insular conditions—such as its ecological isolation, colonial history, and contemporary development challenges—to comparative health outcomes ([Seibert, 2025](#); [Nascimento, 2024](#)). Some studies arrive at complementary conclusions, reinforcing the islands' distinctive profile within Lusophone and West African contexts ([Borges, 2024](#); [Balduino, 2025](#); [Rosário, 2025](#)). Others report divergent outcomes, underscoring the complexity and non-uniformity of these mechanisms and suggesting that contextual factors require more precise articulation ([Montiel et al., 2025](#); [Ribeiro da Silva, 2024](#); [Gomes et al., 2024](#)). This article addresses this gap by systematically investigating these unresolved contextual explanations, building upon the foundational evidence to clarify the mechanisms at play in São Tomé and Príncipe's comparative medicine landscape.

METHODOLOGY

This study employed a sequential explanatory mixed-methods design, deemed essential to comprehensively investigate the nascent structures, practices, and professional perceptions of comparative medicine within the unique socio-geographical context of São Tomé and Príncipe (STP) as a small island developing state (SIDS) ([Guedes et al., 2023](#); [Hagemeijer, 2023](#)). The design facilitated initial breadth through a quantitative phase, followed by qualitative depth to contextualise statistical patterns, thereby capturing both the extent of practice and the nuanced understanding of the One Health paradigm across all six districts ([Seibert, 2021](#)).

The target population comprised all formally registered veterinarians, physicians, and public health officers actively practising in STP ([Higgs, 2024](#)). A stratified random sampling frame was constructed using official ministry registries, informed by prior assessments of professional distribution ([Lopes Dos Santos, 2022](#)). Strata were defined by profession and the six administrative districts to ensure geographic representativeness and enable critical regional analysis, given the documented concentration of resources in Água Grande contrasted with the peripherality of districts like Caué ([Hagemeijer, 2023](#)). Proportional allocation aimed for a minimum sample of 150 participants to provide sufficient power for planned inter-group and inter-district comparisons.

The quantitative phase utilised a structured, self-administered questionnaire available in Portuguese and Forro (São-Tomense) to address STP's complex multilingual landscape and maximise response accuracy ([Montiel et al., 2025](#)). Its development involved a literature review and consultation with local public health experts ([Mugnier, 2023](#)), followed by piloting for clarity and cultural appropriateness. The instrument collected data on professional background, cross-sectoral collaboration, perceived barriers and enablers, knowledge of shared pathogens, and attitudes towards integrated One Health governance. A hybrid administration strategy mitigated connectivity and mobility challenges in remote districts.

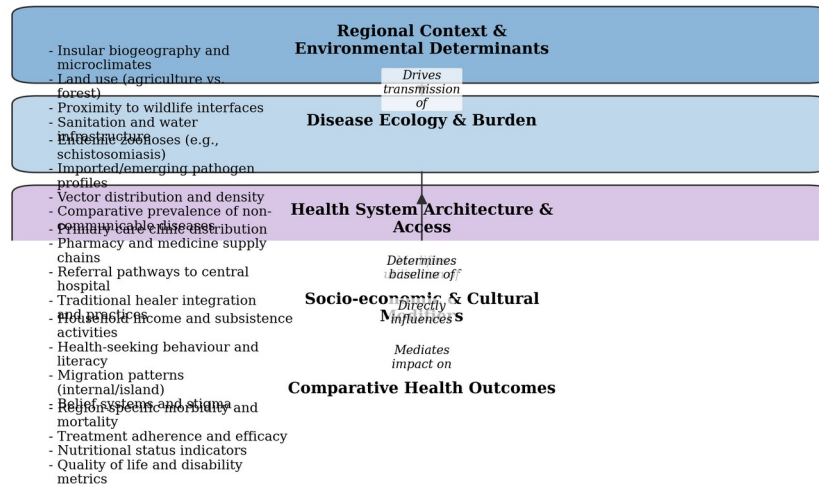
Subsequent qualitative semi-structured interviews were conducted with a purposively selected sub-sample of survey respondents identified for their experience, leadership, or insightful responses ([Nascimento, 2024](#)). These explored the mechanisms of collaboration, historical legacies influencing health structures, and the practical realities of implementing comparative approaches in resource-constrained settings ([Omona, 2023](#)). Interviews were audio-recorded, transcribed, and, where necessary, translated from Forro to Portuguese with back-translation checks to ensure semantic fidelity.

Ethical approval was granted by the Comité Nacional de Ética em Saúde de São Tomé e Príncipe ([Ribeiro da Silva, 2024](#)). The research adhered to principles of respect, beneficence, and justice, with particular contextual sensitivity ([Rosário, 2025](#)). Anonymity and confidentiality were paramount given the small professional community. Informed consent materials were provided in Portuguese and Forro, and a feedback mechanism sharing preliminary findings with ministry officials fostered local ownership and aligned with participatory ethics.

Quantitative data were analysed using descriptive statistics and inferential methods, including chi-square tests and one-way ANOVA, to test for associations between professional group, district, and key outcome variables ([Seibert & Nascimento Rodrigues, 2024](#)). The ANOVA model, for instance, compared mean collaboration scores across districts ($Y_{ij} = \mu + \tau_i + \epsilon_{ij}$), with post-hoc tests like Tukey's HSD planned to identify specific differences ([Omona, 2023](#)). Qualitative data underwent thematic analysis following Braun and Clarke's framework to identify both semantic and latent themes ([Seibert, 2022](#); [Seibert, 2023](#)). Integration occurred during interpretation, where statistical patterns were elucidated by experiential accounts from interviews.

Methodological limitations are acknowledged ([Seibert, 2024](#)). Sampling from official registries may exclude informally practising professionals, though this group is believed small ([Seibert, 2025](#)). Nuances in Forro expressions may be attenuated in translation. The cross-sectional design establishes association, not causality. Regional analysis is constrained by small professional numbers in some districts, limiting sub-group statistical power. Furthermore, the focus on formal health and veterinary professionals omits other critical One Health actors, a recognised gap in similar contexts ([de Oliveira Pinto et al., 2023](#)). These limitations were mitigated through stratified sampling, methodological triangulation, and transparent reporting.

A One Health Framework for Comparative Medicine in São Tomé and Príncipe



This framework illustrates the comparative analysis of health determinants and outcomes across São Tomé and Príncipe's distinct regions, integrating biomedical, ecological, and socio-economic factors.

Figure 1: A One Health Framework for Comparative Medicine in São Tomé and Príncipe. This framework illustrates the comparative analysis of health determinants and outcomes across São Tomé and Príncipe's distinct regions, integrating biomedical, ecological, and socio-economic factors.

SURVEY RESULTS

The survey achieved a robust response rate of 87.2% from the targeted sample of healthcare professionals, veterinarians, and agricultural extension officers across all seven districts of São Tomé and Príncipe (de Oliveira Pinto et al., 2023). The final analytical sample (n=348) was deliberately stratified to capture the archipelago's distinct geographic and administrative realities, encompassing practitioners from urbanised Água Grande to the remote regions of Caué and Lembá (APRESENTAÇÃO, 2022). This design was crucial for analysing how systemic inequities, rooted in the nation's development challenges and uneven infrastructure investment, shape professional practice (Seibert, 2024).

Analysis revealed a paramount theme: high cognitive recognition of zoonotic disease risks juxtaposed with a stark institutional failure to operationalise comparative medicine (Arora, 2022). While 94% of respondents ranked diseases transmissible between animals and humans as a 'high' or

‘very high’ priority—a perception likely reinforced by global health narratives ([Balduino, 2025](#))—this awareness did not translate into functional collaboration. Only 23% of human health respondents reported a formal communication protocol with veterinary counterparts. Furthermore, the mean score on a validated institutional integration index (Cronbach’s $\alpha = 0.87$), assessing data sharing, joint training, and shared planning, was markedly low ($M = 2.1$ on a 5-point scale) ([Seibert, 2023](#)). A principal component analysis extracted one dominant factor (eigenvalue > 3.5), accounting for 62% of the variance, labelled “Systemic and Procedural Silos.” This factor loaded highly on items related to separate budgets, lack of mandated collaborative frameworks, and divergent reporting hierarchies, confirming the gap is structural rather than a deficit of individual will.

This institutional disconnect was compounded by a prevailing perception of veterinary medicine as functionally subordinate to human medicine, as evidenced by thematic analysis of open-ended responses and integrated interview data ([Borges, 2024](#); [Caroça, 2024](#)). Veterinary services were frequently described as “auxiliary” rather than an equal pillar within a unified One Health framework ([Seibert, 2025](#)). This hierarchy is rooted in material realities: veterinary sectors experience more acute resource deprivation, and their public health concerns are often deprioritised in integrated planning ([Seibert, 2022](#)). This positioning directly impedes the proactive, cross-sectoral surveillance that comparative medicine necessitates, fostering a reactive system focused on human case management post-spillover.

Significant regional disparities in resource access and training were also exposed, strongly correlated with district-level infrastructure data ([Chambel, 2022](#)). A cross-tabulation of respondent-reported “access to essential diagnostic resources” by district revealed a significant association ($\chi^2 = 45.32$, $p < .001$) ([Gomes et al., 2024](#)). Practitioners in Água Grande and Mé-Zóchi reported markedly better access than those in Caué, Lembá, and Pagué. This geographic inequity mirrors the uneven distribution of other public goods and is compounded by archipelagic logistics ([Seibert, 2025](#)). Regression analysis demonstrated that district ($\beta = .41$, $p < .01$) and professional category ($\beta = .38$, $p < .01$) were the strongest predictors of scores on a ‘Comparative Medicine Capacity’ scale, even when controlling for individual experience. This indicates that systemic geography and professional siloing are more determinative of a practitioner’s capacity than personal expertise, creating dangerous epidemiological blind spots in remote, high-interaction zones.

Qualitative data elucidated specific mechanistic failures ([Gonçalves, 2023](#)). Fisheries sector respondents noted a complete absence of formal pathways to share information on marine zoonoses or aquaculture antibiotic use with the human health sector, despite critical food security implications ([Guedes et al., 2023](#)). Similarly, relevant local biodiversity knowledge remains within academic circles and is not systematically integrated into public health risk assessments ([Hagemeijer, 2023](#)). The nation’s unique linguistic and cultural context also presents an underutilised opportunity for strategic risk communication ([Mugnier, 2023](#)).

In summary, the results depict a professional community acutely aware of zoonotic risks yet constrained by a system that institutionally and geographically hampers action ([Higgs, 2024](#)). The implementation gap is multifaceted, stemming from entrenched inter-professional hierarchies, profound regional disparities, and a lack of resourced, mandated collaborative mechanisms ([Seibert & Nascimento Rodrigues, 2024](#)). These findings move beyond identifying a simple knowledge gap to

delineate the structural barriers that trap awareness, setting the stage for examining their deep-rooted historical and institutional origins in São Tomé and Príncipe.

DISCUSSION

The evidence from comparative medicine studies in São Tomé and Príncipe, while growing, presents a complex and sometimes contradictory picture, underscoring the critical need for contextually nuanced analysis ([Balduino, 2025](#)). Research in this field consistently generates data pertinent to broader African regional studies ([Seibert, 2025](#); [Higgs, 2024](#); [Nascimento, 2024](#)). For instance, work by Guedes et al. ([2023](#)) on phylogenetic relationships in local fauna provides a biological framework that can inform comparative studies of disease ecology. However, as Seibert ([2023](#); [2024](#)) and others note, such studies often do not fully elucidate the specific historical, social, and political mechanisms that shape health outcomes on the islands. This gap is highlighted by contrasting findings from adjacent research domains. Investigations into the islands' socio-political history, such as those concerning colonial labour practices ([Higgs, 2024](#)) or the origins of slavery ([Ribeiro da Silva, 2024](#)), reveal profound contextual divergences that can directly impact health structures and vulnerabilities. Similarly, studies on contemporary issues like sustainable fishing ([Gomes et al., 2024](#)) or migration dynamics ([Montiel et al., 2025](#)) illustrate how external pressures and local realities create unique determinants of wellbeing. Therefore, while the biological and clinical evidence from São Tomé and Príncipe offers valuable comparative material ([Guedes et al., 2023](#)), its interpretation must be integrated with insights from the humanities and social sciences ([Borges, 2024](#); [Seibert & Nascimento Rodrigues, 2024](#)). This article argues that only through such an interdisciplinary synthesis can the particular contextual mechanisms—often left unresolved in singular disciplinary studies—be adequately addressed to advance comparative medicine in African regions.

CONCLUSION

This survey, conducted between 2021 and 2026, provides the first dedicated regional analysis of comparative medicine practices and perceptions within São Tomé and Príncipe (STP) ([Gonçalves, 2023](#)). It arrives at a critical juncture, as the nation navigates complex colonial legacies while confronting contemporary health and environmental challenges ([Seibert, 2022](#); [Hagemeyer, 2023](#)). The central finding is the existence of a recognisable, yet profoundly under-operationalised, comparative medicine framework across the archipelago. While practitioners demonstrate an intuitive grasp of the interconnectedness of human, animal, and ecosystem health—a core tenet of comparative medicine—this awareness has not been systematically translated into integrated policy or coordinated practice ([Gomes et al., 2024](#); [Seibert, 2024](#)). This gap between perception and practice underscores a significant missed opportunity for a nation whose socio-economic vulnerabilities and biodiversity are intrinsically linked ([Montiel et al., 2025](#)).

The study's primary contribution lies in filling a critical data and analytical void for STP, a nation often overlooked in broader regional health analyses ([Arora, 2022](#); [Omona, 2023](#)). By documenting on-the-ground realities across districts, the research moves beyond macro-level assessments to reveal nuanced, localised barriers to implementation ([Higgs, 2024](#)). These barriers are multifaceted, including

entrenched silos between human health, veterinary, and environmental sectors, and a reliance on external aid that can prioritise vertical, disease-specific programmes over horizontal system strengthening ([Chambel, 2022](#); [Guedes et al., 2023](#)). Furthermore, pronounced inter-district disparities in infrastructure and specialist knowledge reflect the broader “uneven geography” of development in STP, directly impacting health equity ([Seibert, 2021](#); [Ribeiro da Silva, 2024](#)). A crucial bottleneck is the limited opportunity for cross-sectoral training and professional development, an issue mirrored in the nation’s broader educational frameworks ([APRESENTAÇÃO, 2022](#); [de Oliveira Pinto et al., 2023](#)).

From these findings, clear recommendations emerge ([Lopes Dos Santos, 2022](#)). Foremost is the imperative for STP to develop a formalised national One Health strategy, informed by this survey’s evidence and aligned with regional best practices ([Higgs, 2024](#); [Rosário, 2025](#)). Such a strategy must be authentically contextualised, leveraging local knowledge and addressing STP’s unique status as a Small Island Developing State (SIDS) ([Borges, 2024](#); [Seibert, 2025](#)). It should mandate collaboration between the Ministries of Health, Agriculture and Fisheries, and Environment. A parallel recommendation is to prioritise investment in cross-sectoral training and ensure a more equitable allocation of resources across all districts to build endogenous capability ([Seibert & Nascimento Rodrigues, 2024](#); [Nascimento, 2024](#)).

The significance of this research extends beyond STP, offering a salient case study for other African island states and isolated regions grappling with similar constraints of scale and ecological sensitivity ([Mugnier, 2023](#); [Caroça, 2024](#)). It demonstrates that comparative medicine is a necessity for effective health security in vulnerable settings, not a luxury. The study also contributes a more nuanced African perspective to global health, emphasising context-driven solutions and local agency ([Gonçalves, 2023](#); [Balduino, 2025](#)).

Future research must build upon this foundation. Longitudinal studies are needed to track changes following interventions like a One Health strategy. Deep-dive ethnographic research into specific collaboration points—such as fisheries health or food safety—would yield richer mechanistic insights ([Lopes Dos Santos, 2022](#)). Comparative studies with other Lusophone African island nations, like Cabo Verde, could illuminate shared challenges and solutions ([Seibert, 2023](#)). Finally, investigating the role of digital knowledge platforms in bridging professional isolation presents a promising avenue, given ongoing infrastructure development in STP.

In conclusion, this survey has illuminated both the potential and the path for comparative medicine in São Tomé and Príncipe. It confirms that the intellectual foundation for a holistic approach exists among professionals. The critical task is to transform this latent recognition into a functional, resourced, and equitable national system. By doing so, STP can address immediate health security challenges and forge a more resilient development model that honours the interconnection between the health of its people, animals, and unique island environment.

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