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Benefit Analysis and Discussion of the Same Disease in Different Departments of Public Hospitals under the DIP Payment Method

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Abstract: *Objective:* This study aims to explore the benefit analysis of the same disease in different departments of public hospitals under the DIP payment method. *Methods:* This study is a retrospective analysis that selected clinical data from patients who received treatment in the Department of Orthopedics and the Department of Acupuncture and Moxibustion at our hospital from January 1, 2023, to December 31, 2023. The study compared the costs of medications, examinations, treatments, laboratory tests, nursing and other expenses, and total treatment costs between the two departments. It analyzed the cost structure of the two departments and proposed further improvement suggestions. *Results:* The study results indicated that the total costs in the Department of Acupuncture and Moxibustion were significantly higher than those in the Department of Orthopedics. Among medication costs, the total medication costs in the Department of Orthopedics were higher than those in the Department of Acupuncture and Moxibustion, with costs for Western medicine, proprietary Chinese medicine, and herbal medicine all being higher ($p < 0.05$). Regarding examination costs, consultation fees in the Department of Orthopedics were lower than those in the Department of Acupuncture and Moxibustion, while examination costs were higher ($p < 0.05$). In terms of treatment costs, orthopedic treatment and surgical fees were higher than those in the Department of Acupuncture and Moxibustion ($p < 0.05$). For laboratory test costs, orthopedic laboratory fees were significantly higher than those in the Department of Acupuncture and Moxibustion ($p < 0.05$). Among nursing and other expenses, orthopedic blood transfusion, bed fees, and other expenses were higher than those in the Department of Acupuncture and Moxibustion, while nursing fees were lower ($p < 0.05$). *Conclusion:* Treatment fees in the Department of Acupuncture and Moxibustion are the core and account for a relatively high proportion of the total costs. The benefits generated by the Department of Orthopedics are primarily derived from medication, examination, and laboratory fees, aligning with the characteristics of combining diagnosis, medication, and surgical intervention in orthopedic treatment. Consultation fees, nursing fees, and bed fees in the Department of Acupuncture and Moxibustion are higher than those in the Department of Orthopedics, indicating a longer treatment cycle in acupuncture, which warrants clinical attention.

Keywords: DIP payment method; Public hospitals; The same disease; Different departments; Benefit analysis; Application

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1. Introduction

With the deepening reform of China's medical security system, the medical insurance payment method is undergoing a transformation from traditional project-based payment to Diagnosis-Intervention Packet (DIP) payment [1]. The DIP payment model centers on disease diagnosis and treatment methods, constructing a disease score system through big data technology [2]. It links the allocation of medical insurance funds to the actual service volume provided by medical institutions, achieving refined management characterized by total budget control, point-based allocation, surplus retention, and overspending sharing. This reform aims to curb unreasonable growth in medical expenses, optimize the allocation of medical resources, and enhance the efficiency of medical insurance fund utilization, posing a core challenge to the operational management of public hospitals. Data statistics indicate that over 90% of the coordinated regions nationwide have fully implemented DIP payment, covering more than 80% of inpatient cases [3]. Against this backdrop, public hospitals face dual pressures. On the one hand, they must adapt to the changes in medical insurance payment rules by achieving cost control and efficiency improvements to retain surpluses [4].

On the other hand, they must maintain medical quality and patient satisfaction, avoiding service degradation due to excessive cost control. Under the DIP payment model, there are also certain differences in the diagnosis and treatment of the same disease across different departments. Based on this, this study employs a retrospective analysis approach to examine the clinical data of patients treated in the Orthopedics and Acupuncture Departments of our hospital from January 1, 2023, to December 31, 2023. It explores the benefit analysis of the same disease across different departments in public hospitals under the DIP payment method, with a detailed report presented as follows.

2. Materials and methods

2.1. General information

This study adopts a retrospective research approach to analyze the clinical data of patients treated in the Orthopedics and Acupuncture Departments of our hospital from January 1, 2023, to December 31, 2023.

2.1.1. Inclusion criteria

(1) Meet the disease coverage criteria specified in the DIP disease catalog
(2) Represent the same disease
(3) Exhibit homogeneity in clinical pathways
(4) Possess complete clinical data
(5) Have completed medical insurance settlement and payment

2.1.2. Exclusion criteria

(1) Present complex complications
(2) Involve special treatment methods
(3) Are transfer cases
(4) Belong to departments with abnormal cost data
(5) Have missing key data
(6) Are extreme value cases

2.2. Methodology

Under the Diagnosis-Intervention Packet (DIP) payment system, a detailed analysis was conducted on the economic benefits of the same medical condition across different departments. The medical condition selected for this study was lumbar disc herniation, with the specific application methods as follows.

(1) Data collection and organization

DIP settlement data was obtained from the hospital's medical insurance department for each department, including disease score, medical insurance settlement amount, actual cost, etc. The actual costs of different departments were organized, including expenses for medications, examinations, treatments, laboratory tests, nursing, and other fees.

(2) Economic benefit analysis

Calculating the medical insurance settlement amount, actual cost, and surplus rate for the treatment of lumbar disc herniation in each department.

(3) Problem identification

Based on the analysis results, identifying issues related to economic benefits in each department.

(4) Strategy formulation

Developing improvement strategies for the identified issues.

2.3. Observation indicators

For patients admitted to the acupuncture and orthopedics departments of our hospital diagnosed with lumbar disc herniation, direct records were kept of their expenses for medications, examinations, treatments, laboratory tests, nursing, and other fees, as detailed below.

(1) Medication expenses include costs for Western medicines, Chinese patent medicines, and herbal medicines.

(2) Examination expenses include consultation fees and examination costs.

(3) Treatment expenses include costs for treatments and surgical procedures.

(4) Laboratory test expenses refer to the costs for laboratory tests.

(5) Nursing and other expenses include costs for blood transfusions, bed fees, nursing fees, and other miscellaneous expenses.

2.4. Statistical methods

Data statistics for this study were conducted using the statistical software SPSS 23.00 for data comparison. Measurement data were expressed as (mean ± standard deviation) and subjected to a *t*-test, while count data were expressed as n (%) and subjected to a chi-square test. A *p*-value less than 0.05 was considered statistically significant.

3. Results

3.1. Comparison of drug costs across different departments

A comparison of drug costs revealed that the orthopedic department had higher costs for Western medicine, Chinese patent medicine, Chinese herbal medicine, and total drug expenses compared to the acupuncture

department. These differences were statistically significant ($p < 0.05$), as detailed in **Table 1**.

Table 1. Comparison of drug costs across different departments

Department	Total medication cost (¥)	Western medicine cost (¥)	Chinese patent medicine cost (¥)	Chinese herbal medicine cost (¥)
Orthopedics	2,350.27	1,373.42	411.10	565.75
Acupuncture	262.27	25.28	30.34	206.64
t-value	1476.44	1346.46	1846.96	615.87
p-value	< 0.001	< 0.001	< 0.001	< 0.001

3.2. Comparison of examination costs across different departments

The research findings indicate that the orthopedic department had lower consultation fees but higher examination costs compared to the acupuncture department. These differences were statistically significant ($p < 0.05$), as shown in **Table 2**.

Table 2. Comparison of examination costs across different departments

Department	Consultation cost (¥)	Examination cost (¥)
Orthopedics	182.74	1003.69
Acupuncture	322.63	379.98
t-value	239.91	620.615
p-value	< 0.001	< 0.001

3.3. Comparison of treatment costs across different departments

According to the research results, the orthopedic department had significantly lower treatment costs but slightly higher surgical costs compared to the acupuncture department. These differences were statistically significant ($p < 0.05$), as presented in **Table 3**.

Table 3. Comparison of treatment costs across different departments

Department	Treatment cost (¥)	Surgery cost (¥)
Orthopedics	1,898.39	15.46
Acupuncture	7,126.03	11.05
t-value	1653.12	122.311
p-value	< 0.001	< 0.001

3.4. Comparison of laboratory test costs across different departments

The study results demonstrate that the orthopedic department had significantly higher laboratory test costs compared to the acupuncture department ($p < 0.05$), with statistical significance in the data comparison, as detailed in **Table 4**.

Table 4. Comparison of laboratory test costs across different departments

Department	Laboratory test cost (¥)
Orthopedics	914.54
Acupuncture	257.41
t-value	587.75
p-value	< 0.001

3.5. Comparison of nursing and other costs across different departments

The research findings show that the orthopedic department had significantly lower bed and nursing costs but higher other costs compared to the acupuncture department ($p < 0.05$), with statistical significance in the data comparison, as shown in **Table 5**.

Table 5. Comparison of nursing and other costs across different departments

Department	Bed cost (¥)	Nursing cost (¥)	Other costs (¥)
Orthopedics	284.76	246.81	108.53
Acupuncture	356.20	428.16	37.17
t-value	198.139	345.44	319.13
p-value	< 0.001	< 0.001	< 0.001

4. Discussion

Under the Diagnosis-Intervention Packet (DIP) payment model, the revenue structure of public hospitals undergoes fundamental changes. Medical insurance payments are no longer directly linked to project costs but are instead related to disease scores, treatment difficulty, and resource consumption intensity [5]. This places higher demands on hospitals, requiring them to focus on cost-effective diseases and reduce the admission rate for inefficient diseases.

Standardized clinical pathways can effectively reduce actual costs. Ensuring accurate coding of diagnoses and surgical procedures is crucial to prevent payment deviations caused by coding errors [6]. However, public hospitals currently face widespread issues such as scattered disease types, imbalanced treatment efficiency across departments, and inadequate cost control, which directly impact disease-related benefits. Significant differences may exist in treatment approaches, resource consumption, and clinical pathways for the same disease across different departments. Studies have indicated that diseases requiring surgical procedures tend to have higher scores, highlighting the need to guard against payment downgrades caused by mismatches between primary diagnoses and surgical procedures [7].

For internal medicine, the focus is primarily on drug treatment and chronic disease management. While existing research often examines the impact of DIP payment on overall hospital benefits or compares benefits across different diseases, there is a lack of analysis on the benefits of the same disease across different departments [8]. Analyzing disease-related benefits across departments can optimize the allocation of regional medical insurance budgets, prevent funds from being allocated to inefficient departments, and ensure that medical insurance funds are used for high-value medical services.

In the analysis of this study, treatment costs for patients in the acupuncture department were significantly higher than those in the orthopedics department, with statistical significance ($p < 0.05$). The reasons for this are as follows: orthopedics primarily involves surgical procedures, with resource consumption concentrated on consumables and disposable equipment, the costs of which can be reduced through centralized procurement. In contrast, acupuncture focuses on long-term traditional Chinese medicine treatments, relying heavily on human resources and time, resulting in higher treatment costs [9]. In the comparison of drug costs, the acupuncture department had significantly lower drug costs than the orthopedics department, with statistical significance ($p < 0.05$). The reasons for this are that orthopedics primarily deals with single diseases with clear treatment pathways, making resource consumption easily standardizable. The proportion of drug costs may appear relatively reasonable due to higher costs associated with consumables and surgical procedures, but overall cost controllability is stronger. Furthermore, for rare or highly complex combined disease conditions, the adjustment coefficient for DIP scores may not accurately reflect the true costs, leading to a situation where the acupuncture department experiences low drug expenses but overall losses, while the orthopedics department can partially compensate for insufficient scores through surgical grading management. Examination costs in the acupuncture department are significantly lower than those in the orthopedics department ($p < 0.05$).

Analyzing the reasons, the acupuncture department often admits patients with complex disease conditions, necessitating comprehensive evaluations through multiple examinations. In contrast, the orthopedics department primarily treats single diseases with relatively fixed examination items, focusing on surgeries. Examination costs are concentrated on preoperative assessments and postoperative follow-ups. These examination items are well-defined, with controllable costs, albeit relatively high. Bed and nursing fees in the acupuncture department are higher than those in the orthopedics department ($p < 0.05$).

Analyzing the reasons, the acupuncture department primarily relies on long-term acupuncture and physical therapy, which are dependent on the technical expertise and multiple consultations of physicians. Patients require acupuncture three times a week for four weeks, resulting in high labor and time costs. Although bed and nursing fees are calculated on a daily basis, the cumulative costs are higher than those in the orthopedics department due to the prolonged treatment period. Additionally, acupuncture treatment often requires supplementary therapies such as "Tuina" (Chinese therapeutic massage) and cupping, further driving up nursing costs. The orthopedics department primarily focuses on surgical procedures, with short surgical cycles and lower cumulative bed and nursing fees. Although postoperative rehabilitation requires some nursing care, the overall cost proportion is significantly lower than that in the acupuncture department.

5. Conclusion

In summary, in the current context of the widespread implementation of the DIP payment model, conducting an in-depth analysis of the profitability of the same disease condition across different departments in public hospitals holds immense practical significance. This not only pertains to the hospital's own operational management and sustainable development but also has far-reaching implications for enhancing the efficiency of medical resource utilization, safeguarding patient rights, and promoting the fairness and efficiency of the healthcare insurance system. Clinically, this warrants significant attention.

Disclosure statement

The authors declare no conflict of interest.

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