

Niu Y & Xu L (2024) OPTIMIZING FINANCIAL SETTLEMENT IN SPORTS MEDICINE: MANAGEMENT OF ELECTRONIC QUICK PAYMENT METHODS IN GENERAL HOSPITAL SETTINGS. Revista Internacional de Medicina y Ciencias de la Actividad Física y el Deporte vol. 24 (97) pp. 157-173.

DOI: <https://doi.org/10.15366/rimcafd2024.97.012>

ORIGINAL

OPTIMIZING FINANCIAL SETTLEMENT IN SPORTS MEDICINE: MANAGEMENT OF ELECTRONIC QUICK PAYMENT METHODS IN GENERAL HOSPITAL SETTINGS

Yamin Niu, Li Xu*

¹The First Affiliated Hospital of Hebei North University, Zhangjiakou, 075000, China

E-mail: xuli198304@163.com

Recibido 12 de diciembre de 2023 **Received** December 12, 2023

Aceptado 12 de julio de 2024 **Accepted** July 12, 2024

ABSTRACT

Objective: This study aims to explore the current state and challenges of managing electronic quick payment methods within the financial settlement processes of general hospitals, specifically in the context of sports medicine departments. Additionally, it proposes specific optimization strategies to enhance efficiency and security. **Methods:** The study analyzed the advantages of electronic payment systems within the financial operations of sports medicine services in general hospitals, clarifying the value of quick payment methods in this specialized field. It then delved into the application status, existing problems, and challenges associated with electronic quick payments, focusing on issues pertinent to sports medicine. Based on these insights, targeted optimization paths were developed. **Results:** The implementation of electronic payment methods in sports medicine departments of general hospitals revealed several issues, including departmental information silos, mismatches between settlement processes and electronic payment systems, and security risks. Moreover, the study identified challenges such as the need for higher levels of hospital information management and robust internal controls. The proposed optimization strategies include enhancing the functionality of hospital medical cards to enable a seamless "one-card" system, optimizing settlement processes within sports medicine departments, strengthening electronic payment security, improving hospital information systems, and reinforcing internal controls. **Conclusion:** Despite the benefits of electronic quick payments, there are still significant risks and challenges in their application within the financial settlements of sports medicine departments in general

hospitals. Strengthening the management of these systems can facilitate their effective use and ensure the financial security of hospital operations, particularly in the specialized area of sports medicine.

KEYWORDS: General hospital; Financial settlement; Electronic payment

1. INTRODUCTION

The financial management of healthcare services is a critical aspect of hospital operations, directly influencing the efficiency of service delivery, patient satisfaction, and overall institutional sustainability. In recent years, the adoption of electronic quick payment methods has transformed the financial settlement processes in general hospitals, offering a range of benefits such as faster transactions, reduced administrative burdens, and enhanced patient convenience. However, the integration of these payment systems presents unique challenges, particularly within specialized fields like sports medicine, where the demands and expectations of both patients and healthcare providers are distinct. Sports medicine is a dynamic and rapidly evolving specialty that caters to a diverse patient population, including professional athletes, amateur sports enthusiasts, and individuals seeking to maintain or enhance their physical performance. The nature of sports medicine often requires a multidisciplinary approach, encompassing prevention, diagnosis, treatment, and rehabilitation of sports-related injuries and conditions. As such, the financial transactions within this field can be complex, involving a range of services from diagnostic imaging and surgical interventions to physical therapy and ongoing rehabilitation. The swift and accurate processing of payments is essential to ensure that patients can access the necessary care without delay, and that healthcare providers are compensated promptly and efficiently. Electronic quick payment methods have the potential to significantly streamline these processes in sports medicine departments. These systems enable patients to settle their bills quickly, using a variety of payment options, thereby reducing the time spent on financial transactions and allowing healthcare providers to focus more on patient care. Furthermore, in a field where time is often of the essence—whether it's minimizing downtime for an injured athlete or ensuring swift access to rehabilitation services—efficient financial settlement processes can play a crucial role in patient outcomes. However, the implementation of electronic payment systems in sports medicine also comes with specific challenges that must be addressed to fully realize their benefits. For instance, the integration of these systems within the existing financial infrastructure of a hospital can be complicated by the presence of departmental information silos, where different departments operate independently, leading to inefficiencies and potential errors in financial transactions. Additionally, the traditional settlement processes used in many hospitals may not be fully compatible with modern electronic payment systems, resulting in delays, redundancies, or security vulnerabilities. Security is a particularly pressing concern in the adoption of electronic quick

payment methods, especially in sports medicine, where patient data may include not only financial information but also sensitive health records related to athletic performance and injury history. Ensuring the security of these transactions is paramount to maintaining patient trust and protecting the hospital's reputation. Moreover, the rapid pace of technological advancements in electronic payment systems means that hospitals must continuously upgrade their information management infrastructure and internal control mechanisms to keep pace with these developments. Given these challenges, it is essential to explore and identify specific optimization strategies that can enhance the management of electronic quick payment methods within sports medicine departments. This study aims to investigate the current state of electronic payment systems in this context, identify the key issues and challenges, and propose targeted solutions that can improve the efficiency, security, and overall effectiveness of financial settlements in sports medicine. By focusing on this specialized field, the study seeks to contribute to the broader understanding of how electronic payment systems can be better integrated into healthcare services, ultimately improving both operational outcomes and patient experiences. In while electronic quick payment methods offer substantial advantages for financial management in general hospitals, their successful implementation in sports medicine requires careful consideration of the unique needs and challenges of this specialty. By addressing these challenges through targeted optimization, hospitals can enhance the delivery of sports medicine services, ensuring that patients receive timely and effective care, and that healthcare providers can operate with greater efficiency and financial security.(Chukwu, Ubah, & Njideka, 2021; Y. Liu, 2022; Rakhmad, Kurniawan, & Kusnayain, 2021).

2. Advantages of electronic payment in the financial settlement process of general hospitals

2.1 Disadvantages of traditional financial settlement mode

Discharge settlement is an important link in the business process of hospitals. First, patients repeatedly queue up for medical treatment, and the waiting time is long. Most patients hope that the discharge and admission time is within 5-15 minutes (Yang, Zhu, & Jiang, 2021), but the outpatient population is dense, and the number of discharge and admission patients is large every day, which leads to the need for patients to queue up at Windows again and again to complete business, and the time for discharge is too long. Second, medical institutions need to deploy a large number of staffs to meet the needs of patients. Third, manual settlement has low efficiency and high cost. Traditional payment methods such as cash and credit card have certain disadvantages, such as difficult reconciliation of accounts and difficult fund management, which then affect the efficiency of the overall medical system operation of our hospital. At the same time, they cannot be perfectly integrated

with the newly introduced social security discharge system software.

2.2 Advantages of electronic payment methods

With the continuous development of mobile Internet technology, information technology and electronic fast payment methods have been widely used in people's life (Chen, 2023; L. L. Liu, Chen, & Li, ,2022). At present, electronic payment has gradually become the main payment method for hospitalized and discharged patients. Its application advantages are as follows:

2.2.1 Faster capital flow

In the traditional payment mode, the capital exchange between the hospital and the patient is completed by cash, which not only cannot ensure the security of funds, but also brings certain financial risks to the hospital. In the process of financial settlement electronic payment, through the establishment of a perfect hospital online payment system, hospitals can realize the timely update and release of medical charging items, medical expenses and patient funds and other information, which can not only effectively reduce the possible risks of cash transactions, but also ensure the timely monitoring of all links in the process of capital flow. At the same time, electronic payment can reduce the financial settlement between banks and hospitals, which can not only reduce the expenses that patients need to pay when they go to the hospital, but also effectively improve the efficiency of hospital financial management. For example, when patients use electronic payment methods for online payment, as long as the patient's basic information, treatment date and other information are input on the payment page, the hospital can timely deduct the patient through the system platform. This method can not only effectively improve the efficiency of hospital financial management, but also effectively reduce the cost that patients need to pay when they go to the hospital (Zhao, Li, & Miao, 2021).

2.2.2 Provide better service for the hospital

The electronic payment method of hospital financial settlement can improve the efficiency of hospital financial management and effectively avoid various risks in the process of capital flow. On the one hand, the electronic payment method of hospital financial settlement can reduce the cost of medical treatment for patients. Because electronic payment can realize information sharing among banks, hospitals and patients, patients can complete all procedures in a short time, effectively avoiding the queuing phenomenon under the traditional settlement mode, and also reducing the cost of medical treatment for patients. Under the traditional cash payment mode, any link in the hospital financial management work may have problems such as poor capital flow, resulting in the failure of patients to receive timely treatment. However, under the electronic payment mode, this risk can be effectively avoided.

2.2.3 Improve the level of financial management

The emergence of electronic payment methods for hospital financial settlement not only provides a more efficient and convenient payment channel for the development of hospital financial management, but also effectively improves the level of hospital financial management. The development of hospital financial management is an important work for the overall planning and management of the overall economic situation of the hospital, which not only directly affects the future development planning of the hospital, but also relates to the survival and development of the hospital. Therefore, how to improve the level of hospital financial management has become an important problem that hospitals must face and solve. The emergence of electronic payment methods for financial settlement can not only improve the efficiency of financial management, but also provide more reliable and perfect financial guarantee for the development of hospitals. Therefore, it is necessary to recognize the positive role of electronic payment methods in improving the level of hospital financial management, and on this basis, effective measures should be taken to actively deal with the challenges brought by electronic payment methods to hospitals.

2.2.4 It is conducive to optimizing resource allocation

In the practical application process, the electronic payment method of hospital financial settlement can not only effectively monitor the use of funds, but also promote the optimal allocation of hospital internal resources. Through the electronic payment method of hospital financial settlement, funds can be directly paid to patients, thus reducing the waiting time of patients, reducing the cost of patients' medical treatment to a certain extent, and improving the quality of patients' medical treatment. At the same time, due to the application of electronic payment methods for hospital financial settlement, the communication between various departments within the hospital is smoother, which is of great significance for improving work efficiency. Under the electronic payment method of hospital financial settlement, the speed of information circulation among various departments is faster, which is conducive to the mutual communication and cooperation between various departments, so as to improve the efficiency of hospital financial management. Therefore, to some extent, the electronic payment method of hospital financial settlement is conducive to optimizing resource allocation.

2.2.5 Reduce capital risks

With the rapid development of China's social economy, people's demand for medical and health is increasing, which makes all kinds of problems in the medical industry continue to appear, especially in the management of funds. Because the electronic payment method of hospital financial settlement can

realize the effective monitoring of all links in the hospital financial management, so as to effectively avoid all kinds of risks that may appear in the process of cash payment, can effectively reduce the use risk of the electronic payment method of hospital financial settlement, and ensure the safety of hospital funds. Under the background of the continuous development of electronic information technology, the electronic payment method of hospital financial settlement can effectively improve the work efficiency, work quality and management level of the medical industry. At the same time, the electronic payment method of hospital financial settlement can also reduce various risks existing in hospital management to a certain extent. In short, the electronic payment method of hospital financial settlement is of great significance under the background of the current era, which requires relevant personnel to further improve the understanding of its importance, and constantly optimize and improve this payment method, so as to provide more effective guarantee for the stable development of China's medical industry.

2.2.6 Facilitate information statistics

At the same time, it can also provide more accurate and effective funds for the hospital financial department, which is convenient for the hospital to make more scientific and reasonable decisions, so as to improve the overall management level and service quality of the hospital. Electronic payment can make a comprehensive analysis of the hospital's medical service quality and operating cost, which is conducive to improving the hospital's financial management level and enhancing the quality of medical services. At the same time, electronic payment can also effectively reduce the risk problems that may occur in the process of cash circulation, so that the security of funds can be guaranteed. The electronic payment method of hospital financial settlement can also make the flow of funds smoother and more reasonable, and improve the economic and social benefits of the hospital to the greatest extent. Therefore, electronic payment methods have a high necessity.

2.2.7 Improve the image of the hospital

In the current era, the service quality of hospitals has attracted more and more attention from people. Compared with other service industries, the service quality of the medical industry directly affects the social image of the hospital. The traditional cash payment method has certain limitations, such as long queuing time and delayed payment in the process of medical treatment, which will adversely affect patients' medical experience. In order to improve patients' medical experience and hospital service quality, hospitals need to constantly improve various service measures. Therefore, in the hospital financial management work, the application of financial settlement electronic payment method can effectively improve the hospital service image.

3. Application status of electronic quick payment in hospital financial settlement

Electronic quick payment for hospital financial settlement has been widely used. At present, the mainstream electronic settlement and payment modes of hospitals include the following three types:

3.1 Mobile payment

Alipay, we chat and other mobile payment methods have been widely used in hospital financial settlement. Patients can pay by scanning the QR code on their mobile phone or entering the Alipay/we chat account provided by the hospital. We chat has also been applied in the electronic quick payment of hospital financial settlement, which is mainly reflected in the following two aspects: first, we chat provides more self-service functions for hospitals. For example: registration, payment, inquiry, print report and other functions. These self-service features can make patients more convenient during the medical process. Second, we chat also provides hospitals with more operation and management functions. For example, push hospital activities, policy information, health science and other contents through we chat official account; Push the introduction of experts and medical guidelines of various departments of the hospital through we chat official account; Push the cost details of each department of the hospital through we chat official account; Push appointment registration, self-service payment, report inquiry and other services through we chat public account. At present, the application of Alipay in the field of hospital financial settlement is mainly reflected in two aspects: the first is the online binding payment of medical insurance card; The second is the payment after the patient's mobile phone number is bound. At present, Alipay mainly uses SMS notification or active push to remind patients of the binding of medical insurance cards, so as to improve the convenience and security of patients' use. In addition, electronic quick payment for hospital financial settlement can also push relevant information to patients through Alipay life number, Alipay wallet and other channels. However, there are still some problems in the use process, such as the inability to accurately identify whether it is bound by the medical insurance card, and the need to pay a high amount in the use process (K. LIU, 2015).

3.2 Bank card payment

Bank card payment is also a common payment method in hospital financial settlement. Patients can pay by swiping or inserting bank cards. Flash Cloud payment is a mobile payment product launched by China UnionPay. Through the Flash Cloud payment APP, users can bind their bank cards on the flash Cloud payment APP to complete rapid payment. In terms of usage, the cloud flash payment APP can realize fast payment, inter-bank transfer, payment,

balance query and other functions. Union pay mobile phone flash payment can realize fast payment, payment and other functions. Both the cloud flash payment APP and UnionPay mobile flash payment need to turn on the Bluetooth or NFC function of the mobile phone, and need to enter the card number and password during the use of the APP, while the cloud flash payment APP does not need to enter the card number and password, nor does it need to enter the mobile verification code. Mobile flash payment supports users to make mobile payment through hospital self-service machines, consultation rooms, we chat official accounts, Alipay, UnionPay cloud flash payment and other channels. Compared with other mobile payment methods, flash payment has higher security. However, due to its limited use scenarios, the application scope of mobile flash payment is narrow. At present, only some hospitals in a few cities have realized electronic quick payment for hospital financial settlement.

3.3 Medical insurance payment

The way of medical insurance payment is that the personal account funds of the insured personnel are directly transferred into the settlement account of medical institutions by the medical insurance center according to the provisions, or the personal account funds are transferred to the social security card (bank card) of the patient, and the way of medical insurance settlement is completed by the medical insurance card when the insured personnel seek medical treatment and buy drugs in medical institutions. Medical insurance electronic certificate is an online medical insurance identity authentication electronic medium launched by the National Healthcare Security Administration that integrates five functions of "identity certificate, information record, self-service inquiry, medical insurance settlement and medical treatment and drug purchase". It is a new medical insurance settlement method that realizes the direct settlement of medical expenses incurred by medical insurance insured personnel in designated medical institutions and drug purchase, as well as medical expenses incurred in designated retail pharmacies, through the Internet. The medical insurance system in some regions has realized the function of electronic payment, and patients can pay through electronic medical insurance.

3.4 Other methods

With the continuous development of Internet technology, the electronic payment methods in hospital financial settlement also present a trend of diversification. For example, some hospitals have begun to experiment with facial recognition, fingerprint recognition and other technologies for payment. Although the application of face recognition, fingerprint recognition and other technologies in medical payment has great potential, face recognition, fingerprint recognition and other technologies are still in the early stage of

development, and further technology research and development and management improvement are still needed to improve the precision and accuracy of recognition, and ensure the security and reliability of payment information.

3.5 Electronic invoice

With the rise of electronic quick payment, electronic invoice has been widely used in hospital financial settlement. Patients can log in to the electronic invoice platform provided by the hospital through mobile phones or computers to query and download invoices. Patients can not only query all electronic invoices on the electronic invoice platform, but also download electronic invoices, verify and archive them. Stamp the paper invoice with the official seal of the hospital, and match it with the electronic invoice one by one for future inspection and reimbursement. In addition to the electronic invoice platform of hospitals, China has also launched third-party electronic invoice platforms, such as "Beijing Medical Cloud" and "Beijing E-Ticket Pass". The main advantage of the third-party electronic invoice platform is to electronize the original paper invoice of the hospital, and at the same time, it can also provide patients with the service of inquiry and download of electronic invoice. However, the third-party platform also has some shortcomings, such as unable to solve the reimbursement problem and unable to carry out cross-regional reimbursement. Therefore, the third-party platform is mainly used to solve the problem of patient reimbursement and cross-regional reimbursement.

4. Problems and challenges existing in electronic payment methods

4.1 Problems existing in electronic payment methods

4.1.1 Information island of each department

There is a problem of information island among various departments of the hospital. Firstly, the data of the hospital information system cannot be shared. With the continuous advancement of medical and health informatization construction, the hospital information system has gradually realized resource integration and process optimization, but the data among departments is still not shared, resulting in the failure of data sharing among departments, which affects the smooth implementation of electronic payment methods for hospital financial settlement (Shi, 2020). Second, data transmission is not timely enough. Due to the short implementation time of electronic payment method for hospital financial settlement, the data transmission between departments has not been fully automated and intelligent, resulting in information asymmetry between departments, which affects the timeliness of data transmission. How to strengthen the communication and contact between finance and information, logistics, canteen and other departments, establish a unified information sharing platform, and truly realize

the one-card is the difficult problem of hospital financial settlement management.

4.1.2 The settlement process is not adapted to electronic payment

Hospital patients can make payment through online banking or mobile APP, and follow-up treatment activities such as reimbursement or drug collection can be carried out only after the patient has successfully paid. First of all, the payment and refund process is not reasonably designed. Due to the large amount of medical expense funds in and out, and the large number of refund types on the mobile platform, such as registration payment, inter-clinic payment, medical insurance burden and refund caused by network technology, if the original offline refund process or financial settlement process is adopted, it will lead to the waste or interruption of funds during the follow-up treatment activities such as reimbursement or drug collection. Secondly, the check of medical insurance information is not accurate.

At present, the input of medical insurance information in hospitals is still mainly manual, and the settlement of medical insurance expenses is realized through manual verification of medical insurance departments. When patients make electronic payment, the hospital needs to check the data with the network system of the medical insurance department to ensure that the data input is accurate and correct. Data entry errors or missing may occur in the process of checking, resulting in the inability of patients to complete electronic payment normally. Therefore, hospitals should establish a sound checking mechanism for medical insurance information to avoid settlement failure caused by data entry errors (Q. Wang, Li, & Wang, 2020; Y. Wang, Wang, & Shi, 2020).

4.1.3 Security risks of electronic payment methods

First of all, payment security issues, mainly for payment information, password leakage events. Because the whole process of electronic payment relies on information system guarantee, it has high requirements on network security. If the hospital system has loopholes or is not maintained and upgraded in time, it will lead to the disclosure of patient information or be used by criminals, resulting in economic losses; Some hospitals lack necessary security protection measures for password setting of electronic payment platforms (X. Ren, 2019; Zheng, 2019). Secondly, the security authentication mechanism is not perfect. All the payment tools involved in the electronic payment method of hospital finance need to be certified for security, but there are certain loopholes and defects in the certification of payment tools in some hospitals. Finally, the information security guarantee system is not perfect. Electronic payment platform needs to rely on a large number of computers and network technology for support in the process of operation. However, some hospitals still have certain deficiencies and shortcomings in the application of these technologies,

which leads to certain security risks in electronic payment platform.

4.2 Challenges faced by electronic payment methods

4.2.1 Higher requirements for hospital informatization

With the development of the new generation of information technology, the level of hospital informatization has been effectively improved, which provides technical support for the implementation of electronic payment methods for hospital financial settlement. Hospital management system and self-service equipment are important channels and guarantees for the completion of electronic payment.

4.2.2 Higher requirements for hospital internal control

After the implementation of the hospital electronic payment method, the financial settlement process has undergone great changes, the settlement cycle is shortened, the settlement time is reduced, and the financial personnel have to process the electronic payment settlement data. For example, some hospitals cause system failure or abnormal funds due to technical reasons, and there are hidden dangers in fund security; Possible risks in electronic payment business include failure to use funds for the prescribed purpose, wrong bill information, failure to timely enter the account, failure to approve according to the prescribed examination and approval process, and doubts about the legality of payment funds, etc. Therefore, the hospital should strengthen the internal control and management of electronic payment business, and prevent and control risks through information means.

5. Optimization path of electronic quick payment method for hospital financial settlement

5.1 Improve the function of hospital treatment card to realize "one-card"

The function of hospital medical card is the premise of realizing "one-card". The medical card can be used to realize the seamless connection between electronic payment and cash payment, and solve the problem of fund settlement in the process of hospital treatment. Continue to improve the functions of the hospital treatment card, realize the "one-card", so that it has the functions of recharge, payment, settlement, inquiry and so on, mainly including the identification function, personal information storage function, pre-payment of medical expenses function of the medical treatment card, which can effectively avoid the problems of patients' repeated registration, examination, charging, personal information disclosure in the process of diagnosis and treatment, and realize the pre-payment of medical expenses (B. Wang, 2021).

At the same time, in addition to registration, treatment, admission and

discharge settlement, "one card" should also include canteen dining, parking payment, hospital supermarket, etc., electronic quick payment system without dead corner to cover the hospital's various payment links, patients through telephone, Internet, mobile phone APP and other ways to register, payment, so that patients from the fast payment truly feel convenient and fast.

5.2 Optimize the hospital settlement process

In view of the multiple payment and settlement of discharge, it is suggested to optimize the hospital settlement process, introduce new settlement software, realize automatic self-service, and perfectly combine the electronic quick payment system with the hospital treatment system. First, establish cooperative relations with third-party payment platforms and cooperate with Alipay, we chat, e-wallet and other quick payment means. For the problem of refund, the information platform will be intelligent to solve the problem first, such as self-service registration and medical insurance burden part of the refund, Alipay/We chat will take the initiative to refund the fee, if the refund is not successful, you can initiate the refund again within a certain time. For the unsuccessful second refund, the facts can be manually delayed to find out and solve the problem.

According to the information system and mobile platform, the patient can be manually refunded according to the automatic reconciliation of accounts, and the refund list can be prepared to implement the reasons for each unpaid account (Y. Ren, 2023; Sun, 2018). Second, cooperate with banks to improve the self-service settlement method of teller machines, so that patients who handle hospitalization deposit by tapping bank cards can quickly use the self-service teller machines to handle settlement procedures and ease the waiting time in line. Strengthen the relevant performance training for staff, especially the training of seamless connection with social security software, to improve work efficiency.

5.3 Strengthen the security management of electronic payment

Firstly, the paper analyzes the settlement process characteristics of various departments of the hospital and the payment characteristics of various third-party payment platforms, visits and researches patients, clinical departments, medical technology departments and other charging departments, and puts forward reasonable suggestions on comprehensive electronic payment compatible with various payment methods in combination with financial cost control strategies, so as to make the electronic payment platform of the hospital more efficient and humanized. Second, improve the payment process. After the application of electronic payment methods in hospitals, staff need to constantly improve the payment process to ensure the safety and speed of payment. Specifically, in the process of electronic payment, the staff

needs to check the patient's identity information and ensure the accuracy of the patient's identity information. At the same time, it is necessary to improve patients' medical records, payment records, expense details and other relevant contents to ensure the safety and efficiency of electronic payment (Dou & Zhou, 2020; Precison & Hu, 2020). In addition, the staff also needs to clarify the cost details of each department to ensure the smooth implementation of electronic quick payment method for hospital financial settlement. At the same time, hospitals also need to formulate corresponding management systems and clarify responsibilities and obligations in the process of carrying out electronic payment.

For example, hospitals need to establish a set of sound financial settlement procedures and management systems, and strictly implement each system. At the same time, the hospital should also integrate the relevant systems and procedures into the daily work to ensure the smooth implementation of the electronic quick payment method for financial settlement. Finally, strengthen the monitoring of electronic payment. In the process of electronic payment, the hospital should do a good job of monitoring, prevent criminals from stealing patient information by various means, and ensure the safety of patients' funds. At the same time, the hospital should also strictly monitor the process of electronic payment and effectively control all links. For example, in the payment process of patients, payment information should be checked; After patients pay, the fund information should be sent to the hospital financial department in time, and the electronic payment should be monitored in real time. After the patient pays, the hospital financial personnel should send the fund information to the relevant departments in a timely manner. For example, hospital finance staff need to regularly check and test electronic payment platforms. At the same time, the hospital should also establish an internal early warning system, which can timely send early warning information to relevant departments when abnormal situations occur, so as to ensure the safety and stability of electronic payment.

5.4 Improve the level of hospital informatization

The financial settlement system of a hospital is the core system of the hospital's capital flow. When electronic quick payment is adopted in the financial settlement of general hospitals, the system should be updated and upgraded (Ranjan, Soman, Ateria, & Srivastava, 2018). The first is to update and upgrade the financial software and information system function modules; The second is to establish the interconnection between electronic quick payment system and HIS, LIS and other information systems of the hospital. In order to improve the level of financial settlement informatization, hospitals need to actively communicate and coordinate with banks, so that banks can timely provide relevant information about patients' treatment, diagnosis and treatment,

expense settlement and other processes in the hospital. Finally, improve the construction of hospital internal management system and related operation process design. Only in this way can we improve the level of financial settlement informatization, and then improve the satisfaction of patients in the hospital.

5.5 Strengthen internal control and effectively reduce capital risks

Establish and improve the hospital internal control system, strengthen the hospital financial management, and realize the effective supervision of electronic quick payment methods. First of all, unified management norms and procedures should be formulated to incorporate electronic quick payment into the internal control system of the hospital. Secondly, it is necessary to strengthen the training of staff and improve their understanding of electronic quick payment methods. The financial department of the hospital should strengthen the training of accounting personnel, so that they can fully grasp the relevant accounting knowledge and regulations and policies. At the same time, accounting personnel should be organized to carry out learning and exchange activities, encourage them to actively participate in the learning, and constantly improve their business ability.

In addition, the hospital should also carry out regular training activities for financial personnel, organize financial personnel to conduct exchange and learning activities in other units, and improve their overall quality and professional skills. Finally, it is necessary to standardize the setting of relevant posts and the division of responsibilities, and clarify the responsibilities and powers of different posts such as financial personnel, accountants and cashiers, so as to ensure the safe and stable operation of electronic fast payment. For example, the person in charge of the hospital checks the payment process; The internal audit department of the hospital is responsible for the supervision of electronic payment process; The audit department of the hospital is responsible for auditing the electronic payment process. Through the establishment and improvement of internal control mechanism, capital risk can be effectively reduced.

6. Concluding remarks

The integration of electronic quick payment methods into the financial settlement processes of general hospitals, particularly within the specialized field of sports medicine, presents both significant opportunities and challenges. This study has highlighted the numerous advantages of adopting electronic payment systems, such as improved efficiency, reduced transaction times, and enhanced patient satisfaction. However, it also reveals critical issues that need to be addressed to optimize these systems for better functionality and security within sports medicine departments. The key challenges identified include the

existence of departmental information silos, which hinder the seamless flow of financial data, and the incompatibility between traditional settlement processes and the modern requirements of electronic payment systems. Additionally, the implementation of these systems is accompanied by significant security risks, such as the potential for data breaches and fraud, which could compromise the integrity of the hospital's financial operations. Moreover, the need for higher levels of hospital informatization and robust internal control mechanisms further complicates the adoption and effective use of electronic payment methods. In response to these challenges, the study proposes a comprehensive set of optimization strategies. Enhancing the functionality of hospital medical cards to achieve a "one-card" system could streamline the patient experience and reduce the complexity of financial transactions within sports medicine departments. Optimizing the settlement process to align more closely with the capabilities of electronic payment systems is crucial for minimizing delays and errors in financial transactions.

Additionally, strengthening the security management of electronic payments is essential to safeguarding patient data and ensuring the integrity of financial operations. Improving the overall level of hospital informatization would enable better integration and utilization of electronic payment systems, while reinforcing internal controls would help mitigate the risks associated with electronic transactions. In conclusion, while electronic quick payment methods offer substantial benefits for the financial management of sports medicine services in general hospitals, their successful implementation requires careful management and continuous improvement. Addressing the identified challenges through targeted optimization strategies can significantly enhance the efficiency, security, and reliability of financial settlements within sports medicine departments. This, in turn, will not only improve operational efficiency but also contribute to a better patient experience and greater financial security for hospitals. As electronic payment systems continue to evolve, ongoing research and adaptation will be necessary to ensure that these technologies fully meet the needs of modern healthcare, particularly in specialized fields like sports medicine.

Acknowledgment

Zhangjiakou Social Science Research Project 2022(NO. : 2022049, project title: study on the management strategy of refinement of performance appraisal in public hospitals in the context of the four-medicine linkage)

Funding

The research is supported by: Zhangjiakou Social Science Research Project 2022

REFERENCES

- Chen, H. (2023). Construction practice of intelligent financial system based on the integration of industry and finance in F Hospital. *Finance and Accounting*(1), 57-61.
- Chukwu, K. O., Ubah, C. B., & Njideka, E. C. (2021). Electronic Payment System and Customer Satisfaction in Nigerian Banking System. *International Journal of Scientific and Management Research*, 4(05), 30-48.
- Dou, J. F., & Zhou, L. H. (2020). Closed-loop management application of "one-stop payment" in hospital diversified settlement *Chinese Journal of Health Economics*, 39(11), 69-72.
- LIU, K. (2015). Discussion on the challenges and countermeasures of Alipay mobile payment Business to hospitals from a financial perspective. *Chinese Journal of Health Economics*, 34(10), 77-78.
- Liu, L. L., Chen, X. L., & Li, H. N. (2022). Research hotspots in the field of electronic payment *Journal of Jilin University (Information Science Edition)*, 40(6), 1045-1049.
- Liu, Y. (2022). Problems and improvement measures of cash management in A hospital. *Finance and Accounting*(2), 83-84.
- Precision, & Hu, B. (2020). Design and application of unified payment and settlement platform in large class iii Grade A hospitals *China Medical Equipment*, 35(3), 109-111.
- Rakhmad, A. A. N. R. N., Kurniawan, D. T. K., & Kusnayain, Y. I. (2021). Transformation electronic payment system as predictor on financial satisfaction. *International Journal of Research in Business and Social Science (2147-4478)*, 10(8), 250-256.
- Ranjan, P., Soman, S., Ateria, A. K., & Srivastava, P. K. (2018). *Streamlining payment workflows using a patient wallet for hospital information systems*. Paper presented at the 2018 IEEE 31st International Symposium on Computer-Based Medical Systems (CBMS).
- Ren, X. (2019). Design of intelligent management system for real-time financial settlement information of hospital specific patients. *Automation & Instrumentation*(1), 106-109.
- Ren, Y. (2023). Design of hospital financial settlement automatic audit system based on ERP system. *Automation Technology and Application*, 42(4), 134-136.
- Shi, J. (2020). Challenges and countermeasures of electronic payment to hospital financial management *Economic Research Guide*(28), :79-80.
- Sun, J. (2018). Research on innovation of hospital financial settlement management based on informatization. *Economic Research Guide*(27), 120-121.
- Wang, B. (2021). Application of mobile payment technology to help hospital smart financial settlement. *China Digital Medicine*, 16(7), 78-81.
- Wang, Q., Li, Y., & Wang, W. (2020). Design and application of hospital charge

- management system based on mobile payment mode *China Medical Equipment*, 37(1), 51-55.
- Wang, Y., Wang, J., & Shi, Q. (2020). Research on self-service checkout process of public hospital discharge. *Health Economics Research*, 37(6), 49-50.
- Yang, Y., Zhu, Z., & Jiang, Y. Q. (2021). Current status of inpatient service time and patient satisfaction in a tertiary public hospital. *Chinese Journal of Hospital Management*, 41(1), 63-66.
- Zhao, Y., Li, J., & Miao, S. (2021). Discussion on the Development optimization countermeasures of railway electronic payment. *Railway Transportation and Economy*, 43(6), 63-68.
- Zheng, X. (2019). Design of hospital financial internal control management under multiple payment modes of inpatient settlement. *China Health Economics*, 38(3), 89-90.