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THE SPATIAL COORDINATION MECHANISMS AND OPTIMIZATION PATHWAYS FOR URBAN ELDERLY CARE RESOURCES IN THE CONTEXT OF AN AGING POPULATION: AN ANALYSIS BASED ON GUANGZHOU

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Abstract: To explore the issue of spatial coordination of elderly care service resources in megacities against the backdrop of population aging, this study takes Guangzhou as its case and analyzes the practical challenges, formation mechanisms, and optimization pathways for the allocation of elderly care service resources from the perspective of spatial governance. The study finds that population aging in Guangzhou exhibits distinct spatial differentiation, characterized by the coexistence of an aging population concentration in the central urban area and rapid aging in peripheral regions, with demand for elderly care gradually shifting from overall growth to regionally differentiated development. Currently, the allocation of elderly care resources still faces issues such as an incomplete alignment between resource distribution and population trends, insufficient coordination between regional supply and demand, and limited levels of coordinated resource utilization. The primary causes lie in a temporal mismatch between population dynamics and public resource planning, administrative boundaries that restrict the spatial mobility of elderly care resources, and a traditional supply-oriented model that fails to adequately respond to diverse elderly care needs. Consequently, it is necessary to improve demand identification mechanisms, optimize the spatial distribution of elderly care resources, strengthen cross-regional collaborative governance, and promote a shift from the decentralized allocation of elderly care resources to coordinated spatial allocation, thereby enhancing the adaptability and governance effectiveness of the elderly care service system in megacities.
Keywords: Aging population; Elderly care resources; Spatial governance; Resource allocation; Collaborative governance

1 INTRODUCTION

Population aging is a major trend in China's social structural transformation and a key factor influencing the development of urban public service systems and the modernization of governance capabilities. China is undergoing a process of population ageing on an unprecedented scale and at an unprecedented rate; establishing a pension security system suited to the country's specific circumstances has become an urgent task for national governance [1]. 'Chinese-style elderly care' is a distinctive system of elderly care that is consistent with Chinese-style modernisation. Since the concept was first proposed, the academic community has engaged in extensive and in-depth discussions from a multidisciplinary perspective, and has begun to establish a theoretical and practical framework for Chinese-style elderly care [2–10]. The report of the 20th National Congress of the Communist Party of China proposed implementing a national strategy to actively address population aging, emphasizing the need to improve the equity and accessibility of basic public services. As the elderly population grows, the role of family care weakens, and the structure of elderly care needs changes, the provision of elderly care services has shifted from a focus on scale to targeted allocation. Although some progress has been made in building urban elderly care service systems, issues such as a mismatch between supply and demand, uneven spatial distribution of resources, and insufficient coordination among stakeholders persist [11-12]. Existing research indicates that the allocation of elderly care resources exhibits significant spatial characteristics, and the mismatch between resource distribution and population distribution and changing demand has become a key factor affecting the equity of elderly care services [13-14]. However, existing studies have paid insufficient attention to how the spatial differentiation of population aging affects the logic of elderly care resource allocation, or how megacities can optimize their elderly care service systems through spatial coordination mechanisms. As a core city in the Guangdong-Hong Kong-Macao Greater Bay Area, Guangzhou has a large population and pronounced regional disparities. Its population aging exhibits a complex pattern characterized by concentration in the central urban areas and accelerated development in peripheral regions, making it a highly representative case for research. From a spatial governance perspective, this paper analyzes the challenges in the spatial allocation of elderly care resources and explores optimization pathways by examining the interplay among demographic changes, spatial distribution, and governance mechanisms. It aims to provide theoretical references and practical insights for the development of elderly care service systems and the governance of aging societies in megacities.

2 THE THEORETICAL LOGIC OF COORDINATED ALLOCATION OF ELDERLY CARE RESOURCES FROM THE PERSPECTIVE OF SPATIAL GOVERNANCE

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2.1 Population Aging Is Driving a Shift in Demand for Elderly Care from Quantitative Expansion to Spatial Differentiation

Population aging is not only reflected in the growth of the elderly population and changes in the age structure, but also profoundly affects the distribution of demand for urban public services and the logic of resource allocation. The development of traditional elderly care service systems has primarily focused on the supply pressures resulting from population growth among the elderly, emphasizing an increase in the number of facilities and improvements in service capacity. However, with the advancement of urbanization and the acceleration of population mobility, population aging is gradually exhibiting regional disparities. Influenced by factors such as population migration, industrial distribution, family structures, and stages of development, different regions exhibit significant differences in the size of their elderly populations, the degree of aging, and the types of elderly care needs. Due to long-term population concentration, central urban areas have a high density of elderly residents, resulting in a sustained concentration of demand for elderly care services; in contrast, peripheral areas are experiencing accelerated aging alongside urban expansion and population inflows, leading to rapid growth in demand for elderly care. Consequently, demand for elderly care has shifted from homogeneous and static patterns to regionally differentiated and dynamic ones. The allocation of elderly care resources must therefore move beyond the traditional approach guided solely by population size and instead strengthen the spatial alignment between population dynamics and service demand.

2.2 The Equalization of Public Services Requires That the Allocation of Elderly Care Resources Be Spatially Aligned

Equalization of public services does not mean pursuing an absolutely even distribution of public resources across different regions, but rather achieving basic equity in service opportunities and quality while acknowledging regional differences. Elderly care services have distinct public attributes and spatial dependence; their effectiveness depends not only on the scale of resource supply but also on the degree to which resource allocation aligns with population needs. Against the backdrop of an aging population, simply increasing the number of elderly care facilities is unlikely to effectively address the issue of insufficient regional service accessibility; the key lies in enhancing the responsiveness of resource allocation to changing needs in different regions. From the perspective of spatial governance, the allocation of elderly care resources is a process of optimizing the distribution of public resources within the urban space, requiring comprehensive consideration of factors such as population distribution, regional development levels, community structure, and service demand. Only by shifting resource allocation from uniform supply to precise adaptation can we achieve a balance between equity in elderly care services and efficiency in resource allocation.

2.3 Spatial Coordination and Governance Drive the Transformation of the Model for Allocating Elderly Care Resources

Spatial coordination governance emphasizes breaking through traditional administrative boundaries and departmental divisions to enhance the effectiveness of public governance through the optimization of spatial relationships, multi-stakeholder collaboration, and resource integration. The allocation of elderly care resources involves multiple stakeholders, including the government, the market, communities, medical institutions, and social organizations; its effectiveness depends not only on the scale of resource investment but also on the ability of these stakeholders to collaborate. As urban spatial structures continue to evolve, the traditional model of elderly care resource allocation—based on administrative regions—is increasingly proving inadequate. Issues such as uneven regional resource distribution, insufficient information sharing, and poor service coordination are becoming increasingly prominent. Therefore, the allocation of elderly care resources must be examined within the context of the city's overall spatial system. Through demand identification, dynamic adjustments, and regional coordination, it is possible to transition from a fragmented allocation of resources to systematic optimization. For megacities, coordinated spatial governance helps overcome the constraints of administrative boundaries, aligns elderly care planning with demographic trends, promotes the sharing of facilities, information, and service capabilities, and fosters a multi-stakeholder collaborative supply model. This enables dynamic coordination between the elderly care service system, demographic changes, and urban spatial evolution.

3 PRACTICAL CHALLENGES IN THE SPATIAL ALLOCATION OF ELDERLY CARE RESOURCES IN GUANGZHOU

3.1 The Spatial Evolution of Population Aging Is Exacerbating Regional Disparities in Demand for Elderly Care Services

As urbanization progresses and demographic structures continue to shift, Guangzhou's aging population exhibits distinct spatial variations, with demand for elderly care gradually shifting from overall growth to regionally differentiated development. In the central urban areas, due to long-term population concentration and an earlier onset of aging, the elderly population is large, and demand for elderly care services remains concentrated; in the outlying districts, as the city expands and population migration accelerates, the growth rate of the elderly population continues to rise, leading to a rapid increase in demand for elderly care. This spatial evolution has resulted in varying pressures on elderly care across different regions: some areas must cope with the strain on service capacity caused by high-density elderly populations,

while others face the challenge of facility development lagging behind the pace of population aging. Consequently, the demand for elderly care in Guangzhou is shifting from a homogeneous pattern toward a regionalized and differentiated one, placing higher demands on the precise allocation of elderly care resources.

3.2 There Is a Discrepancy between the Distribution of Elderly Care Resources and Population Aging Trends

In recent years, Guangzhou's elderly care service system has been continuously improved, with the steady development of elderly care institutions, community-based elderly care facilities, and integrated medical and elderly care service models, leading to an increase in the capacity to provide elderly care services. However, from the perspective of spatial distribution, there remains a certain degree of mismatch between the layout of elderly care resources and the evolving trends of population aging. The construction of elderly care facilities is characterized by long planning cycles and spatial stability, whereas population aging—influenced by factors such as population mobility, regional development, and changes in social structure—exhibits dynamic evolution. This disparity often leads to a lag in supply response. In central urban areas, the public service infrastructure is relatively well-developed, and medical resources and elderly care facilities are relatively concentrated; however, these areas also bear a high density of elderly care demand, and service pressures persist in some regions. In outlying urban areas, as the population grows and aging accelerates, the development of elderly care facilities and the refinement of service systems have lagged behind, resulting in a gap between resource supply and growing demand. This indicates that the current allocation of elderly care resources still relies heavily on existing population sizes and administrative planning, with insufficient adaptability to spatial population shifts and regional variations in demand. There is an urgent need to shift the focus from simply expanding the scale of elderly care resources to ensuring their precise allocation.

3.3 The Level of Coordinated Utilization of Elderly Care Resources Still Needs to Be Improved

The elderly care service system is comprehensive in nature; its effective operation relies not only on the construction of elderly care facilities but also on the coordinated support of various resources, including healthcare, community services, social organizations, and digital platforms. Currently, a diversified participation model for elderly care services is gradually taking shape in Guangzhou; however, there is still room for improvement in the ability of different stakeholders to integrate resources and coordinate efforts, and the systematic allocation of elderly care resources has not yet been fully realized. A certain degree of compartmentalization still exists in the management of elderly care resources. Information-sharing mechanisms among sectors such as civil affairs, public health, social security, and community governance have not yet been fully established, which affects the efficiency of identifying care needs and precisely allocating resources. Insufficient integration of data on the distribution of the elderly population, their health status, and service needs makes it difficult for some resources to respond promptly to changing regional demands. At the same time, mechanisms for sharing elderly care facilities, professional talent, and service capacity across regions remain underdeveloped; administrative boundaries restrict the cross-regional flow of resources, thereby reducing the city's overall allocation efficiency. Therefore, Guangzhou's elderly care service system still needs to strengthen the government's role in overall coordination and planning, promote the formation of a governance framework among multiple stakeholders characterized by resource sharing, complementary strengths, and coordinated development, and enhance the system's overall capacity to address the challenges of population aging.

4 MECHANISMS BEHIND SPATIAL IMBALANCES IN URBAN ELDERLY CARE RESOURCES

4.1 There Is a Time Lag between Demographic Changes and Public Resource Planning

A key reason for the spatial imbalance in urban elderly care resources lies in the time lag between the progression of population aging and adjustments to public resource planning. Changes in population structure are influenced by multiple factors—including population migration, regional development, and shifts in family structure—and are both dynamic and ongoing. In contrast, the construction of elderly care facilities, the layout of service networks, and resource allocation typically rely on relatively stable planning cycles. Consequently, there is a disparity between the two in terms of adjustment speed and response mechanisms. When trends in population aging shift, resource allocation models based on existing demographic structures struggle to respond promptly to new demand patterns, often leading to a mismatch between the supply of eldercare resources and the spatial distribution of the population. Taking Guangzhou as an example, as the city expands spatially and the population migrates to outlying areas, the elderly population in some new districts is growing rapidly, yet the construction of eldercare facilities has not kept pace, creating a contradiction between rising demand and resource supply. At the same time, while elderly care resources are relatively concentrated in some traditional urban areas, the adjustment of the population structure poses new challenges to resource utilization efficiency. This indicates that the current allocation of elderly care resources still exhibits certain characteristics of static planning; it is necessary to incorporate population evolution trends into the public resource planning system to shift the supply of elderly care services from a reactive approach to a forward-looking, strategic approach.

4.2 Administrative Division Policies Restrict the Spatial Mobility of Elderly Care Resources

The spatial imbalance in elderly care resources is also influenced by the traditional administrative division governance model. For a long time, urban public services have been planned and managed primarily based on administrative regions, with each region allocating elderly care resources according to its population size, fiscal capacity, and development goals. While this model helps clarify governance responsibilities, against the backdrop of increased population mobility and increasingly close spatial connections in megacities, it tends to lead to regional fragmentation in resource allocation, limiting the optimal allocation of elderly care resources on a broader scale. Different areas of Guangzhou vary in terms of economic development levels, population structure, and public service infrastructure, resulting in a mismatch between elderly care demand and resource supply capacity. Since elderly care services still rely heavily on local-level management, there are shortcomings in facility sharing, information exchange, talent mobility, and service coordination across different areas. This has led to a situation where resource shortages in some areas coexist with underutilization of resources in others. From the perspective of spatial governance, elderly care resources exhibit networked characteristics. It is necessary to transcend administrative boundaries and, by improving mechanisms for regional cooperation, resource sharing, and service coordination, achieve a shift in elderly care governance from regional fragmentation to holistic coordination.

4.3 The Supply-Oriented Model Weakens the Ability of Elderly Care Services to Respond to Demand

The underlying cause of the spatial imbalance in elderly care resources lies in the traditional supply-oriented model's inability to adapt to changing demands. For a long time, the development of the elderly care service system has primarily focused on supply indicators such as the number of institutions, the number of beds, and facility coverage. However, as the population ages, significant differences have emerged among the elderly in terms of health status, family support, and service needs; relying solely on the expansion of resource quantities is no longer sufficient to meet the multi-level needs for elderly care. The elderly in different regions face distinct challenges regarding eldercare; some areas require enhanced care services for the disabled and the very elderly, while others have a greater need for improved community-based eldercare and daily living support services. However, current resource allocation still relies heavily on macro-level population data and administrative planning, with insufficient attention paid to micro-level differences in demand and spatial trends, which can easily lead to a mismatch between supply and demand. At the same time, the lack of integration among data on population, health, and community services has also weakened the ability to identify care service needs and dynamically adjust resources. Therefore, the allocation of elderly care resources must move beyond traditional supply-side logic and shift toward a precision governance model based on demand identification. Through data-driven support, dynamic feedback, and coordinated adjustment mechanisms, the elderly care service system's responsiveness to demographic changes and regional needs can be enhanced.

5 PATHWAYS FOR OPTIMIZING THE SPATIAL COORDINATION MECHANISM FOR ELDERLY CARE SERVICES

5.1 Improve the Mechanism for Identifying Needs and Enhance the Precision of the Allocation of Elderly Care Resources

In response to the widening regional disparities in elderly care needs resulting from the spatial evolution of population aging, the allocation of elderly care resources must shift from being guided by population size to being guided by the precise identification of needs. Population aging is not a homogeneous process; different regions exhibit significant differences in demographic structure, family support capacity, community environments, and service needs. Allocating resources based solely on the number of elderly residents makes it difficult to achieve an effective match. Therefore, a dynamic monitoring mechanism based on population trends and shifts in demand structures should be established, incorporating the distribution of the elderly population, age structure, health status, and service needs into a comprehensive analytical framework to enhance the ability to identify elderly care needs. For Guangzhou, given the coexistence of an aging population concentration in the central urban areas and accelerating aging in outlying regions, a differentiated needs assessment should be implemented. In the central urban areas, greater emphasis should be placed on optimizing existing resources to enhance community-based elderly care and professional care service capabilities; in the outlying areas, it is necessary to plan for elderly care facilities in advance in light of population growth trends to prevent service supply from lagging behind demographic changes. By establishing a mechanism that integrates population forecasting, needs assessment, and resource allocation, we can drive a shift in elderly care service resources from a reactive to a proactive approach.

5.2 Optimize the Spatial Planning Mechanism to Promote the Coordinated Alignment of Elderly Care Resources with Demographic Trends

To address the mismatch between the distribution of eldercare resources and population aging trends, it is necessary to shift the allocation of eldercare resources from a uniform approach to a differentiated one. The allocation of eldercare resources must focus not only on the total volume of resources but also on the alignment between resource distribution and the spatial distribution of the population. Therefore, population aging trends should be incorporated into the urban spatial planning system to ensure that the construction of eldercare facilities is coordinated with population migration patterns, community development, and the layout of urban functions. Specifically, central urban areas should fully leverage existing public service infrastructure to enhance resource utilization efficiency through community-embedded

eldercare and integrated medical and eldercare services, thereby shifting from incremental construction to structural optimization; new urban districts should incorporate the construction of elderly care facilities into urban development plans to ensure that the deployment of public services aligns with population inflows; and outlying areas should improve their basic elderly care service networks to enhance service coverage. By establishing a resource allocation model that adapts to the spatial evolution of population aging, we can reduce the spatial mismatch between resource distribution and elderly care needs.

5.3 Strengthen Collaborative Governance Mechanisms and Improve the Efficiency of Integrating and Utilizing Elderly Care Resources

To address the issue of insufficient coordinated utilization of elderly care resources, it is necessary to break through the constraints of administrative divisions and departmental silos and establish a collaborative governance system for elderly care services involving multiple stakeholders. Elderly care services involve multiple entities, including civil affairs, public health, medical insurance, communities, and social organizations, and their effectiveness depends on the ability of these different entities to share information and integrate resources. A key reason for the current inefficiency in the utilization of elderly care resources lies in the lack of information coordination between departments and limited resource sharing across regions, which has undermined the overall effectiveness of the elderly care service system. Therefore, efforts should be made to shift elderly care governance from a fragmented, region-based management approach to a holistic, collaborative governance model. On the one hand, we must improve the government's coordination mechanism, strengthen data sharing and policy alignment across sectors such as elderly care, healthcare, and community services, and establish a comprehensive resource allocation mechanism. On the other hand, we should promote the establishment of mechanisms for sharing elderly care resources across regions to facilitate the cross-regional flow of care facilities, professional personnel, and service capacity. At the same time, we should leverage the roles of market entities and social organizations to foster a diverse, collaborative framework guided by the government, involving the market, and supported by communities, thereby enhancing the efficiency of elderly care resource allocation.

6 CONCLUSION

Against the backdrop of an aging population, the issue of resource allocation for urban elder care services is, at its core, a reflection of the relationship between demographic shifts and the capacity for public service governance. Taking Guangzhou as a case study, this paper analyzes the practical challenges and underlying mechanisms in the allocation of elder care resources from the perspective of spatial governance. It argues that the current spatial imbalance in elder care resources is not merely a matter of insufficient supply, but rather the result of the interplay among demographic evolution, spatial distribution, and governance mechanisms. To actively address population aging, it is necessary to transcend traditional thinking on resource allocation and integrate eldercare services into the overall framework of urban spatial development. By improving demand identification mechanisms, optimizing the spatial distribution of resources, and strengthening regional collaborative governance, we can drive the transformation of the eldercare service system from scale expansion toward precise coordination. In the future, as digital technology and urban governance become deeply integrated, the allocation of eldercare resources will evolve toward greater dynamism, intelligence, and precision, providing new practical pathways for the governance of aging societies in megacities.

COMPETING INTERESTS

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