

Healthcare Pricing Variations in Common Surgical Procedures: Empirical Evidence from a Developing Private Healthcare System

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Abstract

This study investigates the dynamics of healthcare pricing within Sri Lanka's expanding private health sector, focusing on ten common surgical and diagnostic procedures across three provinces. An analysis of patient fee data from over 1,600 patients covering eight major private hospitals demonstrated statistically significant fee variations ($P < 0.001$) across hospitals and provinces. The Western Province consistently recorded higher hospital and clinician fees, indicating the impact of market concentration, affluence, and regional demand elasticity. These results reflect broader inefficiencies—unilateral price determination, clinician influence, and information asymmetry—undermining cost transparency. Despite proximity between hospitals, marked differences persisted, revealing structural segmentation within the healthcare market. Such disparities challenge the fairness and sustainability of Sri Lanka's universal health coverage. The study concludes that establishing standardized pricing mechanisms and regulatory benchmarks tied to national per capita income could stabilize market behavior and ensure more equitable healthcare access in developing private healthcare economies.

Keywords

Pricing variations; policy reforms; unilateral price fixing; information asymmetry; policy parameters; legal and regulatory framework

1. Introduction

South Asia is a region with close to two billion people, and total health expenditure exceeds USD 100 billion. Compared with most South Asian nations, Sri Lanka has enjoyed commendable health outcomes for decades, as the provision of free healthcare has been a national priority. While adhering to universal health coverage principles set out by the United Nations, the Sri Lankan health system comprises both private and public healthcare sectors, with the public sector bearing the bulk of the burden of delivering healthcare services to a population of nearly 22 million people. A total of 643 public sector hospitals, with a bed capacity of 86,589, facilitated 7.4 million inpatient admissions in 2019.

In contrast, the number of private health institutions grew from 800 in 2015 to 1,432 in 2019, of which 111 were private hospitals, nursing homes, and maternity homes. In 2017, 106 private hospitals, nursing homes, and maternity homes accounted for 4,686 beds, representing 5.41% of the public sector bed capacity [1–7].

Healthcare financing in Sri Lanka is predominantly provided through the government and associated agencies (GAA) and out-of-pocket payments made by individuals. The Sri Lankan public health system is fully funded and governed by state agencies. In 2020, Sri Lanka's total current health expenditure (CHE) was USD 3,280 million, of which domestic private health expenditure accounted for more than half

(52%). Most (90%) of domestic private health expenditure was derived from out-of-pocket payments, which has clear implications for Sri Lanka's progression toward universal health coverage. By comparison, in the United States, total current health expenditure in 2021 was USD 4,124 billion, of which domestic private health expenditure accounted for 49%, while out-of-pocket payments represented only 19% of domestic private health expenditure [1–9].

The private health sector in Sri Lanka is a growing force, with greater investment capacity by private investors who recognize the prevailing gaps in the service delivery in the public sector healthcare and the evolving demographics and epidemiological profile of Sri Lanka. This growing demand may be driven by various factors, including increasing purchasing power, lack of personalized care in the public health sector, and perceived benefits of quicker, cleaner, and more flexible service delivery in private healthcare [9–18]. A review of the healthcare system in Sri Lanka indicated that, in terms of stewardship and regulation of the health system, there is a clear need to bridge existing gaps in the legal and regulatory framework and in the enforcement of health regulations applicable to the private sector, as well as to create an enabling environment for more effective private sector participation in the health sector [9–18].

With the growth of private sector healthcare in Sri Lanka, a recent study has indicated that there is growing dissatisfaction among patients regarding the fees charged by clinicians and healthcare providers. Further research suggests that there is a growing influence of senior clinicians within the private healthcare sector in fee determination [19,20].

Studies conducted by Reinhardt identified three main dimensions of payment methods for healthcare services: the base or unit of activity upon which fees are defined and paid; the level of the payment or fees per unit of the chosen base; and the administrative and economic process by which the fee level is determined [21–24].

Global research shows that out-of-pocket payers are least immune to unfair fees being charged by healthcare providers [25]. Studies conducted in Sri Lanka confirm that private sector healthcare fees are predominantly determined unilaterally by private healthcare providers and that the base or unit of activity upon which the fees are determined is mainly based on fees for the services offered [19,20].

There are no studies available to ascertain the reasons for the growing dissatisfaction with healthcare pricing and the possible variations in pricing that might exist across provinces and hospitals within the Sri Lankan private sector. Against this background, the aim of this study was to examine whether there are fee variations in the fees charged by clinicians and healthcare providers for some of the commonly performed medical and surgical procedures across the private healthcare sector in Sri Lanka.

2. Methods

2.1. Study Design

This study tested whether there were variations in pricing and fees across ten commonly performed surgical procedures within prominent private hospital chains distributed

across three provinces in Sri Lanka. During the study period, pricing details from more than 1,600 patients were analyzed, covering ten of the most frequently performed surgical and medical procedures. For each procedure, fee data from a minimum of 160 patients distributed across eight hospitals and three provinces were analyzed. In 2021, these three provinces covered more than half (52.8%) of the total population of Sri Lanka [7]. In each of these provinces, the most prominent private hospitals (in terms of bed capacity) were selected for the purpose of this research. These hospitals covered almost 20% of the total private-sector bed capacity in Sri Lanka [2,3].

2.2. Setting

Three main provinces of Sri Lanka were included in this study: Western Province, with a population of 6.209 million [7], where the commercial capital city of Sri Lanka, Colombo, is located; Central Province, with a population of 2.812 million [7]; and Southern Province, with a population of 2.702 million [7]. Data for each procedure in each hospital were collected over a period of 4–6 months, from November 2021 to April 2022.

2.3. Ethics

Approval was obtained from the Ministry of Health and Indigenous Medical Services, Sri Lanka, to approach private hospitals (AD19/02/42). In Sri Lanka, all private hospitals come under the direct supervision of the Private Sector Health Regulatory Council operating under the Ministry of Health. Ethical approval to conduct the study was also obtained from the Human Research Ethics Committee at the University of Western Australia. The anonymity of patients' personal information was maintained while obtaining fee information from the hospitals; therefore, individual patient consent was waived.

2.4. Participants

From each hospital, for each procedure and clinician, pricing and fee data from more than 1,600 patients were collected. Pricing and fee data from patients who experienced medical or surgical complications, required admission to intensive care units, or occupied high-cost luxury suites were omitted from the study. In addition, when the total number of patients did not reach a sample size of 10 within the given period for a particular clinician, that clinician's pricing data were excluded from the analysis.

2.5. Variables

Ten commonly performed surgical procedures were selected to obtain fee details charged by the performing clinicians and the respective hospitals. The selected surgical procedures were: 1) LSCS (Lower Segment Cesarean Section); 2) Normal Vaginal Delivery; 3) Appendicectomy (open); 4) Appendicectomy (Laparoscopic); 5) Cholecystectomy (Open); 6) Cholecystectomy (Laparoscopic); 7) Total Abdominal Hysterectomy with Bilateral Salpingo-Oophorectomy (TAH and BSO); 8) Total Knee Replacement; 9) Intraocular Lens (IOL); and 10) Colonoscopy.

In each selected hospital, the following pricing and fee data pertaining to the above procedures were obtained: total hospital fee, total clinician fee (including anesthetist fees), and the total fee paid by the patient to the hospital. To create a

statistically significant cohort under each procedure, pricing and fee details for the top two clinicians, based on the total number of procedures performed, were obtained.

The following potential confounders were identified:

- **Patient socioeconomic status**

Income, education, and ability to pay may influence both hospital choice and the level of fees charged.

- **Insurance coverage and payer type**

Differences between self-pay and insured patients may affect pricing strategies, negotiated rates, and billing behavior across hospitals and provinces.

- **Case mix and clinical complexity**

Even within the same procedure category, variation in comorbidities, operative difficulty, or patient risk profiles may influence fees.

- **Hospital input costs**

Differences in staffing costs, technology intensity, infrastructure investment, utilities, and procurement arrangements across hospitals and provinces.

- **Clinician characteristics**

Seniority, reputation, dual public-private practice, and bargaining power may vary across hospitals and provinces and affect fee levels.

- **Market competition**

Local density of private hospitals and clinicians may influence pricing through competitive or monopolistic dynamics.

- **Demand-side utilization patterns**

Higher patient volumes or procedure demand in certain hospitals or provinces may allow providers to charge higher fees.

- **Temporal economic factors**

Inflation, currency depreciation, and macroeconomic shocks during the study period may have affected costs unevenly across providers.

2.6. Data Sources/Measurement

Patient fees were directly obtained from the final patient bill after completion of all payments from the respective private hospitals.

2.7. Bias

To avoid bias, hospitals were requested not to disclose the personal information of patients or clinicians.

2.8. Study Size

The objective was to capture patients who underwent treatment without complications within a period of 4–6 months. Under each clinician, up to 10 patients within the given time frame were selected from each hospital for each of the 10 procedures. As a result, across three provinces and eight major hospitals, fee data from 1,600 patients were collected.

2.9. Statistics

Hospital fees, clinician fees, and total fees were summarized using the minimum, median, mean, maximum, interquartile range (IQR), standard deviation (SD), and coefficient of

variation (CV%). Due to the right-skewed distributions of the fee data, differences in fees across hospitals and provinces were assessed using the Kruskal–Wallis H test for each procedure. This nonparametric test evaluates group differences based on ranked data rather than raw means. Mean ranks are presented in [Table S3](#) and [Table S4](#) for descriptive purposes only and were not used directly for statistical inference. The magnitude of group differences was quantified using the effect size (ϵ^2) for the Kruskal–Wallis test. Because analytical confidence intervals are not available for ϵ^2 , uncertainty was assessed using nonparametric bootstrap confidence intervals based on 1,000 resamples, which do not rely on distributional assumptions.

When the overall tests were statistically significant, post hoc pairwise comparisons were conducted. To improve the interpretability of the multiple pairwise comparisons, the results were additionally summarized using network visualizations. Analyses were performed using R software (version 4.5.1). SPSS software (version 31) was used to obtain the pairwise comparison results used in the network visualizations.

3. Results

3.1. Descriptive Statistics

A total of 1,640 patient records were analyzed across 10 procedures. All fee components (hospital fees, clinician fees, and total fees) exhibited right-skewed distributions, with a small number of high-cost observations ([Figure S1](#), [Figure S2](#), [Figure S3](#)). Normality testing using the Shapiro–Wilk test indicated significant departures from normality across variables ([Table S1](#)). Accordingly, nonparametric statistical methods were used for group comparisons.

Prior to analysis, key assumptions of the Kruskal–Wallis test were evaluated. The outcome variables were continuous, and observations were independent by study design. Additionally, the test assumes similarly shaped distributions across groups, allowing differences to be interpreted as shifts in central tendency (medians). To assess this, distributions of fees across hospitals and provinces within each procedure were examined visually using boxplots (example [Figures 1–3](#)). These plots indicated noticeable variation in distribution shape between groups. As a result, Kruskal–Wallis test findings were interpreted in terms of differences in mean ranks rather than differences in medians.

Hospital fees varied markedly by procedure. Median hospital fees ranged from LKR 16,274 (Procedure 10) to LKR 248,511 (Procedure 8). Procedures 5–8 were associated with notably higher median hospital fees ($\geq$ LKR 170,000), while Procedures 9 and 10 incurred substantially lower costs. Variability was considerable, particularly for high-cost procedures, with CVs exceeding 30% for Procedures 3, 8, 9, and 10, indicating wide dispersion in hospital charges. Procedure 10 exhibited the greatest variability (CV = 59%), and the highest maximum hospital fee was LKR 551,997 for Procedure 8 ([Table S2](#)).

Clinician fees also showed pronounced heterogeneity across procedures. Median clinician fees ranged from LKR 18,000 (Procedure 10) to LKR 205,500 (Procedure 8). High-cost procedures (Procedures 6–8) were associated with both higher medians and greater dispersion, with CVs exceeding 30%

for Procedures 2, 8, and 9. Lower-cost procedures again demonstrated substantial relative variability despite smaller absolute costs, reflecting inconsistent clinician charging patterns (**Table S2**).

Total fees reflected the combined variation in hospital and clinician components and showed the widest spread overall. Median total fees ranged from LKR 35,247 (Procedure 10) to LKR 456,056 (Procedure 8). Procedure 8 incurred the highest median and maximum total fees (LKR 952,748), along with the largest IQR (LKR 170,547), indicating extreme variability. Across all procedures, CVs for total fees ranged from 15% to 36%, with the highest relative variability observed in lower-cost procedures (Procedures 9 and 10) (**Table S2**).

3.2. Differences in Fees Across Hospitals

Kruskal–Wallis tests revealed statistically significant differences in hospital fees across the eight hospitals for all procedures (all $P < 0.001$), with large effect sizes. Bootstrap confidence intervals excluded zero for all procedures, confirming that the observed hospital-level differences reflect meaningful variation rather than sampling artifacts (**Table 1**). As an illustrative example, **Figure 1** demonstrates that hospital fees for Procedure 1 differ significantly across all hospitals.

3.3. Differences in Fees Across Provinces

Significant provincial-level differences were observed for hospital fees and total fees across all procedures (all $P < 0.01$). For clinician fees, most procedures also demonstrated statistically significant provincial differences; however, Procedure 3 did not reach statistical significance ($P = 0.29$, $\epsilon^2 = 0.003$, CI of $\epsilon^2 = -0.011-0.082$), suggesting relative uniformity of clinician charges for that Procedure 3. Effect size estimates (ϵ^2) indicated small to moderate provincial effects, with bootstrap confidence intervals confirming the stability of these findings (**Table 1**).

As an illustrative example, **Figure 2** shows that hospital fees for Procedure 1 differ significantly across all provinces, whereas **Figure 3** indicates that clinician fees for Procedure 3 do not differ significantly across provinces.

3.4. Pairwise Comparisons

Network visualizations of pairwise post hoc comparisons following Kruskal–Wallis testing are presented. Nodes represent hospitals or provinces and are labeled by mean rank. Edges indicate pairwise comparisons: blue edges denote statistically significant differences after adjustment for multiple comparisons ($P < 0.05$), whereas red edges indicate non-significant comparisons.

Figure 4 illustrates multiple comparisons of hospital fees across hospitals for Procedure 1. **Figure 5** presents multiple comparisons of fees across provinces for Procedure 1. Corresponding network visualizations for the remaining procedures are provided in **Figures S4–S21**.

4. Discussion

This study provides robust empirical evidence that fee levels in the private healthcare sector in Sri Lanka vary

substantially across hospitals and across provinces for a uniform set of ten commonly performed procedures. The results show wide variation not only in total fees but also in the breakdown between hospital-facility fees and clinician fees. This widespread variation suggests that not all patients face comparable pricing for ostensibly the same procedure in similar settings. The fact that the variation is statistically significant for every procedure and across every category (hospital, clinician, and total) underlines the pervasiveness of this phenomenon.

The finding that clinician fees vary significantly by hospital implies that within the hospital facility there is heterogeneity in how much clinicians charge, reflecting not just hospital overheads but clinician bargaining power, seniority, reputation, and perhaps the hospital brand. The literature on unilateral provider price-setting and information asymmetry offers a conceptual framework: in settings where patient choice is constrained and insurance bargaining is weak, providers may set fees above cost-based thresholds, and patients may lack effective information or negotiation power [21–25]. In Sri Lanka, where approximately 90% of private spending is out of pocket, these dynamics may be even more acute [4].

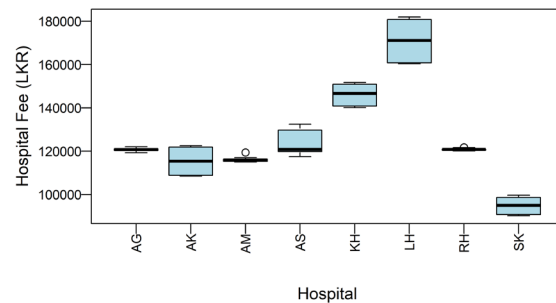


Figure 1: Hospital fees by hospital for Procedure 1.

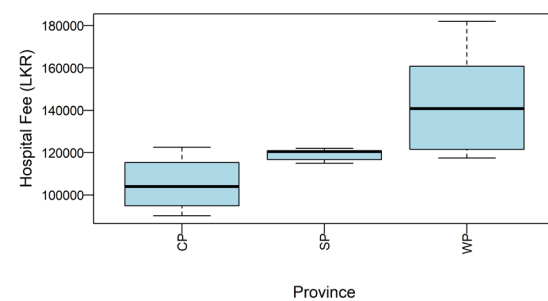


Figure 2: Hospital fees by province for Procedure 1.

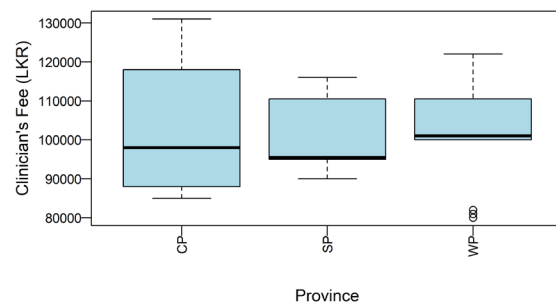


Figure 3: Clinician fees by province for Procedure 3.

Table 1: Kruskal–Wallis test results for fees by procedure across hospitals and provinces.

	Procedure	n	P-value	Hospital		P-value	Province	
				Eta-squared (CI)	Magnitude		Eta-squared (CI)	Magnitude
Hospital fees	1	180	<0.01	0.783 (0.703–0.851)	Large	<0.01	0.483 (0.353–0.606)	Large
	2	180	<0.01	0.938 (0.920–0.951)	Large	<0.01	0.742 (0.683–0.789)	Large
	3	160	<0.01	0.954 (0.936–0.964)	Large	<0.01	0.387 (0.273–0.512)	Large
	4	160	<0.01	0.896 (0.868–0.917)	Large	<0.01	0.656 (0.589–0.710)	Large
	5	160	<0.01	0.942 (0.914–0.959)	Large	<0.01	0.588 (0.499–0.668)	Large
	6	160	<0.01	0.911 (0.876–0.933)	Large	<0.01	0.652 (0.584–0.712)	Large
	7	160	<0.01	0.955 (0.940–0.963)	Large	<0.01	0.714 (0.645–0.764)	Large
	8	160	<0.01	0.976 (0.963–0.980)	Large	<0.01	0.700 (0.626–0.744)	Large
	9	160	<0.01	0.924 (0.897–0.944)	Large	<0.01	0.775 (0.714–0.814)	Large
	10	160	<0.01	0.913 (0.875–0.943)	Large	<0.01	0.272 (0.161–0.417)	Large
Clinician fees								
	1	180	<0.01	0.728 (0.639–0.808)	Large	<0.01	0.473 (0.358–0.579)	Large
	2	180	<0.01	0.753 (0.711–0.802)	Large	<0.01	0.618 (0.536–0.693)	Large
	3	160	<0.01	0.290 (0.222–0.431)	Large	0.29	0.003 (–0.011–0.082)	No effect
	4	160	<0.01	0.632 (0.562–0.727)	Large	<0.01	0.102 (0.036–0.215)	Moderate
	5	160	<0.01	0.838 (0.790–0.888)	Large	<0.01	0.607 (0.527–0.679)	Large
	6	160	<0.01	0.557 (0.472–0.679)	Large	<0.01	0.246 (0.131–0.373)	Large
	7	160	<0.01	0.314 (0.241–0.457)	Large	<0.01	0.148 (0.069–0.268)	Large
	8	160	<0.01	0.754 (0.678–0.836)	Large	<0.01	0.419 (0.264–0.597)	Large
	9	160	<0.01	0.650 (0.567–0.752)	Large	<0.01	0.336 (0.230–0.457)	Large
	10	160	<0.01	0.859 (0.832–0.889)	Large	<0.01	0.606 (0.524–0.676)	Large
Total fees								
	1	180	<0.01	0.755 (0.687–0.821)	Large	<0.01	0.502 (0.395–0.594)	Large
	2	180	<0.01	0.885 (0.858–0.909)	Large	<0.01	0.757 (0.704–0.803)	Large
	3	160	<0.01	0.932 (0.909–0.947)	Large	<0.01	0.273 (0.160–0.422)	Large
	4	160	<0.01	0.702 (0.621–0.794)	Large	<0.01	0.305 (0.184–0.436)	Large
	5	160	<0.01	0.922 (0.891–0.941)	Large	<0.01	0.702 (0.629–0.746)	Large
	6	160	<0.01	0.860 (0.813–0.898)	Large	<0.01	0.614 (0.542–0.683)	Large
	7	160	<0.01	0.816 (0.782–0.854)	Large	<0.01	0.603 (0.514–0.679)	Large
	8	160	<0.01	0.892 (0.853–0.922)	Large	<0.01	0.542 (0.430–0.650)	Large
	9	160	<0.01	0.864 (0.812–0.913)	Large	<0.01	0.658 (0.577–0.722)	Large
	10	160	<0.01	0.892 (0.847–0.923)	Large	<0.01	0.741 (0.677–0.789)	Large

Effect size (ϵ^2) Interpretation: 0.01 to <0.06 (small effect), 0.06 to <0.14 (moderate effect), and ≥ 0.14 (large effect).

The Western Province consistently exhibited the highest mean fees across all ten procedures and fee categories (Figure 6). The clustering of higher fees in the more economically affluent Western Province indicates that regional market factors—likely higher incomes, greater concentration of private supply, and stronger demand—are strongly associated with fee levels. That variation persists even

among hospitals within the same province suggests that pricing is not purely driven by input cost differences or geography alone, but by provider-specific strategic behavior.

International studies covering both high- and low-income countries have shown that healthcare pricing and fees can vary substantially across regions, across hospitals within

regions, and even within hospitals [26–36]. Based on the findings of this research, the Sri Lankan private healthcare sector is no exception. Reasons for such variation include differences in the degree of regulation between private and public systems, variation in local input costs (including wages), and different procurement processes across providers [26,27]. There is also a strong degree of correlation between healthcare pricing and other commodity pricing. While internationally traded commodities such as vehicles and computers tend to equalize in price between trading partners, services such as healthcare, by nature, are procured locally and are more susceptible to information asymmetry. Previous International research suggests that large price discrepancies exist between what private health plans pay healthcare providers and what government health plans pay [26–36]. In Sri Lanka, information asymmetry is also likely to be prevalent, even though this study did not specifically investigate that aspect.

In Sri Lanka, the private-sector healthcare regulator directs healthcare providers to display charge masters. Most hospitals indicate only a few expenditure line items, such as room rates, fees for investigations, and estimates for selected procedures [1]. However, a closer inspection of hospital bills revealed many additional expenditure line items, such as nursing care fees, linen charges, in-house medication fees, and operating theatre charges, which are not captured in the standard hospital charge master, leading to a classic example of information asymmetry.

In the United States, there is increasing evidence suggesting that the rates charged by hospitals to out-of-pocket or

self-pay patients are often 2.5 times higher than what most health insurers actually pay and more than three times higher than standard Medicare (government) charges [35]. Closer inspection of the Sri Lankan private health sector reveals that approximately 90% of domestic private health expenditure is borne by out-of-pocket payments [4,5]. Research evidence suggests that Sri Lankan private healthcare fee setting is derived through unilateral price fixing by private healthcare providers [19]. In this context, it can be inferred that Sri Lankan private healthcare patients may be more vulnerable to unfair pricing than patients in some other countries, where other stakeholders, such as insurance providers, hold stronger bargaining positions to negotiate fair pricing for their clients [19]. The varying proportions of out-of-pocket payers between hospitals and provinces could be another reason for the pricing variations observed across provinces and hospitals. However, the impact of this factor on pricing variation was not tested in this research.

From a universal health coverage (UHC) lens, such variation raises potential equity concerns. If patients in less affluent provinces or in less competitive hospitals face lower fees, one might assume better affordability—but this may equally reflect reduced access to higher-end services or clinicians. Meanwhile, higher fees in affluent regions raise questions about whether private-sector growth is reinforcing segmented access (richer versus poorer populations), undermining the public sector's universal-care mission. Further, if the same procedure is priced variably, it weakens the alignment of private provision with national affordability thresholds.

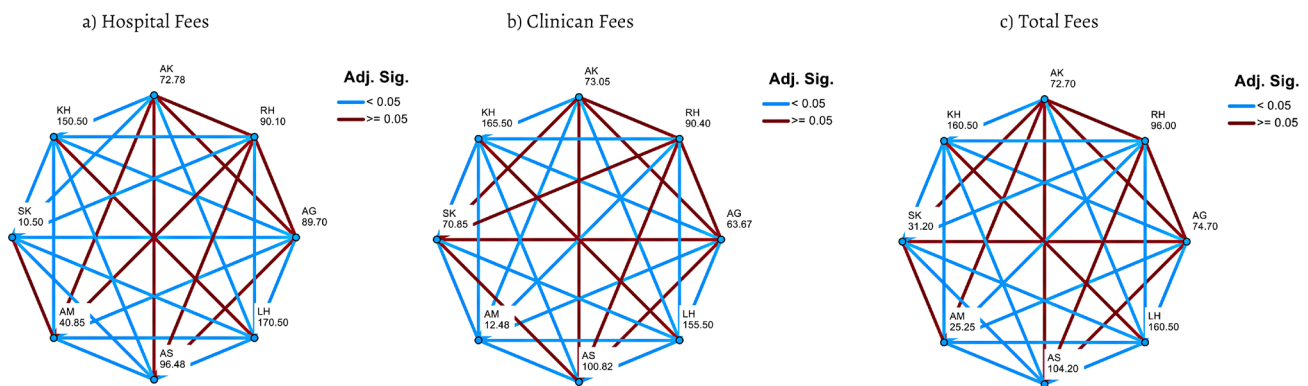


Figure 4: Pairwise comparisons of hospitals for Procedure 1 (each node indicates the mean rank).

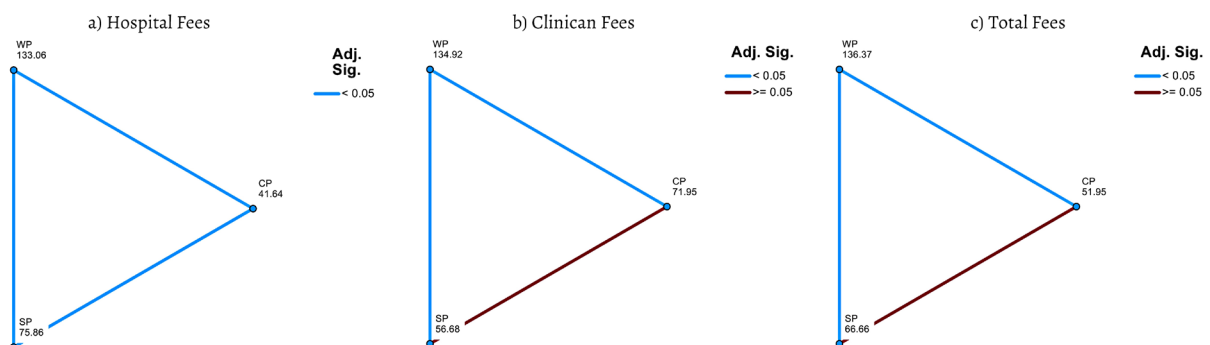


Figure 5: Pairwise comparisons of provinces for Procedure 1 (each node indicates the mean rank).

The findings indicate that the Western Province showed the highest mean values across the three fee categories researched, as well as the highest per capita income and the largest provincial population in the country. Higher economic affluence and greater affordability among patients, together with a rising population in the Western Province, may therefore be related to the higher fees charged compared with the other two provinces. These findings are similar to previous research conducted in Sri Lanka, which has identified that, despite a universal public healthcare policy, economically affluent individuals tend to patronize private-sector healthcare more [9]. Situations such as the concentration of private hospitals and experienced clinicians in economically affluent regions, and the relative difficulty of accessing high-quality private medical care in less affluent regions, could undermine universal healthcare principles. The findings further confirm that, despite close geographical proximity between hospitals within the same province and between provinces, healthcare providers and clinicians are still able to maintain significant pricing variations.

Across the three provinces researched, the mean value of fees charged by clinicians was LKR 122,839, whereas the monthly national per capita income of the Sri Lankan population in 2021 was LKR 65,904 [7,8]. The fact that mean clinician fees (LKR ≈122,839) approach nearly double the monthly national per-capita income (≈LKR 65,904) raises particular concerns regarding affordability for typical patients.

Several mechanisms may explain the observed fee variations:

Demand-side affordability and local income effects. Providers in the Western Province may charge higher fees because local populations can afford them, or because of competitive positioning (premium hospitals).

Supply-side concentration and market power. If private hospitals and senior clinicians are concentrated in affluent regions, reduced competition may permit higher pricing.

Information asymmetry. Patients may not have full visibility of alternative pricing, and providers may exploit this through variable pricing. While not directly measured in this study, this logic is consistent with the observed variation.

Input cost and service-mix differences. Although partially controlled by selecting standard ward and private-bed configurations, there remains the possibility that hospitals differ in overheads, technology, clinician staffing, or negotiated supply costs.

Unilateral price-setting culture. Qualitative work in Sri Lanka suggests that senior clinicians exert influence on pricing decisions, which may amplify fee variation within and across hospitals [24].

That said, this study did not test each of these mechanisms explicitly; the observed variation should therefore be interpreted as descriptive rather than causal.

Given the findings, several policy implications arise:

Benchmarking and reference pricing. Regulators might consider establishing benchmark fees tied to national per-capita

income or median procedure costs, to anchor private-sector pricing within affordability bounds.

Transparency requirements. Strengthening requirements for private hospitals to publish full charge masters (including all ancillary line items such as linen, nursing, and operating theater fees) would reduce information asymmetry and help patients compare pricing.

Geographic distribution of private services. Encouraging greater investment in less affluent provinces may reduce regional disparities in pricing and access.

Insurance and bundling mechanisms. Even in largely out-of-pocket systems, introducing third-party payers or bundled payment models could provide bargaining counterpower to patients and standardize pricing.

Oversight of clinician–hospital fee arrangements. Regulators should monitor how clinician fees are set within hospitals and ensure that full disclosure is provided to patients, particularly when clinicians are also employed in the public sector.

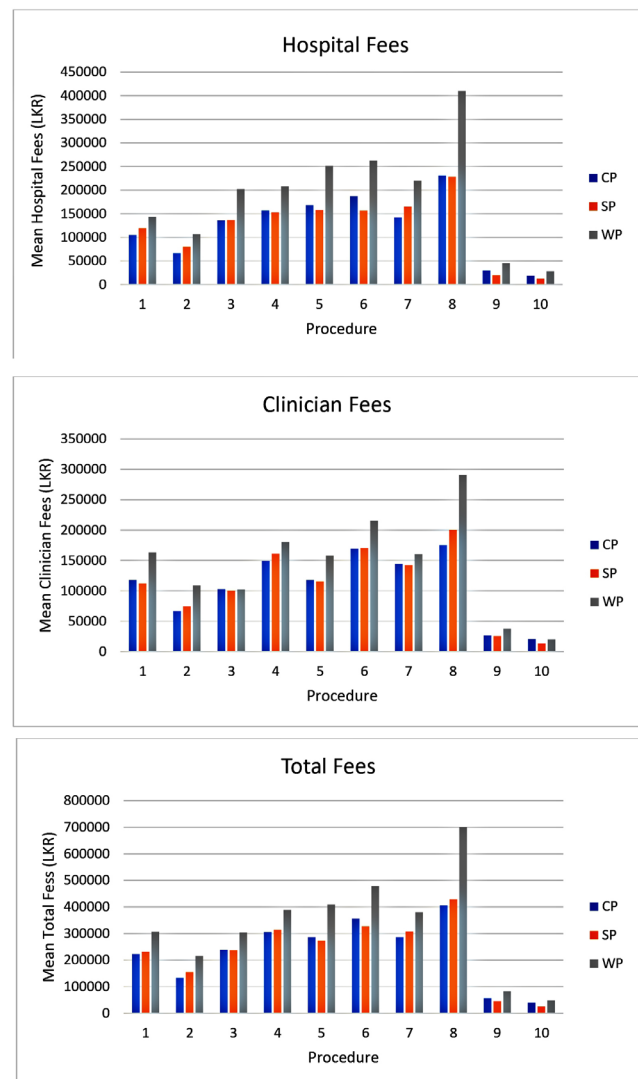


Figure 6: Mean fees (in LKR) across the three provinces for the ten procedures.

4.1. Strengths and Limitations

Despite its strengths, this study encountered several limitations that should be considered when interpreting the findings.

- **Procedure scope:** The analysis focused on ten commonly performed surgical and diagnostic procedures. Pricing variation for emergency care, highly specialized procedures, and long-stay treatments was not examined.
- **Exclusion of high-acuity cases:** Patients with complications, ICU admissions, or luxury accommodation were excluded to improve comparability. As a result, pricing dynamics for complex, high-risk, or resource-intensive cases were not captured.
- **Residual case-mix variation:** Although procedures were standardized, differences in patient characteristics and clinical complexity within procedure categories (e.g., comorbidities, operative difficulty) were not adjusted for and may influence fee levels.
- **Quality and outcome measures:** The study did not assess quality of care, clinical outcomes, or service intensity. Consequently, higher fees cannot be conclusively interpreted as inefficiency rather than as potentially reflecting differences in perceived or actual quality.
- **Clinician selection:** Pricing data were obtained from the two highest-volume clinicians per procedure in each hospital. Their pricing practices may not be representative of all clinicians, particularly junior consultants or visiting specialists.
- **Information asymmetry not directly measured:** While billing practices and prior literature suggest information asymmetry, this was inferred rather than directly measured through patient surveys, disclosure audits, or experimental designs.

The key strength of this study is that the three provinces covered represented more than 50% of the population of Sri Lanka, and the eight leading private hospitals included represented more than 20% of the private-sector bed capacity in the country. In addition, the data sources provided an in-depth visibility of the fee structures charged by hospitals and clinicians.

The need for future research was identified during this study, particularly in areas such as exploring the drivers of significant pricing differences between provinces and hospitals, the tendency of wealthier populations to utilize private healthcare, the influence of clinicians on healthcare pricing, and the impact of unilateral price-setting by healthcare providers.

5. Conclusion

This study provides robust empirical evidence of substantial and systematic price variation for common surgical and diagnostic procedures within Sri Lanka's private healthcare sector. Despite examining identical procedures within comparable clinical settings, statistically significant differences were observed across hospitals and across provinces in hospital fees, clinician fees, and total patient charges. These

variations persist even within geographically proximate areas, indicating that pricing is not driven solely by input costs or clinical considerations.

The consistently higher fee levels observed in the Western Province suggest that regional economic affluence, population concentration, and market dynamics play an important role in private-sector pricing behavior. At the same time, significant variation within provinces and across hospitals points to provider-specific pricing strategies, clinician influence, and weak price coordination mechanisms. In a system where the majority of private healthcare expenditure is financed through out-of-pocket payments, such variation exposes patients to unequal financial burdens and heightens vulnerability to information asymmetry.

From a health system perspective, these findings raise important equity and sustainability concerns. Persistent price dispersion for standardized procedures risks reinforcing segmented access to care, where affordability and location rather than medical need shape healthcare utilization. This challenges the broader objectives of Sri Lanka's universal health coverage framework and highlights gaps in stewardship and regulatory oversight of the private sector.

The results underscore the need for policy interventions that promote greater price transparency, consistency, and accountability in private healthcare pricing. Establishing benchmark or reference pricing mechanisms—potentially linked to national per-capita income or median procedure costs—along with enhanced disclosure requirements and oversight of clinician-hospital fee arrangements, may help moderate excessive variation while preserving provider autonomy. Overall, this study contributes empirical evidence to an under-researched area in developing mixed healthcare systems and provides a foundation for future research and policy dialogue aimed at aligning private healthcare pricing with principles of equity, affordability, and system-wide sustainability.

Supplementary Materials

The supplementary materials include additional descriptive statistics, normality test results, mean rank tables from the Kruskal–Wallis analyses, and network visualizations of pairwise post hoc comparisons for all procedures (**Supplementary Tables:** Table S1–Table S4; **Supplementary Figures:** Figure S1–Figure S21).

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Authors' Contribution

K.S.N.: Conceptualization, Methodology, Data curation, Formal analysis, Investigation, Writing – original draft. E.K.: Writing – review & editing, Supervision. M.T.: Writing – review & editing, Supervision. A.P.: Formal analysis. All authors have read and agreed to the published version of the manuscript.

Data Availability

The data supporting the findings of this study are available upon request from the corresponding author.

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Conflicts of Interest

The authors declare that they have no conflicts of interest.

Ethical Approval

Permission to approach private hospitals was obtained from the Ministry of Health and Indigenous Medical Services, Sri Lanka (AD19/02/42). In Sri Lanka, all private hospitals operate under the supervision of the Private Sector Health Regulatory Council of the Ministry of Health. Ethical approval to conduct the study was obtained from the Ethics Committee of the University of Western Australia (RA/4/20/5489), and local ethical clearance was obtained from the International Institute of Health Sciences, Sri Lanka (BI/ERC/265).

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