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A calculation of capitation-based payment standardto chronic disease cases in primary care settings☆

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ABSTRACT

Background: Outpatient medical care payment play a pivotal role in the reform of medical insurance payment methods. With ongoing reforms in China, a variety of payment strategies, including capitation and the ambulatory patient groups (APG) point method, are being progressively implemented.
Objective: This study aims to identify appropriate capitation calculation methods for chronic diseases in Beijing and to provide recommendations for implementing capitation payments reforms in the city.
Methods: We focused on four prevalent chronic diseases—hypertension, diabetes, coronary heart disease, and stroke—and analyzed basic medical data and public health funding in Beijing's districts C and H as case studies. This research was aimed at developing a capitation calculation method tailored to these locales, determining payment standards for major chronic diseases in primary care clinics, and thus supporting the advancement of capitation reform for outpatient chronic diseases.
Results: Using medical insurance data and public health funding data from 2017 to 2019, a top-down allocation was employed to determine the capitation payment standards in district H: 4,693.11 Yuan for hypertension, 6,597.70 Yuan for diabetes, 5,644.46 Yuan for coronary heart disease, and 6,437.78 Yuan for stroke. A bottom-up costing approach was used in district C, resulting in payment standards of 4,884.18 Yuan for hypertension, 5,960.63 Yuan for diabetes, 3,733.93 Yuan for coronary heart disease, and 3,886.66 Yuan for stroke.
Conclusion: The outpatient costs associated with different chronic disease populations vary considerably. In view of maintaining equity in medical insurance and the fairness of capitation fees, it is imperative to apply risk adjustments to the benchmark capitation fee. Personalized services should be tailored to the diverse types and severities of chronic diseases. It is also crucial to provide customized basic medical and public health services to various chronic disease patients as part of the capitation payment reform for outpatient services. Additionally, enhancing the capabilities of community health services in managing chronic diseases, improving contracting percentages, and establishing effective incentive and evaluation mechanisms for general practitioners are essential for equitable distribution of surplus from capitation payments.

Introduction

Under the "Healthy China 2030"strategy, the medical model in China is transitioning from a "disease-centered" approach to "health-centered" one, prompting a parallel shift in the healthcare insurance model from the type of "disease economic security" to that of "health management". In 2017, the General Office of the State Council in China issued the "Guidance on Further Deepening the Reform of Payment Methods for Basic Medical Insurance" (State Office Issue [2017] No. 55), advocating for the implementation of capitation payments for primary care and encouraging the integration of these payments with chronic disease management. In July 2019, the State Council of China released the "Opinions on Implementing the Healthy China Action" (State Issue [2019] No. 13) along with the "Healthy China Action (2019—2030)," highlighting the vital importance of chronic disease prevention and control. These documents also called for reforms in the medical insurance payment methods

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for chronic diseases and enhancements to the medical insurance support system.[1] In February 2020, the Central Committee of the Communist Party of China and the State Council in China issued the "Opinions on Deepening the Reform of the Medical Security System," which proposed the creation of an effective and efficient medical insurance payment mechanism and promoted capitation payments for outpatient medical care targeting specific chronic diseases. Chronic diseases are a significant public health challenge affecting national economic and social development. Reforming the capitation payment for chronic diseases is essential to advancing the Healthy China strategy and represents a necessary trend in the evolution of medical insurance payment methods in China.

The existing chronic disease medical insurance system in China primarily offers retrospective compensation for patient expenses, playing only a passive role in bill payment and risk control.[2] An imperfect medical insurance system has led to increased escalating costs for chronic disease coverage, exerting significant pressure on the basic medical insurance fund. Additionally, a medical model that prioritizes treatment over prevention has resulted in a lack of emphasis on health management and chronic disease prevention, poor patient compliance, and an increase in the prevalence of chronic diseases. The capitation payment is a prepaid system in which the medical insurance sector calculates a standard payment based on the population served by a medical institution and determines the total funds allocated based on the institution's revenue and expenditure. This method involves making advance payments to medical institutions for medical expenses on a regular basis, operating under a model of "annual prepayment, year-end assessment, surplus rewards, and cost-sharing for overspending." [3] This payment approach not only assists medical institutions in controlling medical expenses but also supports the development of a health-oriented medical model. It motivates healthcare professionals to provide high-quality chronic disease management services to insured individuals, thus effectively controlling chronic diseases and promoting health.[4]

Many countries have adopted capitation payment to control rising healthcare costs. For example, this payment method is used in the gatekeeper system of family doctors in the UK[5], within the "managed care" approach under the Health Maintenance Organization (HMO) model in the United States[6], and as part of the "30 Baht Scheme" in Thailand.[7] Some regions in China are also beginning to explore chronic disease management and medical insurance payment methods. For instance, Tianjin has implemented a capitation payment method for special outpatient chronic diseases[8]; Zhenjiang is exploring a multi-component chronic disease medical insurance payment method[9]; Changde is coordinating a first-visit system with capitation payment[10]; and Jinhua in Zhejiang Province has implemented a medical insurance outpatient capitation payment combined with the ambulatory patient groups (APGs) point method.[11] All practices of capitation payment for chronic diseases provide references for this study. This research will analyze medical care and medical insurance data along with essential public health service funding in two districts of Beijing to calculate capitation payment standards for major chronic diseases in outpatient clinics, providing policy recommendations for advancing capitation payment reform for outpatient chronic disease .

Methods

Selection of sites

Research indicates that there are differences in disease characteristics and healthcare-seeking behaviors between chronic disease patients in suburban and urban areas.[12] Therefore, this study selected one district each from the urban and suburban areas of Beijing as study sites, choosing District C for the urban area and District H for the suburban area. Both districts have recently undertaken extensive explorations and practices in chronic disease prevention and treatment and have comprehensive medical insurance data related to chronic diseases. In 2011, District C was accredited as one of the first 39 comprehensive chronic disease prevention and control demonstration zones in China. During its establishment as a demonstration zone, District C implemented several chronic disease prevention and control measures: it established organizational and financial safeguards; conducted community diagnoses and various chronic disease monitoring activities; carried out health education and health promotion activities; initiated high-risk population discovery and intervention activities using "blood pressure measurement for people over 35 at first visit" and "family doctor-style services" as entry points; and managed patients using hypertension, diabetes, and body mass self-management groups as entry points.[13] District H was designated as "Beijing Municipal Comprehensive Chronic Disease Prevention and Control Demonstration Zone" in 2013 and "National Chronic Disease Comprehensive Prevention and Control Demonstration Zone" in 2017. Taking advantage of the establishment of a national-level demonstration zone, significant explorations in comprehensive chronic disease prevention and control were performed in District H. These included: (1) The government forming a leadership group for the demonstration zone's development, establishing a multi-departmental collaborative mechanism, integrating chronic disease prevention and control into the economic and social development planning, and incorporating these initiatives into the policy and regulatory frameworks, thereby setting up effective performance management and evaluation systems. (2) Under the direction of the District Health Commission, a comprehensive chronic disease prevention and control system was established. This system was led by the Community Management Center of the District Health Commission, the Chronic Disease Department of the District Disease Control and Prevention Center, and three secondary hospitals. It included 16 community health centers serving as the links, with community health stations or village clinics acting as the foundational network, thereby ensuring a coordinated approach that combines prevention and treatment from top to bottom.[14] (3) Community health centers and village clinics provided integrated services centered on health records, offering prevention, health care, health education, chronic disease management, rehabilitation, and medical care. They also conducted inspections, guidance, and evaluations for managing and following up with local populations affected by hypertension, diabetes, and other chronic diseases.

Selection of diseases for study

Based on the current requirements for chronic disease management in China and Beijing, this study primarily selected four major chronic diseases as the focus: hypertension, diabetes, coronary heart disease, and stroke.

Data required for the study

The research team collected data from the health insurance centers, community health management centers, and several community health centers in Districts C and H. The data included incidence rates, health expenditures, average compensation costs, and individual out-of-pocket expenses for hypertension, diabetes, coronary heart disease, and stroke from 2017 to 2019. This information will facilitate the calculation of capitation fees for chronic diseases.

Calculation method for basic medical care

Regarding the calculation of the total outpatient pooling funds and the benchmark capitation fee, the World Bank recommends two methods in its report: the bottom-up costing method and the top-down allocation method. The bottom-up costing method estimates the total funds required for outpatient pooling and the benchmark capitation fee by estimating individual health service expenditures. Conversely, the top-down allocation method extracts a portion from the total medical insurance funds based on a predetermined proportion, then calculates the

amount allocated to each insured individual based on the total number of insured persons (i.e., the benchmark capitation fee).[15]

This study uses the bottom-up costing approach to calculate the benchmark rate by capitation for basic medical care for chronic diseases in District C, based on the medical insurance data for chronic disease outpatient services.

(1) Calculating the average cost per person based on past data, followed by calculating the three-year average cost per person using the formula: average cost per person= $(X_{n-2} + X_{n-1} + X)/3$ (Equation 1), where X represents the average cost per person for a specific chronic disease over the past three years, and n represents the year, with X_n, X_{n-1}, X_{n-2} indicating the per-person costs for the past three years.[16] (2) Calculating the benchmark capitation fee: M = X - D (Equation 2), where X represents the average cost per person for a chronic disease over the past three years, M represents the benchmark capitation fee, and D represents the average out-of-pocket amount per person.[17]

For District H, the top-down allocation approach was employed to calculate the benchmark rate for basic medical care for chronic diseases based on relevant medical insurance data for chronic disease outpatient services. (1) Determining the total medical insurance fund: Total Medical Insurance Fund = Total Cost×Reimbursement Ratio×(1 + Growth Rate) (Equation 3). (2) Calculating the benchmark capitation fee: Benchmark Capitation Fee= Total Medical Insurance Fund/Number of Specific Chronic Disease Patients(Equation 4); Number of Visitors = Number of visits/Average number of visits per person (Equation 5).

What is included in the basic public health service fee and how it is withdrawn

The goal of capitation payments for chronic diseases is to transition the focus of primary care providers from mere disease treatment to comprehensive disease management, aiming to enhance the overall health of the population. Under the traditional disease treatment model, the medical services utilized by chronic disease patients in primary care primarily involve purchasing medications. However, in the health-oriented disease management model, the services currently provided by primary care facilities are insufficient to meet the needs of chronic disease patients. Primary care facilities should extend beyond delivering medical services to offering health education, health examinations, and health monitoring as integral components of health management services.

Based on preliminary field research, services related to chronic disease health management are included in the national basic public health projects. Therefore, when calculating the capitation payment standards for chronic diseases, it is important to consider the costs incorporated within the basic public health service projects for chronic disease management. This includes the current compensation services for key populations (chronic disease patients) under the family doctor contract services in Beijing.

Additionally, to promote early detection of chronic diseases and timely intervention, the costs of regular laboratory tests for different chronic diseases should also be included. This study determines the necessary laboratory test costs for various chronic diseases based on prevention and treatment guidelines for these conditions. The cost standards for each test are referenced from the medical service price standards available on the official website of the Beijing Medical Insurance Bureau. Regular laboratory tests for chronic disease patients should be included in the chronic disease health management projects within the basic public health services.

Calculation of capitation payment standard

In summary, the capitation payment standard for chronic diseases should encompass the sum of several key components: the benchmark fee for basic medical care, the funds allocated for chronic disease management within basic public health service projects, the fees associated with family doctor contract services, and the costs of regular laboratory tests for chronic disease patients. The formula for calculating capitation payment standard for chronic diseases is as follows: Capitation Payment Standard for Chronic Disease= Benchmark Capitation Fee for Basic Medical Care + Related Funds for Chronic Disease Management in Basic Public Health Service Projects + Family Doctor Contract Service Fees + Regular Laboratory Test Fee for Chronic Disease Patients (Equation 6).

Results

Calculation of capitation benchmark fee for basic medical care in district C

District C is located in the central-southern part of the main urban area of Beijing and has a permanent population of 3.45 million. Of this population, 49.4% are male and 50.6% are female. Individuals aged 60 years and older constitute 20.5% of the total population. In 2014, the prevalence of diabetes among residents aged 18 and older in District C was 14.9%, and the prevalence of hypertension was 37.2%.[18] In 2019, the distribution of chronic disease patients across various age groups served by the community health centers in District C is depicted in Fig. 1. The results show that the 60–74 age group had the highest proportion of chronic disease patients, followed by the 45–59 and 75–89 age groups.

Based on Equation (1), the average outpatient costs in District C over the past three years were calculated as follows: hypertension, 3253.94 Yuan; diabetes, 4008.04 Yuan; coronary heart disease, 1420.13 Yuan; and stroke, 1397.76 Yuan (Table 1). The average outpatient fee for hypertension, diabetes, coronary heart disease, and stroke from 2017 to 2019 are shown in Table 2. Using Equation (2), the capitation benchmark fee in District C were calculated as follows: hypertension, 2559.18 Yuan; diabetes, 3227.63 Yuan; coronary heart disease, 1139.93 Yuan; and stroke, 1147.66 Yuan.

Calculation of capitation benchmark fee in district H

District H is located in the far northeastern suburbs of Beijing. The population is composed of 53.3% males and 46.7% females; individuals aged 60 years and older constitute 19.5% of the total population. According to a survey conducted in 2016, the prevalence rates of the four main chronic diseases among adult residents in District H, in descending order, are hypertension, diabetes, coronary heart disease, and stroke, with respective rates of 49.19% (standardized rate of 31.57%), 17.12% (standardized rate of 12.32%), 9.10% (standardized rate of 5.94%), and 5.93% (standardized rate of 3.58%).[19] In June 2015, the State Council Information Office in China released the "Report on Nutrition and Chronic Diseases of Chinese Residents (2015)", which indicated that the national prevalence rates of hypertension and diabetes among adults aged 18 and above were 25.2% and 9.7%, respectively.[20] The prevalence rates of hypertension and diabetes among residents aged 18 and above in District H are higher than the national levels in China, underscoring the urgency of enhancing chronic disease prevention and management in the district.

In 2020, the total costs incurred at a community health center in District H for hypertension, diabetes, coronary heart disease, and stroke were 8849,444.15 Yuan, 9618,573.61 Yuan, 587,316.93 Yuan, and 471,317.42 Yuan, respectively. According to data from the District H Medical Insurance Center, the growth rate of outpatient costs at community health centers in 2019 was 8%, and the outpatient medical insurance reimbursement rate for Beijing's community health centers in 2021 was 90%. Using Equation (3), the projected total medical insurance fund amounts for hypertension, diabetes, coronary heart disease, and stroke in 2021 were calculated as 8601,659.71 Yuan, 9349,253.55 Yuan, 570,872.06 Yuan, and 458,120.53 Yuan, respectively.

Typically, patients with chronic diseases visit community health centers monthly to obtain prescriptions. However, in 2020, due to the COVID-19 pandemic, Beijing introduced long-term prescription services

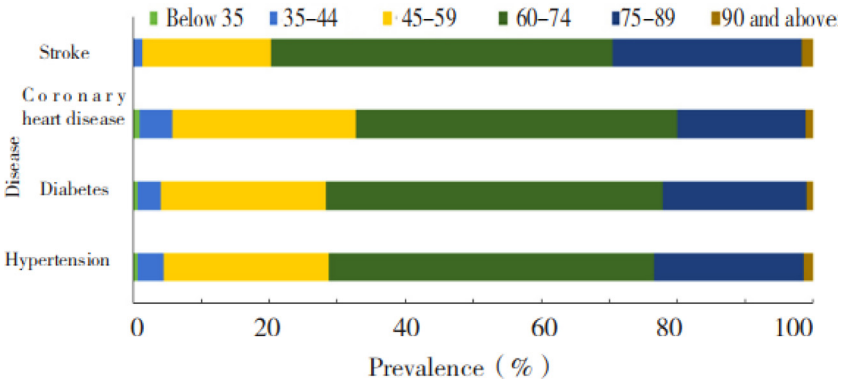

Fig. 1. Composition of patients with stroke, coronary heart disease, diabetes or hypertension in C district by age group in 2019.

Table 1
Per capita cost for outpatient services for hypertension, diabetes, coronary heart disease and stroke in District C from 2017 to 2019.

Year	Hypertension	Hypertension	Coronary heart disease	Stroke
2017	2 804.11	3 301.75	953.73	1 077.98
2018	3 476.56	4 213.21	1 533.69	1 342.18
2019	3 481.15	4 509.17	1 772.97	1 773.11
Annual per capita incurred costs	3 253.94	4 008.04	1 420.13	1 397.76

Table 2
Out-of-pocket payment per capita for hypertension, diabetes, coronary heart disease and stroke in District C from 2017 to 2019.

Year	Hypertension	Hypertension	Coronary heart disease	Stroke
2017	568.55	600.15	166.47	185.64
2018	725.74	816.15	298.13	248.33
2019	790.01	924.94	375.99	316.33
Out-of-pocket expenses per capita	694.77	780.41	280.20	250.10

Table 3
Benchmark capitation for hypertension, diabetes, coronary heart disease and stroke in District H.

Item	Hypertension	Hypertension	Coronary heart disease	Stroke
Total amount of medical insurance fund (yuan)	8 601 659.71	9 349 253.55	570 872.06	458 120.53
Number of person-times (person-times)	25 426	16 934	1 310	867
Number of patients (persons)	3 632.29	2 419.14	187.14	123.86
Benchmark capitation(yuan)	2 368.11	3 864.70	3 050.46	3 698.78

for chronic diseases. In February 2020, the National Medical Insurance Administration issued a notice allowing patients with stable conditions who require long-term medication for diseases such as hypertension, diabetes, coronary heart disease, cerebrovascular disease, and chronic obstructive pulmonary disease, to receive prescriptions for up to 12 weeks at a time. The average number of visits in 2020 was estimated to be 7 times. Using Equation (4) and the top-down method, the capitation benchmark fee for hypertension, diabetes, coronary heart disease, and stroke in District H were calculated to be 2368.11 Yuan, 3864.70 Yuan, 3050.46 Yuan, and 3698.78 Yuan, respectively, as shown in Table 3.

Basic public health funding

Since 2014, funding for basic public health services in China has increased annually, with capitation fee rising from 35 Yuan per person in 2014 to 79 Yuan per person in 2021. The range of services provided has also expanded to become increasingly comprehensive. Currently, basic public health services in China encompass 14 components, which include critical elements that should be covered under the capitation payment for chronic diseases, such as health record management, health education, health examinations, and chronic disease health management.

In 2019, the Beijing Municipal Human Resources and Social Security Bureau, the Beijing Municipal Finance Bureau, and the Beijing Municipal Health Commission jointly issued the "Notice on Improving the Performance Wage Policy of Primary Care Facilities to Ensure the Work of Family Doctor Contract Services." This notice categorized the residents contracting with family doctors into key populations and general populations. Key populations include children, pregnant women, individuals aged 65 and above, chronic disease patients, and patients with severe mental illnesses. The contract service fee for key populations in 2019 was set at 70 Yuan per person per year.

According to the "National Primary Care Hypertension Prevention and Management Guidelines 2020 Edition"[21], it is recommended that all hypertension patients undergo 1–2 assessments per year, with necessary laboratory tests including routine blood test (15 Yuan), routine urine test (35 Yuan), three biochemical indexes (12 Yuan), and dynamic electrocardiogram (200 Yuan). If feasible, additional tests can be performed, such as ambulatory blood pressure monitoring (150 Yuan), echocardiography (300 Yuan), carotid ultrasound (220 Yuan), urine al-

bumin/creatinine ratio (100 Yuan), X-ray chest (140 Yuan), and fundus examination (6 Yuan). Calculating for two hypertension assessments per year, the annual laboratory test costs for a hypertension patient amount to 2176 Yuan.

According to the "National Primary Care Diabetes Prevention and Management Guidelines (2018)," [22] it is recommended that diabetes patients check their fasting blood glucose and 2 h postprandial blood glucose at least once a week (6 Yuan), and glycosylated hemoglobin every three months (80 Yuan). For diabetic nephropathy, primary care facilities should conduct at least one annual screening for kidney disease in all diabetes patients, which includes routine urine test (35 Yuan) and serum creatinine testing (20 Yuan). Additionally, if feasible, urinary albumin creatinine ratio (UACR) testing (100 Yuan) is advised. For retinopathy, diabetic patients should have a fundus examination every six months (6 Yuan), including fundus fluorescein angiography (400 Yuan) and color Doppler ultrasonography (40 Yuan). For vascular complications, it is suggested to perform an annual vascular ultrasound, which includes carotid ultrasound (380 Yuan), duplex ultrasound of the lower extremity arteries (290 Yuan), head CT (400 Yuan), and abdominal ultrasound (140 Yuan), with a cardiac CT every four years (300 Yuan). The total annual cost for these comprehensive tests for a diabetic patient amounts to 2584 Yuan.

The "Guidelines for Primary Care and Treatment of Stable Coronary Heart Disease (2020)" [23] recommend that patients with stable coronary heart disease be re-examined every 3 to 6 months. The suggested regular laboratory tests include a routine urine test (15 Yuan), thyroid function tests (180 Yuan), electrocardiogram (200 Yuan), chest X-ray (120 Yuan), and echocardiogram (300 Yuan). If re-examined every 4 months, the annual laboratory test costs for a coronary heart disease patient amount to 2445 Yuan.

The "Chinese Guidelines for Diagnosis and Treatment of Acute Ischemic Stroke 2018″[24] advise that patients with stable post-stroke sequelae undergo biannual tests, including routine blood test (15 Yuan), four-Item blood lipids (60 Yuan), liver function(220 Yuan), carotid duplex ultrasound (300 Yuan), and brain MRI (700 Yuan). The total annual laboratory test costs for a stroke patient are 2590 Yuan.

Capitation benchmark fee in districts c and H

Using Equation (6), the capitation benchmark fee for hypertension, diabetes, coronary heart disease, and stroke in District H were calculated as 4693.11 Yuan, 6597.70 Yuan, 5644.46 Yuan, and 6437.78 Yuan per person, respectively; in District C, the costs were 4884.18 Yuan, 5960.63 Yuan, 3733.93 Yuan, and 3886.66 Yuan per person, respectively.

Discussion

Comparison of capitation benchmark fee for four chronic diseases

The results of this study indicate that the capitation benchmark fee for diabetes and hypertension are not significantly different between District H and District C. However, the costs for coronary heart disease and stroke are substantially higher in District H than in District C. This discrepancy may be attributed to the fact that patients with hypertension and diabetes are more likely to visit community health centers, whereas those suffering from coronary heart disease and stroke tend to seek care at secondary and tertiary hospitals. District H is an outer suburban area of Beijing with relatively fewer medical resources, whereas District C is located in the urban area with relatively abundant medical resources, including numerous secondary and tertiary hospitals. Consequently, patients with coronary heart disease and stroke in District C are more likely to opt for these higher-level hospitals for care, resulting in lower costs at community health centers. However, since the number of patients remains constant, this leads to lower calculated capitation benchmark fee in District C compared to District H. Research has shown that urban chronic disease patients are more inclined to seek treatment at higher-level hospitals, possibly because these urban patients typically have higher incomes and over half of them are covered by urban employee basic medical insurance or government-paid medical care. Consequently, the acceptance of community medical services among urban chronic disease patients is lower than that among suburban patients, leading to a reduced willingness for initial community consultations among urban patients compared to those in the suburbs.[17]

Factors influencing the calculation of capitation fee standards

The method used to calculate capitation fee directly impacts the capitation benchmark calculation. This study employed both bottom-up costing and top-down allocation approaches to calculate capitation fee in different regions, each with its advantages and disadvantages. The bottom-up costing approach calculates the total funds needed for outpatient pooling and the capitation benchmark fee by estimating individual health service expenditures. This method more closely aligns with actual health expenditures. However, actual individual health service expenditures might be less than what is genuinely needed by chronic disease patients, potentially due to weak health awareness among patients, limited medical resources in the area, or underdeveloped local economies.

Conversely, the top-down costing approach determines the total amount of funds first and then calculates the capitation benchmark fee based on the total number of insured persons. Implementing a capitation system often presupposes the use of the top-down allocation method to ensure that the calculated costs reflect overall funding needs rather than individual expenditure. Whether the total fund amount calculated is reasonable will affect the calculation of capitation payment standards for chronic diseases. The calculation of capitation benchmark fee in District H used the top-down allocation method because this district had implemented control over the total amount of basic medical insurance payments, making it relatively straightforward to determine the total amount of funds. Additionally, the costs of basic medical care for chronic diseases vary according to factors such as age, gender, and health status of different populations. Therefore, capitation fee can be risk-adjusted based on the health status of chronic disease patients, whether they have two or more chronic diseases, their location, and their historical medical expenses. Epidemiological evidence of the relationship between specific risk factors and the incidence and mortality rates of chronic diseases forms the basis for selecting risk factors for the chronic diseases studied. Risk adjustment for the capitation fee can be performed using regression models based on the risk level of different populations. AI et al. [15], in a study on risk-adjusted capitation payment standards calculation in Shenzhen, selected risk adjustment factors using two models. A logistic regression model was employed to identify factors affecting the outpatient visit rate of insured individuals during the coverage period, including gender, age, community health center location, and whether the individual had chronic or severe diseases. In the HMO model of the US, factors used for capitation payments include age, gender, systolic blood pressure levels, serum cholesterol levels, glucose tolerance levels, left ventricular hypertrophy, smoking status, interaction between gender and glucose tolerance, and interactions between age and cholesterol as indicators of an individual's health status.[25] In risk adjustment capitation calculations for chronic disease, the severity and comorbidity of chronic diseases should also be considered. Different degrees of disease incur significantly different costs, so chronic disease populations should be categorized by severity when defining service packages. The severity of chronic diseases varies, and thus the payment standards differ; however, it is challenging to define a standard for the severity of each patient's condition and data acquisition can be difficult. Additionally, when determining capitation payment packages, the issue of patients having multiple chronic diseases concurrently should be considered, and their capitation fee standards should be appropriately adjusted to ensure the fairness of medical insurance and avoid patients purchasing health services redundantly.

Recommendations

Provide Personalized Basic Medical and Public Health Service Packages for Different Chronic Disease Patients

The health service needs vary across different chronic disease populations; therefore, it is essential to design personalized service packages based on the type and severity of chronic diseases. For example, stroke patients vary in their prognoses and complications, necessitating different regular laboratory tests and treatment programs, which lead to significant cost differences. Consequently, personalized capitation payment service packages should be designed according to the type and severity of the chronic diseases, adjusting the payment capitation standards for different chronic diseases at the individual level.

Enhance the Chronic Disease Management and Service Capabilities of Community Health Centers to Improve Contracting Rates

Currently, the capabilities and service levels of most community health centers are inadequate and fail to meet patient needs[26], resulting in low patient trust. Patients often prefer to visit higher-level hospitals even for minor illnesses. The primary care first-visit system is foundational for implementing capitation payment and needs to integrate family doctor contract services with capitation payments effectively. Community family doctors, relying on primary care support and deep community engagement, can leverage their proximity to residents and their understanding of residents' health conditions. By providing proactive, continuous diagnostic and treatment services, as well as health management services, they can strengthen residents' trust in primary care. To improve contracting rates, it is crucial to establish a contractual service relationship between residents and primary care facilities, explore personalized contract service packages that meet residents' needs, satisfy their health requirements, and enhance their compliance with primary care facilities.

Establish Effective General Practitioner Incentive and Assessment Mechanisms to Appropriately Distribute Payment Surpluses

In 2019, the Beijing Municipal Health Commission issued the "Notice on Improving the Performance Wage Policy of Primary Care Facilities to Ensure the Work of Family Doctor Contract Services." This notice proposed establishing a growth mechanism for primary care performance wages, a reward mechanism for family doctor contract services, and the enhancement of tiered performance assessments to improve the capabilities and standards of community health services. Under the payment model of "annual prepayment, year-end assessment, surplus rewards, and cost-sharing for overspending," it is feasible to motivate primary care facilities to enhance the management of chronic disease patients, delay the onset and progression of their conditions, and ultimately conserve medical insurance funds and improve patient health levels. When primary care facilities effectively improve the health status of insured individuals, the demand for services decreases, resulting in a surplus in the capitation payment funds. Therefore, it is crucial to develop a comprehensive assessment method that aligns with the outpatient capitation payment system, establish an effective fund surplus distribution mechanism, and integrate family doctor services with payment contracting management. This integration will jointly promote the high-quality development of payment method reforms and family doctor contract services.

Conclusion

Implementing a capitation payment system for chronic diseases in primary care clinics can enhance the efficiency and quality of medical services while alleviating the financial burden on patients. This payment method encourages medical institutions to focus more on cost control and therapeutic effectiveness during service provision, thereby facilitating the rational allocation of medical resources. Additionally, it promotes competition among medical institutions, leading to improved levels of medical service. For chronic disease patients, the payment system can alleviate their financial burden when seeking treatment at primary care clinics. Patients only pay a fixed fee for visits, rather than for specific medical service items, which significantly reduces their economical burden. Meanwhile, healthy competition among medical institutions will encourage patients to choose contracting institutions that offer better medical services.

However, the implementation of the capitation payment system for chronic diseases at primary care clinics also faces certain challenges in China. First, the implementation of capitation payments requires the support of tiered medical treatment, primary care first-visit systems, and family doctor contract systems. The health management of chronic disease patients necessitates coordinated efforts between primary care facilities and higher-level hospitals, forming a complementary and interactive referral mechanism. Second, further refinement is needed in the regulatory and supervision mechanisms for chronic disease management in medical institutions to prevent a decline in service quality as a result of cost-cutting measures by medical facilities. Additionally, attention must be given to providing personalized services for patients with different chronic diseases to ensure that service package contents meet their individual needs.

Ethics approval and consent to participate

Not applicable.

Consent for publication

Not applicable.

Availability of data and materials

Not applicable.

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Declarations of competing interest

The authors declare that they have no competing interests.

Authors' contributions

Conceptualization, Y.J.; Methodology, Y.J.; Data curation, W.N.; Formal analysis, Z.N. and L.J.; Funding acquisition, not applicable; Project administration, not applicable; Resources, not applicable; Supervision, N.J.; Validation, N.J.; Writingoriginal draft, N.J.; Writingreview and editing, N.J. All authors have read and agreed to the published version of the manuscript.

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