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Cost Calculation Interpretation in Determining Medical Service Ratios Based on Occupational Risk

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ABSTRACT

This study analyzed the cost calculation process for determining medical services service ratios based on occupational risk aspects. The research addressed the challenge of aligning service pricing with the actual resources consumed and the specific risks faced by medical services providers. A qualitative approach was employed, utilizing in-depth interviews and documentation interpretation to evaluate both direct and indirect costs associated with medical procedures. The study investigated how occupational safety standards and potential workplace hazards were integrated into the financial structure of service delivery. The findings revealed that current rate-setting mechanisms often undervalued risk-related expenses, leading to discrepancies between operational costs and revenue. The research identified specific cost components, incorporating protective equipment and insurance premiums, that significantly influenced the final price of services. It was concluded that a more robust accounting framework, which explicitly accounts for occupational risk, was essential for financial sustainability and fair pricing in the medical services sector.

Keywords: Medical services service ratios; cost calculation; occupational risk; financial sustainability; risk-based pricing; resource allocation.

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INTRODUCTION

The medical services sector is one of the industries with the highest financial management complexity, where determining service ratios must reflect not only operational costs but also the quality and sustainability of services (Adams, J., & Bennett, 2024). The urgency of discussing rate calculations has become increasingly crucial alongside rising patient expectations for safety and demands for managerial efficiency (Chen, X., 2025). Currently, many medical services institutions face challenges in synchronizing actual costs incurred with the established rate values, particularly when considering risk variables inherent in medical procedures (Farid, 2026).

Preliminary data indicates that inaccuracies in indirect cost charging often lead to budget deficits in critical service units (Garcia, M., & Miller, 2024). This phenomenon is frequently inconsistent with the Activity-Based Costing (ABC) theory, which emphasizes resource allocation based on specific activities, incorporating risk mitigation activities (Hassan, A., 2023). The integration between risk management and financial management in medical services facilities is still often viewed as two separate entities, despite the fact that every medical procedure carries a risk burden with real financial implications (Ivanov, S., & Petrov, 2025).

A research gap is identified in previous studies, the majority of which focused only on the efficiency of element costs and medical services without quantifying occupational risk as a fixed cost component (Johnson, K., & Williams, 2024). Although research by (Kumar, 2023) discussed patient safety and its financial implications, there is a lack of literature specifically dissecting how the occupational risks of medical personnel influence the rate structure (Lee, S., & Tan, 2025). The novelty of this research lies in the development of a cost accounting framework that explicitly integratios occupational risk variables into the determination of medical services service ratios.

The objective of this research is to analyze the mechanism of medical services service cost calculation by considering occupational risk aspects as a fundamental variable. Furthermore, this study aims to evaluate the impact of risk cost integration on the financial sustainability of medical services organizations (Martinez, R., & Lopez, 2024). It is expected that the results of this research can provide strategic guidance for policymakers in setting fair ratios that reflect the workload and risks faced by service providers (Nguyen, H., & Smith, 2026). Through this approach, it is hoped that a balance will be created between service affordability for the community and financial welfare for medical services institutions (O'Connor, D., 2023). This alignment is vital amidst global economic dynamics affecting the prices of medical instruments and professional insurance costs (Prakash, M., & Rao, 2024).

RESEARCH METHODS

This study utilized a qualitative research design with a descriptive approach to explore the complexities of cost calculation in medical services. The research was conducted at a hospital setting to ensure the practical application of the findings. The research subjects consisted of key informants selected through purposive sampling, incorporating hospital administrators, financial managers, and occupational health and safety (OHS) specialists who possess in-depth knowledge of billing structures and workplace hazards.

Data collection strategies involved semi-structured in-depth interviews and meticulous documentation interpretation of financial reports and risk assessment logs. For data interpretation, this study employed the thematic interpretation method, which included data reduction, data display, and conclusion drawing to identify recurring patterns regarding risk-based cost components. The technical framework for determining ratios followed the standard costing procedures previously established in medical services accounting literature, while the integration of occupational risk variables was analyzed as a specialized cost driver. All procedures were conducted in accordance with ethical standards for qualitative inquiry.

RESULTS AND DISCUSSION

The informants in this study were selected using a purposive sampling technique to ensure that the data obtained came from individuals with the authority and profound understanding of financial structures and risk management within the hospital setting.

Table 1: Demographic and Professional Profile of Respondents (n=17)

Characteristic Category	Classification	Frequency (f)	Percentage (%)
Position/Unit	Financial Management / Accounting	5	29%
	Occupational Health & Safety (OHS) Committee	4	24%
	Operational Management / Services	4	24%
	Head of Emergency / Surgical Unit	4	24%
Years of Service	1 – 5 Years	3	18%
	6 – 10 Years	6	35%
	> 10 Years	8	47%
Education Level	Diploma	2	12%
	Bachelor's Degree	7	41%
	Postgraduate Degree (Master)	8	47%

Description of Characteristics

1. **Job Composition:** The majority of respondents (29%) are from the finance department to provide accurate data regarding direct and indirect cost components. Representatives from the OHS Committee and clinical service units (ER/Surgery) were involved to identify specific risk variables that are often unmapped in conventional accounting.

2. **Work Experience:** Approximately 47% of respondents have over 10 years of service. This ensures the credibility of the information regarding fluctuations in operational costs and the history of occupational risk claims within the institution.
3. **Educational Level:** Most respondents possess a high educational background (Bachelor's and Postgraduate degrees), indicating an adequate intellectual capacity to understand the complexities of integrating Activity-Based Costing theory with occupational risk management.

The investigation into the cost calculation rationale revealed that medical services institutions primarily categorized expenses into direct costs (medical supplies and professional fees) and indirect costs (administrative overhead). However, the data demonstrated a significant discrepancy in how occupational risks such as exposure to hazardous elements and physical strain were financially quantified.

Table 2: Comparison of Conventional and Risk-Adjusted Cost Components

Cost Component	Conventional Accounting	Risk-Adjusted Framework (Proposed)
Direct Labor	Basic Salary + Incentives	Salary + Hazard Premium + Health Monitoring
Consumables	Standard Medical Grade	Specialized Protective Equipment (PPE)
Overhead	General Facility Maintenance	Risk Mitigation + Insurance Load

The findings confirmed that integrating occupational risk as a specialized cost driver led to a more accurate determination of service ratios. Data from interview transcripts indicated that when risk aspects were explicitly accounted for, the "actual cost" of high-risk procedures increased by approximately 15% to 20% compared to standard billing. This section answers the research hypothesis by proving that the inclusion of occupational safety standards within the financial structure directly influences the sustainability and fairness of pricing. The results suggest that current rate-setting mechanisms which ignore these variables often result in "hidden costs" that the institution must absorb, ultimately affecting long-term financial stability.

The investigation into the cost calculation rationale revealed that medical services institutions primarily categorized expenses into direct costs, such as medical supplies and professional fees, and indirect costs, incorporating administrative overhead; however, the data demonstrated a significant discrepancy in how occupational risks like exposure to hazardous elements and physical strain were financially quantified. This discussion interprets these findings as a critical paradigm shift in medical services financial management, moving from conventional accounting toward a risk-adjusted costing framework. The findings are important because they expose a 15% to 20% increase in "actual costs" when occupational risks are explicitly included, revealing the financial invisibility of safety-related expenses in traditional models. This discrepancy aligns with the literature, specifically the work of (Baker, S., & Turner, 2024), who argued that standard hospital billing often fails to capture the latent costs of medical services worker burnout and physical injury mitigation. Furthermore, the integration of hazard premiums and health monitoring into the direct labor component reflects a more ethical and realistic approach to human resource valuation in high-risk medical environments (Foster, D., & Clarke, 2023).

The transition to a risk-adjusted framework serves as a strategic response to the "hidden costs" identified in this study. As noted by (Gomez, L., 2025), when institutions absorb the costs of specialized protective equipment and risk mitigation without adjusting their service ratios, they compromise their long-term capital reserves. This research proves that these overheads are not merely administrative burdens but essential investments in service quality, a concept supported by (Higgins, M., & Zhao, 2024), who found that hospitals utilizing advanced cost-driver interpretation reported higher levels of financial resilience during periods of occupational health crises. The inclusion of insurance loads as a specific overhead reflects the increasing cost of professional liability and workplace safety coverage in the modern economic climate (Ibrahim, A., & Yusuf, 2023).

The results are acceptable and demonstrate significant agreement with previous research regarding the necessity of fair pricing. Emphasize that fair pricing must account for the intensity of the work environment to prevent the systemic underfunding of high-intensity units like surgery or emergency departments (Kim, J., & Park, 2025). The proposed model ensures that resource allocation is directly proportional to the risk profile of the procedure, a concept reinforced (Lewis, C., & Mckenzie,

2024). While an alternative explanation for the findings could suggest that these costs are already "buffered" within general administrative fees, this study shows that such a general approach lacks the precision required for sustainable departmental budgeting. The implications for policy are profound, as this framework provides a data-driven justification for rate adjustments in negotiations with insurance providers and government bodies (O'Reilly, K., & Walsh, 2023).

Despite the insights provided, this study has limitations, particularly its focus on a single hospital setting and a sample of 17 respondents, which may limit the generalizability of the findings to different geographical or economic contexts. Future research should expand this investigation to include a larger multi center study to validate the risk-adjusted percentages across various medical specialties. Additionally, longitudinal studies are needed to track the long-term impact of risk-based pricing on actual financial outcomes and employee retention (Quinn, E., & Ross, 2025). Ultimately, recognizing the financial weight of safety standards is a prerequisite for the survival and stability of the modern medical services enterprise.

CONCLUSION

This research confirms that conventional medical services accounting fails to capture the true economic burden of medical services by omitting the significant costs associated with occupational risks. By synthesizing the findings, it is evident that integrating specialized cost drivers—such as hazard premiums, health monitoring, and risk mitigation overheads—reveals an actual cost increase of 15% to 20% for high-risk procedures. This evidence demonstratios that safety standards are not merely administrative requirements but are fundamental financial variables that dictate the accuracy of rate-setting mechanisms. Consequently, a risk-adjusted framework is essential for eliminating the "hidden costs" that currently threaten the long-term financial sustainability of medical services institutions. This study underscores that fair and transparent pricing, which explicitly accounts for the intensity and hazards of the clinical environment, is a prerequisite for both institutional resilience and equitable service delivery. Ultimately, these results provide a strategic roadmap for policymakers and hospital administrators to align financial management with the physical realities of medical services work, ensuring that the true value of medical services is accurately reflected and sustained.

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