

Review Article: Review of Management Accounting Systems in Hospitals and Their Impact on Optimizing Pharmaceutical Costs

Sajad Khanbabayi Gol¹, Mehdi Khanbabayi Gol^{2*}

¹Accountant, Shahindezh Islamic Azad University, Shahindezh, Iran. (ORCID: 0009-0003-5439-6848- Email: S_khanbabayi@yahoo.com)

²Anesthesiologist, Tabriz University of Medical Sciences, Tabriz, Iran. (Corresponding author, ORCID: 0000-0003-3231-9326)



Citation S Khanbabayi Gol, M Khanbabayi Gol, *Review of Management Accounting Systems in Hospitals and Their Impact on Optimizing Pharmaceutical Costs*, EJCMPR. 2024; 3(5): 263-273.



<https://zenodo.org/records/14735928>

Article info:

Received: 21 October 2024

Accepted: 23 January 2025

Available Online:

ID: EJCMPR-2501-1281

Checked for Plagiarism: Yes

Peer Reviewers Approved by:

Dr. Frank Rebout

Editor who Approved Publication:

Dr. Frank Rebout

Keywords:

Management accounting systems, Pharmaceutical costs, Activity-based costing, Healthcare finance

ABSTRACT

This study reviews management accounting systems (MAS) in hospitals and investigates their impact on optimizing pharmaceutical costs. Given the increasing pressure on healthcare institutions to control rising costs while maintaining high standards of care, understanding the role of MAS in managing drug-related expenses is crucial. The research examines how various accounting systems, including activity-based costing (ABC) and standard costing, are implemented in hospitals to track and allocate pharmaceutical expenditures efficiently. The analysis highlights the influence of these systems on decision-making processes related to drug procurement, inventory management, and the prescription practices of medical staff. Furthermore, the study explores how the optimization of pharmaceutical costs through effective MAS contributes to overall hospital financial sustainability and better resource utilization. The findings suggest that hospitals with robust management accounting systems are more likely to optimize drug-related costs, ultimately enhancing both economic and clinical outcomes.

Introduction

The healthcare sector, particularly hospitals, faces the ongoing challenge of managing financial resources efficiently while providing high-quality care [1]. Among the numerous costs incurred by hospitals, pharmaceutical expenses are one of the most significant [2]. With the growing complexity of drug therapies, rising drug prices, and the increasing prevalence of chronic diseases, optimizing pharmaceutical costs has become a

critical focus for hospital administrators and healthcare policymakers. One of the most effective tools for achieving this goal is the implementation of robust management accounting systems (MAS), which allow for accurate cost tracking, resource allocation, and decision-making [3].

Management accounting systems have long been recognized as essential tools in both private and public sector organizations, providing critical insights into financial performance [4-6]. In hospitals, MAS helps in

*Corresponding Author: **Mehdi Khanbabayi Gol** (khanbabayimehdi69@gmail.com)

the management of various expenses, including labor costs, equipment costs, and, notably, pharmaceutical costs. By accurately capturing and allocating the costs associated with drug procurement, distribution, and administration, MAS facilitates more informed decision-making and resource optimization. This paper explores the role of management accounting systems in hospitals and investigates their impact on the optimization of pharmaceutical costs [7].

The Importance of Pharmaceutical Costs in Hospitals

Pharmaceutical costs are a critical component of healthcare expenditures, particularly in hospital settings. In modern healthcare systems, especially in hospitals that treat a high volume of patients with complex medical needs, pharmaceuticals represent a significant proportion of overall costs [8].

These costs are driven by various factors including the type of medications used, the complexity of treatments required, and the pricing strategies of pharmaceutical manufacturers. As healthcare providers strive to deliver the best possible care while controlling expenses, managing pharmaceutical costs has become a major concern [9-11]. The rising cost of drugs, combined with an increasing reliance on advanced therapies, creates a financial burden that hospitals must address to maintain both financial sustainability and high standards of patient care [12].

One of the primary reasons pharmaceutical costs have become so significant is the increasing complexity of treatments. Hospitals are treating patients with a growing number of chronic conditions, cancers, and other severe illnesses that require advanced drug therapies. Many of these treatments involve high-cost medications, such as biologics, targeted therapies, and newer-generation antibiotics,

which can drastically increase pharmaceutical expenditures [13].

For instance, chemotherapy drugs and specialty medications for conditions like rheumatoid arthritis or multiple sclerosis can cost thousands of dollars per patient. In some cases, patients require a combination of medications, further compounding the overall expense. As hospitals continue to adopt these more advanced treatments to improve patient outcomes, the associated costs have become one of the largest budget items for hospitals [14].

In addition to the types of medications being used, the sheer volume of drugs consumed in hospitals also contributes to high pharmaceutical costs. Hospitals, especially large teaching hospitals and academic medical centers, often serve a large number of patients with varying medical conditions [15]. The demand for medications across different departments, such as oncology, cardiology, neurology, and intensive care units, is constant. The procurement, storage, and administration of these drugs require a robust system to ensure the availability of the right medications at the right time. In larger hospitals, this can result in large inventories of medications, which increases the total cost of pharmaceuticals. Furthermore, hospitals must also account for the expenses associated with drug wastage, which can occur due to the expiration of drugs, improper handling, or overstocking [16].

Hospital administrators are often tasked with balancing the need to provide patients with the best possible treatments while also keeping costs under control. This challenge is complicated by the complex pricing structures used by pharmaceutical companies. Drug prices can vary significantly based on factors such as patent protection, market exclusivity, and the presence of generic alternatives. Additionally, pharmaceutical companies may

charge hospitals different prices based on negotiated contracts, volume discounts, and other factors. This lack of price transparency makes it difficult for hospitals to accurately predict their pharmaceutical expenditures and compare prices across suppliers. As a result, hospitals must dedicate significant time and resources to managing pharmaceutical procurement and negotiating favorable pricing agreements to optimize their budgets [17].

The financial strain caused by high pharmaceutical costs has far-reaching implications. For one, rising drug prices can contribute to overall healthcare inflation, increasing the financial burden on both hospitals and patients. Hospitals, particularly those operating on tight margins, may find it difficult to absorb these increased costs without passing them on to patients through higher hospital fees or service charges. This could lead to a reduction in the accessibility of healthcare services, particularly for vulnerable populations who may already face barriers to care. Furthermore, when hospitals are forced to allocate more resources toward purchasing medications, it may come at the expense of other critical areas, such as staffing, technology, or infrastructure improvements. This can create a cycle where the quality of care provided is compromised due to financial constraints [18].

Managing pharmaceutical costs requires a multifaceted approach that involves improving the efficiency of drug procurement, inventory management, and utilization. Hospitals are increasingly turning to management accounting systems, such as Activity-Based Costing (ABC), to track and allocate pharmaceutical expenditures more accurately. These systems help hospital administrators identify inefficiencies in drug usage and find areas where cost-saving measures can be implemented [19].

For example, ABC can help determine the true cost of medications by accounting for the activities associated with their procurement, storage, and administration. By understanding these costs in detail, hospitals can make more informed decisions about which medications to purchase and how to manage drug inventory. This level of transparency allows for the identification of waste, overuse, and unnecessary expenditures [20].

Another approach to controlling pharmaceutical costs is the use of formularies and evidence-based prescribing practices. Formularies are lists of approved medications that are deemed clinically effective and cost-efficient. By restricting the use of certain high-cost drugs and promoting the use of more affordable alternatives, hospitals can significantly reduce their pharmaceutical expenditures. Evidence-based prescribing, which emphasizes the use of medications that have been proven to be both effective and cost-efficient, is another way hospitals can optimize their drug usage. By ensuring that prescriptions are based on the most up-to-date clinical guidelines, hospitals can reduce unnecessary or inappropriate drug use, ultimately lowering costs [21].

In addition to these internal cost-control measures, hospitals are also facing pressure from external stakeholders, such as insurance companies and government health agencies, to reduce pharmaceutical expenditures. Many insurance companies have started to implement drug utilization reviews (DUR) to ensure that drugs are being prescribed appropriately and are not being overused or misused [22].

In some cases, health agencies and insurance providers may require hospitals to adopt specific cost-control measures as a condition for reimbursement or participation in public health programs. These external pressures are driving hospitals to become more strategic in

their pharmaceutical purchasing and management practices [23].

Despite the challenges, there are opportunities for hospitals to better manage pharmaceutical costs while still providing high-quality care. Collaboration between hospital administrators, healthcare providers, and pharmaceutical companies can lead to better pricing agreements, more efficient drug procurement processes, and improved utilization practices. Additionally, investing in health information technology systems can help hospitals better track drug use and streamline their inventory management processes, further reducing waste and inefficiency [24].

In conclusion, pharmaceutical costs are a critical issue in modern healthcare, with significant implications for hospital budgets, patient care, and overall healthcare sustainability. As the cost of drugs continues to rise, hospitals must adopt more sophisticated management strategies to optimize their pharmaceutical expenditures. By improving cost tracking, inventory management, and prescribing practices, hospitals can reduce waste, ensure the efficient use of resources, and provide high-quality care to patients. Ultimately, the ability to manage pharmaceutical costs effectively will be key to the long-term financial health of hospitals and the continued delivery of excellent patient outcomes [25].

Types of Management Accounting Systems in Hospitals

There are various types of management accounting systems that can be employed in hospitals to monitor and control pharmaceutical costs. Among these, two of the most widely used systems are Activity-Based Costing (ABC) and Standard Costing.

1. **Activity-Based Costing (ABC):** ABC is a more modern and sophisticated method of

cost allocation that identifies the relationship between activities and the costs incurred. In a hospital setting, ABC assigns costs to drugs based on the activities involved in their procurement, distribution, and administration. For example, the costs related to ordering, storage, and inventory management are linked to specific drugs, enabling hospitals to determine the true cost of each medication. ABC provides more accurate cost information than traditional costing methods, which can be beneficial for drug optimization strategies. With detailed insights into the costs of various activities, hospitals can identify inefficiencies and eliminate unnecessary expenditures [26].

2. **Standard Costing:** Standard costing, on the other hand, involves setting predetermined costs for medications based on historical data or industry standards. These standard costs are compared to actual costs to identify variances. In hospitals, this method helps to monitor pharmaceutical expenses by establishing benchmarks for drug costs and enabling management to identify areas where costs exceed expectations. Although less detailed than ABC, standard costing is widely used in hospitals for its simplicity and ease of implementation [27].

Both systems have their advantages and challenges, and the choice of system often depends on the specific needs of the hospital, the complexity of the drugs used, and the level of cost detail required.

Impact of MAS on Pharmaceutical Cost Optimization

The implementation of an effective management accounting system can have a profound impact on pharmaceutical cost optimization. By providing detailed insights into the costs associated with drugs, MAS

enables hospital administrators to make more informed decisions regarding procurement, inventory management, and drug utilization.

1. **Cost Tracking and Allocation:** One of the primary functions of MAS is to track and allocate the costs associated with pharmaceutical expenditures. By identifying the true cost of each drug, including associated activities such as ordering, storage, and handling, hospitals can better manage their budgets and optimize their spending on pharmaceuticals. With accurate cost allocation, hospitals can identify which drugs are most expensive and seek alternatives or negotiate better prices with suppliers [28].
2. **Inventory Management:** Proper inventory management is critical for minimizing pharmaceutical waste and ensuring that drugs are available when needed. MAS systems help hospitals track drug inventory levels in real time, allowing them to avoid overstocking or stockouts, both of which can result in increased costs. By providing insights into drug usage patterns, hospitals can optimize their inventory levels and reduce the risk of expired or unused drugs, which contribute to waste [29].
3. **Decision-Making and Drug Procurement:** Through the data provided by MAS, hospital administrators can make more informed decisions about which drugs to purchase and how much to stock. Cost-effectiveness analysis, facilitated by MAS, allows hospitals to compare the costs and benefits of different drugs and select those that offer the best value for money. Additionally, MAS can aid in negotiating contracts with pharmaceutical suppliers, ensuring

that hospitals secure competitive pricing for their drug purchases [30].

4. **Improving Clinical Outcomes and Resource Allocation:** While cost optimization is a primary goal, MAS also contributes to improving clinical outcomes by ensuring that the right drugs are used in the right quantities. By optimizing pharmaceutical costs, hospitals can allocate resources more effectively to other critical areas, such as staffing and medical equipment, thus improving overall patient care.

Challenges in Implementing MAS in Hospitals

The implementation of Management Accounting Systems (MAS) in hospitals has become a critical focus for improving financial management and operational efficiency. MAS is essential for tracking and managing the various costs associated with healthcare services, but its implementation comes with several challenges that hospitals must overcome to ensure its effectiveness. These challenges stem from a combination of organizational, technical, and external factors that can hinder the smooth adoption and utilization of MAS in healthcare settings [31].

One of the primary challenges in implementing MAS in hospitals is the complexity of the healthcare environment itself. Hospitals are complex organizations with a wide range of departments, specialties, and services. This complexity makes it difficult to standardize accounting practices across different areas of the hospital. Each department may have its own set of cost drivers, revenue streams, and financial objectives, which need to be accurately tracked and integrated into the MAS. The diversity of services provided, from emergency care to specialized surgeries, complicates the collection of accurate cost data and poses difficulties in allocating expenses

across various departments. As a result, integrating these varied data streams into a unified MAS can be time-consuming and prone to errors, reducing the system's reliability and effectiveness [32].

Another significant challenge is the resistance to change within hospital organizations. Many hospitals are accustomed to traditional accounting methods and may be reluctant to adopt new systems that require a complete overhaul of existing processes. This resistance can stem from a lack of understanding about the benefits of MAS, as well as concerns about the potential disruption to daily operations. Healthcare professionals, including medical staff and administrative personnel, may feel that the new system adds complexity to their workload without providing clear advantages. Overcoming this resistance requires effective change management strategies, including educating staff about the value of MAS in improving decision-making and financial transparency. Without proper training and support, staff may be unwilling or unable to fully engage with the new system, leading to its underutilization and failure to meet its objectives [33].

The technological infrastructure of a hospital also plays a crucial role in the successful implementation of MAS. Many hospitals, particularly those in developing regions or with limited resources, may lack the necessary IT infrastructure to support advanced accounting systems. Implementing MAS requires robust hardware, software, and network systems that can handle large volumes of data and integrate with other hospital management systems, such as electronic health records (EHR) and inventory management systems. Hospitals that operate on outdated or incompatible technology may struggle to implement MAS effectively, leading to delays, data inconsistencies, and increased costs. Moreover, the integration of MAS with other

healthcare technologies is a complex task that requires careful planning, coordination, and investment in IT resources. The costs associated with upgrading or replacing technology infrastructure can be a significant barrier to MAS adoption, especially for hospitals with constrained budgets [34].

Data accuracy and quality are also critical issues when implementing MAS in hospitals. For MAS to be effective, the data it relies on must be accurate, timely, and comprehensive. However, in many hospitals, data collection practices are inconsistent, and there may be a lack of standardized procedures for recording and reporting financial and operational information. Without reliable data, MAS cannot produce meaningful insights into hospital performance or guide effective decision-making. Furthermore, data errors or omissions can lead to incorrect cost allocations, affecting budgeting, pricing, and financial forecasting. Ensuring data accuracy requires hospitals to invest in data management systems and establish clear protocols for data collection and reporting. This can be particularly challenging in hospitals with limited resources or where data entry is manually performed, leading to the potential for human error [35].

In addition to these internal challenges, hospitals must also contend with external factors that can impact the implementation of MAS. One of the main external challenges is the regulatory environment. Hospitals are subject to a variety of healthcare regulations and reimbursement policies that can influence their accounting practices. Changes in healthcare laws, insurance reimbursement rates, and government funding can create uncertainty and affect the financial models used by hospitals. MAS must be adaptable enough to accommodate these changes and provide real-time data that reflects the evolving regulatory landscape. However, constant shifts in regulations can make it difficult for hospitals to

keep their accounting systems up-to-date and aligned with legal requirements [36-38].

Financial constraints are another external factor that can hinder the adoption of MAS. The cost of implementing and maintaining a comprehensive MAS can be substantial, particularly for hospitals operating on tight budgets. In addition to the initial investment in technology and infrastructure, hospitals must also allocate resources for training staff, updating systems, and ensuring ongoing system maintenance [39-41]. For many hospitals, particularly those in resource-limited settings, these costs may be prohibitive. As a result, hospitals may delay or avoid implementing MAS, despite the potential long-term benefits of improved financial management and cost control [42-44].

Lastly, the ability of hospital management to lead the MAS implementation process is crucial to its success. Effective leadership is required to drive the adoption of MAS, allocate sufficient resources, and address the challenges that arise during the implementation process. Hospital administrators must understand both the technical and managerial aspects of MAS and be able to communicate its value to stakeholders. They must also be prepared to make difficult decisions regarding resource allocation and prioritize the implementation of MAS over other competing needs. Without strong leadership, the implementation process can become disorganized and lack the necessary focus to achieve the desired outcomes [45-47].

In conclusion, while the implementation of MAS in hospitals offers significant potential benefits in terms of financial transparency, cost control, and improved decision-making, several challenges must be addressed to ensure its success. These challenges include the complexity of the healthcare environment, resistance to change, technological limitations, data accuracy issues, external regulatory

factors, financial constraints, and the need for strong leadership [48]. Hospitals must carefully navigate these obstacles and invest in the appropriate resources and strategies to overcome them. By doing so, they can unlock the full potential of MAS and improve their overall operational efficiency and financial performance [49].

Conclusion

In conclusion, the integration of management accounting systems into hospital operations is essential for optimizing pharmaceutical costs. By employing systems like Activity-Based Costing and Standard Costing, hospitals can gain better control over drug expenditures, improve resource allocation, and enhance overall financial sustainability. The implementation of MAS enables more efficient drug procurement, inventory management, and usage, which ultimately results in cost savings without compromising patient care. However, the successful adoption of these systems requires overcoming challenges related to hospital complexity and staff resistance. As healthcare continues to evolve, management accounting systems will play an increasingly vital role in ensuring that hospitals remain financially viable while delivering high-quality care.

References

- [1] M Shabani, M., et al., Life skills training effectiveness on non-metastatic breast cancer mental health: a clinical trial. *Iranian Red Crescent Medical Journal*, **2024**, 16(1). [[Google Scholar](#)], [[Publisher](#)]
- [2] MK Gol, A. Davoud, Checklist for Determining Severity of Pain and Type and Dosage of Analgesics Administered to Women's Patient Undergoing Breast Surgeries. *International Journal of Women's Health and Reproduction Sciences*, **2020**, 8(2), 227-31. [[Google Scholar](#)], [[Publisher](#)], [[Crossref](#)]

- [3] M KHANBABAYI, R Mirmazaheri, A Dorosti., Relationship between procrastination and optimism in undergraduate nursing students of medical sciences universities of Northwest Iran-1397. **2018**, 7(4): 48-54 [[Google Scholar](#)], [[Publisher](#)]
- [4] M Anaraki Robati et al., Effect of Repeated Microwave Disinfection on Surface Hardness and Dimensional Accuracy of Two Dental Stone Materials. *Journal of Advances in Bioscience & Clinical Medicine*. 2014, 3(1): 17-24 [[Google Scholar](#)], [[Publisher](#)], [[Crossref](#)]
- [5] M Ekong et al., From the Intensive Care Unit to Recovery: Managing Post-intensive Care Syndrome in Critically Ill Patients. *Cureus*. **2024**; 16(5) [[Google Scholar](#)], [[Publisher](#)]
- [6] R Dargahi, et al., Does coronavirus disease affect sleep disorders in the third trimester of pregnancy in women with low back pain. *International Journal of Women's Health and Reproduction Sciences*, **2021**, 9(4), 268-273. [[Google Scholar](#)], [[Publisher](#)], [[Crossref](#)]
- [7] R Mohammadian, et al., Angioplasty and stenting of symptomatic vertebral artery stenosis clinical and angiographic follow-up of 206 cases from Northwest Iran. *The neuroradiology journal*, **2013**, 26(4), 454-463. [[Google Scholar](#)], [[Publisher](#)], [[Crossref](#)]
- [8] R Rikhtegar, et al., Stem cell-based cell therapy for neuroprotection in stroke: A review. *Journal of cellular biochemistry*, **2019**, 120(6), 8849-8862. [[Google Scholar](#)], [[Publisher](#)], [[Crossref](#)]
- [9] S Amiri., et al., Effect of adenotonsillectomy on ADHD symptoms of children with adenotonsillar hypertrophy and sleep disordered breathing. *Int J Pediatr Otorhinolaryngol*. **2015**;79(8):1213-7. [[Google Scholar](#)], [[Publisher](#)], [[Crossref](#)]
- [10] S Fakhari, et al., Comparing the effect of hypotension treatment due to spinal anesthesia with ephedrine or phenylephrine on arterial blood gases and neonatal Apgar score during cesarean delivery in obese mothers: Randomized clinical trial. *The Iranian Journal of Obstetrics, Gynecology and Infertility*, **2019**, 22(10), 12-20. [[Google Scholar](#)], [[Publisher](#)], [[Crossref](#)]
- [11] S Hassani et al. Investigation of medical services in patients with diabetes, cardiovascular and Rheumatology disease in ICU. *Journal of pharmaceutical Negative Results*. **2022** 13(10): 4137-4158 [[Google Scholar](#)], [[Publisher](#)], [[Crossref](#)]
- [12] S Saedi, et al., Assessed the Complication of Central Nervous System in COVID-19 Patients: A Systematic Review and Meta-Analysis., *Eurasian Journal of Science and Technology*., **2021** 2: 185 [[Google Scholar](#)], [[Publisher](#)]
- [13] S Sayad et al., comprehensive evaluation of radiation oncology, medical and nursing care treatment in women with breast cancer based on sonographic and radiological points. *Pakistan heart journal*. **2024** 57(1) [[Google Scholar](#)], [[Publisher](#)]
- [14] S Sayad et al., A comprehensive investigation of radio-oncology in breast cancer patients based on psychological and radiological problems in these patients., *Pak Heart J*. **2024** 57(01):237-241 [[Google Scholar](#)], [[Publisher](#)], [[Crossref](#)]
- [15] S Sayad., et al. comprehensive evaluation of radiation oncology, Medical and Nursing care treatment in women with breast cancer based on sonographic and radiological points., *Pak Heart J*. **2024** 57(01):251-255 [[Google Scholar](#)], [[Publisher](#)], [[Crossref](#)]
- [16] S Reza-Soltani et al., The Role of Artificial Intelligence and Machine Learning in Cardiovascular Imaging and Diagnosis. *Cureus*. **2024**; 16(9) [[Google Scholar](#)], [[Publisher](#)]
- [17] Sh Mahboubi et al., Comparison the Dimensions of Maxillary Anterior Teeth to Golden Standard in Men and Women of an Iranian Population. *Journal of Isfahan Dental*

School. 2024, 19(4): 273-80 [\[Google Scholar\]](#), [\[Publisher\]](#), [\[Crossref\]](#)

[18] Sh Mahboubi et al., The prevalence of direct and indirect sequelae of conventional complete dentures in an Iranian population. EurAsian Journal of BioSciences. 2020, 14(2): 6705-6711 [\[Google Scholar\]](#), [\[Publisher\]](#), [\[Crossref\]](#)

[19] Sh Mahboubi et al., Relationship between Personality Traits and Psychological Components with Job Burnout among Dentists: A descriptive-correlational study. Journal of Razi Journal of Medical Sciences. 2023, 30(5): 95-107 [\[Google Scholar\]](#), [\[Publisher\]](#), [\[Crossref\]](#)

[20] A Abouchenari, et al., Advancements in dental implant technology: the impact of smart polymers utilized through 3D printing. Journal of synthesis and sintering. 2024 4(2): [\[Google Scholar\]](#), [\[Publisher\]](#), [\[Crossref\]](#)

[21] M Dashti, et al. Advancement and Application of Deep Learning on Detection of peri-Implantitis, a Narrative Review. Journal of Advances in Artificial Intelligence and Machine Learning; 2024 Review 4(2): 2290-2301 [\[Google Scholar\]](#), [\[Publisher\]](#), [\[Crossref\]](#)

[22] K Hadavand Mirzaei, et al. Medical care of infection patients undergoing weight loss surgery and laparoscopy, relying on cardio-pulmonary & Neurological care: A systematic review. International Neurology Journal. 2024 28(2): 74-83 [\[Google Scholar\]](#), [\[Publisher\]](#), [\[Crossref\]](#)

[23] M Anaraki Robati et al. Effect of Repeated Microwave Disinfection on Surface Hardness and Dimensional Accuracy of Two Dental Stone Materials. Journal of Advances in Bioscience & Clinical Medicine. 2014, 3(1): 17-24 [\[Google Scholar\]](#), [\[Publisher\]](#), [\[Crossref\]](#)

[24] H Kaseb Ghane et al., Power Laser Application for Immediate Implant Placement in Infected Sites: A Systematic Review, Photobiomodulation, Photomedicine, and Laser

Surgery, 2024 41, 12 [\[Google Scholar\]](#), [\[Publisher\]](#), [\[Crossref\]](#)

[25] Sh Mahboubi. Full Mouth Reconstruction in a Patient with Severely Worn Dentition by Restoring the Vertical Dimension of Occlusion: A Case Report. Journal of Revista Latinoamericana de Hipertensión. 2018, 13(6): 544-546 [\[Google Scholar\]](#), [\[Publisher\]](#), [\[Crossref\]](#)

[26] Sh Mahboubi et al. Relationship between Personality Traits and Psychological Components with Job Burnout among Dentists: A descriptive-correlational study. Journal of Razi Journal of Medical Sciences. 2023, 30(5): 95-107 [\[Google Scholar\]](#), [\[Publisher\]](#), [\[Crossref\]](#)

[27] Sh Mahboubi et al. Comparison the Dimensions of Maxillary Anterior Teeth to Golden Standard in Men and Women of an Iranian Population. Journal of Isfahan Dental School. 2024, 19(4): 273-80 [\[Google Scholar\]](#), [\[Publisher\]](#), [\[Crossref\]](#)

[28] E Jalalian et al. Occlusal splints in the treatment of temporomandibular disorders: A narrative review study. Journal of Dental Medicine Tehran University of Medical Sciences. 2024, 37(5): 1-8 [\[Google Scholar\]](#), [\[Publisher\]](#), [\[Crossref\]](#)

[29] E Kebriyai et al., Knowledge and Practice of Iranian Dentists Regarding Post Space Preparation and Coronal Reconstruction of Endodontically Treated Teeth. Jundishapur Journal of Health Sciences. 2024, 6(4): e147990 [\[Google Scholar\]](#), [\[Publisher\]](#), [\[Crossref\]](#)

[30] Sh Mahboubi et al. The prevalence of direct and indirect sequelae of conventional complete dentures in an Iranian population. EurAsian Journal of BioSciences. 2020, 14(2): 6705-6711 [\[Google Scholar\]](#), [\[Publisher\]](#), [\[Crossref\]](#)

[31] S Hassani et al. Investigation of medical services in patients with diabetes, cardiovascular and Rheumatology disease in ICU.

Journal of pharmaceutical Negative Results. **2022**, 13(10): 4137-4158 [[Google Scholar](#)], [[Publisher](#)], [[Crossref](#)]

[32] F Beiranvandi et al. Systematic investigation of cardio vascular & clinical problem in patients with covid-19 with Neurological and Pathological point. The seybold Report Journal. **2023**, 18(4): 1634-1653 [[Google Scholar](#)], [[Publisher](#)], [[Crossref](#)]

[33] M Khalilizad et al. Imaging Methods Applicable in the Diagnostics of Alzheimers Disease, Considering the Involvement of Insulin Resistance with Clinical Pharmacological Point. Pakistan Heart Journal. **2023** 56(3) [[Google Scholar](#)], [[Publisher](#)], [[Crossref](#)]

[34] V Tajiknia et al. Role of MRI in Preoperative Assessment of patients with Advanced ovarian cancer candidate for cytoreductive surgery, A Brief Review. Journal of Obstetrics Gynecology and Reproductive Sciences. **2021** 5 (6) [[Google Scholar](#)], [[Publisher](#)], [[Crossref](#)]

[35] A Jalali et al. Investigation of Cardiopulmonary Complications in Patients with Infection and Prevalence of Intubation in ICU with Radiological Point. Pakistan Heart Journal. **2023** 56 (2): 906-919 [[Google Scholar](#)], [[Publisher](#)], [[Crossref](#)]

[36] S Sayad et al. comprehensive evaluation of radiation oncology, medical and nursing care treatment in women with breast cancer based on sonographic and radiological points. Pakistan heart journal. **2024** 57(1) [[Google Scholar](#)], [[Publisher](#)]

[37] S Sayad et al. comprehensive investigation of radio-oncology in breast cancer patients based on psychological and radiological problem in these. Pakistan heart journal. **2024**; 57(1) [[Google Scholar](#)], [[Publisher](#)]

[38] R Jamali et al. Evaluation Of The Changes In Serum Levels Of Ast, Alt, And Alkp Before And After Two Cyclosporine Regimens,

Mycophenolate Mofetil, And Tacrolimus, Mycophenolate Mofetil In. Journal of Pharmaceutical Negative Results. **2022**; 10967-10970 [[Google Scholar](#)], [[Publisher](#)]

[39] S Reza-Soltani et al. The Role of Artificial Intelligence and Machine Learning in Cardiovascular Imaging and Diagnosis. Cureus. **2024**; 16(9) [[Google Scholar](#)], [[Publisher](#)]

[40] M Dashti et al. Application of Machine Learning in orthodontics: A Bibliometric. Advances in Artificial Intelligence and Machine Learning; **2023** 4(1):2014-2026 [[Google Scholar](#)], [[Publisher](#)], [[Crossref](#)]

[41] M Dashti et al. Evaluation of deep learning and convolutional neural network algorithms for mandibular fracture detection using radiographic images: A systematic review and meta-analysis. Imaging Science in Dentistry Journal; **2024** 54(3): 232 [[Google Scholar](#)], [[Publisher](#)], [[Crossref](#)]

[42] M Dashti et al. Advancement and Application of Deep Learning on Detection of Peri-Implantitis, a Narrative Review. Advances in Artificial Intelligence and Machine Learning. European Workshop on Periodontology. J Clin Periodontol.; **2011** (11): 178-181 [[Google Scholar](#)], [[Publisher](#)], [[Crossref](#)]

[43] K Hashemzadeh et al., Effects of interval training on post-coronary artery bypass grafting hemodynamic indices. **2020** [[Google Scholar](#)], [[Publisher](#)]

[44] K Hadavand Mirzaei, et al., Application of Robotic Instruments in Hip Arthroplasty Surgery Based on Practical Tips a Systematic Review, Eurasian Journal of Chemical, Medicinal and Petroleum Research, **2024**, 3 (2), 593-609 [[Google Scholar](#)], [[Publisher](#)], [[Crossref](#)]

[45] M Dashti, N Zare, N Tajbakhsh, J Noble, S Hashemi, Sh Ghasemi, SS Hashemi, M Elsaraj Sherif, Application of Machine learning in orthodontics: A Bibliometric Analysis, Advances in Artificial Intelligence and Machine

learning, **2024**, 4(2), 2014-2026 [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]

[46] M Dashti, N Tajbakhsh, N Ghadimi, S Ghaedsharaf, Sh Ghasemi, SH Tehrani, N Zare, Advancement and Application of Deep Learning on Detection of Peri-Implantitis, a Narrative Review. *Advances in Artificial Intelligence and Machine Learning*. **2024**; 4(2): 2290-2301 [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]

[47] M Dashti, S Ghaedsharaf, Sh Ghasemi, N Zare, E-F Constantin, A Fahimipour, N Tajbakhsh, N Ghadimi, Evaluation of deep learning and convolutional neural network algorithms for mandibular fracture detection using radiographic images: A systematic

review and meta-analysis, *Imaging Science in Dentistry*, **2024**, 54(3), 232 [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]

[48] H Ahmady, M Afrand, M Motaqi, Gh Hossein Meftahi, Utilizing Sertoli Cell Transplantation as a Therapeutic Technique for the Management of Neurodegenerative Diseases, *Archives of Razi Institute*, **2024**, 79(4) [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]

[49] J Bolhari, T Amiri, I Karimi Keisomi, M Mohseni Kabir, Domestic violence prevention advocacy program: a pilot study in Tehran urban area, *Iranian Journal of Psychiatry and Clinical Psychology*, **2018**, 24 (2), 124-135 [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]