# Post-print of a Study on Chronic Diseases and Symptoms of Unknown Etiology in General Practice Wards of Tertiary Grade A General Hospitals in Beijing

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## Abstract

Background Against the backdrop of the government' s high emphasis on the development of general practice, tertiary general hospitals have successively established departments of general practice. The disciplinary characteristics of general practice endow it with significant advantages in the admission and management of chronic diseases and symptoms of unknown etiology. However, the admission and management status of chronic diseases and symptoms of unknown etiology in general practice wards of general hospitals remains unclear. Objective To investigate the admission status of chronic diseases and symptoms of unknown etiology in general practice wards of tertiary Grade A general hospitals, analyze existing problems, and explore directions for continuously improving the quality and efficiency of general practice management. Methods Taking the general practice ward of Beijing Friendship Hospital, Capital Medical University as an example, clinical data of all inpatients since the establishment of the general practice ward (November 2019 to January 2024) were extracted through the electronic medical record system in February 2024, and a retrospective analysis was conducted on patients' general information, admission sources, admission diagnoses, inpatient diagnosis and treatment, discharge diagnoses, and outcomes. Results A total of 2,725 inpatient admissions were included, with ages ranging from 12 to 95 years and a mean age of (57.4$±$15.8) years. There were 1,400 admissions (51.38%) of patients aged $ $60 years, the median length of stay was 7 (5, 9) d, and the median hospitalization cost was 9,053.71 (6,551.53, 12,380.82) yuan. Patients were admitted from general practice outpatient clinics in 1,724 cases (63.27%), and transferred from emergency departments or specialties in 1,001 cases (36.73%). The top three diseases by proportion of admission diagnoses were acute pancreatitis (9.06%), abdominal

pain of unknown etiology (7.41%), and pneumonia (7.30%). Chronic diseases were present in 1,899 admissions (69.69%), multimorbidity in 1,085 admissions (39.81%), and polypharmacy in 1,016 admissions (37.18%). At admission, the diagnosis was clear in 1,658 admissions (60.84%), while 1,067 admissions (39.16%) presented with symptoms of unknown etiology. The top three symptoms of unknown etiology by proportion of admission diagnoses were abdominal pain of unknown etiology (7.41%), dizziness of unknown etiology (5.43%), and abdominal distension of unknown etiology (5.03%). The top five systems by discharge principal diagnosis were digestive system in 1,166 cases (42.79%), respiratory system in 334 cases (12.26%), endocrine system in 317 cases (11.63%), cardiovascular system in 279 cases (10.24%), and hematologic system in 176 cases (6.46%). The top ten diseases by number of principal diagnoses were acute pancreatitis in 249 cases (9.14%), pneumonia in 238 cases (8.73%), chronic gastritis in 220 cases (8.07%), type 2 diabetes mellitus with chronic complications in 175 cases (6.42%), acute cholecystitis in 174 cases (6.39%), malignant tumors in 154 cases (5.65%), hypertension in 109 cases (4.00%), coronary atherosclerotic heart disease in 73 cases (2.68%), colorectal polyps in 62 cases (2.28%), and thyroid nodules in 59 cases (2.17%). A total of 2,411 admissions (88.48%) resulted in improved discharge after inpatient diagnosis and treatment in general practice, while 96 admissions (3.52%) were transferred to corresponding specialties after a clear diagnosis due to the need for specialized treatment. The hospitalization costs of patients admitted with symptoms of unknown etiology were higher than those of patients with clear diagnoses at admission ($P<0.05$), while there was no statistically significant difference in length of stay between the two groups ($P>0.05$). The length of stay and hospitalization costs of patients with chronic diseases were both higher than those without chronic diseases ($P<0.05$). The length of stay and hospitalization costs of patients with multimorbidity were both higher than those without multimorbidity ($P<0.05$). Conclusion In tertiary Grade A general hospitals in Beijing, general practice wards exhibit a wide age range of inpatients, with patients aged $ $60 years constituting the majority. The disease spectrum involves common diseases, chronic diseases, and symptoms of unknown etiology across multiple systems, with multimorbidity and polypharmacy being common phenomena. The medical practice aligns with the diagnostic and therapeutic orientation of general practice. General practice departments maintain close connections with primary healthcare institutions, hospital emergency departments, and specialties, playing a significant role in the hierarchical diagnosis and treatment and multidisciplinary management of chronic diseases and symptoms of unknown etiology. Patients with chronic diseases, symptoms of unknown etiology, and multimorbidity have longer lengths of stay and higher hospitalization costs, suggesting that general practitioners need to continuously refine management processes and service content, and continuously improve management levels and quality in the management of chronic diseases and symptoms of unknown etiology.

## Full Text

# The Treatment of Chronic Diseases and Symptoms of Unknown Etiology in the General Medicine Ward of a Tertiary Comprehensive Hospital in Beijing

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**Abstract**

**Background**: Under the government' s strong emphasis on and support for the development of general practice, general practice departments have been successively established in tertiary comprehensive hospitals. The disciplinary characteristics of general practice confer significant advantages in the management of chronic diseases and symptoms of unknown etiology. However, the current state of treatment and management for these conditions in the general medicine wards of tertiary comprehensive hospitals remains unclear.

**Objective**: This study aims to investigate the admission patterns and management of chronic diseases and symptoms of unknown etiology in the general medicine ward of a tertiary comprehensive hospital, analyze existing challenges, and explore directions for continuously improving management quality and efficiency.

**Methods**: Using the general medicine ward of Beijing Friendship Hospital, Capital Medical University as a case study, clinical data for all inpatients since the ward's establishment (November 2019 to January 2024) were extracted from the electronic medical record system in February 2024. General patient characteristics, admission sources, discharge diagnoses, and outcomes were retrospectively analyzed.

**Results**: A total of 2,725 patient admissions were included. Patient ages ranged from 12 to 95 years, with a mean age of (57.4$±$15.8) years; 1,400 admissions (51.38%) involved patients aged 60 years or older. The median length of stay was 7 days (interquartile range [IQR] 5-9), and the median hospitalization cost was ¥9,053.71 (IQR 6,551.53-12,380.82). Of these, 1,724 admissions (63.27%) were from general outpatient clinics, and 1,001 (36.73%) were transferred from the emergency department or specialty departments.

The three most common admission diagnoses were acute pancreatitis (9.06%), abdominal pain of unknown etiology (7.41%), and pneumonia (7.30%). A total

of 1,899 patients (69.69%) had chronic diseases, 1,085 (39.81%) exhibited multimorbidity, and 1,016 (37.18%) were on polypharmacy. At admission, 1,658 patients (60.84%) had a clear diagnosis, while 1,067 (39.16%) were admitted with symptoms of unknown etiology. The three most common such symptoms were abdominal pain (7.41%), dizziness (5.43%), and abdominal distension (5.03%).

The top five systems for principal discharge diagnoses were digestive (1,166 cases, 42.79%), respiratory (334 cases, 12.26%), endocrine (317 cases, 11.63%), cardiovascular (279 cases, 10.24%), and hematologic (176 cases, 6.46%). The ten most common principal discharge diagnoses were acute pancreatitis (249 cases, 9.14%), pneumonia (238 cases, 8.73%), chronic gastritis (220 cases, 8.07%), type 2 diabetes with chronic complications (175 cases, 6.42%), acute cholecystitis (174 cases, 6.39%), malignant tumors (154 cases, 5.65%), hypertension (109 cases, 4.00%), coronary atherosclerotic heart disease (73 cases, 2.68%), colorectal polyps (62 cases, 2.28%), and thyroid nodules (59 cases, 2.17%), totaling 1,513 cases (55.52%).

A total of 2,411 patients (88.48%) improved and were discharged after evaluation and treatment, while 96 (3.52%) were transferred to specialty departments after receiving a definitive diagnosis requiring specialized care. Hospitalization costs were significantly higher for patients admitted with symptoms of unknown etiology compared to those with clear diagnoses at admission ($P<0.05$), though length of stay did not differ significantly ($P>0.05$). Both length of stay and costs were significantly higher for patients with chronic diseases versus those without ($P<0.05$), and for patients with multimorbidity versus those without ($P<0.05$).

**Conclusion**: Inpatients in the general medicine department of tertiary general hospitals span a wide age range, with most aged $ $60 years. The disease spectrum encompasses common conditions across multiple systems, chronic diseases, and symptoms of unknown etiology, with frequent multimorbidity and polypharmacy, aligning with the orientation of general practice. General practice departments maintain close connections with primary care institutions, emergency departments, and specialty departments, playing a vital role in tiered diagnosis and treatment as well as multidisciplinary management of chronic diseases and symptoms of unknown etiology. The prolonged hospital stays and higher costs associated with chronic diseases, symptoms of unknown etiology, and multimorbidity suggest that general practitioners must continuously refine management processes and service content to improve care quality.

**Keywords**: General practice department; Tertiary comprehensive hospital; Inpatient; Symptoms of unknown etiology; Chronic disease; General practitioners; Beijing

## Introduction

The accelerated development of general practice and the training of general practitioners represent a critical task in China' s current healthcare reform. The State Council has issued multiple guidelines requiring tertiary hospitals designated as residency training bases to strengthen general practice program development and establish general practice departments according to standardized protocols [1]. These departments' primary functions include clinical care, education, research, and prevention. The scope of clinical practice encompasses common health problems presenting as symptoms, frequent multi-system diseases, chronic conditions, and referrals for complex or difficult cases [2]. Chronic diseases refer to chronic non-communicable diseases that threaten public health, including cardiovascular and cerebrovascular diseases (stroke, coronary heart disease, hypertension, heart failure), malignant tumors, chronic respiratory diseases (such as chronic obstructive pulmonary disease and asthma), and diabetes [3]. General practice emphasizes person-centered, family-based care that is continuous, comprehensive, and individualized, conferring natural advantages in managing chronic diseases and symptoms of unknown etiology [4-5]. However, the developmental prospects and role positioning of general practice departments in tertiary hospitals remain exploratory [6-7], and few reports have documented the admission patterns and management of chronic diseases and symptoms of unknown etiology in these settings. Understanding the disease spectrum in general medicine wards can inform the future development and role definition of general practice in tertiary hospitals. As a tertiary comprehensive hospital in Beijing, Beijing Friendship Hospital, Capital Medical University, established its general practice department and inpatient ward in November 2019. This study analyzes all inpatient cases over the subsequent 51 months to explore the current state of managing chronic diseases and symptoms of unknown etiology in tertiary hospital general medicine wards, thereby providing evidence for role clarification and optimization of general practice departments.

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## Methods

### 1.1 Data Sources

In February 2024, we collected electronic medical record data for all patients hospitalized in the general medicine ward of Beijing Friendship Hospital, Capital Medical University between November 2019 and January 2024. This study was approved by the Institutional Review Board of Beijing Friendship Hospital, Capital Medical University (Approval No. 2024-P2-519-11649.47).

### 1.2 Research Methods

We extracted and analyzed patient information including sex, age, admission source, admission diagnosis, discharge diagnosis, length of stay, outcomes, and

hospitalization costs. Disease names were coded using the International Classification of Diseases, 10th Revision (ICD-10) guidelines [3], with similar diagnoses merged into categories (e.g., "grade 3 hypertension" and "hypertension" were both classified as "hypertension"; "gallstones with acute cholecystitis" and "acute cholecystitis" as "acute cholecystitis"; "lung cancer" and "gastric cancer" as "malignant tumors"; "chronic superficial gastritis" and "chronic atrophic gastritis" as "chronic gastritis"). Chronic diseases were identified based on the WHO's "Global Action Plan for the Prevention and Control of Noncommunicable Diseases 2013-2020" [8]. Symptoms that could not be immediately attributed to a specific disease after initial evaluation were termed "symptoms of unknown etiology" for research purposes. During the study, we observed that lipid levels are influenced by multiple factors, many patients are diagnosed with dyslipidemia due to statin use for secondary prevention of cardiovascular disease, many are considered to have arthritis after experiencing joint pain or stiffness, and most have not received formal psychiatric diagnosis. Therefore, dyslipidemia, arthritis, and mental disorders were excluded from the chronic disease analysis. Multimorbidity was defined as the coexistence of two or more chronic diseases [9]. Polypharmacy was defined as the use of five or more medications after discharge.

### 1.3 Statistical Methods

Data were entered using Excel and analyzed with SPSS 20.0 statistical software. Categorical variables were expressed as counts and percentages. Non-normally distributed continuous variables were presented as median (P25, P75). Comparisons between two groups were performed using the Mann-Whitney U test. Statistical significance was set at $P<0.05$.

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## Results

### 2.1 General Characteristics

A total of 2,725 patient admissions were included in the study, comprising 1,390 females (51.01%) and 1,335 males (48.99%). Ages ranged from 12 to 95 years, with a mean age of (57.4$±$15.8) years. Patients aged $ $60 years accounted for 1,400 admissions (51.38%), those $ $65 years for 1,057 (38.79%), those $ $80 years for 157 (5.76%), and those <18 years for 14 (0.51%). Length of stay ranged from 1 to 38 days, with a median of 7 days (IQR 5-9); 2,294 admissions (84.18%) had stays of $ $10 days .

The median length of stay was 7 days (IQR 5-9) for patients with clear diagnoses at admission and 6 days (IQR 5-8) for those admitted with symptoms of unknown etiology, with no significant difference between groups (Z=-1.502, P=0.133). The median hospitalization cost for all discharged patients was ¥9,053.71 (IQR 6,551.53-12,380.82). Patients admitted with symptoms

of unknown etiology had significantly higher median costs of ¥9,441.96 (IQR 7,320.17-11,649.47) compared to ¥8,741.03 (IQR 6,021.38-12,809.78) for those with clear diagnoses at admission (Z=-2.79, P=0.005).

### 2.2 Admission Sources and Outcomes

Patients were admitted from general outpatient clinics (1,724 cases, 63.27%), the emergency department (1,000 cases, 36.70%), or transferred from specialty departments (1 case, 0.03%). A total of 444 patients (16.29%) were hospitalized in the general medicine ward two or more times.

Following evaluation and treatment, 2,411 patients (88.48%) improved and were discharged. Other outcomes included: discharge against medical advice for personal reasons (183 cases, 6.72%), transfer to specialty departments after definitive diagnosis requiring specialized treatment (96 cases, 3.52%), transfer to other hospitals or nursing facilities due to care needs (22 cases, 0.81%), and death (11 cases, 0.40%). Causes of death included pneumonia (6 cases), terminal malignancy (3 cases), decompensated liver cirrhosis (1 case), and septic shock from bloodstream infection due to left lower 67 tooth extraction site infection (1 case). Two patients (0.07%) were transferred to the intensive care unit due to acute liver failure or severe pneumonia. Post-discharge follow-up showed that 1,121 patients (41.14%) visited specialty outpatient clinics, 765 (28.07%) visited both general practice and specialty clinics, 234 (8.59%) visited only general practice clinics for follow-up, and 605 (22.20%) did not return for follow-up at our hospital.

### 2.3 Admission Purposes and Diagnosis Patterns

Admission diagnoses encompassed 216 disease categories. The three most common were acute pancreatitis (9.06%), abdominal pain of unknown etiology (7.41%), and pneumonia (7.30%). At admission, 1,658 patients (60.84%) had a clear diagnosis, with 953 (34.97%) admitted for acute disease treatment, 570 (20.92%) for chronic disease management, 134 (4.92%) for elective procedures or special examinations such as endoscopy, and 1 (0.04%) for preoperative evaluation as an allogeneic hematopoietic stem cell donor. The remaining 1,067 patients (39.16%) were admitted with symptoms of unknown etiology, presenting with 1-16 symptoms or signs (mean 3.8$\pm$2.4). Among the top 20 admission diagnoses, nine were symptoms of unknown etiology, most commonly abdominal pain, dizziness, abdominal distension, fever, chest tightness, fatigue, chest pain, dyspnea, and edema .

### 2.4 Discharge Diagnosis Patterns

Principal discharge diagnoses spanned multiple systems, with the top five being digestive (1,166 cases, 42.79%), respiratory (334 cases, 12.26%), endocrine (317 cases, 11.63%), cardiovascular (279 cases, 10.24%), and hematologic (176 cases,

6.46%), accounting for 2,272 cases (83.38%) total. The ten most common principal discharge diagnoses were acute pancreatitis (249 cases, 9.14%), pneumonia (238 cases, 8.73%), chronic gastritis (220 cases, 8.07%), type 2 diabetes with chronic complications (175 cases, 6.42%), acute cholecystitis (174 cases, 6.39%), malignant tumors (154 cases, 5.65%), hypertension (109 cases, 4.00%), coronary atherosclerotic heart disease (73 cases, 2.68%), colorectal polyps (62 cases, 2.28%), and thyroid nodules (59 cases, 2.17%), totaling 1,513 cases (55.52%) .

### 2.5 Chronic Disease and Multimorbidity

Among all patient diagnoses, common chronic diseases included hypertension (1,221 cases, 44.81%), diabetes (832 cases, 30.53%), chronic obstructive pulmonary disease/emphysema/chronic bronchitis (413 cases, 15.16%), coronary heart disease (351 cases, 12.88%), malignant tumors (328 cases, 12.04%), stroke (325 cases, 11.93%), heart failure (242 cases, 8.88%), and asthma (82 cases, 3.01%). No chronic diseases were present in 826 cases (30.31%), while 1,899 patients (69.69%) had at least one chronic disease, and 1,085 (39.81%) had multimorbidity ($ $2 chronic diseases).

Patients with any chronic disease had significantly longer median stays (7 days, IQR 5-9 vs. 6 days, IQR 4-8; Z=-6.90, P<0.001) and higher median costs (¥9,438.53, IQR 6,940.29-12,785.25 vs. ¥8,145.74, IQR 5,701.94-11,129.46; Z=-7.32, P<0.001) compared to those without chronic diseases. Similarly, patients with multimorbidity had longer stays (7 days, IQR 6-10 vs. 6 days, IQR 4-8; Z=-8.57, P<0.001) and higher costs (¥9,890.24, IQR 7,313.59-13,673.80 vs. ¥8,528.54, IQR 6,006.63-11,391.72; Z=-8.81, P<0.001) than those without multimorbidity.

### 2.6 Polypharmacy

Excluding 11 cases (0.40%) where home medications were recorded as "self-provided" without specific details, 444 of the remaining 2,714 patients (16.36%) required no medications after discharge, while 1,016 (37.18%) were prescribed five or more medications. Among patients aged $ $60 years, the polypharmacy rate was even higher.

### 2.7 Diagnostic Outcomes for Patients with Symptoms of Unknown Etiology

Most patients admitted with symptoms of unknown etiology received a definitive diagnosis during hospitalization, though some remained undiagnosed. Among 767 patients admitted with the nine most common unexplained symptoms (abdominal pain, dizziness, abdominal distension, fever, chest tightness, fatigue, chest pain, dyspnea, and edema), 696 (90.7%) received an ICD-10 diagnosis explaining their symptoms at discharge, while 71 (9.3%) remained without a clear diagnosis .

## Discussion

### 3.1 Broad Age Range and Disease Spectrum Align with General Practice Orientation

The general medicine ward served patients with balanced gender distribution across a wide age range, with over half aged $ $60 years, consistent with data from general hospitals in other provinces [7,11-12]. This demonstrates that general practitioners care for patients across all age groups. Notably, 16.29% of patients were hospitalized multiple times in the general medicine ward, and 28.07% visited both general practice and specialty clinics after discharge, while 8.59% followed up solely in general practice clinics, reflecting the continuity of care characteristic of general practice. Inpatient diseases included common conditions across various systems, chronic diseases, and symptoms of unknown etiology. The broad disease spectrum of principal discharge diagnoses, involving multiple systems and organs, illustrates the comprehensive, continuous, and holistic nature of general practice and aligns with its developmental direction.

### 3.2 Close Integration with Primary Care, Emergency, and Specialty Departments Facilitates Tiered Diagnosis and Treatment

The high proportion of patients admitted from the emergency department (36.70%) demonstrates that general medicine wards can alleviate pressure on emergency services and compensate for limitations in emergency care. Most inpatients presented with chronic diseases or symptoms of unknown etiology, often referred from primary care institutions. After diagnosis and treatment, patients were discharged and, when appropriate, referred back to primary care. Only 3.52% required transfer to specialty departments after diagnosis, and 0.81% needed transfer to other hospitals or facilities, indicating that general practitioners could resolve most health issues for common and frequent diseases through comprehensive management, while appropriately referring those requiring specialized care. Thus, general practice departments in tertiary hospitals play a crucial role in implementing tiered diagnosis and treatment, rationally allocating medical resources, and improving service efficiency and quality [13]. Analysis of admission sources and outcomes also reveals frequent interaction and complementary functions between general practice and emergency/specialty departments [14], enabling effective resource utilization and providing continuous, comprehensive, and accessible healthcare for patients with chronic diseases and unexplained symptoms.

### 3.3 High Prevalence of Chronic Disease, Multimorbidity, and Polypharmacy

This study found that 69.69% of inpatients had at least one common chronic disease, 39.81% exhibited multimorbidity, and 37.18% were on polypharmacy. Patients with chronic diseases had significantly longer stays and higher costs than those without, as did patients with multimorbidity compared to those

without. Research on China' s 2013 inpatient data for four major chronic disease categories (cancer, diabetes, cardiovascular/cerebrovascular disease, and chronic respiratory disease) showed that chronic disease patients face heavy direct medical cost burdens and long hospital stays, with higher economic risks for low-income patients and those requiring surgery [15]. The substantial economic burden of chronic diseases on the population compels general practitioners to continuously enhance chronic disease management capabilities and explore more efficient management models [16]. This also underscores the importance of prevention-focused care to control chronic disease progression and complications, fulfilling the general practitioner' s role as "gatekeeper" of both population health and medical expenditures. Polypharmacy is a widespread clinical issue, and general practitioners have important responsibilities to review medications, supplement necessary drugs, eliminate unnecessary ones, and consider non-pharmacological treatments to improve medication safety during hospitalization [17].

### 3.4 High Prevalence of Unknown Etiology Symptoms Demonstrates General Practice Advantage

Our analysis revealed that 39.16% of patients were admitted with symptoms of unknown etiology, consistent with reported rates of 48.2%-84.2% in tertiary hospital general medicine wards [12,14]. These patients sought care to identify the cause of their symptoms, receiving primarily supportive treatment with relatively low medication costs, yet their average hospitalization costs were comparable to those with clear diagnoses, indicating substantial resource consumption during the diagnostic process. Reportedly, healthcare utilization for these patients is approximately double that of the general population [18], with unexplained symptoms costing the U.S. healthcare system $256 billion annually [19]. Under the diagnosis-related group (DRG) payment system, symptoms of unknown etiology place general medicine wards at a financial disadvantage [12]. While most patients admitted with unexplained symptoms received definitive diagnoses during hospitalization, some remained undiagnosed despite extensive evaluation. Managing unexplained symptoms requires a "bio-psycho-social" approach and comprehensive analysis from family, psychological, and social perspectives, fully embodying general practice' s person-centered philosophy [4]. The complex diagnostic process for unexplained symptoms leverages general practitioners' holistic and integrated clinical reasoning to explore disease etiology and treatment, demonstrating natural advantages in managing symptom-based health problems [20].

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## Conclusion

This study analyzed the current status and management of chronic diseases and symptoms of unknown etiology in a tertiary comprehensive hospital general medicine ward in Beijing, providing data to support the promotion of these

characteristic clinical issues in similar settings. Since its establishment, the sample hospital' s general medicine ward has served a broad population with diverse conditions across multiple systems, including common diseases, chronic conditions, unexplained symptoms, and multimorbidity, aligning with the orientation of general practice. Analysis of admission sources and outcomes demonstrates close integration with primary care institutions, emergency departments, and specialty departments, highlighting general practice' s vital role in tiered diagnosis and treatment and multidisciplinary management of chronic diseases and unexplained symptoms. The prolonged stays and higher costs for patients with chronic diseases, unexplained symptoms, and multimorbidity indicate that general practitioners must continuously refine management processes and service content to improve care quality.

This study has limitations. As a single-center study of a recently established ward, the sample size was limited. The retrospective design precluded regular follow-up of discharged patients, so we could not determine whether chronic disease patients were transferred to primary care institutions for continuous management or track post-discharge treatment and outcomes for patients with unexplained symptoms. Future research should expand to multiple centers with larger samples and implement long-term regular follow-up with continuous management of discharged patients.

**Author Contributions**: PANG Shu was responsible for study conception and design, implementation, and manuscript writing. PANG Shu, CHEN Xiangxue, and DIAO Yang collected and organized data and performed statistical analysis and interpretation. WANG Yini and JIANG Chunyan established primary research objectives and revised the manuscript. JIANG Chunyan was responsible for quality control and review of the article and overall accountability.

**Conflicts of Interest**: None declared.

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*Note: Figure translations are in progress. See original paper for figures.*