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The impact of medical audit on health cost reduction: integrative review

O impacto da auditoria médica na redução de custos no cuidado à saúde: revisão integrativa

Racquel dos Reis Carvalho Marreiros[1]
https://orcid.org/0000-0001-5650-4062

Patrícia Freire de Vasconcelos[2]
https://orcid.org/0000-0002-6158-9221

Vitória Talya dos Santos Sousa[3]
https://orcid.org/0000-0002-5403-2820

José Maria Ximenes Guimarães[4]
http://orcid.org/0000-0002-5682-6106

José Iran Oliveira das Chagas Júnior[5]
https://orcid.org/0000-0002-1796-3335

Abstract

Introduction: The emergence of new health technologies, coupled with an aging population, has led to the progressive increase in health care costs and the regulation of health operators. In this context, medical audit has as its main objectives the control and evaluation of the resources and procedures adopted, aiming at adequacy and economy of the services provided. Objective: To analyze the impact of medical auditing on quality improvement in care and cost reduction. Materials and methods: An integrative literature review was performed to identify scientific output related to medical auditing, considering the quality of care and cost reduction between 1994 and 2018 in the Latin American and Caribbean Health Sciences Literature databases (LILACS) and MEDLINE. The corpus of analysis consisted of ten papers. Results: The articles were systematized into three empirical categories: medical auditing under surgical conditions, which addressed surgical strategies to reduce costs and improve therapeutic outcomes; medical / medical treatment auditing, which showed how medical auditing can do detailed analysis of hospital bills to reduce costs; and medical auditing in diagnostic / assistance strategies, which evidenced the audit action in the creation of multidisciplinary programs. Conclusions: It was concluded that robust medical auditing and control measures in the most diverse areas of quality action are fundamental to establish the effectiveness in the provision of services and the provision of good medical and hospital care combined with cost reduction and sustainability of the services. health systems.
Keywords: Medical Audit. Cost Savings. Delivery of Health Care.

[1] Universidade Estadual do Ceará (UECE), Fortaleza, Ceará, Brasil. E-mail: racqueldosreis@yahoo.com.br
[2] Instituto de Ciências da Saúde, Universidade da Integração Internacional da Lusofonia Afro-Brasileira (UNILAB), Redenção, Ceará, Brasil. E-mail: patriciafreire@unilab.edu.br
[3] Instituto de Ciências da Saúde, Universidade da Integração Internacional da Lusofonia Afro-Brasileira (UNILAB), Redenção, Ceará, Brasil. E-mail: vitoriatsantossousa@gmail.com
[4] Universidade Estadual do Ceará (UECE), Fortaleza, Ceará, Brasil. E-mail: jm_ximenes@hotmail.com
[5] Centro Universitário Terra Nordeste (UNINORDESTE), Caucaia, Ceará Brasil. E-mail: iranjunior_unifor@hotmail.com

Resumo

Introdução: O surgimento de novas tecnologias em saúde, aliado ao envelhecimento da população, levou à elevação progressiva dos custos assistenciais e ao regulatório das operadoras de saúde. Nesse contexto, a auditoria médica tem como principais objetivos o controle e a avaliação dos recursos e dos procedimentos adotados, visando adequação e economicidade dos serviços prestados. **Objetivo:** analisar o impacto da auditoria médica na melhoria da qualidade no cuidado e na redução de custos. **Materiais e métodos:** Foi realizada revisão integrativa da literatura para identificar a produção científica relacionada à auditoria médica, considerando a qualidade do cuidado e a redução de custos entre 1994 e 2018 nas bases de dados Literatura Latino-Americana e do Caribe em Ciências da Saúde (LILACS) e MEDLINE. O *corpus* de análise consistiu em dez trabalhos. **Resultados:** Os artigos foram sistematizados em três categorias empíricas: auditoria médica em condições cirúrgicas, que abordou estratégias cirúrgicas para redução de custos e melhores resultados terapêuticos; auditoria médica em tratamentos clínico/medicamentosos, que mostrou como a auditoria médica pode fazer a análise detalhada de contas hospitalares visando à redução de custos; e auditoria médica em estratégias de diagnóstico/assistência, que evidenciou a ação da auditoria na criação de programas multidisciplinares. **Conclusões:** Concluiu-se que auditoria médica robusta e medidas de controle nas mais diversas áreas de atuação de qualidade são fundamentais para estabelecer a eficácia na prestação de serviço e a oferta de uma boa assistência médico-hospitalar aliada à redução de custos e à sustentabilidade dos sistemas de saúde.
Palavras-chave: Auditoria Médica. Redução de custos. Assistência à saúde.

Introduction

The supplementary health scenario has shown, over the years, attrition in the relationship between health plan operators, service providers, and the medical category. In this context, health care is increasingly expensive due to new technologies and new costs, which do not always add value. Besides, the regulation of the Supplementary Health System by the National Agency of Supplemental Health (ANS in Portuguese), an agency linked to the Brazilian Ministry of Health, which regulates health operators regarding their relationship with providers and consumers, generates high economic consequences for operators, especially concerning the incorporation of new procedures and medicines.

The emergence of new health technologies combined with an aging population creates a new scenario. The population is more informed and aware of their rights and plays a more participatory role in their relationship with the provider. Furthermore, it requires improving the quality of health care and incorporating new technologies without worrying about proving cost versus benefit.

These factors led to a progressive increase in the operators' assistance and regulatory costs, which causes a reduction in resources for serving users. With that, several conflicts emerged culminating with the increasing participation of the judiciary as a moderating factor in resolving these conflicts[1].

In this context, audit appears to assess the quality of processes, systems, and services, and the need for improvement or preventive/corrective actions. According to the World Health Organization (WHO)[2], auditing consists of a systematic and independent examination of facts by observation, measurement, testing, or other appropriate techniques to verify the adequacy of the requirements recommended by the current laws and standards to determine whether the actions and their results are following the planned provisions.

It is noteworthy that medical auditing is an activity carried out through medical acts, whose main objective is the control and evaluate resources and procedures aiming at their adequacy, correctness, quality, effectiveness, and

economy, in line with the Code of Medical Ethics and with Resolution No. 1,614 / 2001 of the Federal Council of Medicine[3].

The auditor must act, for example, along with the health care workers to verify the management and origin of hospitalizations, assist in the release of high-cost drugs, materials, or procedures, monitor the inpatient's clinical status, and check the quality of the services provided[4].

As an independent source of information, audit covers all health system sectors guaranteeing its quality. The audit process is currently considered to be the most widely used management tool to determine the level of quality management[5]. Therefore, the analysis and use of the results must be carried out to improve patient care[6].

Changes in public and private health systems over time lead to the progressive need for medical audit to provide hospital medical care. Private companies that perceive auditing as a primordial and essential sector will enjoy all the benefits that such practice brings, such as reducing expenses and expanding the quality of services, which guarantees a competitive advantage for organizations[7].

It is increasingly necessary that health systems (public or private) add value, incorporate new benefits (both diagnostic and therapeutic), be sustainable, and end existing gaps in health care. In other words, it is necessary to combine the rationalization of costs with the maintenance of the quality of the assistance without increasing the administrative cost. In this scenario, there are several challenges for managers and auditors in the Supplementary Health System[8].

In this context, medical auditing plays a fundamental role. Thus, it is exceptionally relevant to develop integrated management models of the different dimensions (medical, technological, and administrative) associated with providing services. In hospitals and health insurance companies, audit is a vital tool in the transformation of work processes to maintain the quality of care provided and to guarantee a competitive position in the labor market[9].

Given this context, it is questioned how the medical audit can impact the quality of care and reduce costs related to the provision of medical and hospital services? The present study aimed to analyze the impact of medical auditing on improving the quality of care and reducing health care costs based on the evidence available in the literature.

Methodology

With a qualitative approach, the study was carried out between October 2018 and March 2019 and reviewed the literature to identify the scientific production related to medical audit, with an emphasis on quality improvement and cost reduction, through an integrative review. Integrative reviews are useful for obtaining, identifying, analyzing, and synthesizing the literature directed to a specific theme. Thus, it allows the construction of a comprehensive analysis of the literature, including discussions about methods and results from publications[10].

Thus, this integrative review comprises five stages:

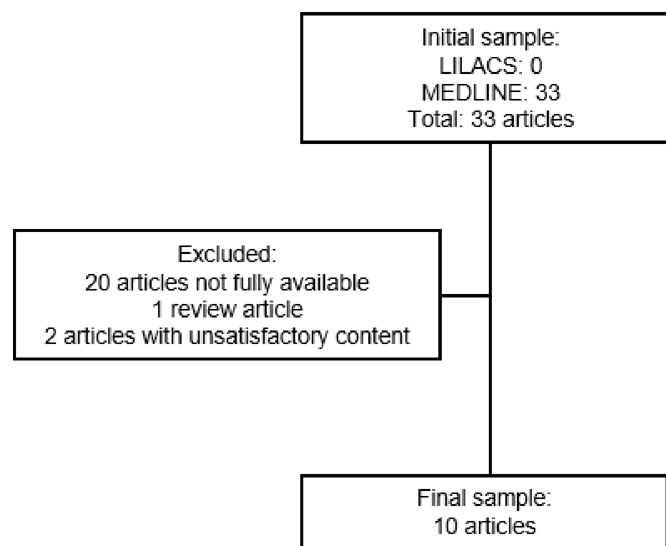
1. Establishment the problem, that is, defining the review's theme in the form of a primary question or hypothesis;
2. Sample selection;
3. Characterization of studies;
4. Analysis of results (identifying similarities and conflicts);
5. Presentation and discussion.

Scientific evidence was searched in the following databases: Latin American & Caribbean Health Science Literature database (LILACS) and Medical Literature Analysis and Retrieval System Online (MEDLINE). The following controlled

descriptors combined with Boolean operators were used in the first database: "medical audit" AND "cost reduction" AND "health care", and the following key terms were used in the second database: "medical audit" AND "cost reduction" AND "healthcare". The data collection took place in December 2018.

Inclusion criteria were articles fully available, and publication in Portuguese, English, or Spanish in national and international journals. Since a lack of available evidence on the topic was identified, it was decided not to limit the search by date, resulting in selecting articles published from 1994 to 2018. In this study, review articles and those that did not answer the research question were excluded, totaling three articles. The details are shown in Figure 1.

Figure 1 - Criteria for the selection of articles studied



Source: the authors

The data extracted from the articles were synthesized using an instrument composed of information such as title, journal, authors, year of publication, institution of study, type of publication, and methodological characteristics (objective, sample, interventions, results, analysis, and implications)[11]. After data collection, the corpus of analysis was characterized. The articles were compared and grouped by similarity of content.

Results

The corpus of analysis was composed of one Brazilian study and nine studies carried out in other countries, all published in English and indexed on MEDLINE/Pubmed.

The ten selected studies address strategies carried out by medical auditing to reduce costs and improve the quality of care. In each study, specific interventions were designed with these objectives, as shown in Table 1.

Table 1 - Articles collected in MEDLINE on medical audit and cost savings, 2018-2019.

Publication Year	Nature	Title	Authors	Journal	Considerations/Theme
1994	Public	Cost Control of out-of-hours laboratory services in district general hospitals	Allen KD.	Journal of Clinical Pathology, September; 47 (9), 782-786.	Cost control methods for laboratory services in district general hospitals in England and Wales
1999	Public	Integrated care pathways for vascular surgery	rker, SG, Sachs Louden C, nard D, Abu-m A, Buckland t al	European Journal of Vascular and Endovascular Surgery, 18 (3), 207-215.	The study evaluates progress in adhering to integrated care routes in vascular surgical procedures
2006	Public	Cost benefit with early operative fixation of unstable ankle fractures	Pietzik P, Qureshi I, Langdon J, Molloy S, Solan M	Annals of the Royal College of Surgeons of England, 88 (4), 405–407.	The study compares the length of hospital stay and the rate of complications before and after the introduction of a fast-track system to treat unstable ankle fractures surgically.
2010	Toilet	The impact of an Acute Knee Clinic	Ball S, Haddad FS	Annals of the Royal College of Surgeons of England, 92 (8), 685–688.	The study highlights the impact of an acute clinic in delaying diagnosis, discussing the socioeconomic impact and the potential cost reduction for the national health service.
2011	Mixed	The costs in provision of haemodialisys in a developing country: a multicentered study	nasinghe P, era YS, karim MFM, jesinghe A, nigasuriya K	BMC Nephrology, 12-42.	The study provides a detailed analysis of the processes and costs of hemodialysis in Sri Lanka and suggests a similar framework for modeling financial auditing.
2014	Toilet	Improved outcomes for elderly patients who received care on a transitional care unit	Manville M, Klein MC, Bainbridge L	Canadian Family Physician, 60 (5), 263-271.	The study evaluates the care and costs of post-hospital elderly patients in a transitional care unit.
2015	Public	Quantifying the healthcare costs of treating severily bleeding major trauma: a national study of England.	Campbell HE, Stokes EA, Bargo DN, Curry N, Lecky FE, Edwards, A, et al	Critical Care, 19 (1), 276.	The study describes the characteristics of patients with severe traumatic and hemorrhagic injuries, the use of blood components and their costs.
2016	Toilet	Chronic case management: clinical governance with cost reductions	Costa ESM, Hyeda A	Revista da Associação Médica Brasileira, 62 (3), 321-235.	The study evaluates the epidemiological profiles and the total health costs of a group of patients with non-degenerative chronic diseases in a Brazilian supplementary health service.

2017	Public	A cluster randomized trial to reduce cesarean delivery rates in Quebec: cost-effectiveness analysis.	ıri M, Ng W, Bermudez-nayo C, Hoch Ducruet T, aillet N	BMC Medicine, 15 (1), 96.	The study assesses the multifaceted audit and feedback intervention with health professionals and the reduction in cesarean rates without adverse effects on maternal and newborn health.
2018	Public	Training: improving antenatal detection and outcomes of congenital heart disease	Uzun O, Kennedy J, Davies C, Goodwin A, Thomas N, Rich D, et al	BMJ Open Quality, 7 (4) 2018.	The study evaluates, through audits, the impact of the implantation of fetal heart screening services and the standardization of care in the economy and in the quality of the national health service.

Source: the authors

The corpus of analysis allowed the systematization of articles in three empirical categories: medical audit in surgical conditions, medical audit in clinical/drug treatments, and medical audit in diagnostic/assistance strategies, as shown in Table 2.

Table 2 - Systematization of the articles selected in MEDLINE in three empirical categories.

Empirical category	Year of publication	Authors	Title
Medical audit in surgical conditions	1999	Barker, SG, Sachs R, Louden C, Linnard D, Abu-Own A, Buckland J, et al	Integrated care pathways for vascular surgery
	2006	Pietzik P, Qureshi I, Langdon J, Molloy S, Solan M	Cost benefit with early operative fixation of unstable ankle fractures
	2017	Johri M, Ng ESW, Bermudez-Tamayo C, Hoch JS, Ducruet T, Chaillet N	A cluster randomized trial to reduce cesarean delivery rates in Quebec: cost-effectiveness analysis.
Medical audit in clinical/drug treatments	2011	Ranasinghe P,Perera YS, Makarim MFM, Wijesinghe A, Wanigasuriya K	The costs in provision of haemodialisys in a developing country: a multicentered study
	2015	Campbell HE, Stokes EA, Bargo DN, Curry N, Lecky FE, Edwards, A, et al	Quantifying the healthcare costs of treating severily bleeding major trauma: a national study of England.
Medical audit in diagnostic/assistance strategies	1994	Allen KD.	Cost Control of out-of-hours laboratory services in district general hospitals
	2010	Ball S, Haddad FS	The impact of an Acute Knee Clinic
	2014	Manville M, Klein MC, Bainbridge L	Improved outcomes for elderly patients who received care on a transitional care unit
	2016	Costa ESM, Hyeda A	Chronic case management: clinical governance with cost reductions
	2018	Uzun O, Kennedy J, Davies C, Goodwin A, Thomas N, Rich D, et al	Training: improving antenatal detection and outcomes of congenital heart disease

Source: the authors

Discussion

Medical audit in surgical conditions

The studies[12-16] that made up this category address strategies used by surgical teams after analyzing the medical audit and sought to balance cost reduction and better therapeutic results for patients.

One of the studies[12] analyzed the use of Integrated Care Pathways (ICP) for three vascular procedures in more than 59 patients from 1998 to 2000, evaluating the progress in adhering to these routes. ICPs allow patients, nursing staff, doctors, and other health professionals to see the expected deadlines for a series of events throughout the hospital stay and the individual steps involved in recovery. It is important to emphasize that ICPs' changes and results only occur when based on real audited experiences.

Also, the ICP offers a structure, in writing, for the expected management path and the outcome for a patient undergoing a specific procedure involving a hospital stay. This strategy is not rigid and does not restrict the usual clinical freedoms of any participating multidisciplinary team members. However, changes in the formulated ICP must be based on the audit report and on other factors[12].

Still, on the performance of the continuous analysis of the medical audit based on this strategy, a reduction in the length of hospital stay and a virtual saving of 26% in related costs were detected[12]. The definition of "virtual economy" is understood as the growing use of information and communication technologies for business mediation, demonstrating apparent cost-effectiveness in real terms[12].

Therefore, the ICP is a structure used to alter care based on proven evidence. The full report of the patients' recovery by a multidisciplinary team is necessary, which is essential for conducting continuous medical auditing. However, it can also be useful for other research and medico-legal issues.

Still, on how the audit can be combined with cost reduction, medical audit assessments and interventions have been proven to decrease hospital length of stay and the rate of complications resulting from unstable ankle fractures treated surgically[13].

Another possible approach to reduce the waiting time for emergency room patients that offers an alternative for patients with minor illnesses and injuries is the "Fast Track" approach[13]. This approach's advantage is that patients with minor injuries, in general, wait longer than patients with severe injuries, are separated from the most severe cases, and treated more quickly. As a result, fast track reduces waiting times for both urgent and non-urgent patients.

The medical audit noted that, after applying fast track, there was a reduction in hospital stay for patients with early fixation (<48h) and cost reduction[13]. Considering that the incidence of ankle fractures is about 100 per 100,000 patients in most large urban centers, it is possible to see significant savings. Intensive physical therapy and planning proved to be essential for an early and safe discharge[14].

These findings also corroborate with a study[15] showing that the length of hospital stay for patients with late ankle fixation is longer than for patients treated early. Thus, the audit assessment indicates that combined policies for early surgical fixation and discharge planning minimize the financial implications of care for this common fracture without increasing the complications.

Still, on how the medical audit intervenes in reducing surgical expenses, the reduction of the cesarean rate in 32 public hospitals in the province of Quebec, Canada was also evaluated[16], reinforcing the importance of feedback combined with multidimensional audit interventions. In the study, hospitals were considered eligible to participate if they had at least 300 deliveries in the year before the

beginning of the study, a cesarean section rate of at least 17%, and no competing program to reduce cesarean sections[16].

The study[16] also included three phases: a 1-year pre-intervention period, a 1.5-year intervention period, and a 1-year post-intervention period. The pre-intervention period involved on-site training and training to improve cesarean delivery and intrapartum care. During the 1.5-year intervention period, the hospital's audit committees implemented four three-month audit cycles using local data to assess cesarean delivery adequacy, engage in collective learning, provide feedback to doctors and implement best practices based on results.

Thus, a statistically significant (but small) reduction in the number of cesarean deliveries was observed. A meaningful reduction in costs was also observed, with the management of neonatal complications, especially cardiopulmonary complications, being pointed out as the main factor in this reduction. It was concluded that a multidimensional intervention with the participation of the audit and feedback resulted in a small reduction in the number of cesarean sections but, at the same time, in cost savings[16].

These results provide critical evidence on a safe and possibly sustainable strategy for reducing unnecessary cesarean sections and shed new light on the potential for audit and feedback interventions to improve the quality of care while controlling costs.

Medical audit in clinical/drug treatments

Two studies[17,20] were included in this category and present results related to the audit contributions in the detailed analysis of hospital bills and general costs in order to point out high-cost items and, from then on, outline action plans for their reduction.

In a prospective study[17] carried out in hemodialysis units located in three public and two private hospitals in Sri Lanka, the audit undertook a careful analysis of hemodialysis processes and costs and suggested a structure for modeling similar financial audits. The audit obtained the cost of medicines and consumables for the three public hospitals from a price list issued by the Division of Medical Supplies and the Department of Health Services. For the two private hospitals, the information was obtained from the financial departments of the respective hospitals. Employees' salaries, monthly electricity and water costs were also analyzed, as well as an apportionment of the total hospital administration costs, cleaning, security, waste and laundry disposal, and sterilization.

The audit identified that the main factor that contributed to the cost was spending on medicines and consumables. Therefore, strategies to reduce these costs would help to reduce annual expenditure in the short term. One of these methods is the reuse of dialyzers implemented by the Kandy Teaching Hospital, which would successfully reduce costs by approximately 35%. Reuse provides significant economic benefit[17].

However, there are doubts about this strategy's success, as morbidity and mortality and disease transmission increased, with reduced efficiency of dialyzers[17].

Studies[18,19] have shown that kidney transplantation is the most cost-effective treatment for end-stage renal disease, offering considerable savings and a drastic improvement in the quality of life of these patients. Because hemodialysis is the most common renal replacement therapy for patients in Sri Lanka, improving kidney transplant programs is highly recommended.

The audit found that hemodialysis costs in a developing country remained significantly lower compared to developed countries. However, it still represents a significant burden for the health sector, although there is a possibility of reducing

additional costs[18,19].

The other study[20] describes the characteristics of patients with severe traumatic and hemorrhagic injuries and the use of blood components (red blood cell concentrate and fresh frozen plasma). Through the audit of data related to treatment and hospital mortality, it was possible to identify the highest costs and create strategies to reduce these events, such as expert opinion regarding the verification of the correct clinical indication and the dose of blood components be transfused.

It was also found that spending on blood components was responsible for 12% of hospitalization's total costs. The study[20] concludes that patients with trauma and severe bleeding are a small subgroup, but at a high cost, and require blood components, considering that 15% of patients with severe trauma have severe bleeding[21].

Detailed knowledge of significant traumatic bleeding costs is essential for healthcare service managers to develop cost reduction strategies. For health economists, on the other hand, these data can be used as inputs in studies that assess the cost-effectiveness of new interventions to stop bleeding. On the other hand, for policy planners, the nationwide cost burden of severe trauma hemorrhage can be compared to that of other conditions and project future potential costs, such as those resulting from an aging population.

Medical audit in diagnostic/assistance strategies

The evidence that makes up the substrate of analysis in this category points out (as a medical audit action) the creation of specialized clinics, multidisciplinary treatment programs, and therapy units aimed at specific groups of pathologies. This strategy may optimize the services leading to significant clinical improvements and cost savings.

By studying cost control methods in 66 laboratory services in general district hospitals in England and Wales, some cost reduction strategies were determined, such as limited list of tests, continuing education of the medical team, fixed payments, extension of the working day, increased multidisciplinary stay, increase of tests at the bedside, and audit of the on-call service. Among these strategies, the audit was cited as one of the most effective, inserting medical professionals in monthly audit meetings to expose costs and other educational approaches. However, this measure is not seen as "popular" by the clinical staff[22].

In another study[23], the medical audit collected data from 100 patients with knee injuries at a sports clinic. The following are highlighted among the various issues observed: date of injury, date of referral, review appointment at a specialized clinic, and total number of medical consultations before a specialized review appointment. The authors cite that there are two identifiable delays in the treatment of knee injuries: first, the one that occurred from the moment of the injury until the diagnosis by a specialist; and second, the one that exists from the diagnosis to the investigation and appropriate treatment.

After the results of this audit, an acute knee clinic was created and services were provided once a week, replacing an existing fracture clinic. This strategy increased the capacity of existing clinics to treat knee injuries since they would no longer have to deal with acute cases.

Thus, the medical audit found that the "acute knee clinic" is a straightforward and effective strategy to decrease diagnosis and treatment time for patients who have suffered a knee injury.

Besides, a wide variety of injuries to the knee's soft tissues were found, although suspected meniscal or anterior cruciate ligament injury was the most common presentation. All soft tissue knee injuries have a significant impact on patients' well-being. Broad physical and

psychosocial consequences have been identified for patients with knee injuries, with delays in clinical management[24]. Besides, they also have a significant socioeconomic impact, resulting from several days of absence from work, mainly when patients are self-employed. Targeted early treatment, whether surgical or conservative, can result in an early return to normal activities.

Another study[25] demonstrated that caring for acute post-hospital patients in an interdisciplinary Transitional Care Unit (TCU) with doctors trained in elderly care and leadership roles can improve health outcomes, decrease hospital stay, improve the rate of hospital discharge, and offer better care at a lower cost. This result was possible due to monitoring carried out by the audit.

For this, the auditor developed a graphics audit tool, and from that, a list of eligible patients. The audit selected patients with alternative level of care (ALC), aged 70 years or older, and who received hospital care in two moments: between September 2009 and February 2010 (the pre-intervention period before the opening of the TCU), and between September 2011 and February 2012 (post-intervention period, after the opening of the TCU). Patients with ALC in the pre-intervention group received care in acute medical, surgical, and psychiatric wards. Patients with ALC in the post-intervention group were either transferred to the TCU or remained in acute care units.

In the proposal mediated by the audit, weekly conferences of interdisciplinary care were established for medical care and revised discharge plans. During weekly care conferences and (informally) in the TCU ward, medical directors provide counseling and education to staff and doctors on best geriatric practices. It was also attested that doctors' involvement with training in elderly care played a substantial role in the success of the TCU[25].

The medical audit also noted that the reduction in hospital infections might be resulting from less exposure to patients with acute illnesses and from a better physical condition. The decrease in antipsychotic drugs use was attributed to the TCU's calmer environment and employees with more experience in dementia care. Medication reviews at conferences by medical and pharmaceutical directors likely contributed to the reduction in the use of antipsychotics and sedatives.

The reductions in hospital admissions and residential care achieved in the post-intervention group have clinical significance and result in cost savings, which are not accounted for in in-hospital cost data.

Another medical audit intervention study to reduce costs evaluated the epidemiological profiles and total health costs of a group of patients with non-communicable diseases (NCDs) in a Brazilian Supplementary Health Service[26]. The World Health Organization (WHO) defines NCDs as cardiovascular diseases (like heart attacks and strokes), diabetes, chronic respiratory diseases (such as chronic obstructive pulmonary disease and asthma), and cancers, in addition to mental and neurological disorders, oral, bone, and joint procedures, genetic disorders, visual and hearing diseases[2].

The audit service compared hospital admissions and total health care costs with a group of patients not monitored by the Multidisciplinary Care Program for the Management of Chronic Diseases (PMAMDC in Portuguese). The medical audit perceived that multidisciplinary monitoring through the PMAMDC reduced hospital admissions, emergency consultations, and complications, positively impacting costs, and health care. The observed cost reduction was relevant: a 31.94% reduction in total costs and an 8.63% reduction in monthly costs, considering that the program evaluated in this study only

offered verbal guidance to users, encouraging patients to self-manage their pathologies without interfering with the physician's treatment plan[26].

The importance of this theme is that, in recent decades, Brazil has undergone important changes in its mortality and morbidity pattern due to changes in demographic, epidemiological, and nutritional profiles. This phenomenon also accompanied the growth of the elderly population and the reduction of child malnutrition, with a massive increase in the number of obese or overweight people, increasing the NCDs.

In the context of clinical governance for the continuous improvement of quality in health care, the PMAMDC analyzed in the aforementioned study incorporated the focus on the individual and health promotion for those under monitoring. The health care provided by the case manager, including guidelines and information for the self-management of chronic pathologies, respect the principles of integrality and equity of care, respecting the patient's autonomy.

Finally, the impact of the implementation of screening services for fetal heart diseases and the standardization of care on the National Health Service's economy and quality was assessed through audits[27]. The increase in the prenatal anomaly detection rate led Wales to become the leading nation for detecting congenital heart disease in the UK by 2010. There was a decrease in the number of tertiary referrals, increased outpatient vacancies, faster interventions, increased confidence in the team, decreased perinatal morbidity and mortality from congenital non-chromosomal heart defects, and total cost savings.

Congenital heart disease is known to be the most frequent cause of congenital anomalies. Undiagnosed heart diseases are responsible for up to 10% of neonatal deaths after birth and up to half of all infant deaths. Prenatal detection of a heart defect can offer several advantages, allowing a planned delivery and intrauterine intervention or treatment.

Prenatal cardiac anomaly detection rates and surgical results for each heart disease in all specialist centers in the UK are available and accessible to the general public on the CARIS and NICOR websites, contributing to other services. The continuous audit at the local and national level allowed the identification of good practices, deficiencies, experiences, and patient satisfaction. In addition, the resolution of local problems allowed them to be treated promptly, which helped to minimize patient dissatisfaction, possible diagnostic errors, litigation, and the drop in the quality of care.

Given the above, the analyzed articles showed that robust medical auditing and control measures in the most diverse areas of quality performance (clinical or surgical medical assistance, technology, medications, among others) are essential to establish the effectiveness of service provision and the provision of reasonable medical and hospital assistance, combined with cost reduction and the sustainability of health systems. The disclosure of audit results, such as feedback and public responsibility, is considered vital.

For the present study, the limitations were the scarcity of articles dealing with the medical audit theme, which corroborates the importance of more diagnostic studies to support necessary interventions to reduce costs without impairing the quality of care. It is also noteworthy the lack of representativeness of Brazilian studies portraying our country's reality concerning its health systems, both public and private.

Conclusion

It is concluded that the medical audit interventions identified in this review can be implemented in health services, whether public, private, or mixed, to

reduce costs and improve quality. The participation of the audit goes beyond the perspective of cost savings. It expands its role by elaborating protocols, creating specialized clinics and services, continuous training of professionals, and periodic meetings to present results.

The authors of the present study declare that they have no economic, ethical, or operational conflicts of interest that compromise the reliability of the study data and its scientific exemption, both in analyzing and presenting these data.

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