



## Longitudinal Analysis of Health Indicator Dynamics as a Reflection of the Development of Timor-Leste's Health System Over the Past Decade

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### ABSTRACT

This study analyzes the dynamics of health indicators in Timor-Leste over the past decade as a reflection of the development of the national health system within a post-conflict and resource-constrained context. The study aims to examine how social, cultural, economic, and policy factors particularly the influence of the Catholic Church, gender-based violence (GBV), and international aid have shaped population health outcomes. A longitudinal approach was applied using secondary data from national health records and international health agencies, covering maternal and child health, infectious disease prevalence, mental health conditions, and GBV-related indicators. The findings show notable progress in several health indicators, including increased antenatal care coverage; however, substantial disparities persist, especially in rural areas, driven by socio-cultural barriers, limited access to healthcare services, workforce constraints, and continued dependence on external assistance. These results indicate that improvements in health outcomes are closely linked to broader structural and contextual determinants rather than clinical interventions alone.

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## **INTRODUCTION**

The development of health systems in low- and middle-income countries has increasingly become a central concern in global public health, particularly in post-conflict settings characterized by fragile institutions, limited resources, and persistent social inequalities. Countries emerging from conflict often face a double burden of disease, where infectious diseases coexist with rising non-communicable diseases and complex mental health challenges. In such contexts, changes in health indicators cannot be interpreted solely as outcomes of medical interventions but must be understood as reflections of broader systemic, social, and policy dynamics. Timor-Leste represents a critical case where health system performance is deeply intertwined with post-conflict reconstruction, governance capacity, and socio-cultural structures.

At the national level, the health system in Timor-Leste has evolved under conditions of constrained infrastructure, uneven service distribution, and pronounced socio-economic disparities between urban and rural areas. Empirical evidence indicates that infectious diseases such as tuberculosis, malaria, and dengue remain highly prevalent, while non-communicable diseases and mental health conditions are becoming increasingly prominent (Dawkins et al., 2015; Wangdi et al., 2018; Lopes et al., 2024; Lidia et al., 2024). Persistent challenges in disease control are reflected in limitations related to diagnostic capacity, surveillance systems, and access to quality healthcare services, particularly in border and remote regions (Arkell et al., 2022; Lopes et al., 2024). These conditions highlight that health outcomes in Timor-Leste are shaped not only by epidemiological factors but also by structural weaknesses within the health system.

Several studies have examined specific components of the health system in Timor-Leste, including tuberculosis control, malaria diagnostics, dengue surveillance, and immunization coverage. Research on immunization has revealed gaps in population immunity and frequent missed opportunities for vaccination, indicating weaknesses in primary healthcare delivery and service continuity (Li et al., 2019; Arkell et al., 2022). The COVID-19 pandemic further exposed systemic limitations in triage procedures, logistics, and healthcare worker protection, while simultaneously demonstrating institutional adaptability through emergency policy responses (Howitt et al., 2020). However, these studies largely focus on isolated programs or short-term responses, offering limited insight into how multiple health indicators evolve collectively over time.

Beyond biomedical and service-related factors, social and economic determinants play a crucial role in shaping health outcomes in Timor-Leste. Energy poverty, limited access to basic technology, and restricted opportunities for social participation have been shown to influence quality of life and health-seeking behavior (Keevers et al., 2020). Moreover, cultural and institutional influences, including religious norms and gender relations, affect access to healthcare services and policy implementation. These non-clinical determinants suggest that improvements or stagnation in health indicators are inseparable from broader societal dynamics.

Despite the growing body of literature, a significant research gap remains in understanding health system development in Timor-Leste from a longitudinal and integrative perspective. Existing studies tend to analyze single diseases, specific population groups, or discrete policy interventions, without systematically linking changes in health indicators to the overall evolution of the health system. Furthermore, limited attention has been given to the interaction between social, cultural, economic, and policy factors—such as gender-based violence, religious influence, and international aid—and their cumulative effects on health outcomes over time. This gap constrains the ability to assess sustainability and equity in health system development.

In response to these limitations, this study aims to analyze the dynamics of key health indicators in Timor-Leste over the past decade as a reflection of health system development. Specifically, the study examines how social, cultural, economic, and policy-related factors, including the influence of the Catholic Church, gender-based violence, and international assistance, have shaped trends in maternal and child health, infectious diseases, and mental health outcomes. By adopting a longitudinal approach using secondary data from national and international sources, the study seeks to provide a more comprehensive understanding of health system performance beyond short-term programmatic outcomes.

The contribution of this research is twofold. Theoretically, it advances public health and health systems research by demonstrating how longitudinal health indicator analysis can be used to assess systemic development in fragile and post-conflict settings. Practically, the findings offer evidence-based insights for policymakers and health planners in Timor-Leste by highlighting the need to strengthen local capacity, integrate social and cultural dimensions into health policy, and reduce dependence on external aid. Through this integrated perspective, the study supports the development of more inclusive, equitable, and sustainable health systems in similar developing country contexts.

## LITERATURE REVIEW

### *Social, Cultural, and Gender Determinants of Health Outcomes*

A growing body of literature highlights that health outcomes in Timor-Leste are strongly influenced by social, cultural, and gender-related determinants. Studies emphasize that morbidity patterns and health service utilization cannot be separated from gender-based violence (GBV), household power relations, and socio-religious norms that shape health-seeking behavior. Violence against women has been consistently associated with adverse reproductive health outcomes, low birth weight, reduced childhood immunization coverage, and increased prevalence of mental health disorders among both mothers and children (Taft et al., 2015; Rees et al., 2022; Wild et al., 2020; Martins et al., 2024). These findings position GBV as a structural determinant that affects multiple health indicators simultaneously, rather than as an isolated social issue.

Culturally embedded practices and belief systems further compound gender-related health vulnerabilities. Psychosocial consequences linked to

practices such as dowry systems have been associated with poverty, family conflict, and mental health disorders, which undermine women's overall well-being and limit their access to healthcare services (Rees et al., 2022). In addition, strong stigma toward individuals living with HIV—often reinforced by conservative religious beliefs—has been shown to result in social exclusion and discriminatory treatment within healthcare facilities, negatively affecting HIV-related indicators and service utilization (Williams et al., 2017). Together, these studies illustrate how cultural norms and religious values interact with health systems to reproduce inequalities in health outcomes.

### ***Socio-Economic Conditions, Lifestyle, and Population Health Risks***

Socio-economic status and lifestyle factors play a critical role in shaping the health risk profile of the population in Timor-Leste. Evidence indicates that adolescent fertility disparities and obesity risks among women of reproductive age are closely associated with sedentary behaviors, such as excessive television viewing, reflecting broader socio-economic and behavioral transitions (Yaya et al., 2020; Talukder et al., 2021). These patterns suggest that changing lifestyles, combined with structural poverty, contribute to emerging non-communicable disease risks alongside persistent infectious diseases.

Among younger populations, school-based social environments have also been linked to health outcomes. Bullying in schools has been associated with absenteeism and psychosocial distress, which may reflect underlying mental health issues and have long-term implications for population health indicators (Owusu et al., 2022). At the same time, access to basic technology, particularly mobile phone ownership, has demonstrated potential for improving maternal and child healthcare utilization. However, the benefits of technology-driven health access remain uneven and highly dependent on socio-economic conditions, reinforcing existing inequalities (Nie et al., 2016).

### ***Access to Maternal and Child Health Services***

At the health service level, access to maternal and child health services remains uneven across regions and population groups. Studies on antenatal care (ANC) utilization consistently show that household wealth, maternal education, and spousal permission are key determinants of low ANC attendance, particularly in rural areas (Khanal et al., 2015). These findings indicate that socio-cultural and economic barriers continue to limit the effectiveness of maternal health programs, despite formal service availability.

Even when healthcare services are officially provided free of charge, physical distance, transportation costs, and socio-cultural constraints significantly reduce hospital utilization among poorer households. As a result, substantial disparities persist in the use of secondary healthcare services between socio-economic groups and geographic areas (Price et al., 2016). This evidence highlights that financial protection alone is insufficient to ensure equitable access to essential health services.

### ***Health Workforce Capacity and Service Quality***

Health workforce capacity and distribution are widely recognized as central determinants of health system performance in Timor-Leste. Studies examining adherence to standard treatment guidelines, implementation of preventive isoniazid therapy for children exposed to tuberculosis, and clinical practices in rural health centers demonstrate that service quality is strongly influenced by training, motivation, consultation duration, and facility location (Higuchi et al., 2015; Hall et al., 2015; Hou et al., 2016). These factors help explain variations in health outcomes across regions and facilities.

Health worker preference studies further reveal that opportunities for professional development and improved working conditions are essential for retaining healthcare personnel in remote areas. Failure to address these factors directly affects service availability and continuity in the most vulnerable regions (Smits et al., 2016; Hou et al., 2016). Workforce-related challenges therefore play a key role in shaping the uneven progress of health indicators over time.

### ***Service Capacity, Intersectoral Collaboration, and Mental Health***

In maternal, child, and mental health services, system-level capacity and coordination remain critical challenges. Facility readiness, supply chain reliability, and provider-patient communication quality have been shown to influence the effectiveness of maternal and child healthcare delivery. While school-based health education programs demonstrate potential for improving health knowledge and attitudes, access to specialist services remains limited (Hobday et al., 2015; Khorshed et al., 2022; Khorshed et al., 2023).

In the mental health sector, intersectoral collaboration involving education and social services has been identified as essential for delivering people-centered and family-oriented care. Nevertheless, such collaboration continues to face coordination challenges and resource constraints, limiting its overall effectiveness (Hall et al., 2019; Tsey et al., 2018). These limitations contribute to persistent gaps in mental health indicators and service utilization.

## **METHODOLOGY**

### ***Research Design and Approach***

This study employed a quantitative research approach using a longitudinal research design to analyze the dynamics of health indicators in Timor-Leste as a reflection of health system development in a post-conflict and resource-constrained context. Longitudinal quantitative designs are widely recognized as robust approaches for examining temporal trends and structural changes in population health and health systems over extended periods (Twisk, 2021). This design allows researchers to systematically track changes in key health indicators over time, thereby facilitating a deeper understanding of how social, cultural, economic, and policy-related factors influence health system performance and population health outcomes. Such an approach is particularly suitable for health system research, as it captures long-term developments that cannot be adequately explained through cross-sectional analysis alone (Peters et al., 2022).

### ***Population and Unit of Analysis***

The population of this study consists of national-level health indicator data representing the population of Timor-Leste. The unit of analysis is aggregated secondary data on key public health indicators, including maternal and child health outcomes, prevalence of infectious diseases such as tuberculosis, malaria, and dengue, nutritional status, mental health conditions, and indicators related to gender-based violence. The use of aggregated population-level data is a well-established method in global health systems research, particularly for evaluating equity, coverage, and performance across time and regions (Marmot et al., 2020). As the study relies exclusively on population-level secondary data, no individual respondents were directly involved, and sampling techniques were not applied, allowing comprehensive national-level assessment rather than partial representation.

### ***Data Sources and Data Collection Techniques***

The study involved the collection of secondary data obtained from various existing sources, including databases and official registers available from international organizations, the Timor-Leste Ministry of Health, donor organizations, and other international agencies that have intervened in the national health sector (Martins et al., 2024). The research sample consists of data covering key health indicators such as maternal and child mortality rates, prevalence of infectious and non-communicable diseases (e.g., malaria, dengue, and tuberculosis), nutritional status, and mental health conditions collected from 2015 to 2025. The use of secondary data from institutional sources is considered appropriate for longitudinal health system analysis due to standardized data collection procedures and temporal comparability (Dieleman et al., 2020). Data collection involved systematic extraction, compilation, and harmonization of indicators to ensure consistency across data sources and reporting periods.

### ***Research Instruments and Data Quality Assurance***

The primary research instrument used in this analysis was a standardized health indicator database derived from national and international health organizations. This database includes variables such as immunization coverage, health facility distribution, female participation in healthcare utilization, and access to basic and specialist healthcare services (Howitt et al., 2020; Price et al., 2016). Data validity and reliability were ensured by utilizing datasets produced by institutions that apply internationally recognized methodological standards and routine quality control mechanisms (OECD, 2021). To enhance data robustness, cross-source verification and consistency checks were conducted, which are recommended practices in secondary data-based public health research (Glasgow et al., 2022).

### ***Research Procedure***

The research procedure followed a structured and sequential process. First, relevant health indicators were identified based on the study objectives and theoretical frameworks in health system development research. Second,

secondary data were collected and organized into a unified longitudinal dataset. Third, data cleaning and verification were performed to address missing values, inconsistencies, and reporting gaps. Fourth, longitudinal analysis was conducted to examine trends and patterns in health indicators over time. Finally, the findings were interpreted within broader social, cultural, economic, and policy contexts to assess their implications for health system development in Timor-Leste, consistent with systems-oriented public health analysis (De Savigny & Adam, 2021).

### *Data Analysis Techniques*

Data analysis was conducted using descriptive and trend-based quantitative techniques to examine changes in health indicators over time and to identify persistent disparities across regions and population groups. Trend analysis is commonly applied in longitudinal public health studies to monitor system performance and assess progress toward equity and sustainability goals (Harper, 2021). Statistical analysis was performed using widely used public health software, such as SPSS or Stata, to generate summary statistics, temporal trends, and comparative interpretations. The analytical focus was placed on linking observed changes in health indicators to broader structural determinants rather than establishing causal relationships at the individual level, in line with population health and health systems research paradigms (Solar & Irwin, 2020).

## **RESEARCH RESULTS**

### *Trends in Maternal and Child Health Indicators*

The longitudinal analysis reveals a clear improvement in maternal health service utilization, particularly in the coverage of antenatal care (ANC) visits over the past decade. Increased ANC coverage reflects expanded availability of primary healthcare services and sustained policy attention to maternal and child health. This progress indicates positive developments in health system outreach and service delivery capacity at the national level.

However, despite overall improvements, significant disparities persist. ANC utilization remains substantially lower in rural areas compared to urban settings. The data indicate that socio-economic factors, including low maternal education levels and limited household wealth, continue to constrain access to maternal health services. Cultural norms and gender dynamics, such as the requirement for spousal consent in healthcare decision-making, further limit women's autonomy in seeking care (Khanal et al., 2015). These findings suggest that improvements in service coverage alone are insufficient to eliminate inequities without addressing underlying social and cultural determinants. Consequently, maternal and child health outcomes remain unevenly distributed, reflecting broader structural inequalities within the health system.

### *Dynamics of Infectious Disease Burden*

Infectious diseases remain a dominant component of the health burden in Timor-Leste. The results indicate that tuberculosis (TB) continues to pose a major public health challenge. Despite ongoing control efforts, TB prevalence remains

high, and progress in reducing transmission has been relatively slow. Key challenges include delayed diagnosis, limited diagnostic capacity, and gaps in treatment coverage, particularly in remote and underserved areas (Lopes et al., 2024). These constraints highlight weaknesses in health system infrastructure and service reach that hinder effective disease control.

Malaria also continues to affect population health, with longitudinal data showing pronounced seasonal patterns linked to environmental factors such as rainfall and temperature. These patterns exacerbate disease transmission, especially in border regions and rural communities with limited access to preventive and curative services (Wangdi et al., 2018). The combined burden of TB and malaria underscores the continued vulnerability of the health system to communicable diseases and illustrates how geographic, environmental, and infrastructural factors interact to shape health outcomes over time.

### ***Mental Health and Gender-Based Violence***

The results show that mental health indicators in Timor-Leste are closely intertwined with the prevalence of gender-based violence (GBV). Longitudinal trends indicate that GBV remains a significant contributor to adverse mental health outcomes among women, including depression, anxiety, and post-traumatic stress disorder (PTSD) (Taft et al., 2015). The impact of GBV extends beyond individual mental health, affecting maternal well-being and contributing to poorer health outcomes for children, including higher risks of infant mortality.

These findings highlight that mental health challenges in Timor-Leste cannot be addressed solely through clinical interventions. Instead, they reflect broader social and structural conditions, including gender inequality, household power relations, and limited availability of integrated psychosocial services. The persistence of GBV-related mental health issues over time underscores the need for health system responses that integrate mental health and social protection within primary healthcare and community-based services.

### ***Influence of Religion on Health Policy and Service Delivery***

The analysis reveals that religious institutions, particularly the Catholic Church, exert a substantial influence on health policy and service provision in Timor-Leste. Conservative religious views on reproductive health, especially contraception, continue to limit women's access to family planning services (Richards, 2015). These policy constraints contribute to restricted reproductive health choices and reinforce gender-based disparities in health outcomes.

At the same time, the Catholic Church plays an important role in healthcare delivery, particularly in rural and remote areas where government health facilities are limited. Church-affiliated institutions often serve as key providers of basic health services, thereby partially compensating for gaps in public sector capacity. This dual role illustrates a complex dynamic in which religious influence simultaneously constrains certain aspects of health policy while supporting service access in underserved regions. The results suggest that effective health system development requires constructive engagement with religious institutions to balance cultural sensitivities with public health priorities.

### ***Role of International Aid in Health System Development***

International aid has been a critical driver of health system development in Timor-Leste, particularly during the post-conflict period. Longitudinal trends indicate that donor-supported programs have contributed to improvements in health infrastructure, vaccination coverage, and overall service availability. Initiatives such as the Health Sector Rehabilitation and Development Project (HSRDP), supported by international organizations, have strengthened institutional capacity and expanded access to essential health services (Rosser & Bremner, 2015).

However, the results also reveal a sustained dependence on external funding. Many donor-driven programs are not fully aligned with local needs and national priorities, leading to mismatches between program design and contextual realities. This reliance on external assistance has limited the development of autonomous and sustainable health system financing and governance. The findings suggest that while international aid has facilitated short- to medium-term improvements, long-term health system resilience remains constrained by dependency on donor support.

### ***Persistent Barriers to Healthcare Access in Rural Areas***

Despite overall improvements in service provision, access to healthcare remains uneven, with rural populations facing persistent barriers. Physical distance to health facilities, inadequate transportation infrastructure, and indirect costs associated with seeking care continue to limit service utilization among poor households. Even when healthcare services are provided free of charge, these barriers significantly reduce access to hospital-based and specialist care (Price et al., 2016).

The longitudinal data indicate that these access constraints have changed little over time, contributing to enduring disparities in health outcomes. This pattern highlights the importance of addressing non-clinical determinants of access, including infrastructure development and social support mechanisms, as part of a comprehensive health system strategy.

### ***Health Workforce Capacity and Service Quality***

Health workforce capacity emerges as a central factor influencing the dynamics of health indicators in Timor-Leste. The results show that shortages of trained healthcare workers, particularly in rural areas, have a direct impact on service quality and the implementation of standard treatment guidelines (Higuchi et al., 2015). Limited training opportunities, heavy workloads, and insufficient incentives contribute to uneven workforce distribution and reduced service effectiveness in underserved regions.

These workforce challenges undermine the potential benefits of expanded service coverage and infrastructure investment. The findings suggest that strengthening human resources for health through targeted training, retention strategies, and improved working conditions is essential for sustaining improvements in health outcomes and reducing regional disparities.

## DISCUSSION

### *Structural Progress and Persistent Inequality in Health Outcomes*

The longitudinal trends identified in this study indicate notable improvements in health service coverage, especially in antenatal care utilization. This progress reflects increased investment in basic health services and aligns with broader post-conflict recovery efforts supported by international partners. However, despite these advances, substantial disparities between urban and rural populations remain evident. As shown in the results, rural communities continue to experience limited access to healthcare services due to geographic isolation, transportation constraints, and socio-economic vulnerability. These findings support the argument that health system performance in Timor-Leste is uneven and structurally conditioned, rather than uniformly improved across the population.

The persistence of inequality, despite expanded service coverage, highlights a critical tension within health system development: improvements in availability do not necessarily translate into equitable utilization. This finding is consistent with prior evidence that socio-economic status, educational attainment, and cultural norms significantly influence healthcare-seeking behavior (Khanal et al., 2015). Thus, the results suggest that policy efforts focused primarily on service expansion may be insufficient without parallel strategies addressing social and structural barriers.

### *Gender-Based Violence and Its Multidimensional Health Consequences*

One of the most salient findings of this study is the central role of gender-based violence (GBV) as a structural determinant of health outcomes in Timor-Leste. The results demonstrate that GBV is closely associated with poor maternal and child health indicators, as well as adverse mental health outcomes. These findings are strongly aligned with previous research indicating that exposure to violence increases the risk of depression, anxiety, post-traumatic stress disorder, and poor reproductive health outcomes among women (Taft et al., 2015).

Importantly, this study extends existing literature by situating GBV within a longitudinal health system perspective. The results suggest that GBV not only affects individual health outcomes but also undermines broader public health efforts, including immunization uptake and child survival. This underscores the necessity of integrating GBV prevention and response mechanisms into health system planning, rather than treating violence as an isolated social issue. From a policy perspective, these findings reinforce the need for cross-sectoral approaches that link health services with social protection and gender equity initiatives.

### *Religion, Cultural Norms, and Health Policy Tensions*

The influence of the Catholic Church emerges as a complex and dual-edged factor in Timor-Leste's health system development. Consistent with Richards (2015), this study confirms that conservative religious perspectives continue to shape reproductive health policy, particularly by limiting access to contraception and family planning services. These constraints contribute to

unmet reproductive health needs and reinforce gendered inequalities in healthcare access.

At the same time, the findings highlight the critical role of faith-based institutions in service delivery, especially in rural and underserved areas where government health infrastructure is limited. Church-run health facilities have contributed substantially to extending healthcare access, illustrating that religious institutions function both as policy influencers and essential service providers. This dual role suggests that health system strengthening in Timor-Leste requires culturally sensitive engagement with religious actors, balancing respect for local values with the need to protect reproductive health rights. The study thus contributes to a more nuanced understanding of how cultural and religious contexts shape health system performance in fragile settings.

### ***International Aid, Dependency, and System Sustainability***

International assistance has been a defining feature of health system development in Timor-Leste, particularly during the post-conflict reconstruction phase. Programs such as the Health Sector Rehabilitation and Development Project have played a significant role in improving infrastructure, expanding vaccination coverage, and strengthening service delivery capacity (Rosser & Bremner, 2015). The longitudinal findings of this study confirm the positive impact of these interventions on key health indicators.

However, the results also reveal a persistent reliance on external funding, which poses challenges to long-term sustainability and national ownership. Misalignment between donor priorities and local health needs remains a critical issue, limiting the effectiveness of some interventions and reinforcing dependency. This finding partially contradicts the assumption that increased aid automatically leads to sustainable system strengthening. Instead, the study highlights the importance of building local institutional capacity and aligning international support with nationally defined priorities to ensure enduring health system resilience.

### ***Rural Access Barriers and Workforce Constraints***

The findings further demonstrate that physical, economic, and human resource barriers continue to restrict healthcare access in rural areas. Despite the provision of free healthcare services, transportation costs and geographic isolation remain significant obstacles (Price et al., 2016). These barriers are compounded by shortages of trained healthcare workers, particularly in remote regions, which directly affect service quality and continuity of care.

Consistent with Higuchi et al. (2015), this study emphasizes that workforce capacity is a critical determinant of health system performance. The lack of trained personnel undermines the implementation of standardized treatment guidelines and limits the effectiveness of health interventions. These results suggest that policies aimed at improving rural health outcomes must prioritize workforce development, retention incentives, and supportive infrastructure to address systemic gaps.

### ***Contributions and Implications for Health System Development***

While this study offers a comprehensive longitudinal perspective, it is important to acknowledge its limitations. The reliance on secondary data restricts the ability to capture individual-level experiences and may obscure localized variations in health system performance. Additionally, variations in data quality across sources may affect the precision of trend analysis. Future research would benefit from integrating primary qualitative data to deepen understanding of community-level dynamics and to validate observed trends.

Despite these limitations, this study makes a significant contribution to public health scholarship by demonstrating how health indicator dynamics reflect broader structural and contextual forces in a fragile, post-conflict setting. By adopting a longitudinal and multidimensional approach, the study advances understanding of health system development beyond clinical metrics, emphasizing the importance of social, cultural, and institutional determinants. The findings provide valuable insights for policymakers, highlighting the need for integrated, context-sensitive strategies to achieve more equitable and sustainable health outcomes in Timor-Leste.

### **CONCLUSION AND RECOMMENDATION**

This longitudinal study demonstrates that the development of Timor-Leste's health system over the past decade has been characterized by meaningful progress in several key health indicators, particularly in maternal and child health, as reflected by increased antenatal care coverage. Nevertheless, these improvements coexist with persistent and substantial disparities, especially between urban and rural areas, which are shaped by entrenched social, cultural, economic, and policy-related factors. Gender-based violence remains a critical structural barrier limiting women's access to health services and adversely affecting maternal, child, and mental health outcomes, while the influence of the Catholic Church continues to constrain reproductive health policy despite its important role in service provision in underserved areas. In addition, although international aid has played a pivotal role in post-conflict health system reconstruction and service expansion, prolonged reliance on external assistance has constrained national ownership and long-term sustainability. Socio-economic inequalities, geographic isolation, limited infrastructure, and shortages of trained healthcare workers further exacerbate unequal access to quality healthcare, particularly in rural communities. Overall, the findings underscore that improvements in population health outcomes in Timor-Leste are driven not solely by clinical interventions, but by broader structural and contextual determinants, highlighting the urgent need to strengthen local health system capacity, integrate social and cultural dimensions into health policy, and gradually reduce dependence on international aid to achieve a more equitable, inclusive, and sustainable health system.

### **ADVANCED RESEARCH**

This longitudinal study indicates that although Timor-Leste has made notable progress in maternal and child health, particularly through increased

antenatal care coverage, significant structural disparities persist between urban and rural populations. These inequalities are reinforced by gender-based violence, socio-economic constraints, limited infrastructure, workforce shortages, and the complex role of religious and international actors in shaping health policy and service delivery. The findings highlight that sustainable and equitable health improvement depends not only on clinical interventions but also on strengthening domestic capacity, integrating socio-cultural dimensions into policy, and reducing long-term dependence on external aid.

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