Postprint of a Study on Management Strategies for Ambulatory Care Sensitive Hospitalizations in Outpatient and Emergency Services

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Abstract

Ambulatory Care Sensitive Hospitalizations (ACSH) result in the waste of at least hundreds of billions of yuan in healthcare resources annually in China. Implementing targeted intervention measures to reduce ACSH constitutes a critical component of the sustainable and healthy development of the healthcare system, contributing to the deceleration of disease onset and progression, improvement of population health status, and reduction of economic burden. This study aims to systematically analyze the influencing factors of ACSH, summarize international experiences in ACSH reduction, and explore ACSH management strategies applicable to China' s healthcare service system. The findings indicate that ACSH is influenced by individual factors, healthcare system factors, and social factors. Internationally, ACSH reduction is primarily achieved through three dimensions: healthcare service models, service delivery, and service management. Based on international experience and domestic realities, this study proposes the following recommendations for ACSH management in China: First, integrate ACSH into the healthcare service evaluation system and implement comprehensive monitoring and integrated management of Ambulatory Care Sensitive Conditions (ACSCs); second, enhance healthcare service capacity, promote the standardization and homogenization of ACSCs management, and improve management levels based on evidence-based principles; third, conduct in-depth localized research on ACSCs to facilitate the translation and implementation of high-quality evidence; finally, continuously improve population health literacy and strengthen proper understanding among patients and the public regarding ACSH reduction.

Full Text

Preamble

The Management Strategies for Ambulatory Care Sensitive Hospitalization

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Abstract

Hospitalization for ambulatory care sensitive conditions (ACSH) wastes at least 100 billion yuan in health resources annually in China. Implementing targeted interventions to reduce ACSH is essential for sustainable health system development, as it helps prevent disease onset and progression, improves population health, and reduces economic burden. This study systematically analyzes the influencing factors of ACSH, summarizes international experiences in reducing ACSH, and explores management strategies suitable for China' s healthcare system. The findings indicate that ACSH is influenced by individual factors, health system factors, and social factors. International measures to reduce ACSH primarily focus on three aspects: healthcare service models, service provision, and service management. Drawing on international experience and China's practical context, this study proposes the following recommendations: First, incorporate ACSH into the health service evaluation system and conduct comprehensive monitoring and management of ambulatory care sensitive conditions (ACSCs). Second, enhance healthcare service capacity, promote standardized and normalized disease management based on evidence-based approaches. Third, conduct localized research on ACSCs and promote the implementation of high-quality evidence. Finally, continuously improve population health literacy and strengthen patients' and the public' s correct understanding of reducing ACSH.

Keywords: Ambulatory care sensitive conditions; Hospitalization for ambulatory care sensitive conditions; Potentially avoidable hospitalization; Management strategy; Ambulatory and emergency care; Out-of-hospital services; Primary health services

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Main Text

Hospitalizations that can be avoided through various methods are collectively referred to as potentially avoidable hospitalizations. Ambulatory care sensitive conditions (ACSCs) refer to certain diseases that can be prevented from requiring hospitalization through timely and effective ambulatory care. Hospitalization for ambulatory care sensitive conditions (ACSH) refers to hospitalizations that occur due to ACSCs and fall under the category of avoidable hospitalizations. ACSH was initially used to reflect the accessibility of primary healthcare services and is now widely applied in research evaluating healthcare systems in major developed countries worldwide.

The global ACSH problem is currently severe, causing tremendous waste of health resources. Evidence indicates that in the United States, the number of ACSH patients exceeded 4 million in 2006, with avoidable hospitalization costs surpassing $30 billion within a single year [1]. For hypertension alone, avoidable hospitalization costs in the U.S. reached $41 billion between 2005 and 2012 [2], with ACSCs patients accounting for 10.5% of total hospitalizations [3]. An analysis of 13.56 million hospitalized patients in China in 2016 found that ACSCs patients accounted for 9.5% of total hospitalizations, with avoidable hospitalization costs amounting to approximately 149.3 billion yuan [4]. Faced with these severe challenges, implementing targeted interventions to reduce ACSH has become an important component of healthy and sustainable health system development. However, the influencing factors of ACSH include not only medical factors but also individual and social factors [5-6]. This study systematically analyzes the influencing factors of ACSH, summarizes and synthesizes international experiences in reducing ACSH, and explores management strategies suitable for China' s healthcare system, aiming to provide references for the high-quality development of China' s health system.

1. Influencing Factors of ACSH

1.1 Individual Factors Individual factors are mainly divided into patient-related and physician-related factors. Patient-related factors include: (1) Basic demographic characteristics such as age, gender, race, and ethnicity [3,7]. Generally, age is positively correlated with ACSH, while the impact of gender remains inconsistent. Significant variations in ACSH exist among different races and ethnicities [8-9]. (2) Personal economic status, including income level, living conditions, and health insurance [10-13]. Within a certain range, income level is negatively correlated with ACSH, but beyond that range, the correlation becomes positive [14]. Stable living conditions and health insurance are

protective factors against ACSH [15-17]. (3) Other patient factors such as personal willingness to seek medical care, treatment adherence, disease severity, and complications [18]. Typically, patients with lower willingness to seek care and poor treatment adherence are more likely to develop severe complications and comorbidities, resulting in higher ACSH rates, and vice versa [19].

Physician-related factors primarily refer to clinical practice behaviors, including adherence to clinical practice guidelines (hereinafter referred to as guidelines) and physicians' professional ethics. Guidelines aim to provide optimal medical services for patients [20-21], and insufficient adherence to high-quality guidelines by physicians can increase ACSH risk. For example, O' Malley et al. [22] found that higher physician adherence to guidelines (particularly among those with $ $10 years of practice) was associated with lower hospitalization risk for chronic obstructive pulmonary disease patients. Proper guideline usage is closely related to shorter hospital stays [23]. Additionally, physicians' professional ethics can affect ACSH occurrence; for instance, defensive psychology due to tense doctor-patient relationships or insufficient technical competence may increase ACSH risk [22].

1.2 Health System Factors Health system factors encompass a broad range of elements, including healthcare accessibility, health insurance systems, continuity of care, stability of healthcare personnel, and use of telemedicine technology [24-29].

First, the quality and accessibility of healthcare services are key drivers of ACSH variation, particularly primary healthcare services. Research has found that effective interventions for reducing ACSH feature participation by primary care physicians [30], indicating their central role in addressing ACSH. Generally, higher quality and accessibility of primary healthcare services correlate with lower ACSH risk [23,31]. Moreover, the supply of primary care physicians affects overall performance of primary care institutions: ACSH risk is relatively low when supply is within a reasonable range, but increases when supply is either too small or too large [14]. As physician ethnic diversity increases, ACSH risk gradually decreases [32].

Second, health system factors such as health insurance payment systems and institutional performance-based payment schemes are closely related to ACSH. For example, Bindman et al. [24] demonstrated that managed care payment methods for Medicaid in the U.S. could better reduce ACSH risk compared to fee-for-service systems, while Harrison et al. [25] found that the UK' s primary care pay-for-performance program led to a continuous reduction in emergency admissions related to ACSCs, with an 8.0% decrease achievable by the seventh year.

1.3 Social Factors Various social factors such as economic development level, education, environment, and others can influence ACSH by affecting both the health system and individual health status [23,33-34]. These factors directly

impact the healthcare process and management approaches for ACSCs patients and high-risk populations, while also indirectly influencing lifestyle and health literacy through social support systems, welfare institutions, and living environments, thereby affecting ACSH occurrence.

2. International Practices and Management Approaches for ACSH

Effective strategies for reducing ACSH include preventive care, early disease detection and management, continuous treatment, and chronic disease management [35]. This study systematically reviews key international recommendations and measures for reducing ACSH, categorizing them into three domains based on action areas: service models, service provision, and service management [30,36-39] (see Table 1).

Table 1 Key Recommendations and Measures for Reducing ACSH

Key Recommendations and Measures	
Service Models	Empower the public and enhance patient participation; Promote use of ACSCs-related guidelines; Improve management of moderate- and high-risk populations related to ambulatory and emergency care

Key Recommendations and Measures	
Service Provision	Strengthen the "gatekeeper" role and coordination function of primary healthcare institutions; Expand the scope of nursing practice; Promote use of electronic and telemedicine

Key Recommendations and Measures	
Service Management	Improve accessibility of ambulatory and emergency care; Promote affordability of healthcare services; Expand ACSCs-related service packages; Establish ACSCs-related quality improvement mechanisms; Adjust incentive mechanisms to improve disease management

Note: ACSH = Hospitalization for Ambulatory Care Sensitive Conditions, ACSCs = Ambulatory Care Sensitive Conditions

2.1 Healthcare Service Models Focused on Improving Patient Participation Regarding healthcare service models, attention should be paid to increasing patient participation, promoting the use of ACSCs-related guidelines, and particularly improving management pathways for high-risk populations in ambulatory and emergency care. (1) Enhance patient participation in the service process: For example, provide professional training and counseling services in primary healthcare institutions, increase dissemination of evidence-based public health literacy practices and interventions, and improve patients' correct understanding of ACSCs through public awareness and health education to support self-management. Enhanced patient participation can not only improve treatment outcomes and satisfaction but also reduce potentially avoidable hospitalizations and lower healthcare costs [37-38]. (2) Improve guideline adherence among units providing ambulatory and emergency care: For instance, timely update ACSCs-related guidelines, particularly for key diseases, and supervise the standardized use of guidelines by ambulatory and emergency care physicians to narrow practice gaps with specialists, thereby improving service quality and reducing ACSH risk [37-38]. (3) Improve management of ACSCs high-risk populations by ambulatory and emergency care service units: In addition to systematically monitoring ACSCs and their occurrence, training should be provided on key knowledge including the concept, characteristics, and high-risk populations of ACSCs to enable healthcare workers to better understand patient needs and improve standardized management levels [36].

2.2 Healthcare Service Provision with Emphasis on Service Efficiency In healthcare service provision, attention should focus on strengthening the "gatekeeper" role and coordination function of primary healthcare institutions, expanding the scope of nursing practice, and promoting the use of electronic and telemedicine. Primary healthcare institutions serve as the first point of entry for patients to access healthcare services, with general practitioners as the core component of this system, capable of prioritizing patient and public health needs while also reducing hospital burden. However, in practice, patients often seek specialist services at hospitals without referral from general practitioners, which is likely unnecessary and may result in relatively higher healthcare costs. Therefore, positioning general practitioners as patients' first point of contact and coordinators of primary services can enable early management of ACSCs and reduce ACSH from the source [37-38].

Meanwhile, innovative physician assistant models are crucial for improving ACSCs management. Particularly for ACSCs high-risk populations requiring close monitoring and continuous surveillance, this model can build a complete healthcare service system by expanding the service scope and case management capabilities of physician assistants and strengthening their connection with general practitioners, thereby providing more comprehensive, effective, and convenient

healthcare services and reducing ACSH risk [36]. Additionally, establishing a national telematics infrastructure is an important cornerstone for achieving comprehensive healthcare service integration. Information technology can improve the efficiency of ambulatory and emergency care, facilitate outpatient management of patients, and expanding mobile health and telemedicine services can ensure and maintain the continuity and equity of primary healthcare access nationwide [36].

2.3 Establishing ACSCs-Focused Disease Management Mechanisms In healthcare service management, in addition to conventional measures such as improving accessibility and affordability of ambulatory and emergency care, integrated medical services must be developed for the entire ACSCs management process, with ACSCs-related service improvement and incentive mechanisms established and adjusted. On one hand, improving the professional prestige and attractiveness of general practitioners, training more general practitioners to meet public healthcare needs, and addressing inequality in general practitioner supply across regions can comprehensively improve accessibility of ACSCs-related primary healthcare services and strengthen healthcare security for low-income populations, thereby improving affordability of healthcare services [36-37]. On the other hand, systematically addressing the social, medical, and psychological health issues of ACSCs patients and high-risk populations [30,40].

Through integrated medical models that promote regular or continuous communication and collaboration among various service departments, establishing ACSCs-focused disease management mechanisms can better prevent, treat, and manage ACSCs, improving the level and effectiveness of healthcare services [36-37]. Furthermore, building upon this foundation, establishing ACSCs-related service improvement and incentive mechanisms that use monitoring data as performance evaluation indicators and provide economic incentives to stimulate general practitioners' early diagnosis, treatment, and management of patients and high-risk populations can further reduce ACSH risk [37-38].

3. Considerations and Recommendations for ACSH Management in China

In the context of the new era, to effectively reduce ACSH in China, this study proposes the following considerations and recommendations from the perspectives of policymakers, healthcare providers, researchers, and patients/the public. The influencing factors and management strategies for ACSH are illustrated in Figure 1 [Figure 1: see original paper].

3.1 Implement Comprehensive ACSCs Monitoring and Integrated Management to Optimize Healthcare Service Performance Evaluation ACSH is closely related to the overall performance of the healthcare service system. Major developed countries internationally have prioritized ACSCs prevention and treatment as a key focus of healthcare work and use it to evaluate

health program or policy performance [41]. However, China' s current understanding and management of ACSCs remain insufficient. First, policymakers' correct understanding of ACSCs should be strengthened. ACSH carries strong policy implications, as it helps understand healthcare service levels and reasons for disparities in specific regions or populations, dynamically monitor trends in healthcare service levels to explore service continuity, and evaluate policy intervention effects. Second, comprehensive monitoring and integrated management of ACSCs should be enhanced by establishing ACSCs monitoring systems and multi-level information sharing platforms covering disease prevention, diagnosis, and treatment, to analyze and track ACSCs incidence, characteristics, hospitalization rates, and treatment outcomes, providing evidence for ACSCs management. On this basis, effectively integrating multi-source information, actions, and resources to conduct cross-sectoral collaborative work and establish management mechanisms covering multiple links, professions, and forms can promote scientific management of ACSCs.

3.2 Improve Healthcare Service Capacity and Promote Standardized and Homogenized ACSCs Management Evidence indicates that the proportion of avoidable hospitalizations due to ACSCs ranges from 5% to 79% [42], revealing an important fact: many hospitalization cases could be avoided if primary healthcare institutions could more effectively prevent, diagnose, and treat diseases. Therefore, improving ACSCs-related healthcare service capacity and standardized management is crucial for reducing ACSH risk. On one hand, given that ACSCs are mostly common and frequent diseases, establishing professional and standardized prevention and treatment teams and improving healthcare service quality and accessibility, especially for primary healthcare, is essential. Although China has implemented a series of policies since the 2009 new round of medical reform to strengthen primary healthcare services, their service level still has considerable room for improvement [43]. Taking diabetes and hypertension —typical ACSCs—as examples, the phenomenon of avoidable hospitalization is widespread in China, imposing heavy economic burdens on patients. In 2016, chronic disease avoidable hospitalization costs accounted for 10.45% of total hospitalization costs, with diabetes and hypertension alone representing 39.72% of total avoidable hospitalization costs [4]. Although the proportion of chronic disease avoidable hospitalizations decreased from 9.53% to 8.85% between 2016 and 2020, and the proportion of chronic disease avoidable hospitalization costs dropped from 10.45% to 8.63%, the absolute cost increased from 149.263 billion yuan to 185.94 billion yuan [44], indicating that primary healthcare services have played a limited role in prevention, referral, and care coordination for these diseases and require further improvement [45]. On the other hand, to ensure high-quality, high-value healthcare services, clinical pathway management should be implemented to strengthen healthcare workers' (especially general practitioners and nurses in primary healthcare institutions) use of high-quality ACSCs-related guidelines and standardize practice behaviors under guideline guidance. Taking diabetes as an example, numerous guidelines for diabetes and

its complications have been published domestically and internationally, such as the updated 2022 *National Guidelines for Primary Diabetes Prevention and Management (2022)*, which covers management requirements, screening, diagnosis, treatment, and chronic complications [46]. Primary healthcare workers should promptly study these guidelines and understand their updates to promote standardized and homogenized diabetes management at the primary level.

3.3 Conduct In-Depth Localized ACSCs Research and Promote Translation of High-Quality Evidence To effectively solve the avoidable hospitalization problem caused by ACSCs, it is recommended to conduct in-depth research on ACSCs, particularly focusing on the current status and development trends of ACSH in China, systematically exploring relevant factors and feasible measures to generate high-quality evidence applicable to China' s current health context, and improving healthcare practice based on this evidence. Furthermore, through interdisciplinary and international collaboration, more in-depth and extensive research can be conducted by leveraging multidisciplinary strengths and resources. However, researchers should exercise caution when interpreting results. Although ACSH can serve as a performance indicator for healthcare systems, it is not a direct measure of healthcare service quality, and its numerical value cannot simply reflect service quality levels. Therefore, researchers need to focus on analyzing its underlying mechanisms according to the characteristics of China' s health system [47].

Moreover, despite the widespread application of ACSH, researchers must consider the applicability of ACSCs directories developed abroad to the local context, as they may not effectively reflect the overall performance of the domestic healthcare system. Currently, Chinese academic research uses foreign ACSCs directories, primarily due to the lack of a domestically developed ACSCs directory based on China' s actual conditions regarding disease prevalence, medical technology levels, disease burden, and healthcare coverage. To conduct targeted ACSCs research and effectively promote the high-quality development of China' s health service system, it is urgent to develop a localized ACSCs directory.

3.4 Improve Patients' and the Public' s Correct Understanding of ACSCs and Emphasize Patient Participation Patients' and the public' s attention to and correct understanding of ACSCs are important prerequisites for reducing avoidable hospitalizations. To achieve this, multidimensional interventions can help patients and the public develop correct concepts about reducing ACSH [48]. Particularly through developing patient or public versions of guidelines [49-50], awareness and self-management of ACSCs can be enhanced. In the modern context, diverse social media and platforms can be fully utilized to disseminate ACSCs prevention and treatment information through "online + offline" approaches to improve population health literacy. On the other hand, during diagnosis, treatment, and management processes, supportive materials matching patients' competency levels and needs can be provided to help them better understand their health status and treatment plans, with psychological

support provided when necessary to enhance patient participation in healthcare services. Regions with adequate conditions should actively promote "Internet Plus" medical management services, innovate fast, efficient, and intelligent diagnostic and treatment services, and implement comprehensive, real-time, and interactive health management models, fully using information technology to enrich ACSCs health management methods and improve management efficiency and effectiveness.

ACSH occurrence is closely related to patients' personal factors, physicians' practice behaviors, health system factors, and social factors. International strategies for reducing ACSH span the entire process of healthcare service models, provision, and management. In the future, as China' s healthcare service level continues to improve and medical resource allocation becomes more rational, it is essential to strengthen comprehensive monitoring and in-depth research on ACSCs, promote standardized, homogenized, and full-process management of healthcare services, further improve service efficiency, reduce unnecessary medical waste, and effectively enhance public health.

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