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Impact of Control on Healthcare Expenses and quality of care in Lebanon: Case of Health Insurance

Joseph Gemayel[1], Dunya Nohra [2], Josiane Abi Khattar [3], Maha Nehme[4], Danie Khawaja[5]

[1 2 3 4 5]Holy Family University, Lebanon

danie.khawaja@usf.edu.lb

Abstract. Background: The efficient management of financial resources and the delivery of quality care are crucial challenges in healthcare. Health insurance companies in Lebanon play a significant role in ensuring medical care through contracted hospitals. Objective: This study assesses the impact of control mechanisms implemented by Health insurance companies on healthcare expenses and the quality of care provided in Lebanon. Methods: A cross-sectional analytical study was conducted with a census of 50 Health insurance controllers working in various contracted hospitals. Data collection was performed using a structured questionnaire. Statistical analysis included descriptive and inferential tests to assess the associations between variables, with significance set at $p < 0.05$. Results: The findings reveal that health insurance controllers significantly influence cost reduction and quality improvement in healthcare services. Key factors, such as the type of hospital and the number of insured patients, were associated with control effectiveness. Conclusion: Control mechanisms by health insurance controllers in Lebanon have demonstrated a positive impact on healthcare expenses and quality of care, highlighting the need for sustained efforts to optimize these practices.

Keywords. Medical Insurance, Healthcare Expenditures, Quality Control, Lebanon, Health Insurance

Introduction:

In the heart of healthcare concerns, the efficient management of financial resources and the delivery of quality care remain complex and crucial challenges. Sanitary control, in a scientific context, can be defined as a set of systematic measures and procedures implemented to monitor, assess, and regulate health-related aspects within an organization or a healthcare system **(Amer, 2021)**.

A comprehensive strategy that incorporates knowledge of quality costs, technology utilization, and the application of strategic interventions such as management of health care expenses and recruitment and training of Community Health Workers (CHW) is necessary for effective control of healthcare costs. Control of healthcare expenses and quality of care involves a number of approaches and initiatives intended for achieving a balance between reducing expenses and sustaining or raising the standard of medical care.

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The success of these interventions frequently depends on the particular context and implementation, even if they have the potential to save costs and enhance quality. To achieve long-lasting changes in healthcare delivery, systemic problems including insurance coverage and continuity of care must be addressed(*Controlling Health Care Expenditures | New England Journal of Medicine*, n.d.).

Depending on a number of factors, integrating community health professionals into chronic care management may reduce healthcare costs and preventable consumption, although their effectiveness has not been well investigated (Jack et al., 2017).

In recent years, the rising total cost of medical care has become a prevalent issue for countries worldwide. Controlling the rapidly rising expenses of healthcare under the presumption of providing quality medical care has thus emerged as a significant issue in the current consideration of medical reform. The role of medical insurance in controlling the medical costs and decreasing medical expenses is clear (Zhao et al., 2014).

Both governmental and private healthcare systems are in place in Lebanon. The private sector is the main source of financing for health care (71%). Since over half of the population lacks official insurance, they qualify for coverage through the Ministry of Public Health, which acts as a "last resort" insurer for costly medical care and hospital stays(*Strategic Plan Of The Ministry Of Public Health 2016-2020 (Final Draft)*, n.d.). However, the public services are frequently insufficient and do not provide all forms of care. All employees, with the exception of those in governmental sectors, are required to get health insurance through the National Social Security Fund (NSSF). For better medical coverage, the majority of Lebanese expatriates and residents choose private health insurance whose plans might provide suitable coverage (Ammar et al., 2016b)

In Lebanon, the Medical Insurance companies play a central role in guaranteeing medical care through their contracted hospitals. As a protective companies, the medical insurance has evolved over time to meet the changing needs of the population. In the healthcare domain, their role has become particularly significant with the establishment of control mechanisms aimed at optimizing expenses while ensuring exceptional quality of care.

In recent years, the medical insurance companies have undertaken strategic initiatives to strengthen the management of their medical resources and improve the quality of care provided, not only in private hospitals but also in public hospitals with which they have established partnerships. The quality of care remains an important concern of insured and uninsured patients.

The recruitment and selection process, including written and oral examinations, aimed to choose among a considerable number of candidates professionals holding a Bachelor in nursing, to occupy the position of health controllers within the medical insurance companies. This strategic decision reflects the ongoing commitment of the medical insurance companies to enhance the management of medical expenses and ensure quality healthcare delivery.

Following the implementation of health control, the research question emerges as follows:

What is the impact of the control exerted by the medical insurance companies on healthcare expenses and the quality of care in private and public hospitals in Lebanon?

The main objective of this study is to assess the performance of medical insurance controllers and their perception of the control implemented on healthcare expenses and the quality of care provided in contracted hospitals in Lebanon. More specifically, the study aims to examine changes in the management of medical costs, the quality of care, and patient satisfaction since the introduction of this control.

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Literature Review

Healthcare Expenditures and Quality of Care

Globally, the rising cost of healthcare has become a central policy concern, prompting reforms to balance financial sustainability with quality of care. Healthcare expenditures encompass all resources dedicated to promoting, preventing, treating, and maintaining population health, including infrastructure, personnel, medications, and preventive interventions (Hussey et al., 2013b). Controlling these costs while maintaining care quality involves strategic approaches such as cost management, technological integration, and targeted interventions like the recruitment of trained personnel and the optimization of healthcare delivery (Jamalabadi et al., 2020).

Health insurance coverage plays a crucial role in medical cost containment. Evidence from China demonstrates that insurance coverage can significantly influence medical costs and out-of-pocket expenditures. In Lebanon, where private spending represents approximately 71% of total healthcare expenditures, health insurance has emerged as a key mechanism for access to care, complementing the Ministry of Public Health's role as the "insurer of last resort" for uninsured populations(Ammar et al., 2016a). Insurance companies thus have a pivotal function in guaranteeing healthcare delivery through their contractual agreements with both public and private hospitals.

2. Control Mechanisms and Cost Containment

Health control can be defined as a set of systematic measures to monitor, assess, and regulate health-related activities within healthcare systems (Fullman et al., 2018). International evidence indicates that interventions such as global budget contracts, pay-for-performance schemes, and payment reforms can moderate healthcare costs while incentivizing quality improvements. Integrating community health workers into care pathways has also shown potential to reduce costs and unnecessary service utilization, although evidence remains mixed and context-dependent (Barber et al., 2017).

In Lebanon, medical insurance companies have progressively implemented structured control mechanisms to manage rising healthcare costs while safeguarding service quality. These mechanisms include deploying trained health controllers often nurses within contracted hospitals to monitor expenditures, ensure protocol compliance, and optimize resource allocation. Their role extends to preventing unnecessary procedures, negotiating service tariffs, and overseeing clinical practices**,** thereby achieving measurable cost reductions without compromising care standards(Ammar et al., 2016a).

Quality of Care Dimensions

Quality of care is defined as the capacity of healthcare services to increase the likelihood of achieving desired health outcomes, in accordance with current professional knowledge (Stavropoulou et al., 2022) . International frameworks emphasize six key dimensions: effectiveness, safety, accessibility, patient-centeredness, efficiency, and equity. Studies have shown that implementing quality protocols, continuous staff training, and technological innovations such as electronic health records significantly improve clinical outcomes and reduce medical errors (Kruk et al., 2018). Furthermore, communication and coordination within healthcare teams are essential determinants of quality, preventing adverse events and improving patient safety(*The Association Between Health Care Quality and Cost*, n.d.)

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Health insurance has also been associated with improved perceptions of care quality among patients, as observed in Ghana and other contexts, by ensuring access and promoting standardized service delivery(Duku et al., 2018).

Control and Quality Improvement

Evidence suggests that cost control and quality improvement are not mutually exclusive. By preventing medical errors, optimizing care processes, and managing chronic diseases proactively, quality interventions can reduce long-term healthcare costs(Wackers et al., 2021). In Lebanon, health controllers act as intermediaries between insurers and hospitals, ensuring compliance with clinical standards and promoting efficient use of medical resources.

Methods and Materials

Study Design:

This research adopts a cross-sectional, analytical, and multicentric design, encompassing all healthcare facilities contracted with the medical insurance companies. The study spans regions across Lebanon, ensuring a comprehensive evaluation of the impact of the medical insurance control on healthcare expenditures and service quality.

Population and Sampling:

The study targets all medical insurance companies' controllers in various hospitals across Lebanon (N=50). Sampling includes 50 controllers available in Lebanon, ensuring a representative sample of this specific population.

Data Collection Procedure:

The questionnaire, distributed electronically to medical insurance companies' controllers, spans a six-week data collection period. Clear instructions guide participants on questionnaire completion, capturing their perceptions at a specific point in time.

Questionnaire Construction:

Structured to gather comprehensive data on medical insurance controllers' perceptions, the questionnaire consists of five sections: Profile and Experience, Sanitary Control, Quality of Care, Healthcare Expenditures, and Satisfaction as a Lebanese Army controller.

Scoring System:

A global score on a 100-point scale assesses control effectiveness. Subsections include Cost Reduction (CR), Quality Improvement (QI), Patient Satisfaction (PS), Operational Efficiency (OE), and Control of Expenditures and Medical Resource Utilization (CEMR). Likert-scale responses (1-5) facilitate scoring.

Statistical Analysis:

Descriptive analysis presents mean ± standard deviation for quantitative variables and percentages for qualitative variables. Non-parametric tests (Mann-Whitney, Kruskall-Wallis, Spearman Correlation) address the non-normal distribution of data. Significance is set at $p < 0.05$.

Ethical Considerations:

This study adheres to ethical research principles, encompassing informed consent, data confidentiality, and responsible use of results. Approval from the MI companies ensures compliance with ethical guidelines.

Results:

The study provides a descriptive overview of key demographic and professional characteristics of the MI companies controllers in the healthcare sector. The majority of controllers are female (82%), with a significant presence in Beirut and Mount Lebanon (64%). The predominant employment is in private non-university hospitals (74%). In terms of

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experience, 50% have less than one year, 30% between one and three years, and 2% have more than three years. The majority hold a Bachelor's degree in Nursing Sciences (50%), and the average age is approximately 34 years. Controllers handle an average of 9.96 patients insured by the MI companies per day *(Table 1).*

Table1: Sociodemographic, Professional, and Organizational Characteristics of Medical Insurance Controllers in Lebanon (N = 50)

Variable	Categories	n	%
Gender	Male	9	18
	Female	41	82
Geographical region of work	Beirut	16	32
	Mount Lebanon	16	32
	North	6	12
	South	6	12
	Bekaa	6	12
Type of hospital	Public	13	26
	Private	37	74
University / Non-university hospital	University	7	14
	Non-university	43	86
Length of work in the current hospital	Less than 6 months	10	20
	Between 6 months and 1 year	24	48
	Between 1 and 3 years	15	30
	More than 3 years	1	2
Are medical insurance controllers subject to regular rotations between hospitals?	Yes, every 6 months	19	38
	Yes, but at a different frequency	25	50
	No	6	12
Have you noticed significant differences between hospitals in terms of health expenditure management and quality of care?	Yes	38	76
	No	12	24
Years of professional experience in the health sector before joining the medical insurance as a controller	Less than 1 year	4	8
	Between 1 and 3 years	6	12
	Between 3 and 5 years	11	22
	More than 5 years	29	58
Highest educational level	Bachelor’s in Nursing Sciences	25	50

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	University Diploma (DU)	14	28
	Master's degree	9	18
	Other (MBA, DBA…)	2	4
Have any hospitals contracted with the medical insurance expressed their intention not to renew their contract?	Yes	9	18
	No	41	82
Age (mean ± SD)		34.18 ± 5.32	
Number of insured patients handled per day (mean ± SD)		8.96 ± 7.8	

Sanitary Control Evaluation Score:

The average score was 65 ± 21.28, which falls within the 60–79 range, and is therefore interpreted as "Positive" (according to the categorization of results described in the methodology). This indicates an overall positive perception of sanitary control among respondents, although some nuances may exist.

the results presented in the table reveal a variety of perceptions among controllers regarding the impact of control on healthcare expenditures and quality of care. Items Q1 to Q10 generally suggest a positive trend, indicating perceived improvements in several areas, such as cost reduction, medication management, operational process efficiency, and coordination among medical staff. However, divergent opinions are observed in items Q11 to Q20, highlighting varying perceptions concerning aspects such as coordination, changes in medical practices, and hospital admissions *(Table 2)*.

Table 2: Sanitary Control Evaluation Score

Sanitary Control Evaluation Items	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)
Q1 Medical procedure costs have decreased since the implementation of MI control.	18	10	6	30	36
Q2 Medication purchases have been better managed and are less costly since the intervention of controllers.	22	14	8	22	34
Q3 Non-essential expenditures have been reduced, contributing to resource savings.	18	12	12	22	36
Q4 The quality of medical care has improved since the intervention of MI controllers.	22	16	12	32	18
Q5 Patients receive faster and more efficient care thanks to LAF control.	18	4	28	16	34
Q6 Patients are more satisfied with the medical care received since the intervention of controllers.	16	10	4	20	50
Q7 Patients have noticed an improvement in communication with medical staff since the intervention of controllers.	16	8	14	28	34

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Q8 Patients have reported improvements in the accessibility and availability of healthcare services.	16	20	14	22	28
Q9 Hospital operational processes have become more efficient since the intervention of controllers.	16	10	12	22	40
Q10 Waiting times for medical care have been reduced through more efficient operations.	16	10	24	18	32
Q11 Coordination among medical staff has improved, enhancing care efficiency.	24	20	28	18	10
Q12 Since taking over as an MI controller in this hospital, to what extent do you believe healthcare expenditure management costs have been reduced?	20	18	8	28	26
Q13 Have you noticed increased efficiency in managing medication and medical supply stocks since the introduction of MI controllers?	16	14	14	32	24
Q14 Have you noticed resistance or challenges encountered during the implementation of these budgetary controls by the MI?	20	26	12	16	26
Q15 Have you noticed changes in medical practices regarding surgeries since the introduction of MI controllers in hospitals?	24	18	18	20	20
Q16 Have you observed reductions in the number of medical examinations performed since the arrival of MI controllers in hospitals?	16	12	10	12	50
Q17 Have you noticed improvements in the use of medical resources since MI controllers began monitoring hospital expenditures?	18	18	10	16	38
Q18 Overall, do you think MI controllers have helped reduce unnecessary medical expenses in hospitals?	20	14	26	20	20
Q19 How would you assess the quality of care provided in the hospitals where you have worked as MI staff?	22	24	12	30	12
Q20 Have you noticed a decrease in hospital admissions since the implementation of MI control?	16	22	26	22	14

1: Strongly disagree **2:** Somewhat disagree **3:** Neutral **4:** Somewhat agree **5:** Strongly agree

Moving to the bivariate analysis, key associations were identified. Notably, a significant negative correlation (Spearman correlation = -0.436, p = 0.02) was found between the number of insured patients and the control score, indicating that a higher number of insured patients is associated with a less favorable assessment of control. Regarding hospitals' contractual intentions, 18% expressed the intent not to renew their contract, highlighting potential concerns. The type of hospital significantly influences the control score (p = 0.0001), with controllers in private hospitals scoring higher than their counterparts in public hospitals.

In terms of experience, no significant differences were observed among gender, geographical region, or education level. However, a noteworthy finding is the correlation

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between the perception of differences in hospital management and a lower control score (p = 0.002), underlining the importance of consistent practices across hospitals.

These results provide valuable insights into the demographics, experiences, and perceptions of controllers, shedding light on potential areas for improvement and strategic interventions within the medical insurance companies on the healthcare control system.

A significant negative correlation (Spearman correlation = -0.436, p = 0.02) was identified between the number of insured patients and the control score. This suggests that an increased number of insured patients is associated with a less favorable assessment of control.

Hospitals' Contractual Intentions:

Concerns arise as 18% of contracted hospitals express the intention not to renew their agreements. These finding highlights potential challenges in sustaining long-term partnerships.

Type of Hospital:

The type of hospital significantly influences the control score (p = 0.0001), with controllers in private hospitals scoring higher than their counterparts in public hospitals.

Perception of Differences in Hospital Management:

Controllers who perceive significant differences in hospital management score lower in control (p = 0.002), emphasizing the importance of consistent practices across hospitals.

Additional Insights:

Gender, Geography, and Education: No significant differences were observed in control scores based on gender, geographical region, or education level.

Experience and Rotations: The majority (50%) of controllers have less than one year of experience, while 30% accumulate between one and three years. Frequent rotations every six months for 38% of controllers highlight significant mobility.

These results provide a comprehensive understanding of the demographic, professional, and contextual factors influencing the performance and perceptions of medical insurance controllers on the healthcare system(Table 3).

Table 3: Association between Independent Variables and the Sanitary Control Score

Independent variables		Mean ± standard deviation	P value
Gender	Man	70.22 ± 22.24	0.49
	Woman	64.6 ± 22.07	
In which geographical region do you currently work as a Medical Insurance Controller?	Beirut	67.68 ± 18.21	0.72
	Mount Lebanon	69.62 ± 22.18	
	North	62.33 ± 21.87	
	South	62.83 ± 19.11	
	Bekaa	55.5 ± 34.8	
Year of professional experience	Less than 1 year	80.75 ± 11.11	0.55
	Between 11 and 3 years	66.5± 10.17	
	Between 3 and 5 years	64.09± 26.27	

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	More than 5 years	63.93± 20.94	
Level of education	Academic Bachelor's Degree	59.64 ± 24.62	0.24
	University Diploma	69.07 ± 18.46	
	Professional Master's Degree	75.88 ± 15.86	
	Other (MBA, DBA...)	70 ± 25.45	
Type of hospital	Public	40.76 ± 20.57	**0.0001**
	Private	74.35 ± 14.68	
University / non-university hospital	University	58.28 ± 26.94	0.22
	Non-University	66.81 ± 21.21	
Working hours in the hospital	Less than 6 months	55.9 ± 25.37	
	Between 6 months and 1 year	64.1± 23.13	
	Between 1 and 3 years	74.13 ± 15.74	
	More than 3 years	71	0.22
Are medical insurance controllers subject to regular rotations between hospitals?	Yes, every 6 months	59.89 ± 22.99	
	Yes, but at a different frequency	68.44 ± 22.6	0.26
As a member of the Medical Insurance, have you noticed any significant differences between the hospitals in which you have worked in terms of the management of health expenses and the quality of care?	Yes	61.73 ± 23.31	
	No	77.91 ± 10.42	**0.002**
Are there any hospitals contracted with the Medical Insurance that have expressed their intention to no longer renew their contract?	Yes	58.44 ± 28.28	
	No	67.19 ± 20.44	0.28
Have you noticed any improvements in the management of health expenditure since the introduction of health control by the Medical Insurance?	Yes	73.91 ± 14.64	
	No	44.28 ± 23.75	**0.0001**
Do you have any information on specific cases where costly surgeries or treatments have been avoided thanks to the intervention of medical insurance controllers?	Yes	64.93 ± 22.44	
	No	76.33 ± 8.5	0.52
Age	Spearman correlation = 0.008		0.93
Average number of patients insured by medical insurance?	Spearman correlation = -0.436		**0.02**

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Discussion

The discussion of the results provides an in-depth understanding of healthcare management challenges within medical insurance companies and allows for a detailed comparison with the existing literature. The results indicate a strong involvement of medical insurance controllers in sanitary control procedures, with a large majority (84%) reporting direct experience. This active participation suggests that controllers are closely integrated into the daily activities of hospitals, which can foster more effective implementation of control practices. The predominance of female controllers (82%) may reflect a demographic trend specific to this profession, warranting further exploration of the factors influencing workforce composition in the healthcare sector (Pai, 2022).

The analysis of the average sanitary control score, which falls within the 60–79 range, indicates a generally positive perception of sanitary control among respondents. This "Positive" categorization reflects overall satisfaction and favorable opinions toward the control measures implemented by the MI in hospitals. These findings may mirror the perceived effectiveness of controllers in managing healthcare expenditures and improving the quality of care. The results highlight a multifaceted approach by controllers to reduce healthcare expenditures (Stadhouders et al., 2019). Their interventions targeted several areas, including medication management, medical examinations, medical equipment, and surgical procedures. The introduction of MI controllers therefore appears to have had a significant impact on cost management, with a particular focus on pharmaceuticals and medical tests, while also addressing other aspects of healthcare spending. This comprehensive approach likely contributes to a more efficient use of resources while preserving the capacity of contracted hospitals to deliver quality care (Haidar et al., n.d.).

The geographical concentration of controllers in Beirut and Mount Lebanon (64%) may be related to specific regional needs or a deliberate strategic distribution of personnel. This observation raises important questions about the equitable allocation of controllers across the country, which is essential to ensure homogeneous coverage and consistent quality of careThe strong presence in private (74%) and non-university hospitals (86%) reflects the particular orientation of the control system in Lebanon. Controllers' prior experience is also noteworthy: 58% have more than five years of professional experience, indicating considerable expertise (Ammar et al., 2016b). However, the high proportion of controllers with less than one year in their current position (68%) underscores the importance of structured onboarding and transition mechanisms for newcomers. The observation of notable differences between hospitals in expenditure management and quality of care (76%) highlights the diversity of practices across institutions. This diversity offers opportunities to identify best practices and develop standardized strategies, thereby improving the overall effectiveness of control measures (Kruk et al., 2018). The average age of controllers (34 years) and their management of approximately nine insured patients per day may serve as useful indicators for evaluating workload and planning human resources, which is crucial to maintain quality service delivery. It is also important to note that 72% of respondents observed improvements in healthcare expenditure management since the implementation of sanitary control. These improvements likely result from targeted policies such as monitoring medication purchases, regulating costly surgeries, and other control initiatives highlighted in this study (Ntais et al., 2024).

The bivariate analysis offers meaningful insights into the dynamics of MI sanitary control within hospitals. While gender does not appear to influence perceptions of control, regional variations, particularly the lower average score in the Bekaa region, highlight the need to explore geographical nuances that may affect control implementation. The significant

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correlation between hospital type and control score indicates marked differences between public and private hospitals. This suggests the need to tailor control approaches to specific hospital contexts. Perceived differences between hospitals are associated with lower control scores, emphasizing the importance of consistent implementation of control measures (Jamalabadi et al., 2020). Furthermore, 18% of hospitals expressed their intention not to renew their contracts, raising concerns about the sustainability of partnerships. This may stem from disagreements over contractual terms, divergences in expenditure management, or concerns regarding quality of care (Hussey et al., 2013b). Investigating these intentions through qualitative methods such as interviews with hospital administrators and key stakeholders could clarify underlying causes and inform targeted corrective actions to strengthen relationships between the MI and contracted hospitals (Berwick et al., 2008). Although education level and years of experience are not determining factors, the positive correlation between perceived improvements in expenditure management and higher control scores underscores the important role of controllers in cost optimization and reinforces the value of their contributions (Ammar et al., 2016b). The negative association between the number of insured patients and control scores points to a potential resource management challenge associated with increased workload. Strategic adjustments may be required to maintain care quality despite growing demand.

Overall, these findings suggest that employment sector, consistency of implementation across hospitals, perceptions of improvement, and workload factors play key roles in how controllers evaluate the effectiveness of control measures on healthcare expenditures and quality of care (Hussey et al., 2013a). These insights can inform strategies to strengthen the effectiveness of controllers within the MI by focusing on targeted initiatives to optimize expenditure management and ensure uniform practices across contracted healthcare facilities. Although most controllers' report satisfaction with their work, challenges related to economic pressure and resistance to change persist. The rewarding aspects of their role are linked to achieving financial objectives and their sense of duty toward the MI. These results highlight the importance of balancing financial imperatives with the preservation of care quality and effective human resource management (Stavropoulou et al., 2022).

Through an in-depth analysis of the data, it is possible to confirm that the implementation of sanitary control has indeed had a significant impact on cost reduction and quality improvement, as hypothesized. This aligns with previous findings showing that healthcare insurance companies play a positive role in enhancing patient satisfaction and access to quality care.

Limitations of the Study

The study relies on self-reported data from controllers, which introduces potential biases associated with subjectivity. Additionally, the questionnaire was designed exclusively in French, which may have affected controllers with limited French proficiency. A bilingual (French–English) version would have been more inclusive, given the linguistic diversity among controllers.

Strengths of the Study

The use of a cross-sectional, analytical, and multicentric design allowed for a comprehensive understanding of sanitary control impacts across various hospital settings. The inclusion of all contracted hospitals and all MI controllers ensured valid representation. Despite the relatively small sample size, the sample's representativeness of the Lebanese context enhances the generalizability of the findings. Conducting a pilot study prior to data collection

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helped refine the methodology, improve the score design, and increase internal validity. The high Cronbach's alpha coefficient (0.954) indicates excellent internal consistency of the questionnaire, strengthening the reliability of the measurements. Importantly, the design of the sanitary control score itself constitutes a major strength. This score can serve as a versatile and adaptable tool for future research and policy initiatives aimed at improving cost management and quality of care in various healthcare settings.

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