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Pricing of hospital services: evidence from a thematic review

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Abstract

The management implications of pricing healthcare services, especially hospitals, have received insufficient scholarly attention. Additionally, disciplinary overlaps have led to scattered academic efforts in this domain. This study performs a thematic synthesis of the literature and applies retrospective analysis to hospital service pricing articles to address these issues. The study's inputs were sourced from well-known online repositories, using a structured search string and PRISMA flow chart to select the pertinent documents. Our thematic analysis of pricing literature encompasses: (a) comprehension of hospital service pricing nature; (b) pricing objectives, strategies and practices differentiation; (c) presentation of factors impacting hospital service pricing. We observe that hospital pricing is an intricate and unclear matter. The terms 'pricing strategies' and 'pricing practices' are often used interchangeably in academic literature. Hospital service pricing is influenced by costs, demand and supply factors, market structure, pricing regulation and third-party reimbursements. The study's findings provide policy implications for service pricing in hospitals, in addition to suggesting avenues for future research on hospital pricing.

Keywords: hospital service pricing; pricing practices at hospitals; pricing strategies; thematic synthesis

1. Introduction

The pricing of marketised services remains ambiguous due to their unique features. This phenomenon is even more complex and intractable in healthcare services, where an inherent information asymmetry exists in their delivery. Hence, the pricing of hospital services warrants greater attention to ameliorate its structural complexity. However, the lack of consideration for pricing, particularly in hospital services, leads to deceptive and unfounded prices (Brown, 2014). This enigmatic issue of hospital service pricing apparently grants considerable leeway for its perpetuation. Newhouse's (2002) restatement, 'healthcare pricing is a conundrum', reveals the complexity of pricing inherent in the system. The issue of healthcare pricing is complex and discriminatory, with significant variations observed for identical services, leading to a fractured healthcare market (Brown, 2014). According to Thekkekara and Thiagarajan (2019), this problem is multi-faceted and overwhelmingly intricate. Tompkins *et al.* (2006) and Brown (2014) have indicated that the hospital pricing system is irrational and harmful. Rising costs are likely to hinder healthcare decision-making for both healthcare service providers, who may suffer a diminished reputation as excessively expensive, and patients, who may find services unaffordable. This has led health economics researchers to approach the issue of pricing from a multi-dimensional perspective, as evidenced by numerous studies (Harris, 1979; Benz, 1988; Bonnici, 1992; Krishnan, 2001; Waters and Hussey, 2004; Tompkins *et al.*, 2006; Hsu, 2011; Brown, 2014; Pandey and Raina, 2019; An *et al.*, 2020). Furthermore, the fluctuation of costs for identical

hospital services remains inadequately expounded upon (Park *et al.*, 2015; Cooper *et al.*, 2018). Additionally, scholars have reiterated this pricing ambiguity (Babcock, 2019; Pandey and Raina, 2019). Therefore, a retrospective analysis of individual studies is necessary for knowledge synthesis and to pave the way for future research. The present study is a modest undertaking in relation to this issue.

Over the past five decades, reviews in this knowledge domain have been sporadic and scant. However, a review conducted three decades ago on issues related to healthcare service pricing suggested that pricing models should incorporate additional factors such as costs, competition and case mix (McKinney, 1990). In their study, Waters and Hussey (2004) analysed costing and pricing methodologies for healthcare services purchased internationally. It is acknowledged that price-setting methods are influenced by provider and purchaser characteristics, payment systems for providers and the available information about costs, service volume and outcomes. A topic of contention among stakeholders and policymakers is the practice of cost-shifting in hospitals, which has been the subject of theoretical and empirical analysis (Frakt, 2011). The review concludes that while cost-shifting is present, it may not be consistent. An analysis by An *et al.* (2020) has examined the effect of price reform policies on the economic performance of hospitals. Additionally, Pandey and Raina (2019) conducted a systematic literature review on healthcare pricing, which revealed the various stages of evolution in healthcare pricing research.

Pandey and Raina's (2019) recent review has neglected journal articles from prestigious databases such as Scopus and Web of Science. They focused on pricing for healthcare services that included the hospital, pharmaceutical, medical device, telemedicine and insurance sectors. It is our assertion that obtaining a complete understanding of the nuances of pricing hospital services is difficult when the synthesis of knowledge concerns various services that are structurally and operationally diverse. Therefore, we solely examine the pricing of hospital services in this review. Moreover, we address the consideration of pricing practices, strategies and methods that Pandey and Raina (2019) neglected in their review. Therefore, there is a necessity for a comprehensive and methodical synthesis of evidence that is exclusively tailored to hospital service pricing. The existing literature is varied and disjointed, leaving a significant gap in knowledge that necessitates a detailed thematic review. Our objective is to address this gap by considering the literature from 1970 to February 2021 and formulating three questions to guide the direction of the review.

- (1) How is hospital pricing of services portrayed in the literature?
- (2) How has the literature addressed pricing objectives, strategies and practices for hospitals?
- (3) What factors influence the pricing of hospital services?

This review provides several contributions to the literature. Firstly, it organises the varied and diverse results of primary research in this field of knowledge. Secondly, it elucidates the intricate and elusive nature of healthcare pricing. Thirdly, we analyse the pricing strategies and practices presented in the primary studies. We then collate the factors that affect hospital pricing. Finally, we suggest potential areas for further research in this field.

2. Methodology

A literature review is a crucial aspect of research that provides current information on a particular topic and justifies future studies of interest (Cronin *et al.*, 2008). This thematic synthesis follows the fivefold systematic review protocol proposed by Denyer and Tranfield (2009).

2.1 Formulation of research questions

We have developed three research enquiries to investigate how the current literature portrays the phenomenon of hospital service pricing and the factors that underpin it.

2.2 Search strategy

We conducted a literature search using electronic databases, including Scopus, Web of Science, ProQuest, Taylor and Francis Online, PubMed and Google Scholar. Our search terms consisted of 'Hospital pricing', 'Pricing in Hospitals', 'Pricing Practices in hospitals', 'Price setting in hospitals', 'Pricing strategies in hospitals', 'Pricing of hospital services' and 'Pricing of services in hospitals'.

To avoid false matching, relevant keywords were used in the search process, with the search field limited to 'Title, Abstract, Keywords'. The literature search was widened to cover from 1970 to 2021 to facilitate a deeper understanding of the thematic findings. The search was conducted in February 2021.

2.3 Selection process

The online database search produced 97 outcomes in Scopus, 57 Web of Science articles, 359 search results in ProQuest, 74 documents on Taylor and Francis Online, 389 PubMed documents and 3,450 Google Scholar documents. The total retrieved publications were 4,426. After screening the titles and abstracts and eliminating duplicates, 432 records were considered. The primary author screened the shortlisted full texts and picked articles that addressed at least one of the research questions. The authors deliberated to create the final list. The full-text screening produced 132 documents. We included 107 articles for this review, excluding dissertations, editorials and policy recommendations. [Figure 1](#) illustrates this process.

All studies on hospital service pricing that met the inclusion criteria were selected for analysis. The review was limited to English-language articles and excluded studies on drug pricing, medical device pricing and pricing by other healthcare providers. Moreover, articles written in languages other than English were excluded. The articles retrieved were categorised based on the different themes identified during the search.

2.4 Data extraction, analysis and synthesis

The relevant data were extracted and recorded from selected articles in a pre-designed MS Excel template by the first author. The second author then cross-checked the data to ensure consistency and minimise potential loss (please refer to online supplementary file). The collected data were arranged in a custom table, which included the authors with their publication year, study title, study objectives/purpose, methodology, study location, key findings, inference and conclusion. The systematic extraction of data enabled the research team to analyse the crucial evidence from the literature. Both team members deliberated and moderated the obtained evidence in real-time. The extracted evidence was then reviewed again following thematic categorisation to improve accuracy in knowledge synthesis.

2.5 Reporting of results

The research adopted an interpretive and explanatory methodology in reviewing the main literature (Denyer and Tranfield, 2009), to present the evidence and insights. A concise framework is provided in [Table 1](#) to demonstrate the evidence synthesis in the subsequent section. The outcomes are presented in line with the guiding research inquiries.

3. Findings

This section presents the review's findings, which are included in the study (please refer to the online supplementary file for details). The hospital service pricing issue has been scrutinised from various perspectives in academic literature. For example, Harris (1979), Brown (2014) and McKinney (1990) note the elusiveness of hospital pricing. Meanwhile, Benz (1988) and Krentz and Jennings (1986) analyse the pricing goals of hospitals. Horowitz and Kleiman

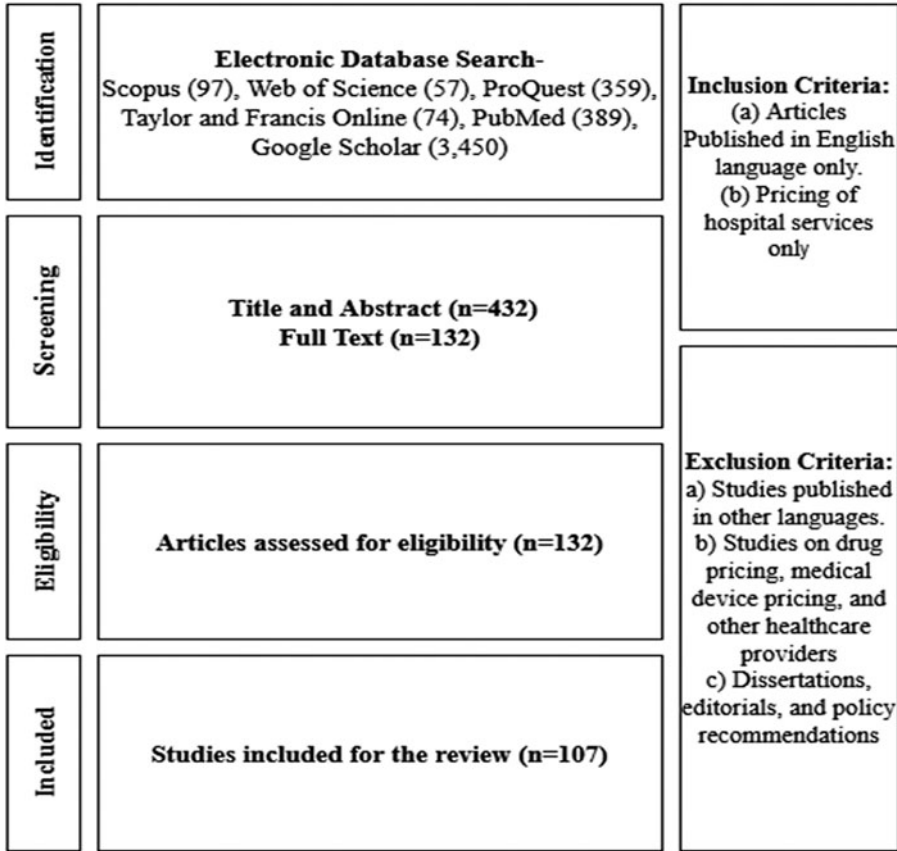


Figure 1. PRISMA 2020 flow chart.
Source: Current study.

(1994) and Audibert *et al.* (2007) provide an objective explanation of the pricing strategies employed by hospitals. Bonnici (1992) and Kleimenhagen *et al.* (1994) discuss commonly observed pricing practices in hospitals. Oostenbrink and Rutten (2006), Hsu (2011), Raulinajtys-Grzybek (2014), Bahuguna *et al.* (2020) and Llewellyn *et al.* (2020) investigate the precision of costing tools and methodologies utilised in price-setting by hospitals. Connor *et al.* (1998), Krishnan (2001), Ciliberto and Dranove (2006), Tenn (2011), Haas-Wilson and Garmon (2011), Baker *et al.* (2014) and Gowrisankaran *et al.* (2015) have reflected upon the impact of organisational restructuring on pricing. Dranove *et al.* (1993), Propper (1996), Propper and Söderlund (1998), Melnick *et al.* (1999), Moriya *et al.* (2010) and Wang and Chen (2017) provide insights into competition and concentration effects on hospital pricing. Harris (1979), Freisner and Rosenman (2009), Melnick and Fonkych (2008) and Moriya *et al.* examine related factors. Frakt (2011), Robinson (2011), Woodworth *et al.* (2017), Wang and Chen (2017) and Cooper *et al.* (2018) have examined third-party reimbursements for hospital pricing practices, while Bai (2015) and Liu *et al.* (2000) have considered the regulatory implications of hospital pricing. Sheiner and Cutler (1999) and Zuckerman *et al.* (2010) discuss demand factors affecting hospital pricing, while Guerin-Calvert and Israilevich (2011) and Baker *et al.* (2014) examine supply factors. A summary of the themes found in the manuscripts analysed as part of this study is presented in Table 1.

The research synthesis presents its findings in three sub-sections, organised by the guiding research questions. Section 3.1 addresses the elusive and intricate nature of hospital pricing.

Table 1. A snapshot of the thematic summary of the relevant manuscripts

Research question	Themes	Sources
Depiction of hospital services' pricing	Hospital pricing is complex, elusive and irrational	Leven (1984); Brown (2014); Tengilimoglu and Dziegielewski (2000); McKinney (1990); Thekkekara and Thiagarajan (2019)
Scholarly insights on the objectives, strategies and practices of the pricing of hospital services	Hospital service pricing objectives, strategies and practices	Krentz and Jennings (1986); Benz (1988); Bonnici (1992); Horowitz and Kleiman (1994); Audibert <i>et al.</i> (2007); Sutherland (2015); Thekkekara and Thiagarajan (2019)
Factors influencing hospital pricing decisions	Institutional factors	Connor <i>et al.</i> (1998); Krishnan (2001); Ciliberto and Dranove (2006); Tenn (2011); Haas-Wilson and Garmon (2011); Afendulis and Kessler (2011); Baker <i>et al.</i> (2014); Gowrisankaran <i>et al.</i> (2015)
	Cost factors	Oostenbrink and Rutten (2006); Hsu (2011); Raulinajtys-Grzybek (2014); Amiri and Khmidi (2019); Bahuguna <i>et al.</i> (2020); Llewellyn <i>et al.</i> (2020)
	Demand-driven factors	Sheiner and Cutler (1999)
	Supply-driven factors	Bodenheimer (2005); Guerin-Calvert and Israilevich (2011); Baker <i>et al.</i> (2014)
	Market structure	Thomson (1994); Dranove <i>et al.</i> (1993); Propper (1996); Propper and Söderlund (1998); Melnick <i>et al.</i> (1999); Moriya <i>et al.</i> (2010); Wang and Chen (2017)
	Third-party re-imburements	Harris (1979); Freisner and Rosenman (2009); Melnick and Fonkych (2008); Moriya <i>et al.</i> (2010); Frakt (2011); Robinson (2011); Woodworth <i>et al.</i> (2017); Wang and Chen (2017); Cooper <i>et al.</i> (2018)
	Regulation	Bai (2015); Liu <i>et al.</i> (2000); McClintock <i>et al.</i> (2019)

Source: Current study.

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Section 3.2 examines the various pricing methods, practices and strategies deployed in hospital pricing. Lastly, section 3.3 explores the factors that impact the pricing of hospital services.

3.1 Elusiveness and complexity of hospital pricing

Hospital prices have been found to be illogical (Tompkins *et al.*, 2006; Brown, 2014), challenging to comprehend (Tengilimoglu and Dziegielewski, 2000) and intricate (Babcock, 2019; Pandey and Raina, 2019; Thekkekara and Thiagarajan, 2019). Harris (1979) hinted towards the lack of transparency on the criteria employed by hospitals for pricing, causing perilous and inadequately functioning price structures. Irrational hospital prices result in significant financial and health-related damages, and escalate costs excessively (Brown, 2014). Hospital prices that do not correspond to the actual costs of providing healthcare services are opaque and exhibit significant inconsistencies (Brown, 2014). McKinney (1990) argues that service cost determination complexity is the main factor behind intricate pricing. Pricing can become laborious without sufficient information. Our views align with Krentz and Jennings (1986) in terms of the necessity to simplify pricing policies. In healthcare, price is considered as the fourth aspect of marketing,

which serves as an offer to consumers (Leven, 1984), representing the income and level of monetary reimbursement for the firm (McKinney, 1990; Tengilimoglu and Dziegielewski, 2000).

3.2 Hospital service pricing objectives, strategies and pricing practices

3.2.1 Pricing objective

The pricing strategy of hospitals varies depending on their purposes and objectives (Krentz and Jennings, 1986). Krentz and Jennings (1986) identified several commonly used pricing objectives including profit maximisation, increasing market share, market skimming, maximising current revenues, target profit and promotional pricing. Establishing pricing objectives is a crucial and initial stage in the process of price development, regardless of the distinctive needs and resources available in hospitals (Benz, 1988; Bonnici, 1992). In the case of non-profit hospitals, the pricing objectives that financial managers aim to achieve are a reflection of their ambition to maximise net revenue, break even, generate target revenue and provide care for all patients requiring medical attention (Bauerschmidt and Jacobs, 1985). Benz's (1988) study acknowledges that an organisation's pricing objectives should align with its mission and goals and precede the pricing strategies of a hospital.

3.2.2 Pricing strategies

The importance of pricing indicates that pricing strategies are now a crucial element of any service delivery (Moore, 1995). Increasing consumer price awareness, customer sophistication, deregulation and an expanding number of competitors have reignited interest in pricing strategies (McKinney, 1990). The healthcare sector has experienced a change in service pricing within the last decade. The three common pricing strategies are cost-oriented, demand-oriented and competition-oriented. The latter strategy can also be referred to as going-rate or imitative pricing (Krentz and Jennings, 1986; McKinney, 1990). Various innovative pricing strategies have been discussed by scholars, including Illness Outcome Groups (IOGs) (Horowitz and Kleiman, 1994), package pricing (Horowitz and Kleiman, 1994; Tengilimoglu and Dziegielewski, 2000; Reinhardt, 2006; Tanwar *et al.*, 2019) and reference pricing (Brown and Atal, 2018; Nassiri *et al.*, 2020), marginal pricing and global budgets (Sutherland, 2015; Malmlose *et al.*, 2018), pricing models for contracts (Teymourifar *et al.*, 2020), bundled payment pricing (Hellsten *et al.*, 2016) and cost accounting pricing models (Audibert *et al.*, 2007; Thekkekara and Thiagarajan, 2019). Horowitz and Kleiman (1994) acknowledge that pricing strategies must reflect market competition realities and minimise financial risks for organisations. Therefore, if hospitals seek to progress in their pricing strategies, it is imperative that they focus more significantly on resolving operational, financial and information systems issues (Horowitz and Kleiman, 1994).

3.2.3 Pricing practices

The service pricing literature frequently uses the terms 'pricing strategies' and 'pricing practices' interchangeably. As healthcare costs continue to rise, hospitals must have a defined strategic plan for analysing pricing practices. This requirement has been reiterated in the literature (Bonnici, 1992; Kleimenhagen *et al.*, 1994). Cross-subsidisation is the principal mechanism by which hospitals (David *et al.*, 2014) subsidise unprofitable departments with profit-making departments. Mysterious within the literature, the pricing practice plays a critical role in compensating for inequities and distortions in existing health insurance coverage (Harris, 1979). The literature provides anecdotal evidence of cross-subsidisation which is not thoroughly documented (David *et al.*, 2014). Cross-subsidisation is defined by Harris (1979) as a kind of discriminatory pricing. This investigation reiterates that hospitals must deviate from the average cost pricing policy in a systematic way since it is not the most efficient pricing policy for them. Any optimal pricing policy should be based on marginal cost, co-payment rate, own price elasticity of demand, and the covariance between consumption and individual or social marginal utility of income. A study by

Dittman and Morey (1981) indicates that profit maximisation in a constrained hospital environment can cause cross-subsidisation.

Cost-shifting is a pricing strategy that has received extensive discussion in the literature on pricing (Dranove, 1988; Frakt, 2011; Robinson, 2011; Brown, 2014, Malmlose *et al.*, 2018). This strategy involves using a differential pricing system to maintain profitability (Tompkins *et al.*, 2006; Melnick and Fonkych, 2008). Research on cost-shifting within hospital settings has focused on price differences for insured and uninsured patients (Melnick and Fonkych, 2008; Woodworth *et al.*, 2017). For cost-shifting to take place, the provider must have the ability to establish higher fees for some patients and lower fees for others (Freisner and Rosenman, 2009). A provider becomes restricted in doing so if an insurer decreases its reimbursement. However, providers shift costs solely when they cannot compensate their losses with cost or efficiency savings. The cost-shifting conduct is observable in hospitals that aim to maximise profits (Dranove, 1988). The practices have raised concerns among hospitals and insurance companies, although they are now less widespread than in past decades and not as significant a phenomenon of late (Frakt, 2011). It is important to note that the dynamic phenomenon of cost-shifting should not be confused with price discrimination, which is driven by differences in market power, as cost-shifting has a direct impact on prices charged (Frakt, 2011).

Cream-skimming is a practice that involves selecting patients based on characteristics other than their need for care and is well-documented in the literature (Newhouse, 1984; Pauly, 1984; Matsaganis and Glennerster, 1994; Ellis, 1998; Barros, 2003; Freisner and Rosenman, 2009; Berta *et al.*, 2010; Levaggi and Montefiori, 2011; Cheng *et al.*, 2015; Yang *et al.*, 2020; Chen and Lang, 2021; Kjøstolsen *et al.*, 2021). Cream-skimming involves selecting patients with lower-than-average costs in a prospective payment system such as a Diagnosis-Related Group (DRG), to maximise financial gains (Yang *et al.*, 2020). Levaggi and Montefiori (2011) classify cream-skimming into horizontal and vertical categories. The limited evidence on cream-skimming practices highlights the need for further research to attain ample evidence.

3.3 Factors affecting the pricing of hospital services

The determinants influencing hospital service prices are shaped by the factors impacting the demand for care (Bonnici, 1992). The drivers of patient's medical care demand are characteristically economic, incidence of illnesses and cultural-demographic factors (Feldstein, 2005). Prices are also affected by internal and external factors. The internal factors comprise of the level of payer class, the level of uncompensated care due to lack of insurance and the adequacy of the underlying information systems/support. The external factors are the position of competitive costs, the total volume of services, the scope of the contract and the needs of the purchaser (Krentz and Jennings, 1986). Heshmat (1989) has established a framework to achieve market-based pricing decisions, including pricing objectives, cost, demand analysis and competition. We have analysed the factors that affect the pricing of hospital services and will outline our findings in the following section.

3.3.1 Institutional factors

The hospital market is comprised of private for-profit, private not-for-profit and publicly owned and operated firms (Dranove, 1988; Duggan, 2000; Hsu, 2011). The pricing objectives differ depending on the hospital's ownership structure. For example, profit objectives can be attained by targeting either a return on investment or 'satisfactory' profit maximisation (Bonnici, 1992), while non-profit objectives can be achieved by maximising net revenues (Heshmat, 1992). Considerable emphasis has been placed on comprehending the pricing aims of non-profit health-care facilities (Weisbrod, 1965; Bauerschmidt and Jacobs, 1985; Dranove, 1988; Heshmat, 1992). A statistical analysis reveals that non-profit institutions charge more for their services than publicly owned hospitals (Hsia *et al.*, 2014). Additionally, for-profit hospitals charge more for

interventions than any other facility (Hsia *et al.*, 2014). As public hospitals rely on tax funding to operate their services, pricing decisions are not vital for them.

Pricing practices for healthcare services are assessed according to the teaching and non-teaching status of hospitals, as evidenced by studies conducted by Newhouse (2003), White *et al.* (2014), Burke *et al.* (2019) and Kotwal *et al.* (2019). The findings suggest that teaching hospitals, which offer education and training for medical practitioners and treat complex cases, tend to be more costly than non-teaching establishments (Koenig *et al.*, 2003; Hsu, 2011; Burke *et al.*, 2019). Price variations also occur depending on the location where the service is provided. Prices differ depending on the services offered in various healthcare settings, including hospital outpatient departments. (Sledge *et al.*, 1996; Hsu, 2011; Higgins *et al.*, 2016; Babcock, 2019). Studies have shown that healthcare services provided in rural areas are generally less expensive than those in urban regions. However, in rural healthcare markets, prices can be higher due to lower patient volumes and increased overhead costs. Moreover, larger hospitals that offer numerous services may establish higher fees for their services in comparison to their smaller counterparts (Hsu, 2011). Therefore, the different fees for services can be attributed to variable pricing approaches based on the institutions' pricing goals.

3.3.2 Cost factors

To ensure efficient use of healthcare financial resources while maintaining price transparency, scholars have called for the development of strong cost accounting techniques (Tengilimoglu and Dziegielewski, 2000; Tompkins *et al.*, 2006). Additionally, they have emphasised the importance of hospitals understanding their cost structures (Sutherland, 2015). Much of the international evidence highlights the need for reliable cost-accounting techniques to support cost-based pricing (Raulinajtys-Grzybek 2014). While Davis (1971) suggests that pricing should not always be based on costs, implementing a costing mechanism can facilitate transparent and efficient management of financial resources (Audibert *et al.*, 2007). Additionally, such a mechanism is crucial for achieving revenue optimisation (Karaesmen and Nakshin, 2007). Therefore, there are current academic endeavours to implement costing methodologies comprising step-down approaches (Audibert *et al.*, 2007) or bottom-up approaches (Sangwan *et al.*, 2017; Thekkekara and Thiagarajan, 2019) and to construct cost models that encompass input expenses or service quantities to achieve the objective of cost-effectiveness in pricing (Tompkins *et al.*, 2006). Activity-based costing in hospitals offers both value extraction and creation whilst enhancing healthcare service quality (Llewellyn *et al.*, 2020).

Accurately measuring healthcare costs and gathering associated cost information is crucial for healthcare providers in both setting prices and arranging reimbursement (Krentz and Jennings, 1986; Raulinajtys-Grzybek, 2014). Hu (1971) studies the pricing behaviour of hospitals and uses maternity care as a case study to assess hospital costs. The provision of cost information for cost-plus pricing enables price setters to make informed decisions on resource allocation (Bahuguna *et al.*, 2020). Cost information comprises of fixed and variable costs, cost per care, costs related to outlier cases, costs specific to physicians, costs incurred per day of stay, payor-specific costs and so on (Horowitz and Kleiman, 1994). Achieving pricing based on cost data is possible only when there is uniformity in cost calculation methods. However, cost-based pricing fails to consider the dynamics of a marketplace (Krentz and Jennings, 1986).

3.3.3 Supply factors

Guerin-Calvert and Israilevich (2011) suggest that hospital prices are determined by both labour and non-labour factors associated with the supply of hospital resources. Provider service factors comprise of physicians providing specialty services at hospitals (Zuckerman *et al.*, 2010) and physicians' practice type (Reschovsky *et al.*, 2011). Specialty physician services are a primary cost generator for hospital services (Feldstein, 1970; Guerin-Calvert and Israilevich, 2011). The rising costs of physicians have led to the proposal and development of pricing models to contain the

expenses (Feldstein, 1970) and to assess the impact of hospital–physician integration on costs (Baker *et al.*, 2014). Various factors such as the structure of the healthcare delivery system, reimbursement systems, high consumer switching costs and differences in the training of physicians have been attributed to the increasing physician service prices (Sheiner and Cutler, 1999). Disagreements among medical professionals regarding treatments, financial incentives for physicians and the quantity of physicians in healthcare settings all have an impact on pricing for hospital physician services. Hospital costs also include the salaries and benefits of nurses, technicians and numerous other personnel (Guerin-Calvert and Israilevich, 2011).

The provision of specialised clinical services by hospitals using high-tech services commands a higher price-cost margin, indicating an evident manifestation of price escalation (Dranove *et al.*, 1993). High and ever-increasing healthcare costs are mainly driven by ceaseless innovations in medical technologies for diagnosis and treatments (Bodenheimer, 2005), invariably leading to price escalation. The pricing of hospital services is closely associated with the blend of services provided and the level and type of care offered by each hospital, thereby leading to regional variations in the costs of hospital services (Dranove *et al.*, 1993; Guerin-Calvert and Israilevich, 2011).

3.3.4 Demand factors

The demand for healthcare services relies on a range of patient characteristics. Several quantitative studies have taken into account factors such as race, income, age, individual treatment preferences, marital status, education, employment and income levels. These characteristics influence demand and thus have an impact on healthcare pricing (Bonnici, 1992; Sheiner and Cutler, 1999; Zuckerman *et al.*, 2010; White *et al.*, 2014). Moreover, scholars contend that specific geographical regions have comparatively weaker populations than others. The health status of a region's population can be evaluated based on various measurements, such as the percentage of smokers and individuals with hypertension, as well as rates of obesity, sedentary lifestyles, hospitalisation for hip fractures and incidences of heart attacks, strokes, gastrointestinal bleeding, surgeries for lung or colon cancers and myocardial infarction (Sheiner and Cutler, 1999; Zuckerman *et al.*, 2010). The severity of a patient's health condition is a precursor to the level of care provided at hospitals and subsequently affects pricing.

The literature on hospital pricing of services based on case-mix has focused on payment reimbursements (Jencks *et al.*, 1984; Wiley, 1992; Oostenbrink and Rutten, 2006). For example, hospitals in developed countries have implemented prospective payment systems through DRGs that are based on the case-mix of patients. These classification systems have been found to lower healthcare costs (Lewis, 1984; Benz, 1988; Corti *et al.*, 2018). Corti *et al.* (2018) have created a clinical group system that is risk-adjusted to account for variations in healthcare costs. Hof *et al.* (2017) posit that using case-mix to establish cost-efficiency highlights the uncertainty surrounding the price-setting protocols adopted by hospitals. This case-mix consists of a precise combination and number of patients, which, under the DRG pricing strategy, can potentially benefit healthcare facilities economically (Hof *et al.*, 2017).

3.3.5 Market structure

Hospitals demonstrate monopolistic market behaviour as they establish their prices by distinguishing their services on various parameters, including location, range of services, quality and level of sophistication (Dranove, 1988; Hsu, 2011). Scholars investigate how organisational changes, such as mergers and vertical integrations, impact the pricing of hospital services (Connor *et al.*, 1998; Melnick *et al.*, 1999; Krishnan, 2001; Haas-Wilson and Garmon, 2011; Tenn 2011; Baker *et al.*, 2014; Gowrisankaran *et al.*, 2015). Connor *et al.* (1998) observe that merging hospitals horizontally and consequently changing their functions can lead to average cost savings, which, in turn, may have a dampening effect on the prices charged by such hospitals. Nonetheless, Tenn (2011) verified an increase in inpatient prices post-merger. Anti-competitive

mergers may cause prices for services to soar due to hospitals having increased market power (Baker *et al.*, 2014). Prices for services in hospitals that have merged with different ownership types have increased, according to Melnick *et al.* (1999). Therefore, mergers between hospitals can cause prices for the same services to be ambiguous compared to other hospitals. We found some evidence of vertical integration affecting hospital prices. However, Ciliberto and Dranove (2006) found no evidence of higher prices resulting from the vertical integration of hospitals. Baker *et al.* (2014) demonstrated that hospitals which underwent vertical integration raised their service prices. Despite an increase in hospital prices and spending, the prices of physician services significantly reduced following vertical integration with physician practices (Baker *et al.*, 2014).

Hospital concentration has no significant relationship with hospital service prices, according to Moriya *et al.* (2010). In contrast, Robinson (2011) has found empirical evidence that hospitals in concentrated markets raise their prices to private insurers in case of payment shortfalls. The literature has evaluated the effect of competition on the pricing behaviour of for-profit and not-for-profit hospitals (Melnick *et al.*, 1992, 1999). Non-price competitions based on factors such as the quality of care, features, amenities and location of hospitals contribute to the high cost of competing hospitals (Heshmat, 1989). However, a shift from non-price to price competition has resulted in lower costs for hospitals (Melnick *et al.*, 1999). The evolution of hospital market concentration has seen pricing become a key consideration (Keeler *et al.*, 1999). The implementation of such a transition can potentially undermine the role of technology and specialised healthcare services in enhancing the quality of healthcare. It is worth noting, however, that the growth in productivity and advancements in technology must be assessed in the context of service pricing (Tengilimoglu and Dziegielewski, 2000; Tompkins *et al.*, 2006). Based on the synthesis of literature, there is no clear consensus on the influence of market structures and strategic decisions on hospital pricing.

3.3.6 Pricing regulation

The healthcare sector is characterised by market failures, which necessitates the regulation of healthcare service pricing. One branch of literature on price regulation has investigated the impact of legislation on the fluctuation of hospital service charges (Liu *et al.*, 2000; Bai, 2015; McClintock *et al.*, 2019). Thus, such regulations are involved in this pricing process. The literature on regulatory aspects of pricing presents evidence that healthcare providers do not strictly adhere to the regulated prices. For example, Liu *et al.* (2000) examined the impact of hospital pricing policies in China and identified that regulatory prices were inadequate in covering all the costs. Consequently, hospitals resorted to charging significantly more for services that used advanced technologies and drugs to offset the losses incurred by hospitals. Similarly, Bai (2015) evaluated the effect of the legislation on uninsured patients. The research uncovered that the legislation facilitated a decrease in prices payable by those without insurance. In a similar vein, McClintock *et al.* (2019) conducted a study that revealed how the extension of Medicaid under the Affordable Care Act (ACA) 2010 in the United States did not result in an increase of charges to private patients by safety net hospitals despite reimbursement reductions for those without insurance.

3.3.7 Third-party reimbursements

Price differences between insured and uninsured patients have been highlighted. Uninsured patients are charged higher prices and receive less comprehensive care (Reinhardt, 2006; Tompkins *et al.*, 2006; Melnick and Fonkych, 2008; Robinson, 2011; Batty and Ippolito, 2017). This indicates that a patient's ability to possess insurance affects the amount they are charged for hospital services and the level of healthcare services they receive at hospitals. A distinct pricing system is implemented for patients based on the third-party payer's identity (Reinhardt, 2006; Tompkins *et al.*, 2006; Anderson, 2007; Bai and Andersen, 2018). Patients may be insured by

public or private payers, resulting in dissimilar prices within and across hospitals depending on the contract type and the agreed-upon service costs between the payers and providers (Barros and Martinez-Giralt, 2008; Bai and Anderson, 2016). Cooper *et al.* (2019) investigated the increase in insurer-negotiated physician prices for care rendered in hospitals, as well as the growth in hospital prices and found an increase in hospital prices. This highlights the need for policymakers to address hospital price hikes in the context of third-party reimbursement. Additionally, policymakers should tackle the issue of price disparities among insured and uninsured patients in hospitals.

Contracting. Contracting is the process of establishing agreements between hospitals and third-party entities. According to Oostenbrink and Rutten (2006), reimbursement prices are determined by contracts between hospitals and insurers. Prior to negotiating contracts with third parties, hospitals first develop a pricing strategy (Barros and Martinez-Giralt, 2008). Insurers, on the other hand, place significant importance on healthcare quality when establishing contracts with hospitals (Magid *et al.*, 2017). Price contracts may incorporate discounts on fees, case-based reimbursements, per diem reimbursements and capitated payments (Horowitz and Kleiman, 1994; Wu, 2009). Some literature suggests creating novel contract mechanisms and pricing strategies between private hospitals and governments (Teymourifar *et al.*, 2020). Contractual mechanisms can significantly enhance health system performance, especially when public hospitals face a reduction in capacity. In their 2012 publication, Robinson and McPherson discuss ‘centres-of-excellence contracting’, in which patients are directed towards hospitals that offer high-quality care at discounted rates in exchange for an increased volume of patients.

Reference pricing. Setting a reference price as the upper limit of charges to be reimbursed by the insurer is reference pricing, a recently originated phenomenon (Robinson and MacPherson, 2012; Brown and Atal, 2018; Nassiri *et al.*, 2020). The literature on reference pricing centres around service prices, their link with insurer spending, as well as an analysis of the reference pricing payment system and its impact on patients, competing providers and insurers (Robinson and MacPherson, 2012; Brown and Atal, 2018; Nassiri *et al.*, 2020). While reference pricing presents a promising payment system for shoppable healthcare services and incentivises patients to choose more economical options, it also has cost-reducing benefits for hospitals (Nassiri *et al.*, 2020). This pricing practice has led to a decline in total per-procedure expenditure for providers and subsequently impacts hospital pricing practices and their profitability. Nassiri *et al.* (2020) suggest that hospitals are viewed as value-based providers by insurers when they charge patients the reference price or less. This impacts the hospital’s reputation and eventual profitability. The methodological reliability of reference pricing studies was assessed by Robinson *et al.* (2015a, 2015b) and Brown and Atal (2018). The impact of reference pricing was investigated on care outcomes, including the choice of care venue, overall costs and treatment complications, for procedures such as arthroscopy and colonoscopy (Robinson *et al.*, 2015a, 2015b). Future studies are needed to examine the effect of reference pricing schemes on pricing for hospital services.

4. Discussion

The pricing of hospital services is a multifaceted process influenced by an array of services provided by hospitals. Hospitals face significant pressure to offer services at affordable prices to ensure accessibility for patients. The issue of hospital pricing remains largely ignored and persists to this day. This study aimed to comprehend how hospitals establish their pricing decisions by surpassing prior research. The literature review revealed the factors that affect hospital pricing, pricing objectives, practices and strategies in the hospital context. Our findings attest to the fact that hospital service pricing can be examined from multiple perspectives, and that these are interconnected. For example, Keeler’s *et al.* (1999) study explored the interplay between competition, institutional factors and hospital pricing behaviour. The literature on pricing is limited during the period of 1970–1995 and its coverage is scant (Harris, 1979; Leven, 1984; Krentz and

Jennings, 1986; Benz, 1988; McKinney, 1990; Bonnici, 1992; Horowitz and Kleiman, 1994). The pricing of hospital services is a multifaceted process and can be seen as both intricate (Thekkekara and Thiagarajan, 2019; Babcock, 2019; Pandey and Raina, 2019) and discriminatory (Harris, 1979).

The study examined pricing goals (Bauerschmidt and Jacobs, 1985), tactics (McKinney, 1990; Horowitz and Kleiman, 1994; Tengilimoglu and Dziegielewski, 2000), as well as prevalent pricing approaches, including cost-shifting (Tompkins *et al.*, 2006; Melnick and Fonkych, 2008) and cross-subsidy (Dittman and Morey, 1981). Previous research has examined the effects of whether hospitals have teaching status or not on pricing (Burke *et al.*, 2019), the care setting (Higgins *et al.*, 2016), hospital size (Hsu, 2011), cost structures (Sutherland, 2015; Llewellyn *et al.*, 2020), DRG pricing (Corti *et al.*, 2018) and reference pricing (Nassiri *et al.*, 2020). Pricing literature for hospitals may be categorised according to institutional, cost, supply, demand, market structure, regulatory and third-party reimbursement factors. Recent pricing innovations in hospital services – such as case-mix pricing, reference pricing, bundled payments, global budgets, contractual mechanisms – were not previously anticipated within hospital service pricing. The latest pricing mechanisms provide possibilities for additional research, particularly within the context of developing countries.

Following Cronin *et al.*'s (2008) advice, this study reports methodological diversities in the literature. For example, Dranove (1988) constructed an econometric model to illustrate how price determination, patient treatment costs, number of services provided and profit factors influence profit maximisation in hospitals. The findings of a panel data analysis (Hsu, 2011) suggest a direct link between hospital prices and the cost of operations, which are in turn influenced by the level of capacity utilisation and demand variability. Tanwar *et al.* (2020) devised a pricing model to determine the optimal price in the face of cost uncertainty. Ciliberto and Dranove (2006) utilised a fixed regression model to examine the impact of vertical integration on the pricing of privately insured patients. Many studies have utilised secondary data sources for their empirical analysis, providing opportunities to explore alternative methodological approaches for studying hospital service pricing.

However, the main limitation of this study is the methodology employed for literature search, omitting substantial publications of grey literature like magazines and conference papers. Therefore, there is a possibility of missing significant information. Moreover, we observe disciplinary overlaps in the pricing of hospital services from a conceptual point of view. The pricing phenomenon is within the scope of social science, while its specific setting falls under medical science. These disciplinary attributes influence our understanding of the subtleties of hospital pricing. The hospitals' diverse and conflicting objectives, strategies and practices may have impeded the synthesis of relevant evidence from literature. The pricing literature's dynamic nature provides extensive evidence to recognise the intricate nature of the pricing phenomenon in hospitals.

5. Scope for future research

Based on the review, we have identified specific areas that require additional research and evidence to understand hospital pricing. Firstly, hospital service pricing is complex and obscure (Brown, 2014). Therefore, more research on pricing methods is needed to increase the transparency of the pricing process. The World Health Organization's report, as outlined by Barber *et al.* (2019), elucidated pricing and payment systems applicable to developed nations. Consequently, additional study on pricing and payment systems in developing countries is necessary. Research on pricing in emerging economies such as India is inadequate. Future scholars are advised to concentrate on pricing mechanisms in low- and middle-income countries as well.

Secondly, the literature lacks an appropriate pricing strategy for hospitals, with pricing terms often used interchangeably. The ambiguity of terms such as 'cost', 'price' and 'charge' can lead to

Table 2. Tentative research questions

Factors	Key research questions
Institutional factors	<ol style="list-style-type: none"> (1) How should price-setting practices vary based on the institutional set up? (2) What pricing strategies would work best for urban hospitals and their rural counterparts? (3) What pricing practices would suit best for non-teaching hospitals incorporate in practice? (4) What pricing practices are best suited for teaching hospitals? (5) What is the combined effect of ownership and operational structures on the pricing of hospital services? (6) How will the healthcare delivery nature- multi-specialty or super-specialty – impact on pricing decisions?
Cost factors	<ol style="list-style-type: none"> (1) How can uniformity in cost-calculation methods be achieved? (2) How can hospitals leverage on cost-accounting techniques and cost-optimisation tools to have an edge over pricing? (3) What are normative dimensions of costing techniques to have pre-eminence in pricing? (4) Is cost-price conundrum real or fictional?
Supply-driven factors	<ol style="list-style-type: none"> (1) What incentives can be used to reduce physician prices in hospitals? (2) Are high-tech diagnostic and interventional apparatus drivers to charge higher prices? (3) How can we operationalise the concept of quality care?
Demand-driven factors	<ol style="list-style-type: none"> (1) How can the efficient use of Diagnosis-Related Group pricing be extended to developing countries? (2) How does the case-mix classification system achieve cost-efficiency? (3) Why do governments not make it a policy mandate to ensure affordable care if case-mixing system culminates into cost-efficiency?
Market structure	<ol style="list-style-type: none"> (1) What can be done to furnish a consensus on the role of market structures and strategic decisions on hospital pricing? (2) What is the role of market-based pricing for hospital services in developing countries? (3) How does the corporate restructuring influence price setting?
Regulatory mechanism	<ol style="list-style-type: none"> (1) What is the extent of influence of hospital regulations in developing countries? (2) How does indirect regulation play a role in pricing for hospital services?
Third-party reimbursements	<ol style="list-style-type: none"> (1) How can hospitals negotiate effectively with insurers to combat hospital price growth? (2) What can be done to reduce differential pricing within hospitals? (3) How does the reference pricing bring down the total pre-procedure expenditure for providers? (4) How are the third-party payments instrumental in driving up the health care prices, relatively to the perceived cost-price spiral? (5) How far the co-payment mechanisms in ameliorating out-of-pocket expenses?

Source: Current study.

confusion. Additionally, there is an absence of clarity regarding ‘pricing practices’ and ‘pricing strategies’. Future researchers should focus on operationalising these terms to provide a clear structure and deeper understanding.

Thirdly, it is widely believed that unfulfilled healthcare requirements provide an opportunity for providers to engage in price skimming. However, there is insufficient evidence in the literature to demonstrate its occurrence. Therefore, investigating cream-skimming pricing practices could be a promising avenue for future research.

Fourthly, it is essential to conduct studies investigating the interplay between health insurance and hospital pricing practices for the development of appropriate policy frameworks and effective regulatory interventions. In addition, the role of technology in pricing hospital services is still up for debate. Proper scholarly intervention can aid in resolving this theoretical tension.

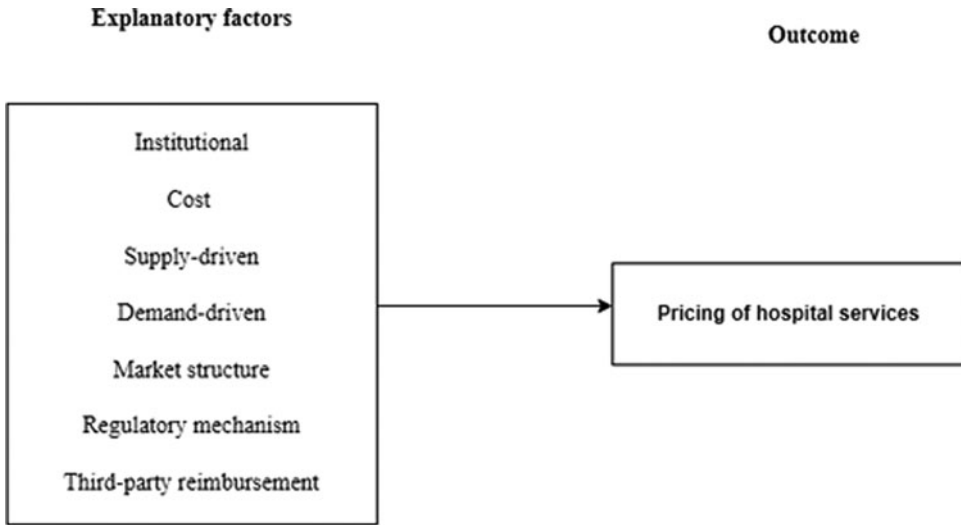


Figure 2. Factors influencing pricing of hospital services.
 Source: Current study.

Lastly, comprehending the challenges confronted by hospitals in pricing is vital. This approach can only be achieved through engaging in discussions and conducting interviews with hospital managers or heads of hospitals.

<ul style="list-style-type: none"> ❖ Institutional factors <ul style="list-style-type: none"> ➤ Ownership structure <ul style="list-style-type: none"> <input type="checkbox"/> Private profit <input type="checkbox"/> Private non-profit <input type="checkbox"/> Government ➤ Operational structure <ul style="list-style-type: none"> <input type="checkbox"/> Teaching hospitals <input type="checkbox"/> Non-teaching hospitals ➤ Locational nature <ul style="list-style-type: none"> <input type="checkbox"/> Urban <input type="checkbox"/> Semi-urban <input type="checkbox"/> Rural etc. ❖ Cost factors <ul style="list-style-type: none"> ➤ Cost structure ➤ Costing techniques ❖ Supply-driven factors <ul style="list-style-type: none"> ➤ Personnel ➤ Facilities offered ➤ Technology & innovations ➤ Special Vs. general care ➤ Quality & sophistication ➤ Productivity 	<ul style="list-style-type: none"> ❖ Demand-driven factors <ul style="list-style-type: none"> ➤ Socio-demographic factors ➤ Type of care sought ➤ The extent of facilities sought ➤ Diagnosis-related groups (case-mix) ➤ Payment mechanisms ❖ Market structure <ul style="list-style-type: none"> ➤ Oligopolistic ➤ Mergers & takeovers ➤ Market concentration ➤ Information asymmetry ❖ Regulatory mechanism <ul style="list-style-type: none"> ➤ Pricing policies ➤ Price-cap on uninsured patients ➤ Policy on special healthcare programmes ❖ Third-party reimbursements <ul style="list-style-type: none"> ➤ Subscriptions to private/public-funded healthcare plans ➤ Contracting ➤ Reference pricing
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Figure 3. Dimensions of the factors influencing pricing for hospital services.
 Source: Current study.

No peer-reviewed studies have been found that explore hospitals' pricing practices. However, to achieve better pricing solutions, it is essential to comprehend pricing methods in hospitals. This can be achieved by employing qualitative methods such as interviews and focus group discussions with hospital managers and administrators.

Additionally, we propose to conduct multiple research investigations into the factors that impact the pricing of healthcare services, as presented in [Table 2](#).

The research questions are aligned with the factors that impact hospital pricing to provide clear focus. Institutional factors, including locational specificity, ownership, size, operational structure and the extent of specialty services offered, are crucial in determining pricing practices within hospitals. Similarly, the validity of co-payment arrangements in health insurance policies is also under scrutiny due to increasing out-of-pocket expenses (Sugunan *et al.*, 2023) in recent times.

The study has produced a conceptual diagram outlining the factors that affect hospital service pricing, as shown in [Figure 2](#). The primary aim of this study was to uncover the factors that influence the pricing mechanism due to its perceived ambiguity and complexity. These factors include institutional, cost, demand and supply, market structure, regulatory requirements and third-party reimbursement.

The literature review indicates that multiple factors influence hospital service pricing practices, demonstrating the inherent complexity of this area. This study has organised these factors into specific themes, as shown in [Figure 3](#), to provide a clearer understanding of each individual dimension.

6. Conclusion

Prices impact the supply and demand of services, which ultimately affects the profitability of businesses. Despite its impact on profitability, there's a dearth of interest in service pricing in both theoretical and empirical contexts. The healthcare services market doesn't follow a traditional buyer and seller structure, making healthcare pricing complex for both patients and providers. Patients are insensitive to prices when seeking hospital services due to their necessity. From the healthcare providers' perspective, prices play a crucial role in determining the required resources and providing incentives for efficient, comprehensive and high-quality delivery of healthcare. The unquantifiable characteristics of services make their pricing challenging and distinct from that of tangible products. Pricing remains an underutilised management tool. Factors such as third-party payers or insurers' involvement, incomplete information and inadequate cost measurement processes impact the focus on pricing hospital services.

We have compiled the factors that underpin hospital pricing literature into five themes: institutional factors, costs, supply factors, demand factors, price regulation and third-party reimbursements. These factors amalgamate to affect pricing of hospital services. For example, reimbursement systems differ between private and public providers. Additionally, the literature documents pricing objectives and strategies. Furthermore, the study has revealed evidence of cream-skimming, cost-shifting and cross-subsidisation practices in hospitals. Our research suggests that service pricing in hospitals is context-dependent. There are no definitive pricing policies or ideal prices that align with a country's health system objectives. Despite the vast evidence on pricing, it is extensively fragmented, and a specific focus on pricing in low- and middle-income countries is necessary.

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