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Factors Influencing Healthcare Utilization of the Migrant Population: An Empirical Study of the Pearl River Delta Region

LI Yan

Doctor of Management

Supervisor:
PhD Nelson Antonio, Professor,
ISCTE University Institute of Lisbon

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BUSINESS
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Abstract

With the Pearl River Delta (PRD) region as an example, this research explores the healthcare utilization of the migrant population and its influencing factors. A managerial dimension is adopted to study healthcare utilization, so as to deepen the understanding of the healthcare utilization behavior of the migrant population. According to the empirical analysis, the following conclusions have been reached. First, the demand of the migrant population for healthcare public services is universal. Second, the differences in the healthcare utilization by the migrant population with different characteristics are significant. Third, the healthcare utilization of the migrant population is influenced by a variety of factors. Fourth, the accessibility of public healthcare services for the migrant population in the PRD region needs to be improved. Therefore, it is necessary to improve the public health service system, promote the health literacy of the migrant population, and strengthen the monitoring og the health status of the migrant population, so as to realize the strategic goal of Healthy China.

Keywords: Pearl River Delta region; migrant population; healthcare utilization; influencing factors

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Resumo

Com base no modelo de utilização proposto por Andersen e no modelo de stress psicofisiológico proposto por Brunner e Marmot, e tendo a população migrante da região do Delta do Rio das Pérolas (DRP) como alvo de pesquisa, analisamos os dados da Pesquisa de Monitoramento Dinâmica de Migrantes da China (PMDMC) de 2016, 2017 e 2018 para estudarmos empiricamente a utilização dos cuidados de saúde da população migrante do DRP e os seus fatores influenciadores. Os resultados da pesquisa foram: Primeiro, os migrantes têm baixa iniciativa na utilização dos cuidados de saúde e fraca consciência de cuidados de saúde preventiva. A porpoção de migrantes do DRP que procuram tratamento médico oportuno é de 45,12%, e somente 17,52% dos migrantes estão disponíveis para participar em exames de saúde gratuitos. Segundo, os migrantes têm baixo nível educacional e elevado stress no trabalho e na vida. O nível educacional da população migrante da amostra é baixo e a percentagem daqueles que têm um nível de escolaridade até ao ensino médio é de 57, 51. Terceiro, existe uma diferença significativa na utilização dos cuidados de saúde entre os migrantes do DRP. Os resultados mostram que o tratamento médico oportuno, a preferência por hospitais gerais, e a utilização de cuidados de saúde preventiva difere entre migrantes com diferentes fatores sociais, fatores stressantes, características predisponentes, características facilitadoras e características de necessidade, e as diferenças são estatisticamente significativas. Quatro, existem diferenças no grau de influência dos diferentes fatores na utilização de cuidados de saúde da população migrante.

Palavras-chave: Delta do Rio das Pérolas; população migrante; utilização dos cuidados de saúde; fatores influenciadores

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摘　要

本研究以珠三角地区为例，探讨流动人口医疗卫生服务利用状况及其影响因素。研究从管理学维度拓展医疗卫生服务利用的研究视野，以深化对流动人口医疗卫生服务利用行为的理解。实证分析表明：第一，流动人口对医疗健康公共服务需求具有普遍性；第二，不同特征流动人口对医疗卫生服务利用的差异性较为显著；第三，流动人口的医疗卫生服务利用受多因素影响；第四，珠三角医疗卫生公共服务对流动人口的普及性亟待提升。为此，应健全公共卫生服务体系，推动流动人口健康素养持续提高，强化流动人口健康状况监测，以实现“健康中国”的战略目标。

关键词：珠三角地区；流动人口；医疗卫生服务利用；影响因素

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Chapter 1: Introduction

1.1 Research background

As one of the fundamental rights for human development, health is of great importance for individual development, family harmony, social development and stable economic growth. Health issues, in a general sense, are closely related to both the state and society. However, in China, health is universally regarded as an individual matter, and only national public health care is considered to be accountable by the government (Z. Wei, 2004). Although scholars in sociology, economics, and even management are increasingly concerned with issues on population health and health care, the government still tends to rely on public health management experts when formulating relevant health policies. Since the implementation of the reform and opening up policy, China has made enormous achievement in its economic development, but its health care system built upon social resources has been quite unsatisfactory (Shan, 2018; Wang & Wang, 2021). As a result, how to improve people's utilization of healthcare services and the overall health of the whole society is now a pressing challenge for the government to address. In addition, social differentiation and social stratification have become an important feature in the current stage of economic and social transformation, which, in terms of healthcare issues, is mainly reflected in the significant differences in the level of healthcare service utilization between urban and rural residents and between people with different socioeconomic statuses. Therefore, the government interventions need to be based on the heterogeneous characteristics of the population and adopt different targeted approaches to reduce the inequality of healthcare services among different groups of people. Currently, research on healthcare service utilization among the migrant populations is facing the following social background and policy environment.

First, practically speaking, China has witnessed accelerated industrialization and urbanization, with its urbanization rate reaching 65.22% in 2022. However, the rapid social and economic development has been followed by the intensification of imbalanced development between different regions and between urban and rural areas. The development in the eastern, central and western regions of China is imbalanced, and there is a huge gap of economic development between coastal areas and inland areas and between urban and rural areas. These

imbalances and inadequacies have brought many social contradictions and problems, which are the main source of the various social contradictions at this stage. This this is one of the major motives for the large-scale population migration between regions, especially between urban and rural areas, and between economically developed and underdeveloped regions (M. X. Zeng et al., 2019). The population migration pattern has gradually developed from seasonal migration as the majority supplemented by perennial migration to perennial migration as the majority supplemented by seasonal migration, and a large number of migrant population distinct from the household registered population have emerged in cities as a result (Mu, 2006). The frequent migration of population has become a prominent social phenomenon in the development of China. Statistics show that within two years from 2015 to 2016, the total amount of migrant population had dropped from 247 million to 244 million. In spite of the decrease of 3 million people, the migrant population still accounted for 17.55% of the total Chinese population in that year. Accordingly, it goes without saying that the urban migrant population is a very important group worthy of study. In fact, the large-scale population migration is an important manifestation of economic development and social progress. The movement of population accelerates the urbanization process, satisfies the need for labor-intensive and low-skilled jobs in cities, promotes the industrialization of the society, and makes an indelible contribution to urban modernization and economic growth.

However, population migration inevitably brings about a number of problems in social management, among which a prominent one is the challenges posed to health care. Generally speaking, China's social security system, such as the health care system, is managed on a geographical and registered residence basis, so the migrants are mostly excluded from the social security system and urban medical assistance system in their residence cities, and their social needs have long been neglected by the public (Croucher & Miles, 2010). In addition, the living conditions of these migrants are generally poor and their health awareness is relatively insufficient, so they may encounter the danger caused by public health crisis apart from dealing with their own health security problems. Therefore, given that population migration has become a prominent feature in the economic, social and demographic transformation in China at the present stage, the health care problems faced by the migrant population, or the urban migrants, have important research value, and how to solve the health care problems of the migrants is also an urgent issue to be considered at present.

After reviewing the relevant policy initiatives, it is found that in order to solve the problem of difficult and expensive access to medical treatment for the urban migrant population, the State Council promulgated in 2006 the *Several Opinions of the State Council on Solving the*

Problems of Migrant Workers, which proposed to focus on solving the problem of insufficient inpatient medical coverage for the migrant workers in the city and actively promote the medical coverage of major diseases for the migrant workers. The *Labor Contract Law of the People's Republic of China (2021 version)* stipulated for the first time that the migrant workers should have the same labor protection rights as the local workers, and required all employers to pay social insurance premiums for their employees in accordance with the law. In 2014, the Ministry of Human Resources and Social Security of China launched the *National Insurance Registration Initiative*. In the same year, the State Council released *Opinions on Further Promoting the Reform of the Household Registration System*, which incorporated the migrant population and other permanent residents into the community health and family planning service system and provided them with basic medical and health services. In addition, the government also actively implemented the policy of fully integrating migrant workers settling in urban areas into the urban social security system, transferring pension insurance and medical insurance paid in rural areas to the urban social security system, improving and implementing methods for transferring and continuing medical insurance and settlement of medical treatment in different places, integrating the basic medical insurance system for urban and rural residents, and accelerating the implementation of a unified urban and rural medical assistance system. On July 6, 2018, President Xi Jinping presided over the third meeting of the Commission for Further Reform under the CPC Central Committee and approved the *Guiding Opinions on Establishing and Improving a Standardized System for Basic Public Services*, which clarifies the requirements for the quality of the national basic public services covering 9 aspects including early childhood care, education, labor, medical treatment, elderly care, housing, support for the vulnerable as well as protection for the military, and cultural and sports service.

Although the Chinese government has actively formulated policies to alleviate the problems of healthcare service utilization such as difficult and expensive access to medical treatment, it makes no difference to fundamentally solve the difficulties in the utilization of healthcare services for the migrant population. In addition, one of the important features of economic and social transformation is social differentiation and social stratification, and in terms of population health and health care issues, they are manifested by the significant differences in health level and healthcare service utilization level among different groups of people (for example, between urban and rural residents, between the registered and migrant populations, and between groups with different socioeconomic status). As a result, the relevant government interventions should be differentiated according to the population heterogeneity, and efforts should be made to reduce inequality in health and healthcare service utilization

among different groups of people. Therefore, based on the existing research results, it is necessary to conduct a more systematic study on the differences in healthcare service utilization among the migrant population as well as the influencing factors and the degree of influence.

Furthermore, due to the large differences in resource endowment and institutional background between different regions, their healthcare service systems that are closely related to the health of the migrant population also differ from each other. Therefore, in order to strengthen the typical value and generalizability of the research findings, we take the migrant population in the Pearl River Delta (PRD) as the research respondents based on the parameters such as the size of the migrant population, the level of regional economic development, and the goal of new-type urbanization, analyze the facilitating factors influencing the utilization of healthcare services among the migrant population, and identify other hindering factors. This research is of practical value to improve the utilization of public healthcare resources of the migrant population in the Pearl River Delta region, enhance the health and welfare of the migrant population, achieve the goal of equalizing basic healthcare services, promote social equity and justice, and ultimately achieve the strategic goal of “Healthy China”.

As a special group of people, the urban migrants have attracted extensive attention from the academia and the government in their healthcare service utilization problems. On the surface, the healthcare problems of the urban migrants are the development problems of themselves as a special group caused by the spatial displacement of the population, but in fact, they also imply the problems of balanced urban and rural development, social stability and equity. In response to the problem of unequal utilization of healthcare services, the government has introduced several health policies and encouraged medical and healthcare institutions in the market to provide more healthcare services, so as to meet the urgent healthcare needs of the migrant population, but the current situation of healthcare utilization of the migrant population is still not optimistic. The migrant population in China has exceeded 376 million people as revealed in the Seventh National Census of China carried out in 2020, and with the social and economic transformation, there are bound to be differences in the utilization of healthcare services among such a large group of people. Therefore, based on the existing research results, it is necessary to conduct a more systematic study on the differences in the utilization of healthcare services among the migrant population as well as the influencing factors and degree of influence.

As one of the important economic centers in China, the Pearl River Delta is a globally influential advanced manufacturing base and modern service base as well as a national base for scientific and technological innovation and R&D. Its high level of economic development and openness has created a large number of employment opportunities and attracted surplus labor

from all the other provinces across China as well as labor from small and medium-sized cities, leading to an unprecedentedly large scale of migrant population in the Pearl River Delta. Authoritative data from China's seventh census conducted in 2020 show that the permanent resident population of in the Pearl River Delta region amounted to 78.01 million, accounting for about 62% of the whole population of Guangdong Province. However, the migrant population in the Pearl River Delta regions reaches at least 39.12 million, a figure close to the permanent resident population of Shaanxi Province in 2020 (39.529 million), exceeding the population size of provinces such as Shanxi, Heilongjiang, Guizhou and Gansu. The biggest drawback of traditional urbanization is that it only allows the migrants to get employed in the cities, but fails to provide them with equal citizenship or basic public services. At present, the top priority in promoting the new-type urbanization is to enable the migrant permanent residents including migrant workers to be treated equally as citizens as soon as possible. Under the existing institutional framework, public service resources in cities of the Pearl River Delta are mostly allocated according to the household registered population, but the actual population that the cities need to manage far exceeds the household registered population, which gives rise to the problem of resource misallocation. One of the major issues related to the allocation of public service resources to the migrant population is the allocation of healthcare and medical resources, which is also one of the important goals of government management and public services. Given that a prerequisite for policy formulation is the need to explore the key factors affecting the utilization of healthcare services for the migrant population, research in this respect has also received considerable academic attention.

1.2 Institutional background

The dual social structure in China, represented by the household registration system, exerts a profound impact on its social and economic development. The inequitable "dual" system of employment, social security, housing and healthcare driven by the household registration system is prevalent across China. Due to the migrating and transient nature, the urban migrants are permanently marginalized in the urban area, unable to enjoy the social services of their place of household registration and excluded by the public service system of the place where they move. The inequity of social security rights and benefits caused by the dual social structure puts the migrant population in a disadvantaged position in terms of their medical services and benefits.

1.2.1 Dual household registration system

The household registration system currently adopted in China started from the urban-rural household registration system implemented during the planned economy after the founding of People's Republic of China, which is a product of the special institutional changes in China. At the beginning of the founding of People's Republic of China, due to material scarcity and backward productivity, in order to get rid of poverty and establish a relatively complete industrialization system as soon as possible, the development of heavy industry was identified as the main strategy of the country, and the planned economy model was adopted in the economic system to promote the allocation of social and economic resources and the optimization of industrial distribution. Given that heavy industry is capital-intensive and requires a limited amount of labor, in order to prevent a large flow of the agricultural population to the cities, which can lead to increased pressure on urban employment and a shortage of rural labor, the government has developed the household registration system to divide the urban population from the rural population, resulting in an urban-rural division of the household registration system by institutional design.

(1) Development of the dual household registration system

China's household registration system was gradually established after the founding of People's Republic of China in order to realize the strategy of prioritized development of industrialization. According to the attitude towards people's freedom of migration (Ren & Song, 2018), there are three stages including the stage of free migration, the stage of strict restriction on migration and the stage of relative restriction on migration.

1. The stage of free migration (1949-1957): Formative period of the household registration system

Generally speaking, in this stage, the government adopted a policy of free migration with no restrictions. In 1949 when People's Republic of China was initially founded, "to guarantee people's freedom of residence and migration" was confirmed as the basic principle of the Party and government's household registration work. In 1951, China promulgated the first regulations on household registration, the Provisional Regulations on the Administration of Urban Household Registration, which also clearly stated that "the security and the freedom of residence and migration of the people shall be guaranteed". In 1954, the Constitution clearly stated that "citizens of the People's Republic of China have the freedom of residence and migration". In June 1955, the State Council issued the Instruction on the Establishment of a Regular Household Registration System, which established a unified household registration

system in urban and rural areas nationwide. Only the approval of the People's Committee of the place of departure is required for household migration, and there are few restrictions on population migration, especially for the rural population moving to cities.

Due to the affirmative attitude of the national policy towards the free migration of citizens at this stage, the free two-way movement of urban and rural populations was also smooth and largely unrestricted. Population migration during this period was mainly from urban areas to rural areas. According to statistics, between 1950 and 1954, nearly 150,000 urban residents were mobilized by the government to voluntarily return to the rural areas to engage in agricultural production. Although this part of the population migration was planned by the government, it was a voluntary act of the masses, so it was still a kind of free migration.

2. The stage of strict restriction on free migration (1958-1978): Development period of the household registration system

During this period, the overall trend was that the government implemented a policy of strict restriction on the free migration of the public. In order to effectively limit the influx of rural population to the urban areas, in 1958, the Standing Committee of the National People's Congress promulgated China's first law on household registration, *the Regulations of the People's Republic of China on Household Registration*. It is stipulated that citizens moving from the rural areas to the urban areas must apply to the permanent residence household registration authority for migration procedures with a certificate of acceptance from the urban labor department, a certificate of admission to a school, or a certificate of permission to move in from the urban area household registration authority. Hereby, the peasants' migration to cities was restricted by law, and the citizens' right to free migration was de facto abolished. In April of the same year, the Ministry of Public Security issued Preliminary Opinions on the Implementation of the Regulations on Household Registration, which stipulated that migration from rural areas to cities (including counties and towns) should be strictly restricted in accordance with the relevant regulations on the blind outflow of the rural population. Afterwards, policy documents such as *the Notice on the Handling of Household Registration Transfer Issues*, *the Opinions on Strengthening Household Registration Management*, and *the Regulations of the Ministry of Public Security on the Handling of Household Registration Transfer* have been released successively, further restricting the liberty of population migration.

At this stage, the household restriction policy implemented by the government had led to extremely slow growth of urban population. The urbanization rate was 18.4% in 1959 and 17.9% in 1978, with a decline of 0.5 percentage points in 20 years. The urban-rural dual social structure of has been gradually formed and solidified.

3. The stage of relative restriction on free migration (1978 to present): Adjustment period of the household registration system

In this stage, the government implemented the policy of relative restriction on free migration. After the Third Plenary Session of the Eleventh CPC Central Committee in 1978, the focus of the Party and the state shifted to economic development. In October 1984, the State Council issued the Notice on Transfer of Household Registration to Towns for the Peasants, which stipulated that all peasants and their relatives who apply to work, do business, or run service enterprises in towns, or work in township enterprises and public institutions on a long-term basis are allowed to transfer their household registration to towns, which is a great breakthrough in the household registration reform in China. In September 1985, the Standing Committee of the National People's Congress issued the Regulations of the People's Republic of China on Resident Identity Cards, which stated that residents may present their resident identity cards to prove their identity when dealing with matters of political, economic, and social life. The implementation of the ID card system somehow reflects the state's respect for the individual and the attitude of equality of all people, which has further promoted urban-rural population migration.

Due to the loosening of the policy, rural residents swarm to the urban areas in large numbers. Coupled with the influence of the international environment, the increasingly large urban population exerts great pressure on the planned supply of China. As a result, in October 1989, the State Council issued the Notice on Strictly Controlling the Excessive Growth of "Conversion from Rural to Non-rural Household Registration", which again strictly controlled the migration of the rural population into the cities. With the further development of the market economy, the grain and oil market has been fully opened since January 1, 1993. The termination of the circulation of food coupons ended the history of linking household registration to grain and oil and greatly weakened the value of urban household registration. As a result, local governments also started reform of the household registration system and lowered the restrictions on the conditions for migrants to settle down. The reform of the household registration system has become a consensus among all sectors. In essence, the reform of the household registration system is a matter of equalization of public services. However, the reform has no substantial progress with much cry and little wool.

In recent years, with the development of China's economy and the improvement of transportation convenience, the scale and speed of population migration have been increasing. According to the statistical data of relevant departments, the total number of migrant population in China in 2011 was nearly 230 million, which accounted for 17% of the total population of

China. The proportion of rural household registration migrant population accounted for about 70% of the total migrant population, and with the deepening of the household registration system reform, the number and proportion of rural migrant population will continue to rise. From the perspective of population inflow, most migrant population are concentrated in the eastern coastal areas, and with the adjustment of China's urban structure and the continuous implementation of the household registration system reform, the migrant population is now mainly concentrated in the major national key cities. Labor-intensive and resource-intensive industries gradually transfer from the eastern coastal areas to the inland areas, especially the central and western cities, which has attracted a large number of central and western population to migrate backwards, and a large number of workers from other provinces are also attracted to work in the central and western regions. It is expected that within a long period of time in the future, the key developing cities and urbanized regions in China will become the main migration destination of the migrant population in China.

(2) Evaluation of the dual household registration system

The essence of the household registration system is a social administration system serving the registration and management of population, but the household registration system in China established since the founding of the People's Republic of China has generated some functions with Chinese characteristics in its formation and development. One is the "subsidiary" function of the household registration system, namely, a series of social welfare systems linked to the household registration system; the other is the function of restricting population mobility (W. L. Wang, 2010). In the dual household registration system, people are categorized into urban residents and rural residents, and the social welfare enjoyed by these two groups of people is different. Moreover, the change of identity between the two groups is explicitly restricted, and the allocation of social public resources according to the difference in household registration status further restricts population migration. The household registration system has a profound impact on the life, work, and healthcare of the people, especially the migrant population.

From the perspective of historical achievement, China's dual household registration system has provided a relatively stable environment for the development of the national economy. To be specific, on the one hand, the strict household registration system has prevented the expansion of city size, ensured the relative stability of urban population, and eased the pressure of urban employment. On the other hand, this system also allows China to have a stable rural area and a large and stable group of farmers, which has an inestimable value in developing the rural economy, improving agricultural productivity, and ensuring the supply of agricultural by-products for cities and food raw materials for industries. However, there are also disadvantages

of the dual household registration system. First, this system is the institutional root of the separation between the urban areas and the rural areas, on which all the other unequal systems are based. It not only restricts the personal freedom of peasants, but also hinders the sound operation of economy and society, and restricts the process of urbanization and urban-rural integration. Second, this system has led to different political, economic and social rights for urban and rural residents. Under the current institutional arrangement, from the first day of birth, there is a big gap and unfairness between rural residents and urban residents in term of social rights, economic rights and political rights.

With the advancement of the reform of China's household registration system, it is further clarified that the reform of the household registration system is not simply the abolition of rural household registration, and the biggest obstacle lies in the differences in the corresponding welfare system brought about by the categorization of household registration. Therefore, the reform of the household registration system is a step-by-step process, and the ultimate goal is to separate public welfare from the categorization of household registration (X. Y. Guo, 2010). As a provider of social public goods, the government has the responsibility to provide reasonable institutional arrangements for the harmonious social development and social equity, but it should be realized that the reform of the household registration system faces the problem of resource bearing capacity brought by the expansion of urban population. Therefore, the reform of the household registration system should further follow the principle of "recognizing differences and promoting it in a step-by-step manner, and steadily promote the equity of public services such as employment, basic old-age pension, housing security, and basic healthcare. With reference to the research objectives of this thesis, we argue that the government should regard realization of the basic rights of the migrant population as the focus of the household registration reform, establish a new type of people-oriented, standardized and orderly household registration system, and improve the healthcare utilization level of the migrant population after the household registration system reform.

1.2.2 Dual housing security system

The root cause of the dual housing security system resulting from the dual household registration system is the difference in the relationship between urban and rural residents and land. The most prominent characteristic of China's population migration is that the direction of population movement is predominantly from rural to urban areas, and the homestead policy for Chinese rural residents implies that the migrant population are bound to face housing pressure.

This is closely related to the efficiency of land use in Chinese cities, and the disparity between the building densities of land in rural areas and urban areas is a key factor leading to the high pressure on housing for the migrant population.

Compared with the low building density in rural areas, the high building density in cities is an important factor contributing to the increased psychological stress and deteriorating physical health of the migrant population. Similar to the household registration system, the housing security system in cities has also been designed and reformed within the framework of the urban-rural dual economic and social system. At this stage, although a market-oriented approach has been adopted in resource allocation, and housing allocation in the planned economy has been abandoned to a certain extent, the affordable housing is still only applicable to the permanent urban residents. This means that both the migrant population with "non-rural household registration" or "rural household registration" cannot enjoy the beneficiary housing policy of the place where they move.

The historical development of the dual housing security system shows that during the planned economy, housing for urban residents was built or allocated by the government or public institutions for a long time, and the renters only paid a small amount of rent. While this housing supply system ensures that urban residents can rent houses at low cost, it also poses two problems: the slow construction of housing in towns and cities, and the heavy burden on governments and public institutions. In 1980, Comrade Deng Xiaoping proposed the general reform idea of "selling public housing, adjusting rents, and advocating individuals to build and buy houses". In 1988, the State Council issued the Notice on the Issuance of the Implementation Plan for the Reform of the Housing System in Phases and Batches in Cities and Towns Across China, and the General Office of the State Council issued the Notice on the Forwarding of the Opinions of the Leading Group of the State Council on Housing System Reform to Encourage Employees to Buy Old Public Housing, proposing that the reform of the housing system should be implemented in phases and batches in cities and towns nationwide, and the focus should be placed on adjusting housing rents and selling newly-built housing to employees. In the 1990s, the housing system for urban residents began to undergo fundamental changes. In 1994, the State Council issued the Decision on Deepening the Reform of the Urban Housing System, proposing to change the system of housing construction investment from state and employer responsibility system to shared responsibility by the stage, the employer, and the individuals, establish a system of affordable housing (for low and middle-income urban families) and commercial housing (for high-income urban families), and establish the housing provident fund system. In 1998, the State Council issued the Notice on Further Deepening the Reform of Urban

Housing System and Accelerating Housing Construction, deciding to stop the allocation of housing and gradually realize the monetization of housing allocation from the second half of 1988. To ensure that urban residents can afford housing, the government established two basic systems in a targeted manner, namely the provident fund system and the affordable housing system.

From the perspective of urban-rural division, urban migrants, especially those who migrate from rural to urban areas, do not have the financial ability to purchase commercial houses in the cities due to the restriction on the transfer of ownership of rural homesteads. Regionally speaking, the migrants are excluded from the beneficiaries of housing policies in the places they move to. Under the dual housing system, the peripheral areas of the cities still adopt the "homestead" management system, and therefore become the best choice for the urban migrants. Moreover, the migrant population, including the "new immigrants" from rural areas, those who cannot afford to buy a house within a certain period of time, and the "permanent migrant population", cannot enjoy the "low-rent housing" or "affordable housing" provided by local governments for low-income families. Neither can they enjoy the housing benefits (for example, housing loans and housing subsidies), and therefore they have gradually become the disadvantaged groups in housing in the urban area. Although there is no longer a distinction between rural and non-rural household registration, there is still a long way to go to reform the rights to enjoy resources based on to the traditional dual household registration system. The dual housing security system is a major source of housing problems for the migrant population, and housing problems are an important factor of psychological stress for this group of people. In addition, psychological stress is a key pathway to influence individual health behavior and healthcare utilization.

1.2.3 Dual medical security system

The medical security system in China follows a dual development path with different resource allocation in urban and rural areas, and this dual medical security system has led to a certain degree of imbalance in the supply and demand of medical security resources in various regions. There are two independent medical security systems in China: the urban medical security system consisting of the basic medical insurance for urban employees and the basic medical insurance for urban residents as well as the new rural cooperative medical system. The independence of the two medical insurance systems and the territorial management model have put the urban migrant population in an awkward situation for a long time. In addition, in terms

of medical insurance coverage and support, due to the territorial management model of basic medical insurance, there are obvious regional, urban-rural and industrial differences in the financial support of various medical insurance systems in China, and there are many restrictions on cross-regional medical reimbursement for the insured. The inability to implement cross-regional medical security initiatives is the most obvious obstacle to the current medical security system, and it is also a great hindrance to the free flow of labor forces, which is not conducive to the sustainability of medical insurance funds.

The medical security of the urban migrants has now attracted close attention from the society as well as regional governments. After issuance of the Notice on Promoting the Employment Management and Service for the Urban Migrant Workers, the Opinions on Promoting the Participation of Employees of Mixed-Owned Enterprises and Non-public Economic Organizations in Medical Insurance, and the Opinions on Solving the Problems of Migrant Workers, in 2015, the General Office of the State Council issued the National Healthcare Service System Planning Outline (2015-2020), and various cities have also formulated corresponding policies to address the problem of insufficient medical insurance of migrant workers in light of their own economic development levels. In the Pearl River Delta region, Shenzhen promulgated the Interim Measures on Medical Insurance for Contract Employees in Shenzhen in 2006, upgrading the "cooperative medical insurance" introduced on a trial basis in 2005 to the migrant worker medical insurance system featuring "low enrolment fee, wide coverage, and assurance of basic health needs". In 2008, the migrant workers' medical insurance was formally incorporated into Shenzhen's basic medical insurance system, and the Shenzhen Social Medical Insurance Measures were promulgated. In 2015, Guangzhou released the Measures for Social Medical Insurance in Guangzhou (hereinafter referred to as the "Measures"), which also clearly proposed that the insured persons who have confirmed receiving long-term medical treatment in other places or settled abroad can retain their personal accounts. It is further clarified in the Measures that when transferring the social medical insurance relationship, the migrants who work in places other than their household registration place can transfer the balance of their personal account or withdraw cash as long as they can provide necessary information.

The different health insurance models for the migrant population in each region constitute the "firewall" against medical risks for urban migrants. In addition, due to the development of the Internet and the improvement of the transportation network, the population migration is becoming increasingly more frequent, and the scale of the migrant population with long-term settlement intention is also expanding. In the long run, the ultimate goal is to provide equal

medical services to the migrant population and the local residents, so as to gradually realize equalization of the basic public services.

1.2.4 Relevant situation in the Pearl River Delta Region

In the regional level, the household registration system, housing security system and medical security system reforms in the PRD region are basically the same as those in Guangdong Province, the institutional background in this section is mainly based on the situation in Guangdong Province.

(1) Dual household registration system in the Pearl River Delta Region

The household registration system in Guangdong Province is basically consistent with the policies prevailing in China. However, as the reform and opening up policy was first implemented in Guangdong Province, the reform of its household registration system has been accelerated to meet the needs of the economic system reform. The household registration system in Guangdong can be roughly divided into four stages since the implementation of the reform and opening up policy.

The stage of household registration system reform with the main goal of liberating the surplus rural labor force (1978-1992)

At this stage, the reform of the household registration system in Guangdong Province was implemented in line with the overall national policy. However, with the continuous development of Guangdong's industrial economy, in order to meet the economic development and achieve a breakthrough in further liberating the surplus labor force in the rural areas, in July 1984, the Guangdong provincial government approved the Opinions on Settlement in Towns for Rural Residents Responsible for Their Own Grain Rations proposed by Guangdong Provincial Department of Public Security, which allowed rural residents working, doing business and running service industries in towns and rural residents who are responsible for their own grain rations to settle in towns. This is the first major reform of the household registration system of Guangdong Province since the founding of the People's Republic of China. In 1986, the Guangdong Provincial Government stipulated in the Notice of Approval of the Report of the Provincial Public Security Department on the Settlement of Rural Population in Cities and Towns that large and medium-sized cities, county-level cities, and counties were allowed to receive workers and family members of urban residents who change from rural household registration to non-rural household registration by no less than 2%, 3%, and 4% respectively of their existing residents. Previously, all types of non-rural areas can only receive

migrants no more than 1.5% of the total population, and this stipulation has relaxed the control of rural population moving into cities and towns.

The stage focusing on household registration system reform in small towns (1992-1998)

As a pioneer, forerunner and experimental zone of the reform and opening up policy, Guangdong went through a rapid increase of migrant population as well as intensified pressure on the household registration management. In order to meet the demands of the migrant population for household registration, in November 1992, the Guangdong provincial government issued the Notice of Approval of the Provincial Public Security Department on the Adjustment of Certain Policies on Household Migration, pioneering the reform of the household registration system for small towns in China, and delegating the control of rural migration to small towns to local governments. Under the principle of "local needs, local benefits, local burden, and local effectiveness", the local governments determine the total amount of rural population who can migrate to towns, so that the scale and speed of population migration are coordinated with economic development. Those who have applied for local urban household registration are defined as non-agricultural population, and they enjoy the same rights and fulfill the same obligations as the existing urban residents in education, health care and implementation of the family planning policy. From 1992 to 1998, a total of more than 5 million people achieved the household registration in small towns. In June 1997, the State Council issued the Notice of Approval of the Pilot Program for Reforming the Household Registration Management System in Small Towns and Opinions on Improving the Household Registration Management System in Rural Areas by the Ministry of Public Security, which called for reform of the household registration management system in small towns nationwide and liberalization of the conditions for persons with rural household registration to apply for permanent residence in small towns. In February 1998, the Guangdong Provincial Public Security Department, in its Notice on Forwarding the Answers to Questions Concerning the Reform of the Household Registration System in Small Towns and the Improvement of the Household Registration System in Rural Areas, broke through the principle that babies should register their household only with their mothers according to the Regulations on Household Registration, and for the first time proposed that babies born after January 1, 1998 could be registered with either their fathers or mothers. This is the first attempt to reform household registration in Guangdong, and in August of the same year, the State Council issued a formal permit for the registration of babies with either their fathers or mothers.

The stage of comprehensive reform (1999-2002)

After 1998, the State Council intensified the reform of the household registration system,

issuing several opinions on the reform of the household registration system in August 1998 and March 2001. The government has broken the original household registration management system by liberalizing the conditions for urban household migration, implementing the voluntary registration of infants with their parents, and abolishing the association of grain and oil supply with household registration. At this stage, however, Guangdong province conceived and introduced a more aggressive initiative to reform its household registration system. In November 2001, the General Office of the provincial government issued the Notice on Forwarding the Opinions of the Provincial Public Security Department on Further Promoting the Reform of the Household Registration System, and took the lead to abolish the rural and non-rural household registration, followed by adjustment of policies by the family planning departments and civil affairs departments.

The stage of further exploration (2003 - Present)

After 2004, some economically developed areas in the Pearl River Delta Region attempted to steadily implement reforms of the household registration system, and the reforms have been successful in the highly urbanized cities such as Shenzhen and Foshan. In March and July 2004, the governments of Shenzhen and Foshan launched a unified reform program to coordinate urban and rural development, and endeavored to gradually eliminate the differences created by the dual management system. To date, the reforms in both cities have achieved certain social results in rebuilding the unified management system, such as the integration of education, employment and minimum living standards, unemployment relief and family planning policies in Shenzhen, and integration of education, minimum living standards and unemployment relief policies in Foshan. However, the dual structure in Shenzhen and Foshan is not obvious, because both of them are regions with a high degree of economic development. The differences in the treatment between the rural and non-rural household registration are not significant, and even the benefits of those with rural household registration are better than those with non-rural household registration. Therefore, their reforms are not very difficult, and are only somewhat representative of the Guangdong province or even the country. However, it can be proved from another perspective that the reform of the household registration system should be in line with the degree of economic development.

At the end of 2016, 31 provinces and municipalities across China had abolished the distinction between rural and non-rural household registrations, which means that the reform of China’s household registration system is in line with the requirements of the development of the market economy. Our goal has always been to strive for equal citizenship, abolish migration restrictions and improve registration system. In this context, the continuous improvement of the

household registration system in the PRD region has further promoted the reform of other undertakings such as family planning, social security, compulsory education and labor and employment, and paved the way for the reform of these supporting measures.

(2) Dual housing security system in the Pearl River Delta Region

Due to historical reasons and the degree of economic development, the housing construction and the related security system in Guangdong Province have their own special characteristics. Based on the actual situation, we divide the reform of housing security system in Guangdong Province into four stages.

The stage of traditional welfare housing construction (1949-1977)

After 1949, China entered the era of planned economy. During this period, the country was just founded, the socialist system was not perfect, the financial burden was heavy, industrial construction was prioritized, and many distribution systems were based on socialist ideas. The housing construction and distribution in this period also adopted the socialist ideas. The economic development of Guangdong Province at that time was slow, the living conditions were poor, many residents lived in shacks, and the whole area was dominated by bungalows. The only type of housing at this stage was public housing, and the government was responsible for the construction and distribution of housing. As the single supplier of housing, the government offered funding for construction of limited amount of housing. The state treasury allocated money to enterprises, and they then organized the construction of corresponding housing, which is known as welfare housing.

The stage of welfare housing reform (1978-1991)

The reform and opening up allowed Guangdong Province to achieve leaps and bounds in economic development, and the economic improvement brought about the vigorous development of housing construction. The planned economy gradually shifted to the market economy, and Guangdong Province was one of the first regions to implement reform. Pilot reforms such as the sale of public housing were also underway. In terms of housing development, the key word is welfare housing allocation, and flats or apartments had become the major type of housing construction, with people's living conditions reaching a new level. In addition, it is the use value of land and the rise of the real estate industry that serve as a huge boost to housing. As the first province exploring the road of commercial housing, Guangdong was the first province to implement commercialization of housing and explore the socialist market economy with Chinese characteristics, and the supplier of housing started to shift from the government to the market.

The stage of comprehensive promotion of housing reform (1992-2002)

After 1992, China's real estate industry had achieved relatively good development, and the main supplier of housing was no longer the government, but the real estate market. The housing was obtained mainly through purchase, and the real estate industry experienced rapid development with the increasing demand for housing. This is also caused by the rigid needs for housing in China, which allows China's economy to maintain the momentum of rapid development. The government has shifted the pressure of housing to the market to build more houses through the development of the real estate market so as to meet the public needs for housing. The land auction also allows the government to obtain more funds for development. The rapid development of the real estate industry also leads to the slow development of government-subsidized housing, so a large number of families living in government-subsidized housing have to buy commercial housing. The market has become the only supplier for housing.

With the continuous improvement of the economy of Guangdong Province, its overall living environment has also jumped to the leading level across China. In particular, the per capita living standard in the Pearl River Delta region is already comparable to that in developed countries. Shenzhen, as a special economic zone, has a very promising development prospect. It has borrowed the advanced experience from foreign countries to develop its real estate industry and established a multi-level housing standard supply system to meet different income groups. Shenzhen, Zhongshan and Foshan won honorary awards in living environment by the United Nations in the late 1990s.

The stage of strengthening the construction of indemnificatory housing (2003 to present)

In the 21st century, the real estate market has continued to develop rapidly, and the various types of commercial housing has met most of the residents' needs for housing and provided a large amount of capital gains. However, the rapid development of the real estate industry has also led to disconnection in the market. With no linkage between the sale and purchase of houses and other products in the market, and a chaotic market order, there appears a sharp rise in housing prices. High housing prices have made some people unable to afford housing, and this chaotic phenomenon has become a new point of conflict in society. The counterpart of commercial housing is the indemnificatory housing, or the government's subsidized housing, in which the government's investment is far from enough. As a result, there is often a severe lag in the construction of indemnificatory housing, and in many areas, the indemnificatory housing is unable to meet the residents' needs for housing. For the government housing administrative department, it is necessary to allocate some resources toward the indemnificatory housing, so that it can return to the right track of development. Through the construction of indemnificatory housing, the local governments can allow low-income people

to have houses to live in, thus eliminating some of the social conflicts. Guangdong has also offered talent housing and social security housing for talents.

Guangdong has adopted a unified management of the indemnificatory housing since 2012, which makes the management and control of the indemnificatory housing more accurate and reasonable. Since 2014, the public rental housing and low-rent housing in Guangdong has been merged, but Shenzhen still retains affordable housing, which is also in line with the local economic environment. The rent of public rental housing can be reduced in other forms, which is also equivalent to the nature of low-rent housing. It can be found that the government of Guangdong province is becoming more flexible in the formulation of indemnificatory housing policies, and with the development of the indemnificatory housing, it can really play its due role.

(3) Dual medical security system in the Pearl River Delta Region

In 1965, the Central Committee of the Communist Party of China (CPC) approved the Report of the Party Group of the Ministry of Health on Putting the Focus on Health Work in Rural Areas, which marked China's efforts to promote the development of the rural cooperative medical system. It was clearly emphasized in the Report that all the local governments should strengthen primary-level health care in the rural areas. By the end of 1965, the cooperative medical system had been implemented in some counties and cities in many provinces and autonomous regions, including Jiangsu, Guangdong, Jiangxi, Shanxi, Xinjiang, Hubei, and Fujian. At this stage, the main components of the rural cooperative medical care were cooperatives and doctors, and efforts had been made to strengthen the development of rural clinics, which eventually constituted a three-level medical service network covering the county, township, and village areas. As a result, the threshold for rural collectives and individuals to participate in cooperative medical care was greatly lowered, and the accessibility, availability and feasibility of cooperative medical care were greatly enhanced, which has provided an objective basis of medical technology for the nationwide promotion of the cooperative medical system.

Before the 1990s, the PRD region still implemented two major medical policies, namely, labor insurance and publicly-funded free medical service. However, after the 1990s, with the development of reform and opening up, the PRD region entered a period of rapid development of industry and manufacturing, and the growth of enterprises brought a surge of migrant employees. In response to this change, governments in the PRD region started to explore medical insurance policies that are more suitable for the actual situation and actual needs. The dual medical insurance system in the PRD region follows the relevant system reform

requirements of Guangdong Province, namely, the medical security system reform for the migrant population, and the medical security system reform based on the dual household registration system.

First, medical security system for the migrant population.

As a major economic province, Guangdong attracts a large number of migrant workers. To ensure that the migrant population can have basic medical services, the Guangdong Department of Labor and Social Security issued the *Notice on the Guiding Opinions on the Participation of Urban Flexibly Employed Persons in Basic Medical Insurance* and the *Interim Measures for Transferring and Continuing Basic Medical Insurance Relations of Migrant Employees in Guangdong Province*, which includes the flexibly employed persons in the basic medical insurance and ensures the protection of medical insurance rights and interests when employees transfer their medical insurance relations across regions within the province due to migrant employment. By now, the medical insurance system in Guangdong Province has been increasingly complete, covering all types of in-service and retired employees of enterprises in the province, ranging from employees of private enterprises and those working in places other than their household registration place to those who are flexibly employed.

Second, medical security system reform based on the dual household registration system.

The Guangdong government had launched a pilot new-type rural cooperative medical care system integrating government subsidies, collective support and individual contributions in 2002, from which the majority of rural residents could get direct benefits. The Dongguan Social Security Bureau took the lead in promoting basic medical insurance for rural residents in 2004, and by September 2004, the number of rural residents participating in medical insurance in Dongguan reached 1.085 million, with the medical insurance coverage ranking the first in Guangdong. By 2005, all the counties (county-level cities and districts) with rural areas in Guangdong had basically established a new-type rural cooperative medical care system. By the end of 2006, Guangdong had established a new-type rural cooperative medical care system that basically covers all the agricultural population.

Despite the advancement of the basic medical system reform in urban areas, there are still some deficiencies in the policy. For special groups of illnesses, especially those not covered by medical insurance but in urgent need of government medical insurance services, the Guangdong Department of Labor and Social Security issued the Guiding Opinions on the Management of Specific Outpatient Diseases for Basic Medical Insurance in Guangdong Province in 2006, which included some diseases with long treatment periods and high medical costs into the scope of basic medical care, such as hepatitis B, uremia, malignant tumor, and hemophilia. In 2007,

the Guangdong provincial government issued the Notice on Forwarding the Opinions of the Provincial Department of Labor Security and the Department of Finance on the Implementation of the Basic Medical Insurance System for Urban Residents, which proposed to focus on social equity and provide universal basic medical insurance to every citizen. In the same year, the government implemented pilot basic medical insurance system for urban residents in 6 cities, and included the migrant workers from the rural areas as well as the rural residents relocated to urban areas out of housing demolition in the medical security system. In 2008, the Guangdong Department of Labor and Social Security issued the Guiding Opinions on the Pooling of General Outpatient Medical Expenses in Urban Basic Medical Insurance to further reduce the burden of general outpatient medical expenses on basic medical insurance participants and promote the integration of medical resources. In 2009, the Guangdong provincial government issued the Notice on the Inclusion of College Students and Students of Secondary Vocational and Technical Schools in Guangdong Province in the Pilot Basic Medical Insurance System for Urban Residents, which included college students and students of secondary vocational schools, as well as full-time undergraduate and postgraduate students in the basic medical care system to meet their basic medical needs.

In 2012, the Guangdong provincial government issued the Notice on Deepening the Urban-Rural Medical Security System Reform in Guangdong Province to further expand the coverage of the basic medical insurance, promote the integration of basic medical insurance for urban and rural residents, and improve the medical security service management system in line with balanced urban and rural development. In the same year, the government formulated policies to introduce commercial insurance into the urban and rural medical insurance. In 2013, the General Office of Guangdong Province issued the Notice of the General Office of the Guangdong Provincial People's Government on the Implementation Plan for the Critical Illness Insurance for Urban and Rural Residents (For Trial Implementation) to promote the "Zhanjiang Model" of critical illness insurance.

Since then, Guangdong has started to integrate the basic medical insurance system for urban residents and the new rural cooperative medical system. By the end of 2012, the integration of the two systems has been popularized in all cities and counties in Guangdong, and a unified basic medical insurance system for urban and rural residents has been implemented.

1.3 Technology roadmap

We carry out the research based on the logic line of "propose the problem-analyze the problem-

solve the problem". The technology roadmap of this research is shown as per Figure 1.1.

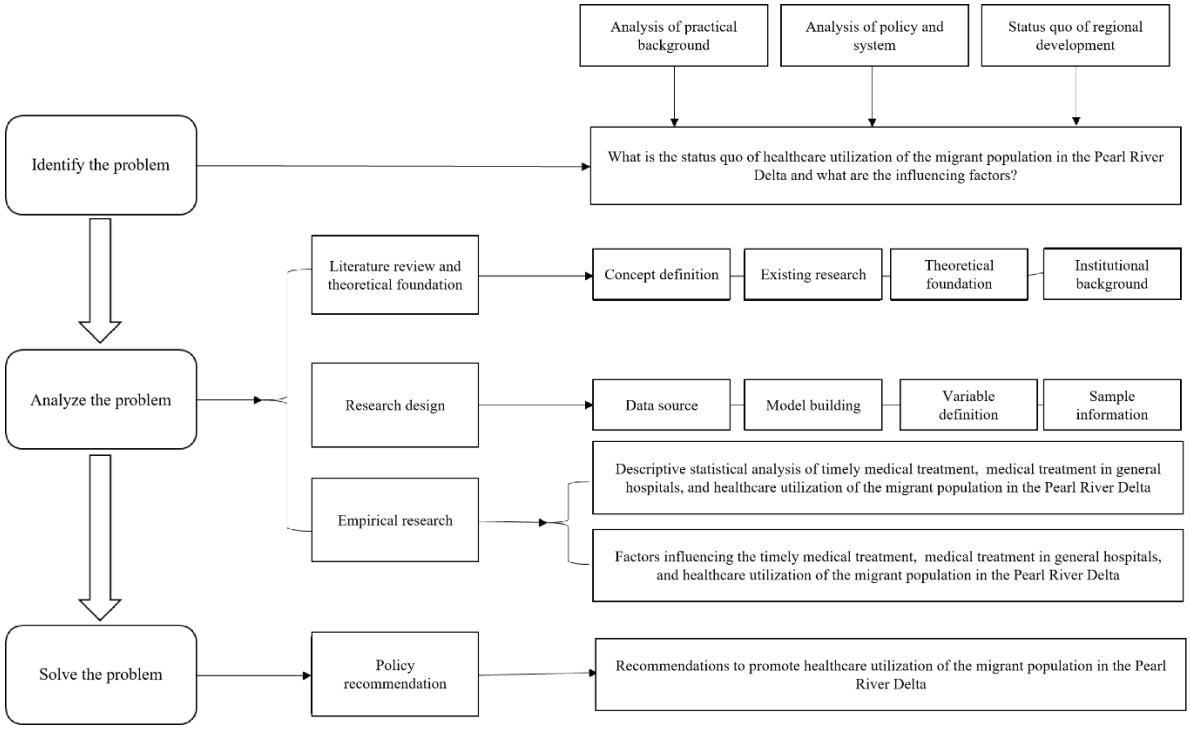

Figure 1.1 Technology roadmap

1.4 Research contents

This thesis consists of six chapters, and the contents of each chapter are as follows.

Chapter 1: Introduction. This chapter systematically explores the historical background and institutional background of the research. With the dual household registration system, dual housing security system and the dual medical security system as the foundation, we analyze the historical and institutional background of the existence of contradictions in the healthcare services of the migrant population. On this basis, the technology roadmap of the study is designed, and with the support of relevant theories, we hope to achieve corresponding innovative results.

Chapter 2: Literature review and theoretical foundation. First, the concepts of population movement, population migration and healthcare utilization are defined based on several related studies. Second, the existing studies on the health problems of the migrant population and the influencing factors of healthcare utilization of the migrant population are reviewed, and on this basis, the shortcomings of the related existing studies are summarized to provide some reference and theoretical basis for the feasibility and necessity of subsequent studies. Third, the advantages and disadvantages of the Andersen healthcare utilization model and psychological

factor mechanism model are integrated to construct a healthcare utilization model that meets the research background and research purpose of this thesis.

Chapter 3: Research design. It includes data sources, model setting, operability and measurement of each variable.

Chapter 4: Research results and discussion. This chapter mainly contains two aspects. One is the descriptive analysis of healthcare utilization among the migrant population in the Pearl River Delta region. Based on the theoretical model derived from the theoretical foundation, and from the perspectives of social factors, psychological pressure, predisposing characteristics, enabling characteristics and need characteristics, the basic situation of the healthcare utilization of the migrant population in the Pearl River Delta region and as well as the distribution of various influencing factors are identified. The other is the regression analysis of the factors influencing the healthcare utilization of the migrant population in the Pearl River Delta region. Analysis is conducted to identify the degree of influence of social factors, psychological pressure, predisposing characteristics, enabling characteristics and need characteristics on the utilization of outpatient, inpatient and preventive health services of the migrant population, and find out the key factors accordingly.

Chapter 5: Research conclusion and policy recommendation. Based on the results of the descriptive analysis and regression analysis, the conclusion of this thesis is summarized. Based on the problems that exist in reality, targeted and operable policy recommendations are proposed from the perspectives of corporate profit makers and policy makers to build a policy intervention system.

1.5 Research significance

Rapid and large-scale cross-regional migration of population is an important feature of China's urbanization in the past 40 years. A detailed exploration of the factors influencing the healthcare service utilization of the migrant population has important theoretical significance and practical value for alleviating the current contradictions in the utilization of healthcare services faced by the government and the public. An in-depth study in this respect can not only expand the research horizons of healthcare services, and deepen the understanding of healthcare utilization behaviors, but also improve the utilization efficiency and management effectiveness of healthcare services, promote the high-quality development of public healthcare, promote the coverage of universal healthcare, improve the public health care, service system, promote the health of the migrant population, and provide theoretical and practical guidance to realize the

strategic goal of Healthy China.

1.5.1 Theoretical significance

With the migrant population in the Pearl River Delta region as the research objects, this research covers the medical and preventive healthcare situation of this special group, and integrates the psychological factor mechanism model and the Andersen healthcare utilization model to explore the influencing factors of the healthcare utilization of the migrant population in a specific region from multiple perspectives such as the social factors, individual psychology, and individual predisposition. The theoretical significance of this study is as follows.

First, it expands the research horizons of healthcare utilization from a managerial perspective. Most of the previous studies have analyzed the influencing factors of healthcare utilization from the perspectives of medicine, economics, and sociology, while relatively few studies have been conducted from the perspective of management. This study integrates the psychological factor mechanism model and the Andersen healthcare utilization model, and incorporates individual psychology, resource acquisition, and public service for research from a managerial perspective, which expands the research horizon of healthcare utilization. By focusing on individual psychological characteristics, behavioral tendencies, and the effectiveness of the healthcare public service system, we can better understand the behavioral decision-making of the migrant population in utilizing healthcare services, thus providing theoretical support for the formulation of more effective public healthcare policies.

Second, it deepens the understanding of the behavioral decision-making of the migrant population in the healthcare utilization. The migration population is a special group, as they have certain instability in residence, work and life, so their healthcare utilization behavior also has its special characteristics. This study delves into the behavioral decision-making of the migrant population in healthcare utilization by focusing on a number of factors such as the social environment, individual psychology and individual predispositions of the migrant population. When utilizing healthcare services, the migrant population is affected by individual health concepts, willingness to seek medical care and other factors in addition to economic factors. This can help us better understand the healthcare utilization behavior of the migrant population and provide theoretical support for the formulation of more targeted public health policies.

Third, it provides theoretical support for the optimization of the management of healthcare services. This study analyzes the influencing factors of the healthcare utilization of the migrant

population in order to improve the quality and effect of the migrant population's utilization of healthcare services, and provide theoretical support for the construction of a fairer and more efficient public health management service system.

1.5.2 Practical significance

Focusing on the special group of the migrant population, this research explores the healthcare utilization of this group and the influencing factors based on the China Migrants Dynamic Survey (CMDS) through a case study in the Pearl River Delta (PRD) region. The practical significance is mainly reflected in three aspects as follows.

First, it is conducive to improving the efficiency of healthcare utilization and management effectiveness. This study integrates the psychological factor mechanism model and the Andersen healthcare service utilization model to analyze the influencing factors of the healthcare utilization of the migrant population from the perspectives of social factors, individual psychology and individual tendency, which can help the public sector management understand the healthcare utilization of the migrant population in a more comprehensive way, and thus adopt more targeted technical means and management strategies to improve the efficiency and effectiveness of healthcare utilization.

Second, it is conducive to promoting the management innovation of healthcare services. Through in-depth analysis of the healthcare utilization behavior of the migrant population, this study can reveal the special needs and psychological mechanisms of the migrant population in utilizing the healthcare services. These findings can help promote innovation in the management of health care services and provide new ideas and innovative solutions for the management mode, service mode, publicity and education of health care services. For example, more flexible and convenient health service methods can be explored, such as online healthcare and telemedicine, so as to meet the special needs of the migrant population in terms of healthcare services.

Third, it is conducive to building a more equitable and efficient public health service system. By analyzing the influencing factors of the health utilization of the migrant population, this study can provide ideas and methods for building a more equitable and efficient health service system. The results of the study show that the healthcare utilization behavior of the migrant population is influenced by a variety of factors, including the social environment, individual psychology, and individual predisposition. Therefore, in order to build a more equitable and efficient health service system, the health administration departments need to formulate

corresponding development strategies and service strategies according to the characteristics and needs of the migrant population, so as to meet the diversified health service needs of the migrant population, and continuously improve the fairness and efficiency of health care services.

Chapter 2: Literature Review

2.1 Definition of core concepts

2.1.1 Population migration and population movement

According to Du et al. (2018), generally only two concepts, “population migration” and “migrant population”, are internationally recognized, and there exist no concepts of “mobile population” or “population movement”. Population migration refers to the regional or spatial movement of population from one region to another, characterized by changes in permanent residence and movement across administrative boundaries. Accordingly, those persons who have migrated are referred to as the migrant population, which specifically implies the spatial movement of the population (Stark, 1991).

Influenced by China’s household registration system, migrant population has become a unique and long-term phenomenon in China. In a study on the scope of the migrant population in urban areas in China, J. S. Wei (1999) defines the migrant population as the population that temporarily resides in townships, towns, and streets outside the place of their household registration, as well as the temporary population from Hong Kong, Macao, Taiwan, and abroad, without changing their original place of household registration. Yao et al. (2008) explored the driving factors of population migration and defined the migrant population as those who go to places other than their original household registration to work or do business, without changing their original household registration place, but those who go out to travel, seek further learning, visit relatives, or join the military are excluded. In the sixth national census of China in 2010, the migrant population was both broadly and narrowly defined. In a broad sense, migrant population is defined as those who leave their place of household registration, with their place of household registration separated from the current place of residence, and become permanent residents in a certain city, while the migrant population in the narrow sense is identical with the definition in the broad sense except excluding those urban residents who live outside their place of household registration (Ma et al., 2014). The Seventh National Census Bulletin suggests that the migrant population is defined as those whose household registered residence is separated from their actual residence (excluding those urban residents who live outside their place of household registration).

In summary, we propose to define the migrant population as those who live in the cities but whose household registration in not in the cities. The definitions of population migration and migrant population are summarized as per Table 2.1.

Table 2.1 Definition of population migration and migrant population

Research perspective	Scholar (year)	Viewpoints
Spatial movement	Du et al. (2018)	Population migration refers to the regional or spatial movement of population from one region to another, characterized by changes in permanent residence and movement across administrative boundaries.
	Stark (1991)	Only those persons who have migrated are referred to as the migrant population, which specifically implies the spatial movement of the population.
Household registration system	J. S. Wei (1999)	The migrant population refers to the population that temporarily resides in townships, towns, and streets outside the place of their household registration, as well as the temporary population from Hong Kong, Macao, Taiwan, and abroad, without changing their original place of household registration.
	Yao et al. (2008)	The migrant population refers to those who go to places other than their original household registration to work or do business, without changing their original household registration place, but those who go out to travel, seek further learning, visit relatives, or join the military are excluded.
	Ma et al., (2014)	In a broad sense, migrant population is defined as those who leave their place of household registration, with their place of household registration separated from the current place of residence, and become permanent residents in a certain city, while the migrant population in the narrow sense is identical with the definition in the broad sense except excluding those urban residents who live outside their place of household registration

2.1.2 Health

The World Health Organization defines health as a state of complete physical, mental, and social well-being, not just the absence of disease or inflammation (Nobile, 2014). There are many measures of health, including energy, attitude, resilience, and appearance characteristics. There are also many types of health, including not only physical health, but also moral health and mental health. The opposite concept to health is sub-health. According to Ye et al. (2004), sub-health is a dynamic state that can lead to different degrees of decline in an individual's self-perceived physical function, psychological function or social adaptive function, but is not severe enough to be diagnosed.

The key points of the definition of sub-health are manifested in four aspects. First, three-dimensionality, namely, the definition and evaluation of sub-health are around the three

dimensions of health; second, variability, or dynamic state, sub-health is closer to health than sub-clinical, and with the progress of time, it can eventually move from sub-health to disease or from sub-health to health, or maintain the state of sub-health; third, subjective, or self-perceived, the evaluation of sub-health is mainly self-assessment, which is the respondents' experience and evaluation of his or her own situation; fourth, limited nature, the functional decline described in the definition of sub-health is limited and has not yet reached any diagnosable disease criteria. Individual factors such as physical health determine an individual's propensity to utilize more health services, so it is necessary to sort out the research on health in all aspects before elaborating on health service utilization.

2.1.3 Healthcare utilization

People's demand for healthcare arises out of their need to maintain health and is satisfied by the utilization of healthcare (Borson et al., 1986). From the demand-oriented perspective, healthcare utilization is a demand-oriented service provided by the government to residents through power or public resources to achieve equality in basic health and reduce risk of illness (Y. M. Yang, 2009). The healthcare utilization behavior from the demand-oriented perspective contains two aspects, namely, healthcare demand and health need. Generally speaking, healthcare need is an objective reflection of residents' actual health condition, and healthcare demand is transformed from healthcare need (L. Li, 2007). From an individual perspective, healthcare utilization behavior refers to the process of individuals in a non-healthy state to seek medical assistance in order to alleviate their illnesses and regain their health. Research from this perspective focuses more on the individual demand (Shin et al., 2015) and the process of healthcare utilization (X. M. Li, 2009).

Theoretically speaking, if all the individual needs for healthcare service can be transformed into demands, it is possible for the demands to be satisfied through the actual utilization of the healthcare service (L. L. Zhang et al., 2002). However, it is not the case in reality. On the one hand, the individual healthcare needs are not transformed into demands due to individual factors such as economic capability, so they do not seek healthcare utilization. On the other hand, the individual healthcare demands are difficult to be fully satisfied due to limited medical resources, unreasonable allocation, and phenomena of poor service quality, low efficiency, and waste of resources, and the actual degree of satisfaction depends on the supply of healthcare services. Therefore, healthcare utilization reflects the result of mutual constraints between demand for healthcare services and supply of healthcare resources, and it is the actual amount of healthcare

services utilized by the demanders. Accordingly, we define healthcare utilization behavior as an individual's choice of outpatient medical treatment such as buying medicine or seeing a doctor or inpatient medical treatment when he/she feels sick, contracts a disease or has a physiological disorder. The definitions of healthcare utilization are summarized as per Table 2.2.

Table 2.2 Definition of healthcare utilization

Research perspective	Scholar (year)	Viewpoints
Demand orientation	Borson et al. (1986)	People's demand for healthcare arises out of their need to maintain health and is satisfied by the utilization of healthcare.
	Y. M. Yang (2009)	Healthcare utilization is a demand-oriented service provided by the government to residents through power or public resources to achieve equality in basic health and reduce risk of illness.
	L. Li (2007)	The healthcare utilization behavior from the demand-oriented perspective contains two aspects, namely, healthcare demand and health need. Generally speaking, healthcare need is an objective reflection of residents' actual health condition, and healthcare demand is transformed from healthcare need.
Individual perspective	Shin et al. (2015)	From an individual perspective, healthcare utilization behavior refers to the process of individuals in a non-healthy state to seek medical assistance in order to alleviate their illnesses and regain their health.
	X. M. Li (2009)	Li focuses on the process of healthcare utilization.
Demand satisfaction	L. L. Zhang et al., (2002)	Theoretically speaking, if all the individual needs for healthcare service can be transformed into demands, it is possible for the demands to be satisfied through the actual utilization of the healthcare service. However, it is not the case in reality. On the one hand, the individual healthcare needs are not transformed into demands due to individual factors such as economic capability, so they do not seek healthcare utilization. On the other hand, the individual healthcare demands are difficult to be fully satisfied due to limited medical resources, unreasonable allocation, and phenomena of poor service quality, low efficiency, and waste of resources, and the actual degree of satisfaction depends on the supply of healthcare services. Therefore, healthcare utilization reflects the result of mutual constraints between demand for healthcare services and supply of healthcare resources, and it is the actual amount of healthcare services utilized by the demanders.

2.2 Literature review

2.2.1 Research related to individual health

Individual health encompasses both physical and mental health issues. With regard to the definition of health, scholars have extended the standard definition of the World Health

Organization (WHO), and most researchers tend to define health as a dynamic equilibrium, which refers to a state of relative well-being and perfection in a number of aspects, including physical and mental health and social relationships (Liang, 2013; Liu et al., 2005; McCartney et al., 2019; O'Rourke et al., 2020). Existing research on individual health focuses mainly on influencing factors such as family atmosphere, economic income levels, residential migration, education and health interventions, government fiscal policies, and media contact.

(1) Family atmosphere and individual health level

Studies on influence of family atmosphere on individual health are mainly divided into two categories. One is to analyze the negative effects of family atmosphere on individual health from a negative perspective, and the other is to explain the motivating effect of family atmosphere on individual health from a positive perspective.

Based on a life course and critical period analysis framework, Y. H. Zhu and Lv (2021) used the 2014 and 2015 China Health and Retirement Longitudinal Study (CHARLS) data to examine the immediate impact of early life misadventures on individuals' childhood health and the long-arm effect of adult health. They drew three main conclusions. First, childhood experiences of hunger, family poverty, parent-child estrangement, and exposure to and witness of violence directly impair healthy development of the children, and the three misadventures of hunger, parent-child estrangement, and exposure to violence have more lethal effects; second, paternal frustration has a long-arm effect although there is no significant immediate shock, while hunger and violent environment exerting negative immediate impact as well as long-arm effect in health; third, mental state is the most important mediator, for those suffering from misfortunes such as hunger, parent-child estrangement, and witness of violence in their early years, 50% of them will affect their health in later life.

Y. S. Zhang (2003) studied the relationship between family structure composition and individual health characteristics and found that with the improvement of the education level and the full socialization of daily life of the family members, there was a fundamental change in the emotional projection. The desire for the relationship of "growing old together" seemed to be challenged to such an extent that it affects the relationships within the family and the physical and mental health of each member, as well as their related biological characteristics and disease characteristics. In order to keep the quality of human health at the same pace as modern culture, it is necessary to focus on the development and study of the natural sciences as well as the humanities and ethics. People should be aware that "family" is a concrete expression of civilized human behavior and a cultural way of life, and it is necessary to maintain its humanized behavior. Similarly, based on the Outline of Family Education Guidance for 0-18

Year Olds in Shanghai and the Regulations on the Promotion of Family Education in Jiangxi Province, D. F. Liu et al. (2021) explore three factors that promote the healthy growth of individuals from the perspective of family education, namely, parents' attitude toward their children is the foundation, parents' own literacy is the core, and parents' knowledge of scientific family education is the key. The purpose of this study is to help parents develop a more scientific family education for their children. The research on the relationship between family atmosphere and individual health level is summarized as per Table 2.3.

Table 2.3 Research on the relationship between family atmosphere and individual health level

Categorization	Representative Scholar (year)	Major viewpoints/research conclusions
(1) Negative perspective	Y. H. Zhu and Lv (2021)	First, childhood experiences of hunger, family poverty, parent-child estrangement, and exposure to and witness of violence directly impair healthy development of the children, and the three misadventures of hunger, parent-child estrangement, and exposure to violence have more lethal effects; second, paternal frustration has a long-arm effect although there is no significant immediate shock, while hunger and violent environment exerting negative immediate impact as well as long-arm effect in health; third, mental state is the most important mediator, for those suffering from misfortunes such as hunger, parent-child estrangement, and witness of violence in their early years, 50% of them will affect their health in later life.
(2) Positive perspective	Y. S. Zhang (2003)	With the improvement of the education level and the full socialization of daily life of the family members, there was a fundamental change in the emotional projection. The desire for the relationship of "growing old together" seemed to be challenged to such an extent that it affects the relationships within the family and the physical and mental health of each member, as well as their related biological characteristics and disease characteristics.
	D. F. Liu et al. (2021)	The parents' attitude toward their children is the foundation, parents' own literacy is the core, and parents' knowledge of scientific family education is the key. The purpose of this study is to help parents develop a more scientific family education for their children.

(2) Economic income level and individual health level

The studies on the effect of economic income level on individual health level can be broadly divided into two categories. One is from the perspective of family income level. Z. B. Wang (2011) took the minors as the respondents and found that poverty during adolescence affects the innate quality, nutritional intake, living environment and medical resources available to individuals, which is not conducive to the healthy growth of poor individuals and has a negative impact on their intellectual development and education. The state and government should strengthen research on the poverty of the minors, actively advocate the concept of social upbringing, and guarantee the healthy growth and development of poor minors through the

formulation and implementation of a sound policy system. L. Guo et al. (2018) explored the factors that affect the health status of individuals in the long term with medical insurance as the focus. By using data from CHARLS based on the life course theory, they explore the long-term impact of family economic status during childhood on individual health through a linear regression model and Stata 14.0 statistical software. Analysis of two instrumental variables "whether the respondent's mother is illiterate and whether the respondent's parents are CPC Party members" reveals that individuals with relatively poor family economic status in their childhood have better activity of daily living (ADL) ability and instrumental activities of daily living (IADL) ability in middle and old age.

The other is from the perspective of economic income disparity. Using data from the 2006 China Nutrition and Health Survey, Tang et al. (2011) analyzed the impact of rural income disparity on individual health heterogeneity among rural residents aged 18 years and older by building a multi-layer logistic regression model and applying the RSPL method. The results showed that income disparity could explain to some extent the heterogeneity of individual health of rural residents in different counties and the heterogeneity of the effects of per capita income and age of rural residents' households on their health. Moreover, for rural residents with low income levels, the positive effect of income on their health will be reduced by the increasing income disparity; for middle-aged rural residents, the negative effect of age on their health will be exacerbated by the increasing income disparity. Using data from the 2005 China General Social Survey (CGSS2005) and county-level social statistics, B. Zhou and Qi (2012) analyzed the influence of regional income inequality on individual health status by fitting a multi-layer logistic regression model, and systematically tested the absolute income theory and income inequality theory. The results show that even after controlling the effect of individual income on health, the degree of county-level income inequality still had a significant negative impact on individual self-rated health. Further analysis of the mechanisms of action of income inequality on health suggests that psycho-social mechanisms only partially explain the negative effects of inequality on health, while new materialist mechanisms fail to be empirically supported.

Some other studies focus on the group of rural residents and explore the relationship between income disparity and individual health of rural residents. Based on the impact of individual health on income disparity, Yang and Wang (2019) constructed a Probit model to explore the impact of individual health on rural poverty based on CHNS 2000-2015 rural data, with height, BMI index, disease shocks, and other socioeconomic factors that may affect poverty being selected. The findings suggest that declining physical health of rural residents

increases their probability of falling into poverty, and this effect is more evident in male. Therefore, they suggest that emphasis should be placed on the nutritional intake and physical exercise of children and adolescents in rural areas, promotion of the social security system in rural areas, improvement of rural medical and health conditions, and enhancement of rural residents' health awareness, so as to improve individual health and reduce their probability of falling into poverty. Su and Zhang (2021) focused on the impact of income disparity on individual health of the rural residents, and used objective and subjective individual relative deprivation to measure individual income inequality from the microscopic perspective of relative deprivation. With data from the China Family Panel Studies 2010-2018, they analyze and validate the impact of relative income deprivation on individual health from three aspects of psychological pathways, resource allocation, and social cohesion. The results show that the higher the objective individual relative deprivation, the worse the self-rated health and psychological health of rural residents, and the higher the subjective relative deprivation, the more damage there will be to the physical health. In addition, the above effects are more evident among male, middle-aged and elderly groups, non-farm workers, and low-income and high-income groups. Moreover, greater relative deprivation impairs individual health through three main pathways: increasing individuals' negative emotions, decreasing their accessibility to healthcare resources, and reducing social cohesion. The research on the relationship between economic income level and individual health level at home and abroad is summarized as per Table 2.4.

Table 2.4 Research on the relationship between economic income level and individual health level

Categorization	Scholar (year)	Viewpoints/research conclusions
(1) Family income level	Z. B. Wang (2011)	The level of family income during adolescence of the individuals can affect their physical health.
	L. Guo et al. (2018)	Individuals with relatively poor family economic status in their childhood have better activity of daily living (ADL) ability and instrumental activities of daily living (IADL) ability in middle and old age.
(2) Economic income disparity	Tang et al. (2011)	Income disparity could explain to some extent the heterogeneity of individual health of rural residents in different counties and the heterogeneity of the effects of per capita income and age of rural residents' households on their health. Moreover, for rural residents with low income levels, the positive effect of income on their health will be reduced by the increasing income disparity; for middle-aged rural residents, the negative effect of age on their health will be exacerbated by the increasing income disparity.
	B. Zhou and Qi (2012)	The degree of county-level income inequality exerts a significant negative impact on individual self-rated health. Psycho-social mechanisms only partially explain the negative effects of inequality on health, while new materialist mechanisms fail to be empirically supported.

Categorization	Scholar (year)	Viewpoints/research conclusions
	Yang and Wang (2019)	Declining physical health of rural residents increases their probability of falling into poverty, and this effect is more evident in male. Therefore, they suggest that emphasis should be placed on the nutritional intake and physical exercise of children and adolescents in rural areas, promotion of the social security system in rural areas, improvement of rural medical and health conditions, and enhancement of rural residents' health awareness, so as to improve individual health and reduce their probability of falling into poverty.
	Su and Zhang (2021)	The higher the objective individual relative deprivation, the worse the self-rated health and psychological health of rural residents, and the higher the subjective relative deprivation, the more damage there will be to the physical health. In addition, the above effects are more evident among male, middle-aged and elderly groups, non-farm workers, and low-income and high-income groups. Moreover, greater relative deprivation impairs individual health through three main pathways: increasing individuals' negative emotions, decreasing their accessibility to healthcare resources, and reducing social cohesion.

(3) Residential migration and individual health level

The impact of residential migration on individual health level includes both internal migration and cross-regional migration. In terms of intra-city migration, Y. Z. Liu et al. (2018) used data of the 2016 household survey questionnaire conducted in Guangzhou, and adopted logistic regression analysis and in-depth interview to analyze the impact of temporal characteristics and spatial characteristics of residential migration on individuals' self-rated physical health and mental health. The results show that residential migration exerts both long-term cumulative impact and short-term impact on individual health. The former is manifested by the negative impact of frequent residential migration on physiological and psychological health before the age of 18; the latter is manifested by the negative impact of residential migration on psychological health within a short period of time. Voluntary migration has a significant positive effect on physiological health, and eccentric migration also has a significant positive effect on psychological health; long-distance migration, on the other hand, exerts a negative effect on psychological health. In terms of cross-regional migration, L. W. Zhang and Gao (2022) used a theoretical model of social determinants of health based on the framework of social capital evaluation system. They introduced five levels of social capital in individual, family, community, workplace, and macro policy, constructed an analytical framework for the impact of social capital on health, and used this analytical framework to systematically test the influence of social capital on health. The results show that the overall social capital score and individual social capital score of policy-related urban migrants were lower than those of the local urban residents, and the differences were statistically significant (p<0.05).

Based on knowledge graph analysis and literature research method, H. B. Cheng et al. (2020) systematically reviews the latest progress on the influence of residential migration on residents' health. The results are as follows. First, over the past 15 years, the amount of literature on the influence of residential migration on individual health has increased year by year, with increasingly more attention paid on this issue. The existing research is mainly carried out in the developed countries, but the research contents in different areas are significantly different. Second, the main research targets have changed from "homogeneous groups" to "heterogeneous groups" and from "general groups" to "special groups", and the research method has changed from mathematical statistics to mixed research and comprehensive application. Third, the research perspective has experienced three stages of "population migration-individual health", "residential migration-environment-individual health" and "migration trajectory-environment evolution-individual health and development". Fourth, recent studies have focused on migration behavior and children's health, spatial and temporal characteristics of migration and physical and mental health, housing career and physical and mental health, and neighborhood environment, cumulative deprivation and health development. Most of the studies suggest to focus on "integrated" analysis and pay attention to the impact of intra-city migration behavior and multiple migration trajectories on residents' health. We should extend the study of environmental factors (such as residential isolation, social differentiation, and spatial dislocation of work and residence) caused by migration, pay more attention to the impact of migration on the health of second-generation migrant children, and focus on the study of informal living spaces such as urban villages. The research on the relationship between residential migration and individual health level is summarized as per Table 2.5.

Table 2.5 Research on the relationship between residential migration and individual health level

Categorization	Scholar (year)	Viewpoints/research conclusions
(1) Intra-city migration	Y. Z. Liu et al. (2018)	Residential migration exerts both long-term cumulative impact and short-term impact on individual health. The former is manifested by the negative impact of frequent residential migration on physiological and psychological health before the age of 18; the latter is manifested by the negative impact of residential migration on psychological health within a short period of time. Voluntary migration has a significant positive effect on physiological health, and eccentric migration also has a significant positive effect on psychological health; long-distance migration, on the other hand, exerts a negative effect on psychological health.
	L. W. Zhang and Gao, (2022)	The overall social capital score and individual social capital score of policy-related urban migrants were lower than those of the local urban residents, and the differences were statistically significant (p<0.05).
(2) Cross-	H. B. Cheng et	First, over the past 15 years, the amount of literature on the

Categorization	Scholar (year)	Viewpoints/research conclusions
regional migration	al. (2020)	influence of residential migration on individual health has increased year by year, with increasingly more attention paid on this issue. The existing research is mainly carried out in the developed countries, but the research contents in different areas are significantly different. Second, the main research targets have changed from "homogeneous groups" to "heterogeneous groups" and from "general groups" to "special groups", and the research method has changed from mathematical statistics to mixed research and comprehensive application. Third, the research perspective has experienced three stages of "population migration-individual health", "residential migration-environment-individual health" and "migration trajectory-environment evolution-individual health and development". Fourth, recent studies have focused on migration behavior and children's health, spatial and temporal characteristics of migration and physical and mental health, housing career and physical and mental health, and neighborhood environment, cumulative deprivation and health development.

(4) Education and health interventions and individual health level

On the one hand, as far as the influence of education on individual health level is concerned, by studying the impacts of individual health education on negative emotions, health rehabilitation and quality of life, J. X. Li et al. (2006), H. Gao and Tan (2007), C. J. Lin and Su (2010) and G. F. Wu and Wei (2010) found that individual health education can significantly help improve patients' mental symptoms, reduce anxiety and depression, promote rehabilitation and enhance quality of life. Individual health education also helps to improve self-care ability and reduce disease recurrence rate, and individualized health education can effectively improve the compliance and quality of life of the elderly diabetic patients. W. H. Zhang and Chen (2020) used data from the 2015 Chinese General Social Survey to analyze the impact of education on individual health level and explored the differences of this impact in urban and rural areas and between different regions. The results show that the longer the years of education, the higher the level of individual health, and there are urban-rural difference and regional difference in this impact. To be specific, this impact on rural residents is significantly greater that on urban residents, and the impact on residents in the central and western regions is significantly greater than that on residents in the in eastern regions. In addition, it is also found that education influences health through two types of mediators: material mediators (occupation and income) and cognitive mediators (lifestyle). The cognitive mediators only play a partially mediating role in urban and eastern regions, while the material mediators play a fully mediating role in the eastern regions and a partially mediating role in other regions.

On the other hand, as for the impact of health intervention on individual health level, D. Luo and Duan (2021) focused on the significance and realization of individual health self-care

capacity in the epidemic prevention and control of the COVID-19. They found that with the spread of the COVID-19, the health awareness of the public has been significantly promoted, and the concept that individuals are the persons of primary responsibility for their own health has been significantly implemented. No consensus has been reached as for the definition of health self-care ability, but it is the basis and key for individuals to fulfill their primary responsibility for health, and it is also an important guarantee for the maintenance and restoration of health as well as an important prerequisite for the achievement of good public health ethics. Based on qualitative analysis, Q. W. Dong et al. (2021) adopted the transtheoretical model and stages of change (TTM) and the Delphi method to construct the indicator system. After an empirical study based on the construction of the indicator system, it is found that to achieve the effectiveness of health interventions, in addition to the direct use of test indicators for evaluation, the health risk assessment model and risk factor questionnaire survey are also adopted, but the evaluation process has certain limitations.

On the basis of the above studies, F. Y. Wang et al. (2022) divided 112 patients with coronary heart disease into a control group and an observation group according to the different modes of nursing care, with 56 cases in each group. Patients in the control group were given conventional care, and patients in the observation group were offered a holistic care program based on individual health behavior habit remodeling, and the improvement of psychological status [self-rating anxiety scale (SAS), self-rating depression scale (SDS)], compliance behavior, improvement of cardiac function (left ventricular ejection fraction, 6 minutes walking distance), quality of life score (SF-36), self-management ability scores, nursing satisfaction, and incidence of adverse cardiovascular events of the two groups after interventions are observed. On this basis, the specific impacts of holistic care programs based on individual health behavior habit remodeling on patients' quality of life and self-management ability in the care of patients with coronary heart disease were investigated.

It is found that the scores of the observation group in SF-36, self-management ability, nursing satisfaction, compliance behavior, and improvement of cardiac functions were higher than those of the control group. The SAS and SDS scores, and the incidence of adverse cardiovascular events were lower in the observation group than those in the control group, and the differences were statistically significant ($p<0.05$). It means that the holistic care program based on individual health behavior habit remodeling can exert a positive impact on the quality of life and self-management ability of patients with coronary heart disease, which can improve the quality of life and enhance the self-management ability of the patients. The research on the relationship between education and health interventions and individual health level is

summarized as per Table 2.6.

Table 2.6 Research on the relationship between education and health interventions and individual health level

Categorization	Scholar (year)	Viewpoints/research conclusions
(1) Education	J. X. Li et al. (2006)	Individual health education can significantly help improve patients' mental symptoms, reduce anxiety and depression, promote rehabilitation and enhance quality of life.
	H. Gao and Tan (2007)	Individual health education also helps to improve self-care ability and reduce disease recurrence rate.
	C. J. Lin and Su, 2010)	Individualized health education can effectively improve the compliance and quality of life of the elderly diabetic patients.
	W. H. Zhang and Chen (2020)	The longer the years of education, the higher the level of individual health, and there are urban-rural difference and regional difference in this impact. To be specific, this impact on rural residents is significantly greater that on urban residents, and the impact on residents in the central and western regions is significantly greater than that on residents in the in eastern regions. In addition, it is also found that education influences health through two types of mediators: material mediators (occupation and income) and cognitive mediators (lifestyle). The cognitive mediators only play a partially mediating role in urban and eastern regions, while the material mediators play a fully mediating role in the eastern regions and a partially mediating role in other regions.
(2) Health intervention	D. Luo and Duan (2021)	No consensus has been reached as for the definition of health self-care ability, but it is the basis and key for individuals to fulfill their primary responsibility for health, and it is also an important guarantee for the maintenance and restoration of health as well as an important prerequisite for the achievement of good public health ethics.
	Q. W. Dong et al. (2021)	Individual health behavioral habits have a positive impact on the quality of life and health management ability of individuals, which can improve the quality of life and enhance the self-health management ability of individuals.

(5) Government fiscal policy and individual health level

The influence of government fiscal policy on individual health is mainly reflected in two aspects: medical investment and medical insurance. Based on the theory of health economics, Q. Cheng et al. (2016) empirically tested the relationship between residents' education level, individual health and public financial support using the data from the CGSS 2010 survey. The study demonstrated that education level and individual health had an inverted U-shaped relationship, but the impact of education level on individual health gradually converged with the increase of age. Public expenditures directly improve the health status of the residents, and healthcare expenditures have the greatest impact on individual health, followed by cultural and

scientific expenditures, urban and rural community affairs expenditures, environmental protection and public security expenditures, and social security and employment expenditures. Public expenditures also exert a moderating effect on the health through education. The public expenditures indirectly improve residents' health status by raising the education level, and the lower the education level of individuals, the more obvious the indirect moderating effect of public expenditures.

Guided by "people in context" and "social ecosystem", M. Liu (2019) used social capital as a specific analysis tool and found that there is a significant correlation between the level of government investment in medical aid and individual health level. Bai and Cheng (2019) used medical resource data and micro data from urban and rural areas in each province of China, and for the first time added the variables of regional medical condition and health shock to the influencing factors of individual health to investigate the impact of medical conditions on individual health levels and the regional differences of the impact. The results show that the impacts of medical conditions on individual health levels differ across regions and between urban and rural areas, and the supply-side reform in China's healthcare industry should focus on solving the structural supply shortage of overall medical services. In order to achieve equalization of medical conditions between the east, central and western regions and between urban and rural areas, each region and each area should to fine-tune the internal structure of health service resource allocation according to their own conditions.

Q. S. Chen and Tian (2017) focused on whether health insurance as well as various environmental protection behaviors could mitigate the impact of environmental pollution on individual health by establishing an ordered logit model and using data from the CGSS database in 2010. The results show that residents' choices of health insurance and environmental protection behaviors can effectively mitigate the damage to health caused by environmental pollution. The influence of environmental pollution on the health of the elderly is significantly lower than that on the health of the young and middle-aged individuals, and the influence of environmental pollution on the health of those with high education is significantly lower than those with low education. The research on the relationship between government fiscal policy and individual health level is summarized as per Table 2.7.

Table 2.7 Research on the relationship between government fiscal policy and individual health level

Categorization	Scholar (year)	Viewpoints/research conclusions
(1) Medical investment	Q. Cheng et al. (2016)	Education level and individual health had an inverted U-shaped relationship, but the impact of education level on individual health gradually converged with the increase of age. Public expenditures directly improve the health status of the residents, and healthcare expenditures have

Categorization	Scholar (year)	Viewpoints/research conclusions
		the greatest impact on individual health, followed by cultural and scientific expenditures, urban and rural community affairs expenditures, environmental protection and public security expenditures, and social security and employment expenditures. Public expenditures also exert a moderating effect on the health through education. The public expenditures indirectly improve residents' health status by raising the education level, and the lower the education level of individuals, the more obvious the indirect moderating effect of public expenditures.
	M. Liu (2019)	There is a significant correlation between the level of government investment in medical aid and individual health level.
	Bai and Cheng (2019)	The impacts of medical conditions on individual health levels differ across regions and between urban and rural areas, and the supply-side reform in China's healthcare industry should focus on solving the structural supply shortage of overall medical services. In order to achieve equalization of medical conditions between the east, central and western regions and between urban and rural areas, each region and each area should to fine-tune the internal structure of health service resource allocation according to their own conditions.
(2) Medical insurance	Q. S. Chen and Tian (2017)	The residents' choices of health insurance and environmental protection behaviors can effectively mitigate the damage to health caused by environmental pollution. The influence of environmental pollution on the health of the elderly is significantly lower than that on the health of the young and middle-aged individuals, and the influence of environmental pollution on the health of those with high education is significantly lower than those with low education.

(6) Media contact and individual health level

Based on data from The Health Information National Trends Survey (HINTS) China in 2017 in Beijing, Y. Liu et al. (2018) explored the relationship between media contact and cancer risk perception using the extended parallel process model (EPPM) model for the dimensional division of perceived efficacy of information and perceived threat, with the influence of individual differences incorporated. The results show that different media contact behaviors and levels of information trust exert different impacts on threat assessment and perceived efficacy of the risks. In terms of media trust, the higher the trust in TV health information, the higher the perceived efficacy, the higher the trust in radio health information, the lower the perceived efficacy, and the higher the trust in medical APPs, the higher the perceived efficacy. In terms of information seeking, the more information seeking behaviors on the Internet, the higher the perceived sense of efficacy.

In recent years, with the popularization of the Internet and the development of artificial

intelligence, increasingly more researchers have begun to focus on the impact of next-generation information technology on individual health. Y. X. Zhao and Li (2020) empirically analyzed the impact of Internet use on individual health based on data of CFPS 2014, and found that Internet use could improve individual health to a certain extent. Individuals who use the Internet as an important channel for information acquisition and reasonably arrange the length of time spent online will obtain more opportunities to get access to knowledge on health, which is conducive to promoting the development of a healthy lifestyle and thus achieving improvement of health. As a result, Y. X. Zhao and Li (2020) proposed that to bring into play the role of Internet use in promoting individual health, it is necessary to further increase the Internet penetration rate and pay attention to the construction of Internet information channels. In addition, it is also necessary to actively promote the construction of an Internet health information platform and carry out targeted Internet health education progressively.

In contrast to discussion of the impact of the Internet on individual health from a holistic view, some researchers have elaborated on the factors influencing individual health from specific perspectives such as socialization, artificial intelligence, and online medical care. With source from Sina Weibo, J. L. Zhou et al. (2022) adopted the research method of computational communication to explore the factors influencing social media information exposure on individual HPV vaccine adoption in three dimensions of quantity, content, and information source. A probability function model was used to present the "contact-adoption" curve between the amount of information contacts and the probability of vaccine adoption, and analyze the persuasive effect of different information contents and sources on individual vaccine adoption. The results show that the cumulative exposure to a small amount of information is beneficial to increase the probability of vaccine adoption, but the probability of adoption begins to decrease when the exposure exceeds a certain threshold, and there are differences in the adoption curves of different information sources. Exposure to anti-vaccine information has no significant influence on individual vaccine adoption, while exposure to supportive information or information of no definite attitudes is detrimental to vaccine adoption. Both professional and homogeneous information sources have a persuasive effect on individual vaccine adoption. In the homogeneous sources, the supportive information or information of no definite attitudes have a relatively large positive effect on vaccine adoption, and anti-vaccine information of professional sources has a relatively large influence in discouraging vaccine adoption. Ding et al. (2022) discussed the development of AI algorithms and technology-driven genetic testing, wearable devices, and IoT mobile ports in the precision health management of individuals from an individual to holistic perspective based on the impact of AI technologies on individual health

management. It is found that AI can build a novel epidemic risk warning system by collecting individual health data. Similarly, X. Zhang et al. (2022) explored the influence of physicians' linguistic style (abstract/concrete) on individual anxiety about health in online medical consultation and found that physicians' adoption of abstract linguistic style in online medical consultation is more likely to lead to individual anxiety about health, and perceived uncertainty and information load play a mediating role in the influence of linguistic style on individual anxiety about health. The research on the relationship between media contact and individual health level is summarized as per Table 2.8.

Table 2.8 Research on the relationship between media contact and individual health level

Categorization	Scholar (year)	Viewpoints/research conclusions
(1) Holistic view	Y. Liu et al. (2018)	Different media contact behaviors and levels of information trust exert different impacts on threat assessment and perceived efficacy of the risks. In terms of media trust, the higher the trust in TV health information, the higher the perceived efficacy, the higher the trust in radio health information, the lower the perceived efficacy, and the higher the trust in medical APPs, the higher the perceived efficacy. In terms of information seeking, the more information seeking behaviors on the Internet, the higher the perceived sense of efficacy.
	Y. X. Zhao and Li (2020)	Internet use could improve individual health to a certain extent. Individuals who use the Internet as an important channel for information acquisition and reasonably arrange the length of time spent online will obtain more opportunities to get access to knowledge on health, which is conducive to promoting the development of a healthy lifestyle and thus achieving improvement of health. As a result, Y. X. Zhao and Li (2020) proposed that to bring into play the role of Internet use in promoting individual health, it is necessary to further increase the Internet penetration rate and pay attention to the construction of Internet information channels. In addition, it is also necessary to actively promote the construction of an Internet health information platform and carry out targeted Internet health education progressively.
(2) Online healthcare	J. L. Zhou et al. (2022)	The cumulative exposure to a small amount of information is beneficial to increase the probability of vaccine adoption, but the probability of adoption begins to decrease when the exposure exceeds a certain threshold, and there are differences in the adoption curves of different information sources. Exposure to anti-vaccine information has no significant influence on individual vaccine adoption, while exposure to supportive information or information of no definite attitudes is detrimental to vaccine adoption. Both professional and homogeneous information sources have a persuasive effect on individual vaccine adoption. In the homogeneous sources, the supportive information or information of no definite attitudes have a relatively large positive effect on vaccine adoption, and anti-vaccine information of professional sources has a relatively large influence in discouraging vaccine adoption.
	Ding et al. (2022)	AI can build a novel epidemic risk warning system by collecting individual health data.
	X. Zhang	The physicians' adoption of abstract linguistic style in online medical

Categorization	Scholar (year)	Viewpoints/research conclusions
	et al. (2022)	consultation is more likely to lead to individual anxiety about health, and perceived uncertainty and information load play a mediating role in the influence of linguistic style on individual anxiety about health.

2.2.2 Health of the migrant population

(1) Overview of the health of the migrant population

Before discussing the healthcare utilization of the urban migrant population, we need to clarify the health issues of the migrant population. Research on population migration and individual health issues started rather late in China, and research on the health issues of urban migrant population mainly focus on the following perspectives.

In terms of physical health, relevant qualitative and quantitative studies on urban migrant population have generally reached a consensus that most migrants in the urban areas are young people who are relatively in good health (Seungok et al., 2021; K. J. Zhu & Di, 2008). In terms of mental health, X. F. Li (2004) selected migrant population in Shanghai as the respondents and found that the mental health of the young migrants was worse than the national average. In the same year, Jiang (2004) studied the mental health of the migrant population in Shenzhen and found that their mental health was better than the national average. M. Z. Li et al. (2007) found that the mental health of the migrant population was better than that of the local residents of the same socioeconomic status in Zhejiang Province by comparing the mental health of the three groups including the migrants, the local residents and the rural residents. However, after controlling the demographic characteristics such as gender, age, and marital status, there were no statistically significant differences in mental health levels between the two groups.

In addition to physical health and mental health, the migrant population also faces problems such as infectious diseases, reproductive health, workplace safety, and occupational safety. Although population migration is an autonomous choice with individual physical health as the prerequisite, with the extension of work time in the place of migration, the physical and mental health of the migrants are continuously damaged by the high-intensity and high-stress work (Niu et al., 2011). Through an empirical study of the migrant population in Beijing, J. J. Zhang et al. (2008) found that 21% of the respondents felt that their physical and mental health had deteriorated compared to the pre-migration period. Yuan (2009) also carried out an empirical study on the migrant population in Beijing and found that there was a ubiquitous deterioration in the physical and mental health of the urban migrants, and that there was a causal relationship between their physical and mental health levels and their income.

(2) Factors influencing the health of the migrant population

Earlier studies related to the influencing factors of individual health mostly focused on exploring the factors influencing the health of urban and rural residents through a comparative analysis under the dual household registration system in China. X. W. Yu et al. (2010) studied the factors influencing the health status of residents in China based on the 2006 CHNS data, and the results showed that economic condition was the key factor influencing the health status of rural residents.

With the deepening of the research, more scholars break through the dual household registration system and turn to the migrant population moving across regions. They gradually divide the research targets into indigenous residents and migrant population, and systematically analyze the factors affecting the health of migrant population in the urban areas. Ye et al. (2004) studied the migrant population in the urban area and found that demographic characteristics such as gender, marriage, age, occupation, working age, economic income, and living habits had significant influence on the health of individuals. Huang (2010) found that social capital and education level had significant influence on individual health of the migrant population in a survey of migrants in five cities including Shenyang, Tianjin, Shanghai, Guangzhou, and Kunming. Fang et al., (2007) found that comfortable and safe working conditions were able to positively predict individual health.

Chen and He (2010) studied the influencing factors of mental health of the migrant population from the perspectives of psychological stress, social support and the significance of population migration, and the results showed that psychological stress of the migrant population had a significant negative impact on individual health, social support was a key protective factor to maintain individual mental health, and the significance of migration lied in the positive promotion of the migrants' current mental health by their prediction of the future mental health. Focusing on the mental health of the female group in the migrant population, Chen and He (2010) studied the influence of work stress and social support on women's mental health, and the results showed that social support was a critical factor in ensuring women's mental health. In addition, from the perspective of social outcomes, D. Liu (2008) explored the impact of social system structure (including employment system, medical security system, and children's education system) on the mental health status of the migrant population, and the results showed that structural constraints of urban social system would significantly worsen the mental health of the migrant population.

(3) Theoretical models related to the health of the migrant population

Among the theoretical models of factors affecting individual health of the migrant population, one of the most commonly used and recognized by the public is the mechanism of action model of population migration affecting HIV transmission proposed by W. Q. Wang and Pan (2008) (see Figure 2.1). They argue that the differences in health between the migrants and other groups of people reflect macro-statistical characteristics and correlations, so the mechanism of action is the most important. In addition, the analysis of the mechanism of action can help weaken the transmission of infectious diseases caused by population migration. In the model of population migration affecting HIV transmission, the action of population migration is not the most important. Instead, the behavior of the migrant population is the key, and the transmission of infectious diseases is caused by the inappropriate behavior of the migrant population. Moreover, the behavior of migration itself does not exert any impact, and it is the environment of the place where the migrants move that makes this group susceptible to infectious diseases, which means that it is necessary to focus on the association between environment and behavior when exploring the relationship between population migration and infectious diseases (Lambert et al., 2014). Furthermore, when analyzing the behavior-environment relationship, it is important to further explore what changes in the environment are caused by population migration and what behaviors do migrants tend to adopt to help them avoid being exposed to high-risk environment with high possibility of contracting infectious diseases compared to non-migrants?

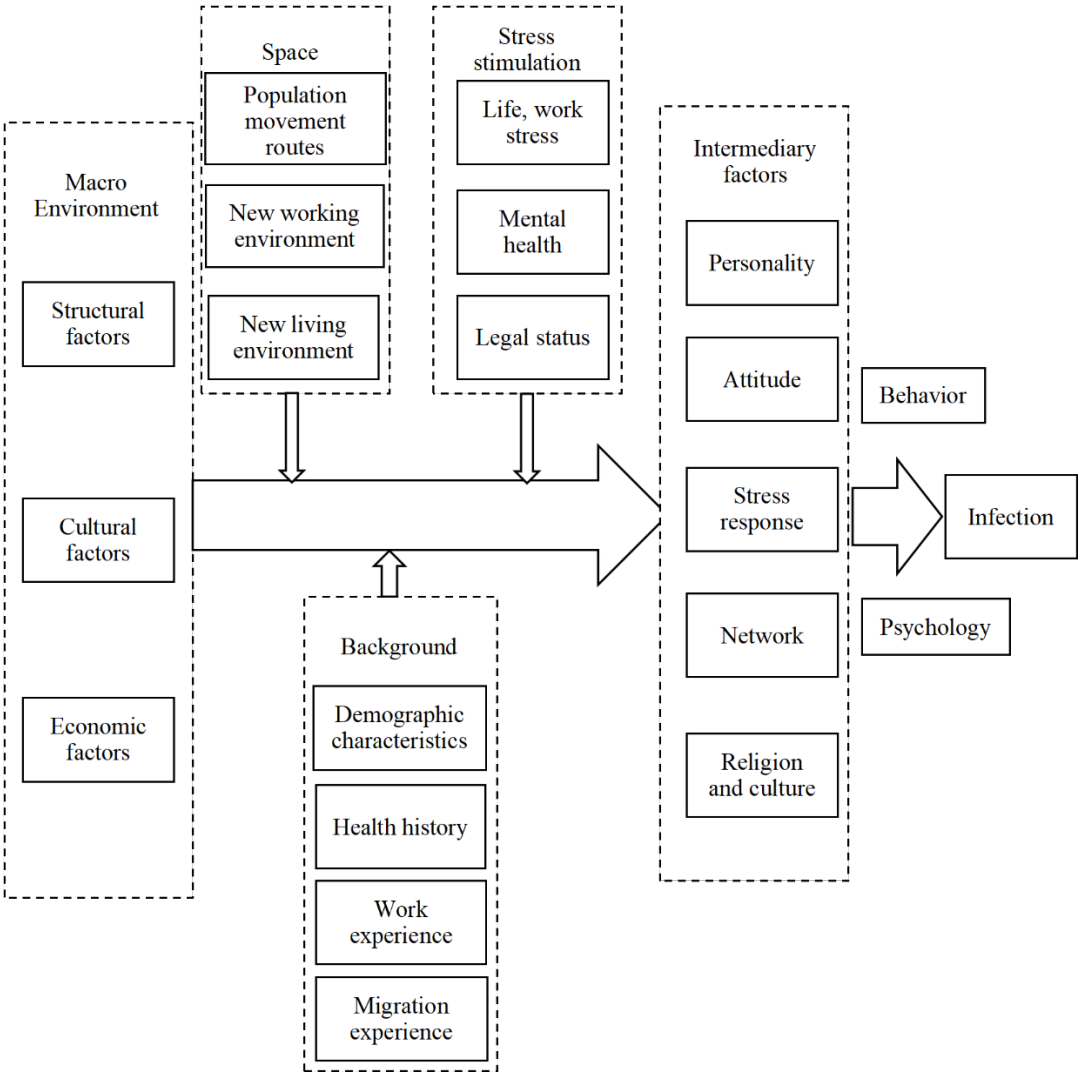

Figure 2.1 Mechanism of action model of population migration affecting HIV transmission

In summary, there is a wealth of research on the influencing factors of health of the migrant population, but there lacks comprehensive and systematic analysis of the influencing factors of health. This also indicates that it is necessary to further explore the influencing factors of healthcare utilization and analyze them in a systematic manner. The research on the health of the migrant population is summarized as per Table 2.9.

Table 2.9 Health of the migrant population

Research dimension	Scholar (year)	Viewpoints/research conclusions
Overview of the health of the migrant population		
(1) Physical health	K. J. Zhu and Di (2008); Seungok et al. (2021)	In terms of physical health, relevant qualitative and quantitative studies on urban migrant population have generally reached a consensus that most migrants in the urban areas are young people who are relatively in good health
(2) Mental health	X. F. Li (2004)	The mental health of the young migrants was worse than the national average.
	Jiang (2004)	The mental health of the migrant population in Shenzhen is

Research dimension	Scholar (year)	Viewpoints/research conclusions
		better than the national average
	M. Z. Li et al. (2007)	The mental health of the migrant population was better than that of the local residents of the same socioeconomic status in Zhejiang Province by comparing the mental health of the three groups including the migrants, the local residents and the rural residents. However, after controlling the demographic characteristics such as gender, age, and marital status, there were no statistically significant differences in mental health levels between the two groups.
(3) Infectious diseases, reproductive health, workplace safety, and occupational safety	Niu et al. (2011)	Although population migration is an autonomous choice with individual physical health as the prerequisite, with the extension of work time in the place of migration, the physical and mental health of the migrants are continuously damaged by the high-intensity and high-stress work.
	J. J. Zhang et al. (2008)	21% of the respondents felt that their physical and mental health had deteriorated compared to the pre-migration period.
	Yuan (2009)	There was a ubiquitous deterioration in the physical and mental health of the urban migrants, and that there was a causal relationship between their physical and mental health levels and their income.
Factors influencing the health of the migrant population		
(1) Influencing factors of physical health	Ye et al. (2004)	Demographic characteristics such as gender, marriage, age, occupation, working age, economic income, and living habits had significant influence on the health of individuals.
	Fang et al. (2007)	Comfortable and safe working conditions were able to positively predict individual health.
(2) Influencing factors of mental health	Chen and He (2010)	Psychological stress of the migrant population had a significant negative impact on individual health, social support was a key protective factor to maintain individual mental health, and the significance of migration lied in the positive promotion of the migrants' current mental health by their prediction of the future mental health.
	Chen and He (2010)	Social support was a critical factor in ensuring women's mental health.
	D. Liu (2008)	Structural constraints of urban social system would significantly worsen the mental health of the migrant population

2.2.3 Individual healthcare utilization

Review of the literature related to individual healthcare utilization shows that as different groups of people have different levels of demand for different health services and they even have different levels of demand for the same health service, so the target population in the existing literature varies. For instance, some researchers focus on the utilization of healthcare services by women, while other researchers mainly focus on the elderly.

(1) Research on the individual healthcare utilization based on age stratification

There are mainly two types of studies related to individual healthcare utilization based on age stratification, one focusing on the healthcare utilization of the elderly and the other on the

healthcare utilization of the youth people and the children.

Most of the studies on individual healthcare utilization behavior of the elderly population are based on a specific area. For example, X. Y. Wang (2020) selected the elderly people aged 60 years or above in three districts of Shangqiu (Liangyuan District, Urban-rural Integration Demonstration District, and Suiyang District) as the respondents, and after adopting the questionnaire survey method, she found that the utilization of healthcare services among the elderly population is unsatisfactory, with low rates of medical consultation within two weeks, hospitalization within one year, and regular medical examinations. The main factors affecting the utilization of healthcare services for the elderly include education level, age, self-assessed health status, form of insurance, chronic diseases, and time to visit the nearest medical institution. The main factors affecting the life satisfaction of the elderly include gender, age, marital status, preferred way of elderly care, source of income, payment of medical expenses, whether smoke or not, whether drink alcohol or not, whether exercise regularly or not, self-assessed health status, and chronic diseases. The healthcare utilization of the elderly has an impact on their satisfaction with life. Similarly, with the theoretical model of health ecology as the framework, Shi (2023) has empirically explored the current situation and influencing factors of healthcare utilization of elderly rural migrants in Hubei Province based on the China Migrants Dynamic Survey in 2017. The following two research conclusions were drawn. First, the elderly migrants from the rural areas of Hubei Province have deficiencies in the utilization of basic public health services. Second, the elderly migrants from the rural areas of Hubei Province who rarely interact with local people have relatively low likelihood and willingness to utilize health education and other services. Based on data from the HINTS CHINA 2017 in Beijing, X. F. Wang and Feng (2022) explored the relationship between media contact and perceived cancer risk using the EPPM model for the dimensional division of perceived efficacy and perceived threat. The results are as follows. First, age has a relatively large impact on individual health status. Among the people aged 45 years and above, their self-rated health will deteriorate and the probability of developing chronic diseases will increase as they grow older. Second, age has a significant impact on health service utilization. Among the respondents, the probability and number of outpatient and inpatient healthcare services will increase incrementally with age. Third, age has a significant positive effect on the outpatient and inpatient medical expenses. In particular, both the outpatient and inpatient medical expenses of the surveyed elderly people increase with age. With the aging of the Chinese population, China's healthcare resource allocation and healthcare service delivery model will be under great pressure. Under the current healthcare payment system, China's healthcare expenditure will

face the risk of further growth.

The literature studying the youth people and the children is divided into two categories. The first category analyzes the status of healthcare service utilization of this group, and the second category further analyzes the influencing factors of healthcare service utilization of this group based on the analysis of the current situation. Zeng and Chen (2021) analyzed the healthcare service utilization of children aged 0-6 years old in the townships under Wanzhou District of Chongqing Municipality. The results show that the two-week prevalence rate of rural children aged 0-6 years in the Three Gorges reservoir area is higher than the national average, and there are problems in healthcare service utilization such as low satisfaction with medical institutions, poor implementation of public health service programs, and insufficient publicity and mobilization capacity of the primary-level government. They further suggest that the healthcare service utilization of the rural children reflects the prominent contradiction between the overall rapid growth of public demand and the unbalanced and insufficient supply of public services at this stage in China, and system deficiency and system defect is a common problem that hinders the development of public services in rural areas in China at this stage. Moreover, in order to achieve a balance between supply and demand of rural public services, we should, on the one hand, carry out supply-side reforms by deepening institutional reforms, effectively transforming government functions, choosing efficient resource allocation methods, and establishing a perfect monitoring mechanism to ensure the quality of services, and, on the other hand, obtain timely information about people's needs through various means, because accurate and effective decision-making on public service supply is based on sufficient information about demand. L. Chen et al., (2021) conducted an empirical study using data from the 2017 China Migrants Dynamic Survey to analyze the utilization of health services and its influencing factors among the young migrant population in Guangdong Province. They found that among the 6564 samples of young migrants, 3989 (60.77%) of them had been ill (injured) or felt physical discomfort within one year before the survey, while 2443 (61.24%) of them consulted medical institutions at all levels after the illness. Gender, average monthly income, number of working hours per week, establishment of health records, reception of health education, and application of temporary residence permits are the main factors affecting the utilization of healthcare services among the young migrants in Guangdong Province.

(2) Individual healthcare utilization based on the dual household registration system

Studies related to the individual healthcare utilization under the dual household registration system mainly divided the research subjects into two categories of urban residents and rural residents. Focusing on the group of new citizens in the urbanization process, Zi (2020) found

that in terms of household economic life, although the household economic life of the new citizens has greatly improved after settlement, it is still lower than that of the local urban residents. The personal health knowledge and health behavior of the new citizens and their access to the basic medical and health services still lag behind those of the local urban residents. The self-reported level of basic medical service needs of the new citizens is lower than that of the local urban residents. The level of utilization of basic public health services for the new citizens is relatively low and lower than that of the local urban residents. Although the utilization rate of various public health services has improved compared with that before settlement, the utilization rate in chronic disease health management and health management for the elderly is still low. The overall satisfaction of the new citizens with the current general living conditions, medical technology level, medical service costs, convenience of medical care, medical service attitudes, public health service, and medical service system is lower than that of the local urban residents. The reform of the urbanized household registration system has a positive effect, which improves the scores of residents' satisfaction with public health services and medical service system.

Q. Li, (2020) and Z. N. Fan et al. (2022) studied the factors influencing the individual healthcare utilization of rural residents. In the context of the implementation of the Innovative Payment System and Improved Health Benefits healthcare reform project in Ningxia, Q. Li, (2020) used four years of unbalanced panel data from the sample counties in 2009, 2012, 2015, and 2019 to analyze the progressive impact of Ningxia's healthcare reform project policies on the utilization of health services by the rural residents aged 15 and above. The healthcare utilization is higher among the female, the married, and the middle-aged and elderly people; the healthcare utilization is higher among rural residents with high school education and above, high household economic level, and proximity to medical institutions; the healthcare utilization is higher among rural residents with chronic diseases and poor self-rated health status; the adjustment of health insurance policies could, to a certain extent, increase outpatient service utilization of the rural residents, but with a lag; the health insurance policy adjustment can increase inpatient health service utilization of the rural residents, and the effect is continuous. Z. N. Fan et al. (2022) used data from the 2017 China Migrants Dynamic Survey to analyze the current situation and influencing factors of medical and health service utilization of the rural migrants, and found that the utilization of medical and health services of the rural population is poor. Their initial diagnosis and consultation institutions after illness are mostly local community health stations and local individual clinics. Factors such as the reasons for migration, employment status, self-assessed health status, health record establishment, health education

acceptance, whether or not they have heard of the national basic public health service programs, and whether or not they have medical insurance all affect the utilization of healthcare services of the rural migrants.

(3) Individual healthcare utilization based on gender differences

Studies related to individual healthcare utilization based on gender differences mainly focus on female. J. Ma and Xu (2018) selected data involving female household heads from four pilot provinces in the national monitoring of residents' healthcare utilization behavior in 2016 for general descriptive analysis, and found that female household heads had increased accessibility to medical services, enhanced medical service needs, and increased medical service utilization levels. Y. D. Li (2021) reviewed research on healthcare utilization at home and abroad and analyzed the healthcare utilization behavior of female migrants based on theories related to female migration flow and health service utilization. He studied the health service utilization status of the female migrants and the influencing factors using the data from the 2017 China Migrants Dynamic Survey. The results show that the level of healthcare utilization of female migrants is lower than the national standard. There are differences in healthcare utilization among the female migrants with different inclination factors, migration factors, demand factors and ability factors, and the factors affecting healthcare utilization of the female migrants are diversified.

(4) Individual healthcare utilization based on nationality and ethnicity differences

Y. Wu (2020) compared the incidence of major infectious diseases in the foreign-arrival population and the Chinese people using the data on the incidence of infectious diseases in the foreign-arrival population reported by the national disease surveillance information reporting management system from 2004 to 2017, and further analyzed the utilization of healthcare services in the foreign-arrival population. The results show that infectious diseases in the foreign population are on the rise, with an average annual percentage change of 4.2%; the incidence of infectious diseases in the foreign population is relatively high and rises relatively fast among females and children under 15 years old. Focusing on the theme of equity in healthcare utilization, Bai (2018) adopted a multi-stage stratified sampling method to conduct a household questionnaire survey of 962 households with a total of 3635 residents of Yi, Bai, and Lahu ethnic groups who had lived in Pu'er, Dali, and Zhaotong for one year or more and were 16 years old or above. The survey data were used to analyze their health status, the current situation of health service utilization, and the factors influencing the current situation of health service utilization, and the findings are as follows. First, few of the ethnic minority residents' healthcare needs have been converted into demands, and the reasons why needs are not

converted into demands may be poor health awareness and low economic capability. Various health evaluation indicators are lower than the national average, and their overall health needs to be improved. Second, the utilization of outpatient services by ethnic minority residents is low, and the utilization of inpatient services is close to the national average. Residents' awareness of self-care for early diagnosis and treatment is poor, and health education needs to be strengthened. Third, gender, ethnicity, age, marital status, occupation, per capita annual income, family size, two-week illness contraction and chronic diseases are the influencing factors of healthcare utilization, and Lahu ethnicity, female, middle-aged and elderly people, divorced or widowed people, people with no fixed occupation and those who have already suffered from diseases should be guided to pay more attention to their physical and mental health. Fourth, there are differences in equity among different ethnic minorities in the evaluation results of healthcare utilization equity. However, in general, the demand for healthcare resources tends to present a pro poor feature. In the decomposition of the horizontal inequity index, ethnicity, age and marital status have a relatively great impact on equity. The research related to individual healthcare utilization is summarized as per Table 2.10.

Table 2.10 Research related to individual healthcare utilization

Classification	Researcher (Year)	Views
Research on individual healthcare utilization based on age stratification		
(1) Focus on the elderly	X. Y. Wang (2020), X. F. Wang and Feng (2022)	The main factors influencing healthcare utilization among the elderly include literacy, age, self-rated health status, form of insurance participation, contraction of chronic diseases, and time to get the nearest healthcare institution. Age has a significant impact on healthcare utilization.
(2) Focus on the young and the children	Zeng and Chen (2021), L. Chen et al. (2021)	The utilization of healthcare services for children in the rural areas reflects the prominent contradiction between the comprehensive and rapid growth of public demands and the unbalanced and insufficient supply of public services at the present stage in China. System deficiency and system defect is a common problem hindering the development of public services in rural areas in China at the present stage. Gender, average monthly personal income, number of working hours per week, establishment of health records, reception of health education, and application of temporary residence permits are the main factors affecting the utilization of health services for the young migrant population in Guangdong Province.
Research on individual healthcare utilization based on dual household registration system		
(1) Research on urban residents	Zi (2020)	The utilization of public health service programs for urban residents is relatively high,

Classification	Researcher (Year)	Views
		and the level of individual healthcare utilization is influenced by factors such as individual health knowledge.
(2) Research on rural residents	Q. Li, (2020), Z. N. Fan et al. (2022)	Healthcare utilization is relatively high among women, people with spouses and the middle-aged and elderly people. Healthcare utilization is relatively high among rural residents with high school education and above, high household economic level and proximity to medical institutions. Healthcare utilization is relatively high among rural residents with chronic diseases and poor self-rated health status. Health insurance policy adjustment can increase rural residents' outpatient health service utilization to some extent, but with a lag. Health insurance policy adjustment can increase rural residents' inpatient health service utilization, and the effect is continuous.
Research on individual healthcare utilization based on gender differences		
(1) Research on female	J. Ma and Xu (2018); Y. D. Li (2021)	The level of healthcare utilization of female migrants is lower than the national standard. There are differences in healthcare utilization among the female migrants with different predisposing factors, migration factors, demand factors and ability factors, and the factors affecting healthcare utilization of the female migrants are diversified.
Research on individual healthcare utilization based on nationality and ethnicity differences		
(1) Nationality differences	Y. Wu (2020)	Infectious diseases in the foreign population are on the rise, with an average annual percentage change of 4.2%; the incidence of infectious diseases in the foreign population is relatively high and rises relatively fast among females and children under 15 years old.
(2) Ethnicity differences	Bai (2018)	First, few of the ethnic minority residents' healthcare needs have been converted into demands, and the reasons why needs are not converted into demands may be poor health awareness and low economic capability. Various health evaluation indicators are lower than the national average, and their overall health needs to be improved. Second, the utilization of outpatient services by ethnic minority residents is low, and the utilization of inpatient services is close to the national average. Residents' awareness of self-care for early diagnosis and treatment is poor, and health education needs to be strengthened. Third, gender, ethnicity, age, marital status, occupation, per capita annual income, family size, two-week illness contraction and chronic diseases are the influencing factors of healthcare utilization, and Lahu ethnicity,

Classification	Researcher (Year)	Views
		female, middle-aged and elderly people, divorced or widowed people, people with no fixed occupation and those who have already suffered from diseases should be guided to pay more attention to their physical and mental health. Fourth, there are differences in equity among different ethnic minorities in the evaluation results of healthcare utilization equity.

2.2.4 Factors influencing the healthcare utilization of the migrant population

2.2.4.1 Factors influencing the individual healthcare utilization in the context of the dual household registration system

Before studying the influencing factors of the healthcare utilization behavior of the migrant population in the urban area, we must first carry out an initial integration of factors influencing the health of these migrants. The earliest studies did not make a clear classification of the population, and most focused on the factors influencing the health of urban and rural residents under China's dual household registration system which categorize people into urban or rural residents. Z. Zhao (2006) conducted a systematic study on the health status of rural residents in China based on the 2000 China Health and Nutrition Survey (CHNS) data, and the results showed that economic condition was the key factor influencing the health status of rural residents. Similarly, X. W. Yu et al. (2010) also studied the factors influencing the health status of urban residents in China based on the CHNS data and reached similar conclusions. X. W. Wang (2005) investigated the factors influencing the health of residents in some counties and cities in Hunan Province using a sampling method and compared them with the factors influencing the demand for medical services, concluding that there were overlaps between the two influencing factors, such as economic conditions, age, and marriage.

2.2.4.2 Factors influencing the individual healthcare utilization in the context of population migration

With the deepening of research, more scholars turn to study the migrants moving across regions. They gradually classify the research targets into indigenous residents and migrant population, and systematically analyze the factors affecting the health of the migrant population in the urban areas. X. J. Ye et al. (2004) took urban migrants as the respondents and found that demographic characteristics such as gender, marriage, age, occupation, length of service, economic income, and lifestyle habits had significant effects on individual health. Radel et al. (2010) studied the

influence of demographic factors such as gender on the health status of the migrant population and found that gender significantly influences the health of individuals, especially the migrant population. F. Zhou (2009) studied the influence of economic condition on health with the migrant population in Zhejiang Province as the research targets, and found that the economic income of individuals significantly influenced their health status. In addition, the relationship between the two was moderated by socioeconomic status. Migrants with higher economic status and higher income would have better health status. Huang (2010) found that both social capital and education level had significant influence on individual health of the migrant population in a survey on migrant population in five cities including Shenyang, Tianjin, Shanghai, Guangzhou, and Kunming. When individuals have relatively high level of social capital, they will enjoy high level of employment, living conditions, and access to healthcare services, and their health will also increase accordingly. High education level also increases the possibility for the individuals to get access to high social capital. Fang et al. (2007) studied the factors influencing the health of the migrant population and found that comfortable and safe working conditions could positively predict individual health level. On this basis, Niu et al. (2011) further investigated the influence of working environment and living conditions on individual health, and found that the influence of living conditions and working environment on individual health was more direct and prominent than that of socioeconomic factors. Chen and He (2010) studied the factors influencing the mental health of the migrant population from the perspectives of psychological stress, social support and the significance of population migration, and the results showed that psychological stress of the migrant population had a significant negative impact on individual health, social support was a key protective factor to maintain individual mental health, and the significance of migration lied in the positive promotion of the migrants' current mental health by their prediction of the future mental health. Focusing on the mental health of the female group in the migrant population, Chen and He (2010) studied the influence of work stress and social support on women's mental health, and the results showed that social support was a critical factor in ensuring women's mental health.

In addition, from the perspective of social outcomes, D. Liu (2008) explored the impact of social system structure (including employment system, medical security system, and children's education system) on the mental health status of the migrant population, and the results showed that structural constraints of urban social system would significantly worsen the mental health of the migrant population. However, at the same time, it is also important to realize that the reproduction of the existing social structure of the cities by the urban migrant population is a counteraction to the constraints of the urban social system, and with the increasing frequency

of the migration and expanding size of the migrants, one of the major significance of population migration is to weaken the structural constraints of the urban social system, restructure the internal social network and improve the allocation method and efficiency of urban resources. This is a manifestation of urban progress and an inevitable path of development. In summary, there is a wealth of research on the influencing factors of health of the migrant population, but there lacks comprehensive and systematic analysis of the influencing factors of health. This also indicates that it is necessary to further explore the influencing factors of healthcare utilization and analyze them in a systematic manner.

A further review of the literature reveals that although there is considerable research on healthcare utilization, due to differences in the social concern of researchers and their selection of the research targets, they have reached different conclusions. A few researchers have studied the healthcare utilization of regional residents with a full sample without categorizing them into different groups. For example, Qi and Li (2011) used CHNS data from 1991 to 2006 to study the inequality of healthcare utilization among urban and rural residents due to income disparity, and the results showed that the income disparity between urban and rural residents led to serious inequality in healthcare utilization among residents in China.

2.2.4.3 Factors influencing the healthcare utilization of the migrant population from the perspective of sample division

Most scholars tend to divide residents into different groups according to differences in age, household registration, and gender, so as to focus on the healthcare utilization behavior of a particular group of people. Y. Q. Wang et al. (2009) found that the price of medical services, severity of illness, and gender were the main influencing factors of healthcare utilization among rural residents in five counties in northern Jiangsu Province. Based on four years of CHNS data, Feng and Li (2009) explored the influencing mechanism of the compensation model of the New Rural Cooperative on rural residents' healthcare utilization behavior, and found that the New Rural Cooperative only played a limited role on rural residents' healthcare utilization and effective protection against health risks. It only compensated rural residents' hospitalization costs to a certain extent and did not promote outpatient service utilization of rural residents. Based on the 2013 China Health and Retirement Longitudinal Study (CHARLS), Y. Zhao et al., (2017) studied the equity of healthcare utilization among the elderly in China and its influencing factors, and pointed out that the level of economic development is the root cause of inequality in healthcare utilization among the elderly, and the proportion of household consumption expenditure, the amount of retirement pension, health insurance, and the ability

to fend for themselves in the daily life are the main factors affecting their healthcare utilization. The findings of their study are similar to those of J. K. Han (2013).

With the implementation and popularization of the new rural cooperative medical system, researchers gradually began to pay attention to the healthcare utilization behavior of rural residents. After population migration became a normalized phenomenon, some scholars began to focus on the healthcare utilization behavior of the migrant population. For example, X. J. Lu and Zhang (2018) studied the factors influencing the hospitalization behavior of 6,168 agricultural migrants using data from the 2014 China Migrants Dynamic Survey, and the results showed that income level was a key factor influencing the hospitalization utilization of the migrant population. Y. B. Zeng et al. (2019) focused on patients with chronic diseases and studied their healthcare utilization and the influencing factors.

2.2.4.4 Problems in healthcare utilization of the migrant population

After reviewing literature on healthcare utilization of the migrant population, it is found that the problems in healthcare utilization of the migrant population are as follows. First, the rate of medical consultation and hospitalization after illness among the migrant population is much lower than that of the registered population in the region (Cai & Xu, 2019; P. L. Gao, 2015; J. Guo et al., 2015). Second, the proportion of people who should seek medical consultation but does not is higher among the migrant population than the urban residents (Gong et al., 2015; W. P. Liang et al., 2010; E. L. Wang et al., 2017; J. Xu et al., 2014). Third, in terms of the choice of medical institutions, the migrants tend to choose private clinics or resort to self-treatment (G. H. Luo, 2012). Fourth, the medical insurance coverage rate of the migrant population is relatively lower than that of the urban registered population (X. W. Fan, 2019; Luo & Gui, 2014). Fifth, the awareness and utilization rate of the migrant population in terms of preventive healthcare service utilization is low (J. Guo et al., 2014). Therefore, whether it is from the perspective of protecting the health rights of the migrant population, maintaining the medical and health safety of the whole city, promoting the construction of modern urbanization, or enhancing social integration of the migrant population and building a harmonious society, we should pay attention to and attach importance on the healthcare utilization of the migrant population and improve their healthcare utilization level.

In order to improve the level of healthcare utilization of the migrant population, the influencing factors need to be further explored and analyzed. Current research on the factors influencing the healthcare utilization of the migrant population has focused mainly on medical insurance (Du et al., 2018), family migration situation (Dang et al., 2018), demographic

characteristics (age, gender, marital status, and educational attainment) (G. E. Liu et al., 2003), occupational characteristics (Xie, 2009) and economic factors such as family income (H. Zhao et al., 2007). However, there lacks research on factors such as the type of medical insurance and time of consultation. The migrants and their families are at a disadvantaged position in terms of access to health services and related benefits compared to other groups (X. Y. Wang, 2020; Wong et al., 2007), and healthcare utilization is closely related to their individual health as well as the public health.

2.2.5 Summary of literature review

Through review of the relevant research, it is found that previous scholars have already explored the healthcare utilization status of the urban migrants as well as the factors affecting the healthcare utilization behavior, but no consensus has yet been reached in terms of the research findings. The large-scale population migration in China has continued for more than 40 years after the reform and opening up, but there still exist deficiencies in our research on the healthcare utilization of the urban migrants.

First, there lacks a complete theoretical framework to explain the factors affecting the healthcare utilization of urban migrants and the relationship between the various influencing factors. Second, the comparative analysis is insufficient. Most of the studies have been conducted to compare the differences in the healthcare utilization between urban migrants and local residents, lacking comparative analysis of the factors influencing healthcare utilization. In this thesis, we believe that it is necessary to explore the differences in healthcare utilization between urban migrants and local residents as well as the differences in the factors influencing the healthcare utilization of the urban migrants, so as to help propose targeted policies to improve the level of healthcare utilization of urban migrants and reduce the inequality of healthcare utilization between urban migrants and other residents.

2.3 Theoretical foundation

2.3.1 Development of the Andersen healthcare utilization model

The Andersen Healthcare Utilization Model was developed by Dr. Andersen in 1968 to explain the huge differences in healthcare utilization among people with different demographic, social, and economic characteristics and provide a basis to promote healthcare system reform.

In the initial stage, the Andersen healthcare utilization model mainly uses the household as

the basic unit of analysis to explore the reasons for the differences in healthcare utilization behavior among households. Predisposing characteristics, enabling resources and need, which are the factors influencing the use of health services of the households, form the initial structure of the Andersen healthcare utilization model. The specific relationship is as follows. Propensity characteristics influence the use of health services through enabling resources and need in turn. To be specific, predisposing characteristics refer to the characteristics of people who tend to utilize medical services before the occurrence of diseases, and are not directly related to healthcare utilization. Predisposing characteristics include three variables of demographic characteristics (age and gender), social structure (education, occupation, race, and social relations) and health beliefs (perceptions, attitudes, and values about medical services). Enabling resources refer to the ability of individuals to obtain healthcare services and the availability of healthcare resources. The indirect influencing factors of healthcare utilization include personal or family resources (income and health insurance) and community resources (accessibility of community medical resources, price of medical services, time for medical treatment and waiting time for consultation). Need refers to the individual's perceived need for medical services, which is the prerequisite and direct influencing factor of healthcare utilization. Needs includes two variables of perceived need (subjective judgment of one's own health status and illness) and evaluated need (professional assessment and objective measurement of patients' health status by clinicians). Healthcare utilization refers to medical services such as outpatient, inpatient, and dental care utilized by households over the past year. The model in this stage is shown as per Figure 2.2.

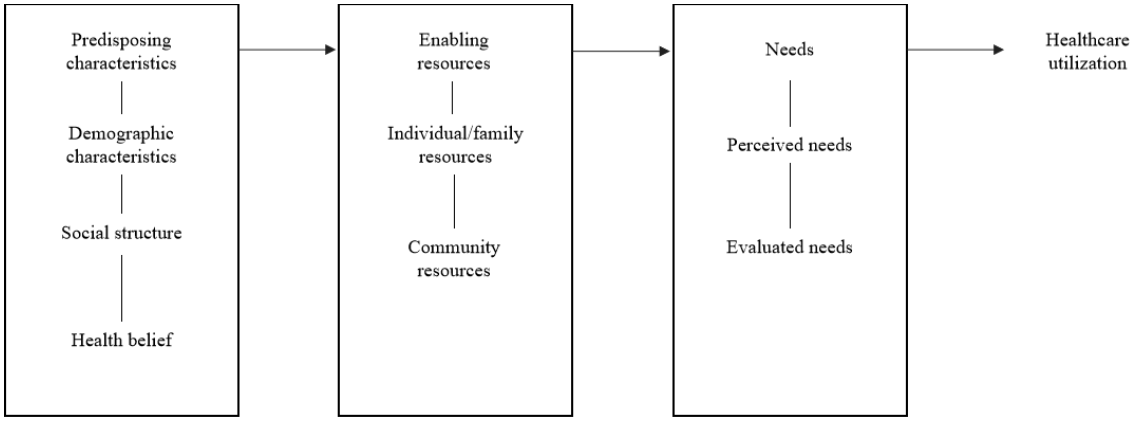

Figure 2.2 Initial structure of healthcare utilization model

From the 1970s to the 1990s, the Andersen healthcare utilization model underwent three modifications. The changes are mainly manifested in the continuous adjustment of the model structure, the increase of variables and the diversification of the relationship between variables. Compared with the initial stage, the fundamental difference lies in the shift of the basic unit of

analysis of healthcare utilization from the household to the individual, change of the theoretical viewpoint from the individual perspective only, and the gradual strengthening of the influence of external factors on healthcare utilization behavior. In addition, the dimension of health outcomes is included in the model as a subjective evaluation reflecting the outcome of individuals' utilization of medical services, which strengthens the focus on medical outcomes and enables the model to cover the whole process of medical service utilization behavior. The first modification of the Andersen healthcare utilization model was carried out in the 1970s, and the core of this modification was the shift of the basic unit of analysis of healthcare utilization behavior from the household to the individual. The reason for this change was that Andersen found that there was heterogeneity in household members and it was difficult to explain the healthcare utilization behavior of different family members by building a uniform model, so the unit of analysis was adjusted. In addition, the model was modified by adding the dimensions of health care system and consumer satisfaction, as well as the extension of the contents of health care utilization. The modified Andersen model includes four dimensions of population characteristics, health care system, health care utilization, and patient satisfaction. The relationship between them is as follows. Population characteristics and health care system directly affect health care utilization, while they also influence each other, and health care utilization directly influences patient satisfaction. The model in this stage is shown as per Figure 2.3.

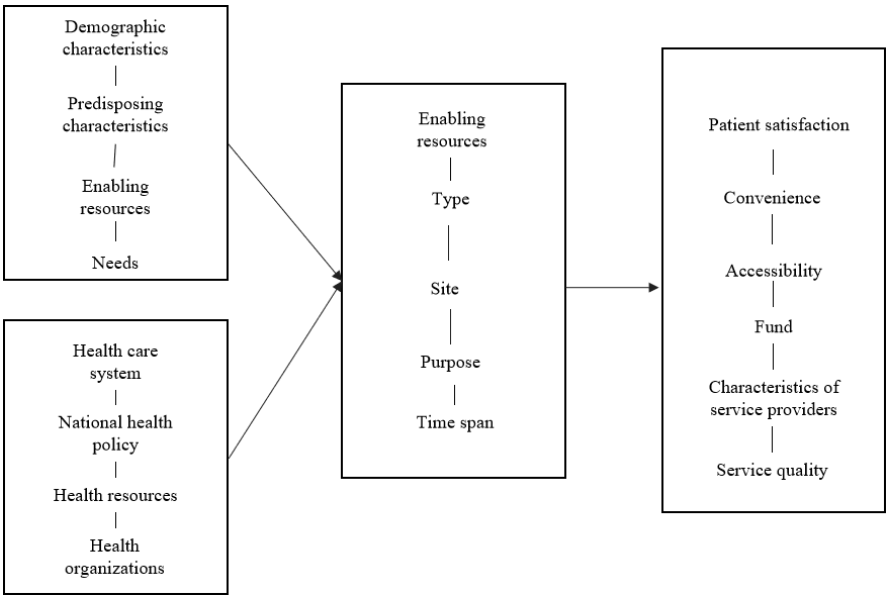

Figure 2.3 The Andersen healthcare utilization model after first modification in the 1970s

The second modification of the Andersen healthcare utilization model in the 1980s was characterized by the simplification of the model structure and the addition of variables. The modified Andersen healthcare utilization model contains three dimensions: primary

determinants of health behavior, health behavior, and health outcomes. To be specific, the dimension of primary determinants of health behavior is integrated from the dimensions of demographic characteristics and healthcare service system, and the dimension of external environment is added. The model structure has been simplified by integrating all the three factors influencing healthcare utilization into one dimension. In addition, the variables of personal health practices and healthcare service utilization are added to form the dimension of health behavior. The Andersen healthcare utilization model had expanded from a study of healthcare utilization to a study of health care behavior that includes both personal self-care and "healthcare utilization. The addition of the two variables of perceived health status (change in self-perceived symptoms) and evaluated health status (change in professionally evaluated symptoms) enables the evaluation of individual health outcomes to be more comprehensive and objective. The relationship between the three dimensions in the model is as follows. The primary determinants of health behavior indirectly influence health outcomes through health behavior. The model in this stage is shown as per Figure 2.4.

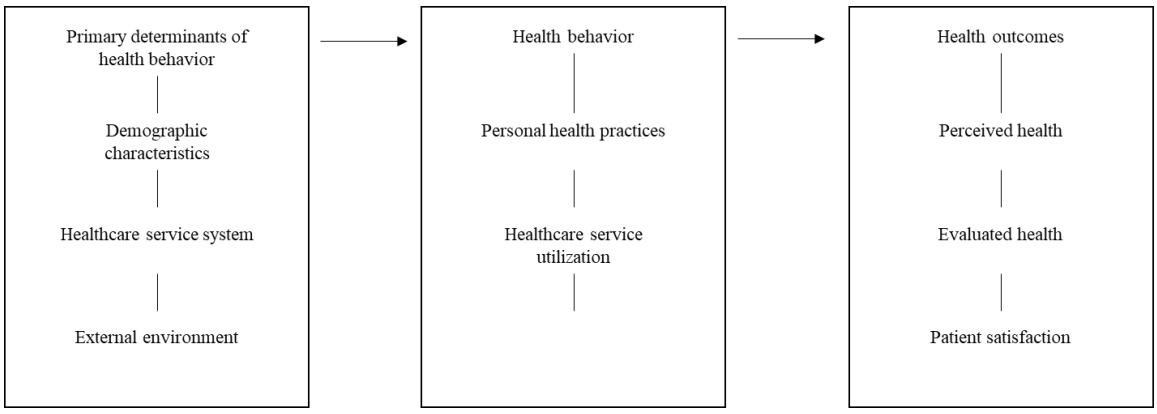

Figure 2.4 The Andersen healthcare utilization model after second modification in the 1980s

The third modification of the Andersen healthcare utilization model in the 1990s adjusted the structural relationship between individual and external environmental factors in the primary determinants of health behavior and strengthened the dynamic relationship between the variables. The modified Andersen healthcare utilization model includes four dimensions of environment, demographic characteristics, health behavior, and health outcomes. The dimensions of environment and demographic characteristics are generated from the division of primary determinants of health behavior according to the individual factors and the external environmental. Thus, the Andersen model basically establishes a parallel structural relationship between individual-level and external environment-level influencing factors, and is transformed from a recursive model to a non-recursive model. The model in this stage is shown as per Figure 2.5.

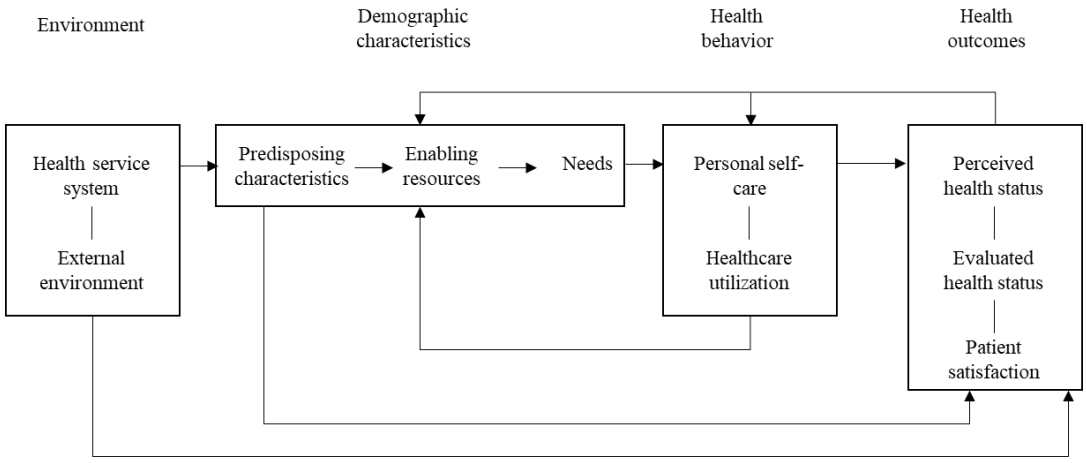

Figure 2.5 The Andersen healthcare utilization model after third modification in the 1990s

In the fourth modification of the Andersen healthcare utilization model in 2000, the dimension of environment was renamed contextual characteristics, the dimension of demographic characteristics was renamed individual characteristics, and the dimension of contextual characteristics is expanded to have the same structure of individual characteristics, including predisposing characteristics (demographics, social structure, and health beliefs), enabling resources (health policy, fund, and organization), and needs (external environment, and population health index). The relationship between the three variables is the same as the relationship between the three variables in the dimension of individual characteristics. The health service process (patient consultation, examination sequence, prescription, and doctor-patient communication) was included in the dimension of health behavior, which is designed to consider the interaction between patients and medical service providers in the health service process as a health behavior. The relationship between the four dimensions in the model is more complex than the previous model, and there are interactions between every two dimensions. The model in this stage is shown as per Figure 2.6.

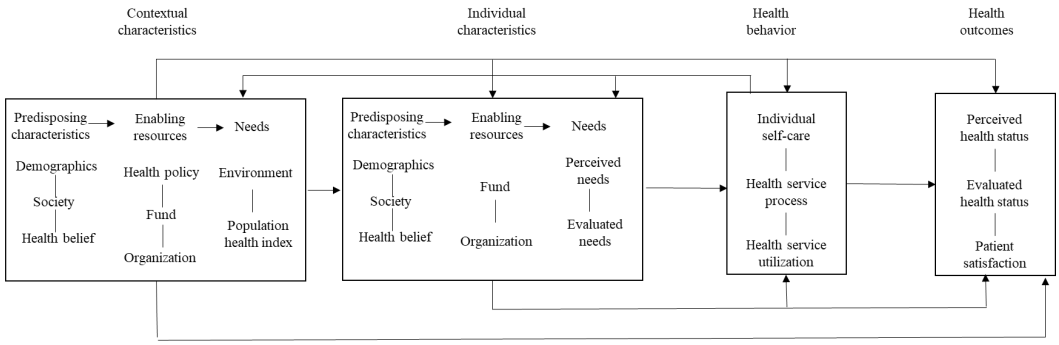

Figure 2.6 The Andersen healthcare utilization model after fourth modification in the 2000s

The last modification of the Andersen model was carried out in 2013, and only two variables of DNA and quality of life were added, with all other components unchanged. The latest version of the Andersen model uses the individual as the unit of analysis and considers

individual healthcare behavior as a result of the interaction of contextual characteristics, individual characteristics, and health outcomes, as shown in Figure 2.7.

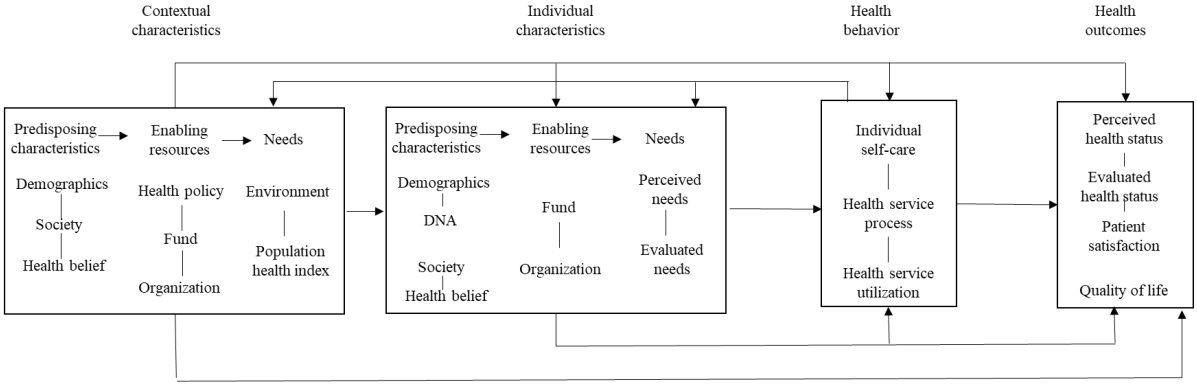

Figure 2.7 The Andersen healthcare utilization model after fifth modification in the 2013

2.3.1.2 Connotation of the Andersen healthcare utilization model

The Andersen Model is one of the most comprehensive and widely used theoretical models among the theoretical models of healthcare utilization, which is also known as the "healthcare utilization model" or "Andersen's behavioral model of health services use". The model covers various aspects including healthcare accessibility, healthcare demand, healthcare utilization behavior and behavioral outcome (Y. E. Li & Lu, 2017). The logical relationship of the Andersen healthcare utilization model is as follows: individual demographic characteristics influence individual health behaviors, and health behaviors further react on the demand factors in individual demographic characteristics (Fotios & Botse, 2016). On this basis, Pascal et al. (2021) suggested in his study that the Andersen healthcare utilization model involves relatively complex relationships between the variables, which increases the complexity in determination of both independent and dependent variables, presumption of causality, pathway of action, and policy recommendations derived from the model. The Andersen healthcare utilization model consists of four dimensions: environment, population characteristics, health behavior, and outcomes. Moreover, except for the dimension of environment, all the other dimensions have feedback loops that influence each other. The environment and population characteristics influence the health behavior and further determines the outcomes. The environment and population characteristics can also directly influence the outcome, and the health behavior and outcome can in turn influence the population characteristics (M. S. Chen, 2018). The modified Anderson model based on M. S. Chen (2018) is shown as per Figure 2.8, and we intend to analyze the influencing factors of healthcare utilization behavior of the migrant population in China based on this model.

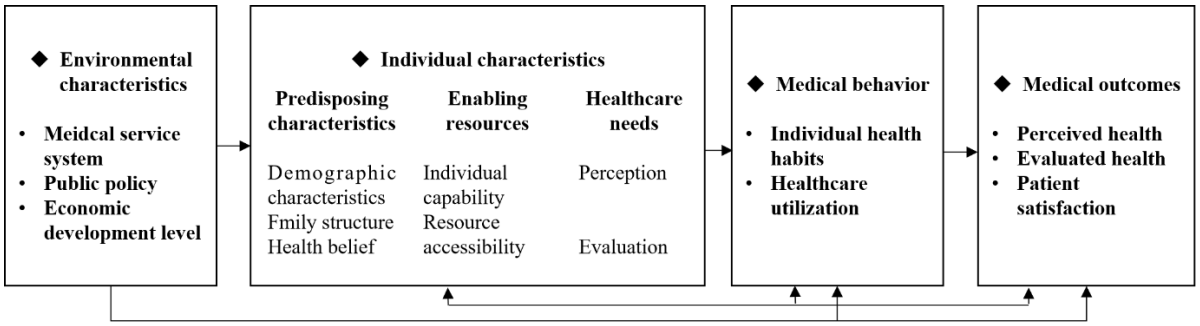

Figure 2.8 The Andersen healthcare utilization model

In the model, the environmental characteristics include external factors such as medical service system, design and implementation of public policies, and external environment of regional economy and society. In this research, we intend to select the basic medical insurance policy (public policy) and socioeconomic level to analyze the healthcare utilization behavior of the migrant population.

The individual characteristics include internal factors such as predisposing characteristics (characteristics of the population that tend to utilize medical services before the occurrence of diseases, such as demographic characteristics, family structure and health beliefs), enabling resources (the ability of individuals to acquire medical services and the accessibility of medical service resources), and individual needs (individual perception and evaluation of medical services) (Y. E. Li & Lu, 2017). In this research, we will analyze the accessibility as well as the necessity of healthcare utilization of the migrant population in detail from the aspects of predisposing characteristics, enabling resources and individual needs, and then analyze the factors influencing healthcare utilization of the migrant population.

Medical behavior includes individual self-medication after illness, doctor-patient relationship in the process of healthcare and patients' utilization behavior of medical service of formal hospitals. In this research, we focus on analyzing the medical treatment behavior of the migrant population. Medical outcomes include perceived health (changes in disease symptoms by self-perception), evaluated health (changes in disease symptoms by hospital professional evaluation), and patient satisfaction with medical services (Y. F. Li & Meng, 2013). In this research, we will select the self-rated health status (perceived health) and the probability of illness (evaluated health) of rural insured residents for analysis.

2.3.1.3 Relevant research on the Andersen healthcare utilization model

Research that uses the Andersen healthcare utilization model as the theoretical model can be divided into two main categories, one of which is research that does not modify the Andersen healthcare utilization model, and the other is research that partially modifies the Andersen

healthcare utilization model according to research needs.

(1) No modification of the Andersen healthcare utilization model

1. Status quo of foreign research

The literature on empirical studies conducted by foreign scholars using the Andersen healthcare utilization model mainly focuses on the study of factors influencing healthcare utilization behavior of different groups, and the research can be divided into three categories.

The first category of research is conducted based on differences of ages. Based on the Andersen healthcare utilization model, Kim (2018) conducted a specific study on the factors influencing the healthcare utilization behavior of 240 elderly people aged 65 years or above in the community. It is found that the factor of needs, namely, self-reported health status, exerts the most significant impact on the health-related quality of life of the elderly people, and age, education level, financial income, and activities of daily living are the main predisposing factors for health service behavior. Sinha et al. (2018) used an empirical research approach based on the Andersen healthcare utilization model to test the following three propositions. First, whether financial hardship associated with out-of-pocket medical expenditures affects health care in the following year; second, whether such financial hardship has an impact on timely access to health care (significant indirect effects); and third, whether this mediating effect differs by chronic health status (moderated mediators) among U.S. adults. The results suggest that in addition to direct effects, predisposing factors, enabling factors, and needs factors also indirectly influence access to health care through economic hardship. Nareudee et al. (2019) used the Andersen healthcare utilization model to assess determinants associated with inequality in denture service use among elderly adults in Thailand. The results show that the odds of using denture services are significantly higher among the elderly, female, highly educated people, and people who have health promotion behaviors. Among the elderly in Thailand, predisposing variables have a greater impact on denture service use than enabling variables. Despite the availability of free public denture services, socioeconomic-related inequalities persist. Hajek et al. (2021) used the Andersen health service utilization model as an analytical tool, and found that the factors influencing the level of health service utilization of adults are more complex than that of children. In addition to the influencing factors mentioned in the Andersen model, there are other factors that can also affect the healthcare utilization of adults.

The second category of research is based on occupational particularity. Scholars have assessed healthcare utilization from the perspective of stakeholders rather than actual users when applying the Andersen healthcare utilization model and reached the findings which are

divided into four categories such as working environment and work stress and ten subcategories such as psychological stress and medical healthcare prediction level.

The third category of research is based on differences of physical status. Xue et al. (2009) used the Andersen healthcare utilization model to examine the impact of marketization of care on individual healthcare utilization behavior using the convenience sample data of 488 informal caregivers, and found that favorable factors such as household income, housing type, and education level can positively predict individual healthcare utilization in families. Liselot et al. (2020) selected 451 patients with intermediate dementia and their informal caregivers from eight European countries as the respondents and explored whether patients had equitable access to formal care services for dementia and which specific factors should be used as targets to improve access to formal care services. The results show that the most important predictors for different care groups are disease severity, total sum of (un)met needs, time spent on informal care, living alone, age, area of residence, and gender. In addition to need factors, predisposing variables such as area of residence, gender, and age also play a role in access to care services. Moreover, the time spent on informal care, living alone, need, and severity of illness are also significant predictors within the model framework.

2. Status quo of domestic research

Domestic research using the Andersen healthcare utilization model as a theoretical basis is mainly divided into the following categories.

The first category of research is based on different age groups. Y. Zeng et al. (2021) used data from the Chinese Longitudinal Survey on Healthy Longevity conducted in 2014, from which data of 4738 participants aged ≥ 80 years old were extracted, and the Andersen healthcare utilization model was used as an analytical framework to explore the expected needs of the elderly for different types of elderly services and the determinants, as well as investigate the elderly people's preferred choice of living alternatives and its influencing factors. The results show that the oldest elderly have relatively high expected needs for home visits (83.5%) and health education (76.4%). In addition, there is a large imbalance between the supply and demand of elderly care services. Living with children is still the most important way to provide for the oldest old. The expected needs for elderly services and expected living arrangements of Chinese elderly are influenced by age, place of residence, housing ownership, financial status, loneliness, and activities of daily living (ADLs). The elderly people without housing ownership, without children, and with restrictive ADLs tend to live in long-term care facilities. G. M. Yang et al. (2022) used the Andersen healthcare utilization model as a theoretical framework to explore the impact of predisposing characteristics, enabling resources, and need factors on the

willingness of the elderly in the rural areas to choose their elderly care method. The results show that most elderly people in the rural areas chose family-based elderly care, and marital status, education, residence status, disability, type of chronic disease, and ability of the elderly are the factors that influence their choice of elderly care. Predisposing characteristics and enabling resources are found to have a great influence on the dependent variable from the regression model of influencing factors. Y. Liu et al. (2022) studied the elderly groups in rural areas of Shandong Province, and systematically analyzed the influencing factors of healthcare utilization of these groups based on the Andersen model. The results show that gender, age, marital status, knowledge of family doctor contract, self-rated health status, health management utilization, participation in medical insurance and contraction of chronic diseases all have significant impacts on the healthcare utilization behavior of the elderly, and the enabling factors exert the greatest influence. B. X. Xu et al. (2022) designed a specific questionnaire using the Andersen healthcare utilization model as the theoretical framework to investigate the guardians of children aged 0 to 14 years old so as to analyze the children's willingness to seek medical care in primary medical institutions and the factors affecting their willingness to seek medical care in primary medical institutions. The findings indicate that the distance to the hospital, the length of waiting time, and the medical conditions of the hospitals are the key factors affecting the willingness of children's parents to seek medical care in primary medical institutions.

The second category of research is focused on women. Hui et al. used data from the 2010 Women's Social Status Survey conducted by the All-China Women's Federation to focus on the differences between male and female health service utilization behaviors. They applied the Andersen healthcare utilization model to analyze and explore the effects of predisposing characteristics, enabling resources, and health needs on healthcare utilization behavior. The findings suggest that property ownership is only significant for the mental health of men, and for women, recent exercise and participation in leisure activities are better predictors of their mental health. Close relationships with neighbors, eligibility for the old age benefit program, and better overall health are found to be beneficial to the mental health of both men and women. Delayed medical treatment has a negative effect on the mental health of men but it has a positive effect on women, which may indicate that elderly women take pride in their self-sacrifice.

The third category of research is based on the migrant population. Yin et al. (2023) empirically investigated the factors influencing the choice of medical care and medical institutions for sickness among the migrant population in Xuzhou based on the Andersen healthcare utilization model. They found that the male migrants, migrants engaged in the service industry, migrants who have moved for a short period of time, migrants who migrate

within the province, migrants with commercial medical insurance, migrants close to a primary care institution, and migrants who have visited a primary care institution within 1 year are more inclined to seek medical care after sickness. Unmarried migrants, migrants who have moved for a short period of time, migrants who are far from the hospital, migrants who have visited a primary care institution within one year, and migrants who have good self-assessed health status are more likely to seek medical care in primary medical institutions.

The fourth category of research is based on the residents in a certain region. Xu and Yin (2017) analyzed the factors influencing the health service utilization of urban and rural residents in Jiangsu Province using data from the sixth National Health Service Survey in 2018 with the Andersen health service utilization model as the theoretical basis. The results of the study show that there are significant urban-rural differences in the health service utilization behavior of residents in Jiangsu province.

The fifth category of research is based on groups with relatively poor health. With the Andersen healthcare utilization model as the theoretical framework, Shen et al. (2022) applied the General Information Questionnaire, the Continuing Care Needs of Patients with Chronic Heart Failure Questionnaire, the Social Support Rating Scale, the Depression Self-assessment Scale, and the General Self-Efficacy Scale to investigate 309 patients with chronic heart failure to study the current situation of continuing care needs of patients with chronic heart failure and analyze the influencing factors. The results show that self-efficacy, social support, and self-rated health status are the influencing factors of the needs for continuing care by patients with chronic heart failure, among which social support is the main factor affecting the continuing care needs of patients with chronic heart failure. J. Li et al. (2022) analyzed the factors influencing the chronic disease patients' choice of initial-diagnosis institutions with the Anderson healthcare utilization model as the framework. The results show that the proportion of initial diagnosis at primary healthcare institutions is relatively high among patients with chronic diseases in rural areas of Shandong Province, and family doctor contracting service has a positive effect on promoting rural patients with chronic diseases to choose primary healthcare institutions for initial diagnosis.

(2) Modification of the Andersen healthcare utilization model

1. Status quo of foreign research

Based on the Andersen healthcare utilization model, Chatterjee et al. (2019) analyzed the predictors of the choice of inpatient health care services between private and public services among the elderly in India and further elaborated on the inter-regional differences in the choice of health care services among the elderly in India. They also incorporated factors such as

economic status of the elderly, source of health care financing, need for surgery, and length of stay in the model in a uniform manner. The results suggest that the elderly people with high levels of education, high income, large family size, and need for surgery are likely to choose private health care services, while those with high levels of financial dependence, chronic illnesses, and long hospital stays tend to choose public inpatient services. However, the extent and importance of these factors vary from region to region.

Sigrid et al. constructed a community and healthcare utilization model based on the Andersen healthcare utilization model, and investigated the role of community characteristics in influencing healthcare utilization from three perspectives: supply-side, demand, and demand for health care. The findings show that potential community characteristics such as degree of urbanization, public and open space, resources and facilities, green and blue space, environmental noise, air pollution, social capital, crime and violence, socioeconomic status, stability, and ethnic composition all influence the healthcare utilization behavior of community residents.

Sun et al. (2020) added the variable of time-variant factors to the Andersen healthcare utilization model and investigated the effects of time-invariant and time-variant factors on individual healthcare utilization behavior. The results indicate that changes in functional health are important determinants of willingness to use respite care. Despite care is considered to be an effective resource for reducing the burden of the caregivers and promoting the well-being of the elderly and their family caregivers. However, respite care is underutilized in China.

2. Status quo of domestic research

Y. Wei and Zhang (2020) used 3260 elderly people aged 60 years or above in 44 communities in 16 sub-districts of 6 districts in Xiamen as the respondents, and constructed an adjusted theoretical model of demand influencing factors according to the research objectives and variable information availability. (a) Predisposing factors influencing model variables include type of residence, gender, age, and education; (b) enabling variables include lifestyle, marriage, number of children, income, primary caregiver, and type of health insurance; and (c) individual needs variables include health self-assessment, activities of daily living (ADL), and loneliness. The results show that the preference for CMCP among the elderly in Xiamen is lower than that for home-based care, and the preference for CMCP is influenced by various factors such as age, education, place of residence, income, and self-care ability, with the enabling factors exerting the greatest influence. C. G. Liu et al. (2022) explored the current situation of elderly people’s healthcare service utilization in China and its influencing factors based on the modified Andersen healthcare service utilization model, and found that factors

such as marital status, residence conditions, personal income level, number of children, and physical health level are the important factors influencing the healthcare service utilization of the elderly. W. Zhang et al. (2022), on the other hand, incorporated health perception factors in the model and systematically elaborated on the influencing factors of e-health literacy among the elderly. The results show that educational background, personal income level, health perception, community health service availability, frequency of finding health information online, health status, and health risk perception are the influencing factors of e-health literacy among the elderly. Lan et al. (2022) constructed a model of influencing factors of quality of life by making appropriate adjustments to the original theoretical framework based on the Andersen healthcare utilization model. There are many factors affecting the quality of life of elderly cervical cancer patients, among which per capita household income, treatment modality, and payment method are the most important influencing factors.

Based on the development history of the Andersen healthcare utilization model and the review of related literature, we propose the following hypotheses.

Hypothesis 1: The level of economic development in the socio-economic environment exerts a significant impact on the healthcare utilization behavior of the migrant population.

Hypothesis 2: There is a significant impact of the predisposing factors represented by factors such as gender, age, education level, and marital status on the healthcare utilization behavior of the migrant population.

Hypothesis 3: There is a significant impact of the enabling factors represented by income status, health insurance participation, and convenience to get health care on the healthcare utilization behavior of the migrant population.

Hypothesis 4: There is a significant impact of need factors represented by self-assessed health status on the healthcare utilization behavior of the migrant population.

2.3.2 Psychological factors mechanism model

2.3.2.1 Development of psychological factors mechanism model

Psychological factors, as an important way in which individual trait factors affect health, also have a significant impact on individual health. Pressman and Sheldon (2005) proposed a direct effect model of emotion and health when studying the effect of positive emotion on individual health status, and concluded that positive emotion can improve individual health by reducing cortisol levels under normal conditions. Subsequently, given that the direct effect models do not identify the conditions under which positive emotions can play a role in individuals' health,

Cohen et al. (2005) proposed a stress buffer model of emotion and health based on the direct effect model of emotion and health. The modified model emphasizes that the effect of positive emotions on health is mainly manifested when individuals are in a state of stress. In other words, positive emotions relieve individuals stress, which in turn leads to maintenance of individual health. Brunner and Marmot (2006) studied the mechanistic effects of behavioral psychology and built a model of social determinants of individual health. They further detailed that social structure influences individual health in three ways: physical factors, social environment, and work environment.

Based on the model of social determinants of individual health, L. Li (2007) further explored the psychological pathways through which social factors influence health and identified the mechanism pathway. Psychological factors, as the mechanism of action of social factors influencing individual health, function in three main dimensions: personality, cognition, and psychological stress. Of the three dimensions of psychological factors, stress is the main psychological factor that generates health problems. The relationship between stress and individual health has attracted considerable attention from researchers. According to the psycho-physiological stress model proposed by Brunner and Marmot (2006) (see Figure 2.9), the social stressors faced by individuals can be mainly classified into life events (for example, unemployment, divorce, broken relationship), and daily troubles and chronic stress (for example, high workload and high stress of life). Faced with different social stressors, different people will show differentiated responses such as resistance and vulnerability (Liang & Li, 2003). In addition, different social classes and different economic levels directly affect individual's ability to cope with and recover from stress. Individuals in lower social classes and with lower levels of economic conditions receive relatively lower social support and suffer from greater negative influence on health from psychological stress.

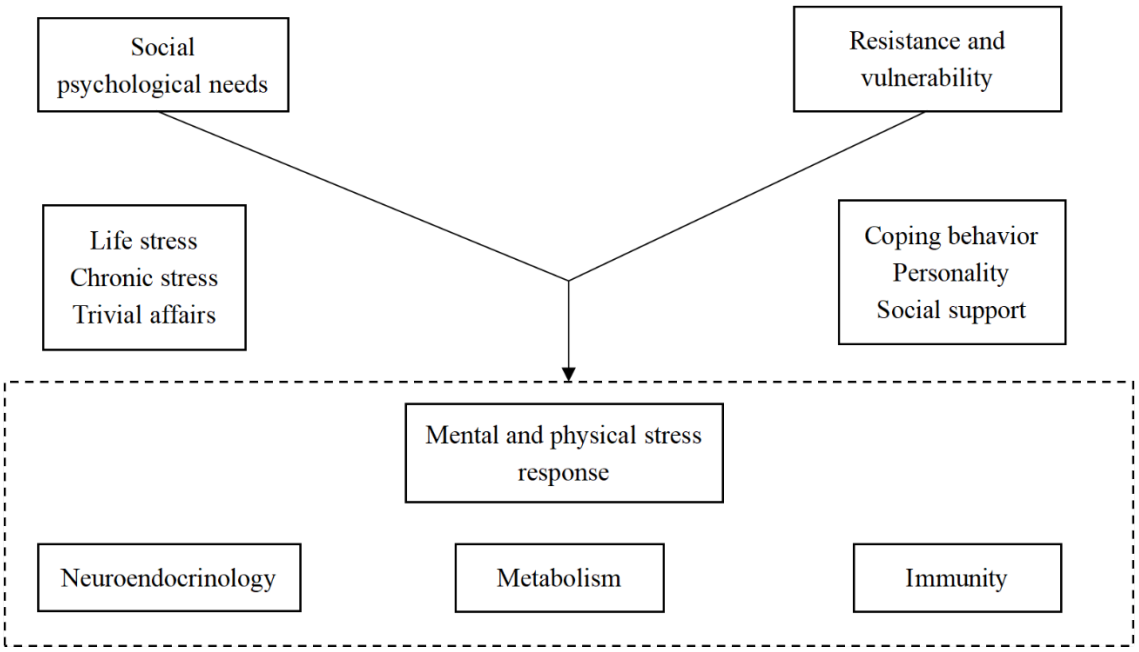

Figure 2.9 Psychological and physiological stress model

Given that the Andersen healthcare utilization model only describes the influencing factors of healthcare utilization in terms of environmental characteristics, individual characteristics, and medical behavior, and ignores the effect of individual psychological activities. Therefore, the theoretical model in this research will integrate the Andersen model and the psychological factor mechanism model to explore the influencing factors of healthcare utilization from various dimensions including social factors, stress factors, and individual traits.

2.3.2.2 Psychological factors mechanism model

The psychological mechanism model is relatively a systematic theoretical basis used to study the influence of psychological factors on individual health. Existing studies have analyzed the effects of work stress, life stress, social stress and other stressors on individuals' physical and mental health from theories such as cognitive adaptation theory and adaptation load theory.

(1) Status quo of foreign research

Foreign research on the influence of psychological factors on the mental and physical health of individuals is also carried out based on the particularities of different groups. In a study on the relationship between psycho-social work characteristics and 4-year health-related quality of life changes among working women in the United States, Y. Cheng et al. (2000) found that unfavorable psycho-social work conditions are an important predictor of health decline, and the largest drop of health level occurs in women with low work control, high work demands, and low work-related social support. Similarly, with HIV-infected women as respondents, Ickovics et al. (2006) explored the relationship between psychological resources (positive affect, positive

expectations of health outcomes, identification of meaning in challenging environments) and mortality and immune system in HIV patients based on cognitive adaptation theory. Results show that psychological resources are negatively associated with HIV-related mortality and death time, and they can also enhance immunity of the HIV patients.

Tsutsumi et al. (2001) focused on the elderly Japanese population and found that work stress was associated with hypertension in Japanese working men by examining the relationship between work stress and individual health levels. Focusing on the health issues of employees within work organizations, Mahee studied the impact of external stress and individual psychological stress on health, and found that organizational employees who experience strong external stress (pressure of overtime, increasing workload, constant time pressure, repeated interruptions), if not compensated accordingly, are prone to unbalanced mentality and increased individual psychological stress, which can produce health problems such as hypertension, and the effects are greater on men than on women. With physicians as the respondents, Magnavita et al. explored the relationship between work stress and physical and mental health of individuals, and found that occupational stress is closely related to the perceived lack of distributive equity and is significantly related to the probability of illness in individuals. In the modern workplace, in addition to physical, chemical and biological hazards, other risks are related to the nature of the work organization and the work itself. Stefania et al. (2023) investigated the relationship between employees' well-being and the psycho-social and physical risk factors at work using data from the European Working Conditions Survey. They proposed an integrated measurement method and confirmed that the two risk factors of well-being at work and personal risk factors do exert a significant impact on workers' health.

There are also studies that do not divide specific groups and explore the impact of psychological factors on individual physical health as a whole. Based on the idea that humans have an evolutionary ability to experience negative and positive emotions, Barak (2006) proved that people with a more negative emotional style have a weaker immune response and are more likely to contract disease than those with a positive emotional style. In the exploration of the role of social relationships and social support in influencing physical and mental health, Thoits et al. found that good social relationships and social support can effectively promote the physical and mental health of individuals and this impact is achieved mainly through buffering stress. In their study of the health status of the Italians, Sabatini (2014) found that after controlling some relevant socioeconomic factors, happiness is closely related to health.

(2) Status quo of domestic research

Similar to foreign studies, Chinese studies also focus on the influence of psychological

factors on physical health of individuals by classifying different groups. For example, groups of different occupations have been studied based on the differences in employment. C. X. Fan et al. (2003) studied the current status of sub-health and its risk factors among 8417 faculty members in 19 higher education institutions in Guangdong Province. The study shows that the prevalence of sub-health is highest among faculty members between 30 and 40 years old, and the prevalence of severe sub-health among female faculty members is significantly higher than that of male faculty members. The main risk factors of sub-health include work stress, psychological factors and bad behavioral habits, among which, psychological factors and work stress have more obvious effects on the sub-health of university teaching staff. Ying et al. (2004) investigated 407 nurses in emergency departments of 10 grade A tertiary general hospitals in Beijing using whole-group sampling method to study the role of work stress, social support, coping styles, and self-esteem in maintaining the health status of emergency department nurses. It is found that work stress exerts the greatest impact on the health status of emergency department nurses and can affect physical health, psychological health, and social health, with the greatest impact on psychological health. Self-esteem plays an important role in maintaining health and it mainly protects psychological health and social health. L. B. Fan et al. (2009) measured the psycho-social factors of work psychological requirements, work autonomy, and work social support faced by 1208 teachers (579 men and 629 women) in a comprehensive university in Yunnan Province, and found that there were significant gender differences in the associations between the three psycho-social factors and self-rated health in universities, high job requirements are associated with poor physical and psychological health of the female teachers, and low job autonomy and low social support are associated with poor physical and psychological health of the male teachers. Xue et al. (2009) investigated the effects of social and psychological factors such as occupational stress and emotions on the physical health of female teachers among 354 female teachers from 18 elementary school in Lanzhou. The results show that social and psychological factors such as occupational stress have certain influence on the physical health of female teachers. Luo and Yu (2011) focused on the group of on-the-job civil servants to study the relationship between work stress, emotional management and physical and mental health of civil servants. The results show that work stress and emotional management affect the physical and mental health of civil servants, and emotional management is an important moderating factor in the "work stress-physical and mental health" system. Y. E. Li and Lu (2017) used the effort-reward imbalance (ERI) scale to analyze the differences in the distribution of scores of work stress and physical and mental health among different genders in a survey of 2647 workers in Guandu District of Kunming and explore the effects of work stress

on the health functions of workers of different genders. The results indicate that there are gender differences in the scores of physical and mental health of the workers and work stress may be an important risk factor for physical and mental health of the workers.

Some studies focus on students. Using 612 valid questionnaires from seven schools, C. P. Li and Zhang (2009) adopted hierarchical regression analysis to examine the relationship between role stressors and physical and mental health of the teachers. The results show that role stressors have a significant negative effect on the physical and mental health of the teachers. S. P. Zhao and Gao (2009) evaluated the physical health of university students and found that the factors influencing physical health mainly include personality traits represented by psychosis, anxiety, and depression, as well as interpersonal factors represented by obsession, interpersonal sensitivity, and paranoia, and the influence of psychology on physical health is greater than the influence of physical health on psychology. X. F. Lu and Han (2011) studied the effect of social support of university students on their subjective stress and physical and mental health, and found that social support indirectly affects physical and mental health by influencing subjective life stress.

Some other research focuses on the elderly population. C. L. Han et al. (2021) used data from the 2015 Chinese General Social Survey (CGSS) to study the health status of the elderly in China and the influencing factors. The results show that the health status of the elderly is influenced not only by individual characteristics but also by the level of the urban area they live in. Income level, lifestyle, and psychological factors play a particularly important role in the health of the elderly. J. Q. Wu et al. (2023) explored the relationship between positive mental health and disease recovery in the elderly based on a bio-psycho-social medicine model, and found that positive mental health is a protective factor for disease recovery of the elderly. Compared with the elderly people with high level of positive mental health, those with low level of positive mental health are 50.3% less likely to recover from diseases, and those with moderate level of positive mental are 29.8% less likely to recover from diseases.

Some research focuses on the importance of psychological stress through a comparative approach. Shang et al. (2008) randomly selected 1133 male and 1045 female workers aged 30 to 65 years old in a central urban area of a city and conducted a cross-sectional survey using the Copenhagen Psycho-social Questionnaire (COPSOQ) to study the influence of work stress on the physical and mental health of ordinary workers in the urban areas. The results show that the physical and mental health of the urban workers is related to various psycho-social factors in the workplace, and health of the women are more likely to be affected by work stress compared to that of men. Job requirements and job instability have negative effects on both

physical health and mental health for both men and women.

Some other scholars carry out specific research based on overall sampling. Through a review of the literature related to psychological factors affecting individual health, Guo and Wang (2007) found that positive emotions are beneficial to physical recovery and disease prevention, and can promote physical health by improving immune system functions. W. L. Wang et al. (2010)started from the concept of risk factors and distinguished risk signals from other factors with reference to the quality-stress model. The psychological risk factor of sub-health is incorporated into the "susceptibility quality-risk cause-psychological danger signal" model. Based on this theoretical framework, they reviewed in detail the research on psychological susceptibility, stress and psychological risk signals of sub-health, elaborated on the psycho-pathological mechanism of sub-health, and supported the value of psychological factors in the prevention and intervention of sub-health. Qiu et al. (2011) used data from the 2006 China Health and Nutrition Survey (CHNS) to analyze the factors affecting individuals' self-rated health. The results show that the self-rated health of individuals is influenced by many factors, and social and psychological factors have a great influence on self-rated health in addition to medical problems. Using data from the 2014 China Family Panel Studies (CFPS), L. Han and Gu (2019) found that improvement in psychological status is beneficial to the enhancement of self-rated health, and good psychological status can enhance physical health to a certain extent. Psycho-social factors (such as depression) may affect the nervous system and in turn affect physical health through direct pathways, and may also affect physical health through indirect pathways (such as affect behavior). C. Yu et al. (2022) used data from the China General Social Survey (CGSS) and the China Statistical Yearbook to systematically analyze and compare the influencing mechanisms of urban and rural residents' self-rated health in multiple dimensions including time, space, and scale, and found that from 2010 to 2017, the overall level of self-rated health of the Chinese had been gradually declining, the health level in rural areas is generally lower than that in urban areas, the focus of self-rated health has shifted to mental health, and people's perception of social environment (work pressure and life pressure) has gradually became a key factor affecting health.

A small number of studies have also investigated the effects of psychological stress on physical health and disease recovery for those with deficiencies in physical health. C. X. Liu et al. (2015) conducted a questionnaire survey on 120 hypertensive patients with health-risk stress using the General Self-Efficacy Scale and Coping Style Questionnaire to explore the levels of self-efficacy, coping style, and perceived stress and the relationship between them for patients with health-risk stress hypertension. The results show that positive coping and self-efficacy are

predictive of stress. By assessing and intervening in the coping style and self-efficacy of patients with health-risk stress hypertension and improving patients' positive coping and self-efficacy, the effect of stress as a risk factor on patients' blood pressure can be reduced.

On this basis, we further propose the following hypothesis in addition to the previous four hypotheses.

Hypothesis 5: There is a significant impact of stress factors represented by work stress, social stress and life stress on the healthcare utilization behavior of the migrant population.

2.3.3 Managerial implications of the theoretical foundation

According to the literature research, on the one hand, the Andersen healthcare utilization model is a model that has been continuously modified and improved rather than a solidified theoretical model. Its contents can be added or subtracted appropriately depending on the differences in research subjects and research environments, and there are many factors that affect individual healthcare utilization behavior, so it is necessary to make localized modifications to the model. On the other hand, there is a wealth of research that illustrates the significant influence of socioeconomic and individual psychological factors on the physical health of individuals, and the level of individual physical health is closely related to healthcare utilization behavior.

Given that the Andersen healthcare utilization model only describes the factors influencing healthcare utilization in terms of environmental characteristics, personal characteristics, and health care behavioral processes, but pays little attention to the psychological activities of individuals, the theoretical model in this research integrates the Andersen healthcare utilization model and the psychological factor mechanism model. In other words, we will adjust and expand the Andersen healthcare utilization model based on the psychological factor mechanism model, and explore the influencing factors of healthcare utilization from the perspectives of social factors, stress factors, and individual traits. The Andersen Healthcare Utilization Model is significant in management science, as it provides a theoretical framework for health service providers, managers, and policy makers help them understand the choices and behaviors that affect individual healthcare utilization, so as to improve the quality and effectiveness of healthcare utilization and address the problem of inequality in healthcare utilization. In practice, health service providers, managers and policymakers can improve the utilization of health services by collecting relevant data, analyzing the data, formulating health service policies and evaluating the effectiveness of the services so as to improve the quality of life and health of the people. As is known to all, quality management is an important part of the management

paradigm and is particularly important in healthcare delivery. By adopting quality management and continuous improvement methods, the healthcare systems and healthcare institutions can continuously improve the quality of services and patient experience. Quality management includes the establishment of quality policy and quality objectives, quality planning, quality control, quality improvement, and quality assurance. A quality management system consists of processes, organizational structures, resources, and procedures to ensure the quality of products and services and meet the needs of customers. The Andersen model of healthcare service utilization and the psychological factor mechanism model reflect the quality of healthcare utilization at different levels, and can be integrated into the quality management system of the management disciplines. In this research, the Andersen healthcare utilization model is adjusted and expanded by introducing the psychological factor mechanism model, and the influencing factors and the degree of influence on the healthcare service utilization behavior of the migrant population are studied with the healthcare utilization behavior of the migrant population as the dependent variable, and the social factors, stress factors, predisposing characteristics, enabling resources, and need resources as the independent variables, with an aim to exploring the feasible path to promote the high-quality development of China’s medical and healthcare services.

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Chapter 3: Research Design

3.1 Data source

The China Migrants Dynamic Survey (CMDS) is organized by the National Health Commission to collect data of the migrant population across China. Started in 2009, it conducts sample surveys once a year, and the latest published data when we initiated this study was data of 2018. Given that the publicly available data at that time were data of a total of nine years from 2010 to 2018, in order to objectively reflect the realities of the healthcare utilization of the migrant population, we adopt the latest available data from 2016 to 2018.

3.2 Model specification

The theoretical model adopted in this research is mainly based on the Andersen healthcare utilization model, and based on the mechanism model of psychological factors, we identify the influencing factors of the healthcare utilization behavior of the migrant population. Based on three years of CMDS data from 2016 to 2018, we intend to use analytical methods such as hierarchical logistic regression to compare the healthcare utilization of the migrant population and the household registered population, explore the factors influencing healthcare utilization of the migrant population and the degree of influence from the macro perspectives such as the basic health insurance policy (public policy) and the socioeconomic level as well as the micro perspectives such as individual demographic characteristics, service purchasing power, and self-rated health status, and further clarifies the key factors that influence the utilization of healthcare services of the migrant population.

In this study, the dependent variables are “refusal to seek necessary medical treatment”, “preference of general hospital in face of physical discomfort” and “participation in free health examination”, which are all 0-1 variables or binary variables. Therefore, we selected a binary logit regression model from the stochastic models for this research. That is, for each observed sample, the conditional probability of an event occurring or not can be written in the form as follows.

$$\begin{cases} P(y_i = 1|X) = P_i \\ P(y_i = 0|X) = 1 - P_i \end{cases} \tag{4.1}$$

P_i is the logit function of the β coefficient, and P represents the target probability. The two cases can be combined to yield a bivariate distribution function as follows.

$$\mathbf{P}(y_i) = p_i^{y_i}(1 - p_i)^{1-y_i} \tag{4.2}$$

In addition, since logit regression assumes that the samples are independent of each other, their joint distribution can be treated as the product of the individual marginal distributions, and thus the likelihood function can be constructed as follows.

$$\mathbf{L}(\boldsymbol{\beta}) = \prod_{i=1}^{n} p_i^{y_i}(1 - p_i)^{1-y_i} = \prod_{i=1}^{n} (\frac{e^{X\beta}}{1 + e^{X\beta}})^{y_i} (1 - \frac{e^{X\beta}}{1 + e^{X\beta}})^{1-y_i} \tag{4.3}$$

To get the specific β value, it is necessary to further calculate the maximum value of the likelihood function. The partial derivatives for each β value are evaluated, and the derivative results of the newly-generated n+1 equations are set to be 0. To facilitate the derivative, equation 4.3 is treated logarithmically to obtain the linear form as shown in 4.4.

$$\ln(\mathbf{L}(\boldsymbol{\beta})) = \ln\left(\prod_{i=1}^{n} p_i^{y_i}(1 - p_i)^{1-y_i}\right) = \sum_{i=1}^{n} [y_i \ln(p_i) + (1 - y_i)\ln(1 - p_i)] \tag{4.4}$$

Given that probability P_i is a logit function of the β coefficient, the β coefficient cannot be explained by simple marginal effects. Its intrinsic meaning is the change in the logarithmic relative risk ratio resulting from a one-unit change in a certain explanatory variable, which can be expressed as 4.5 and 4.6.

$$\frac{p}{1 - p} = \exp(\mathbf{X}\boldsymbol{\beta}) \tag{4.5}$$

$$\ln(\frac{p}{1 - p}) = \mathbf{X}\boldsymbol{\beta} \tag{4.6}$$

The above interpretation shows that the logistic model establishes the relationship between the probability of the occurrence of an event and the explanatory variables, and therefore the model is applicable for research on the factors influencing the healthcare utilization of the migrant population in this thesis. The pre-processing and measurement of data in this research are based on STATA15.

3.3 Operationalization and measurement of variables

3.3.1 Operational definition of healthcare utilization

According to the definition of healthcare utilization and considering the availability and accessibility of data, we rely on the China Migrants Dynamic Survey (CMDS) data from 2016 to 2018 as well as healthcare service accessibility, healthcare service demand, healthcare service utilization behavior process and behavioral outcomes in the Andersen Model to quantify the dependent variable of healthcare utilization in this study, and the specific indicators include "refusal to seek necessary medical treatment", "preference of general hospital in face of physical discomfort", and "participation in free health examination".

The purpose of choosing the three indicators as the dependent variables is to examine the factors influencing the healthcare utilization of the migrant population from three aspects of outpatient service, inpatient service, and preventive care. The item of "refusal to seek necessary medical treatment" corresponds to the item of "Do you seek timely medical treatment when you feel unwell" in the CMDS data, and the answer of "no" will be assigned 0 and "yes" will be assigned 1. The item of "preference of general hospital in face of physical discomfort" corresponds to the item of "When you were sick (injured) or unwell last time, where did you go first for medical treatment?" in the CMDS data, and the answer of "not choosing a general hospital" (including local community health stations, local individual clinics, local pharmacies, treatment at household registration place) will be assigned 0 and "choosing a general hospital (including local general/specialized hospitals)" will be assigned 1. The item of "participation in free health examination" corresponds to the item of "Over the past year, did you receive free follow-up assessment and health examination for the above diseases from local community health centers (stations)/township health centers" in the CMDS data, and the answer of "no" will be assigned 0 and "yes" will be assigned 1.

3.3.2 Operational definition of influencing factors

Influencing factors are also known as explanatory variables. Based on the analysis of the Andersen healthcare utilization model, the influencing factors are classified into social factors, stress factors, predisposing characteristics, enabling characteristics, and need characteristics. To be specific, social factors mainly include the level of economic development of the city where the migrants live. Stress factors are divided into work stress, social stress and life stress. Predisposing characteristics refer to the individual characteristics that urge migrants to utilize

healthcare services before they feel unwell but are not directly related to the utilization of healthcare services, and they mainly include demographic characteristics and social structure characteristics.

To be specific, demographic characteristics mainly include gender and age, and social structure characteristics cover education level, marital status, and category of household registration. Since we take the migrant population as the research target, which has certain special characteristics, the social structure characteristics in this research further highlight the characteristic of migration, including the scope of migration and the reasons for migration. The enabling characteristics refer to the ability of individuals to obtain healthcare services and the availability or accessibility of healthcare services, including residents' family resources and community resources. The family resources include factors such as personal/family income, income growth and the type of health insurance coverage, while the community resources mainly refer to the distance to get medical treatment. The need characteristics mainly refer to the self-rated health status. The specifics of the independent variables included in this study are shown as per Table 3.1.

Table 3.1 Variable measurement and assignment of explanatory variables

Dimension	Operational indicators	Corresponding question items	Meaning and assignment
Social factors (a)	Socio-economic development of the migrant city (a1)	GDP per capita of urban residents	Matching GDP per capita in each city's yearbook
Stress factors (b)	Work stress (b1)	In the past two years, did you feel that the difficulty of finding a job has changed?	Decrease in difficulty = 1, Basically the same = 2, Increase in difficulty = 3
	Social stress (b2)	I would love to be a part of the local residents.	Completely agree = 1, Basically agree = 2, Disagree = 3, Completely disagree = 4.
	Life stress (b3)	Is your family currently experiencing difficulties in your life in the migrant places?	No difficulty = 0, With difficulty = 1
Predisposing characteristics (c)	Gender (c1)	What is your gender?	Female = 0, Male = 1
	Age (c2)	When were you born?	20-29 = 1, 30-39 = 2, 40-49 = 3, 50-59 = 4, 60 and above = 5
	Education level (c3)	What is your education level?	Elementary school and below = 1, Middle school = 2, High school/technical secondary school = 3, College and above = 4
	Marital status (c4)	What is your current marital status?	Without spouse = 0, With spouse = 1
	Category of household	What is your current household registration	Rural = 0, Urban = 1

Dimension	Operational indicators	Corresponding question items	Meaning and assignment
	registration (c5)	category?	
	Range of migration (c6)	What is the range of migration?	Cross-city migration within the same province = 0, Cross-province migration = 1
	Reason for migration (c7)	What is the reason for migration?	Work, further education or do business = 1, Move along with family members = 2. Old-age care or others = 3
	Household income (d1)	What is the average monthly gross income of your family in the past year?	Income less than the national per capita disposable income of the year = 0, Income greater than the national per capita disposable income of the year = 1 (based on the national per capita disposable income of the years 2015, 2016 and 2017)
	Growth of income (d2)	Has your monthly income changed compared to the same period last year?	Decrease = 1, Basic no change = 2, Increase = 3
Enabling characteristics (d)	Basic medical insurance (d3)	What kind of social health insurance do you currently participate in?	Not insured = 0, Insured = 1 (The insurances include new rural cooperative medical insurance, urban and rural residents' cooperative medical insurance, urban residents' medical insurance, urban employees' medical insurance, and medical services at state expense)
	Distance to get medical treatment (d4)	How long does it take to get to the nearest medical service institution (including community health centers, village clinics, and hospitals) from where you live? (by the most accessible means of transportation for yourself)	More than 15 minutes = 0, 15 minutes and less = 1
Need characteristics (e)	Self-rated health status (e1)	How is your health?	Unhealthy and unable to take care of oneself = 1, Unhealthy but able to take care of oneself = 2, Basically healthy = 3, Healthy = 4

3.4 Basic situation of the sample

The respondents of this research are the migrant population in the Pearl River Delta region. The samples are selected based on answers to the questions of "What is your current city or region of residence?" and "What is your range of migration this time?" in the 2016, 2017 and 2018

CMDS questionnaires. After deletion of the sample data with invalid values, a sample of 993 migrants in the Pearl River Delta are ultimately identified. The results of descriptive statistical analysis of the sample are shown as per Table 3.2.

Table 3.2 Descriptive statistical analysis of the sample

Categorization	Variable	Attribute	Frequency	%
Explained variable	Refusal to seek necessary medical treatment (Y1)	Timely medical treatment	448	45.12
		Delayed medical treatment	545	54.88
	Preference of general hospital in face of physical discomfort (Y2)	Yes	174	17.52
		No	819	82.48
	Participation in free health examination (Y3)	Yes	224	22.56
		No	769	77.44
Stress factors	Work stress (B1)	Decrease in difficulty	80	8.06
		Basically the same	597	60.12
		Increase in difficulty	316	31.82
	Social stress (B2)	Completely agree	355	35.75
		Basically agree	64	6.45
		Disagree	560	56.39
		Completely disagree	14	1.41
	Life stress (B3)	No difficulty	379	38.17
		With difficulty	614	61.83
Predisposing characteristics	Gender (C1)	Female	529	53.27
		Male	464	46.73
	Age (C2)	20-29	346	34.84
		30-39	409	41.19
		40-49	161	16.21
		50-59	71	7.15
		60 and above	6	0.60
	Education level (C3)	Elementary school and below	108	10.88
		Middle school	463	46.63
		High school/technical secondary school	237	23.87
		College and above	185	18.63
	Marital status (C4)	Without spouse	142	14.30
		With spouse	851	85.70
	Category of household registration (C5)	Rural	873	87.92
		Urban	120	12.08
	Range of migration (C6)	Cross-city migration within the same province	161	16.21
		Cross-province migration	832	83.79
	Reason for migration (C7)	Work, further education or do business	921	92.75
		Move along with family members	49	4.93
		Old-age care or others	23	2.32
Enabling characteristics	Household income (D1)	Income less than the national per capita disposable income	971	97.78

Categorization	Variable	Attribute	Frequency	%
		Income greater than the national per capita disposable income	22	2.22
		Decrease	181	18.23
	Growth of income (D2)	Basically the same	592	59.62
		Increase	220	22.16
	Basic medical insurance (D3)	Not insured	110	11.08
		Insured	883	88.92
	Distance to get medical treatment (D4)	More than 15 minutes	12	1.21
		15 minutes and less	981	98.79
Need characteristics	Self-rated health status (E1)	Unhealthy and unable to take care of oneself	0	0.00
		Unhealthy but able to take care of oneself	10	1.01
		Basically healthy	159	16.01
		Healthy	824	82.98

According to the results of the descriptive statistics of the 993 individuals in Table 3.2, first, more than half of the migrant population do not choose to seek timely medical treatment in the case of discomfort, and the amount of samples who should seek medical treatment but not is 545, accounting for 54.88%; second, only 17.52% (sample size of 174) of the migrant population prefer general hospitals in case of illness; third, over the past year, only 22.56% of the migrant population in the sample have received services such as follow-up assessment and health examination provided by local community health service centers (stations)/township health centers free of charge. The results show that the level of healthcare service utilization for the migrant population in the sample is relatively low. Therefore, both the efficiency of medical resource utilization and the overall level of preventive healthcare utilization of the migrant population in the Pearl River Delta region need to be further improved.

In terms of the factors influencing the utilization of health services. At the level of social factors, the per capita GDP of the cities where the migrant flow into in the sample amounts to 126,317 yuan, much higher than the national per capita GDP of 54,303 yuan in 2015, 2016 and 2017, indicating that the socio-economic development level of the PRD region is at a higher level compared to the country as a whole. In terms of stress factors, 31.82% of the sample believe that the work stress they face has increased in the past year, indicating that most migrants are facing great work stress. More than half of the migrants (57.80%) are unwilling to get assimilated into the local community, implying that the migrants are facing relatively great social pressure. 61.83% of the migrants believe that they are facing difficulties in their lives, indicating that most migrants are experiencing huge life stress.

As for predisposing characteristics, in terms of the gender structure in the sample data, the number of female migrants accounts for 53.27%. In terms of age, most migrants are under 40

years old, indicating that the migrant population in the sample is mainly young and middle-aged people, with a relatively young age structure. In terms of education level, those with education level of high school or below account for a relatively high percentage (81.37%), indicating that the education level of the migrants is generally low, which has a great correlation with the talent policy and household registration residency policy in the Pearl River Delta region. In terms of marital status, most of the migrants are married (85.70%). In terms of category of household registration, the majority of the migrants are registered as rural residents (87.92%), which is in line with the typical feature of rural-urban migration in China's urbanization. In terms of the range of migration, most of the migrants migrate across provinces (83.79%). In terms of the reason for migration, work, further education or do business is the key factor for population migration in the sample (92.75%), and only a small portion of them migrate because of their families or seek old-age care.

In terms of enabling characteristics, the per capita disposable income of 97.78% of the migrants is far below the national per capita disposable income level, indicating that their economic income is seriously inadequate. In terms of income growth, most migrants' income is relatively in a stable or even decreasing state, and only 22.16% witness an increase in their income. In terms of basic medical insurance, the vast majority of the migrants have purchased at least one of the various types of insurance including new rural cooperative medical insurance, urban and rural residents' cooperative medical insurance, urban residents' medical insurance, urban workers medical insurance, and medical services at state expense (88.92%). This reflects to some extent the high degree of basic medical insurance coverage in the Pearl River Delta region. In terms of distance to get medical treatment, 98.79% of the migrants spend less than 15 minutes from their place of residence to the nearest medical service institution, indicating a high degree of public service penetration in the Pearl River Delta region.

In terms of need characteristics, more than half of the migrants in the sample are in a basically healthy or healthy status, accounting for 98.99%, indicating that the health status of the migrant population in the sample is relatively good.

Chapter 4: Analysis of Empirical Results

4.1 Analysis of healthcare utilization of the migrant population in the Pearl River Delta

4.1.1 Analysis of timely medical treatment among the migrant population in the Pearl River Delta

Table 4.1 presents the results of the descriptive analysis of timely medical treatment for the migrant population in the Pearl River Delta region under different influencing factors such as stress factors, predisposing characteristics, enabling characteristics and need characteristics. In terms of stress factors, the proportions for the migrants who perceive a decrease in work stress and no significant change in work stress to get timely medical treatment are 32.50% and 44.05% respectively, and the proportion for the migrants who perceive a significant increase in work stress is 50.32%, which is the highest among the groups of people. According to the results of the X^2 test, there are significant differences in the choice of timely medical treatment among the migrant population with different perceptions of work stress. It indicates that the migrants with relatively high work stress are more sensitive to their health problems. In terms of the degree of perceived social stress, the proportion of timely medical treatment for the migrants who perceive relatively high social stress is 48.39%, which is significantly greater than that of the migrants with lower social stress, and the X^2 test results (X^2=23.45, P<0.01) indicate that there is a significant difference in the timely medical treatment of the migrant population under different social stress. Therefore, the migrants who perceive great social stress will pay more attention to their health problems. In terms of the perceived degree of life stress, the proportion of timely medical treatment of the migrants who perceive relatively low life stress is 42.48%, which is lower than the proportion of those who perceive high life stress (46.74%), and the X^2 test results have passed the significance test level, which means that the migrants with relatively high life stress pay more attention to their health conditions. As a result, the migrants will pay more attention to their own health management when they perceive a greater degree of work stress, life stress and social stress, and will seek timely medical treatment when they are not feeling well.

Table 4.1 Descriptive analysis of timely medical treatment for the migrants in the PRD

Categorization	Variable	Attribute	Timely medical treatment		X^2	P value
			Yes (%)	No (%)		
Stress factors	Work stress (B1)	Decrease in difficulty	32.50	67.50	18.90	0.00
		Basically the same	44.05	55.95		
		Increase in difficulty	50.32	49.68		
	Social stress (B2)	Completely agree	43.38	56.62	23.45	0.00
		Basically agree	32.81	67.19		
		Disagree	48.39	51.61		
		Completely disagree	14.29	85.71		
	Life stress (B3)	No difficulty	42.48	57.52	35.44	0.00
		With difficulty	46.74	53.26		
Predisposing characteristics	Gender (C1)	Female	49.34	50.66	12.22	0.00
		Male	40.30	59.70		
	Age (C2)	20-29	44.51	55.49	17.29	0.00
		30-39	49.63	50.37		
		40-49	37.89	62.11		
		50-59	42.25	57.75		
		60 and above	0.00	100.00		
	Education level (C3)	Elementary school and below	31.48	68.52	13.43	0.00
		Middle school	44.49	55.51		
		High school/technical secondary school	43.46	56.54		
		College and above	56.76	43.24		
	Marital status (C4)	Without spouse	40.14	59.86	24.90	0.00
		With spouse	45.95	54.05		
	Category of household registration (C5)	Rural	43.64	56.36	22.01	0.00
		Urban	55.83	44.17		
	Range of migration (C6)	Cross-city migration within the same province	62.73	37.27	13.51	0.00
		Cross-province migration	41.71	58.29		
	Reason for migration (C7)	Work, further education or do business	45.17	54.83	71.43	0.00
		Move along with family members	36.73	63.27		
		Old-age care or others	60.87	39.13		
Enabling characteristics	Household income (D1)	Income less than the national per capita disposable income	44.70	55.30	39.38	0.00
		Income greater than the national per capita disposable income	63.64	36.36		
	Growth of income (D2)	Decrease	43.65	56.35	13.22	0.00
		Basically the same	44.43	55.57		

Categorization	Variable	Attribute	Timely medical treatment		X^2	P value
			Yes (%)	No (%)		
Need characteristics	Basic medical insurance (D3)	Increase	48.18	51.82	25.80	0.00
		Not insured	44.09	55.91		
		Insured	49.62	50.38		
	Distance to get medical treatment (D4)	More than 15 minutes	41.67	58.33	42.82	0.00
		15 minutes and less	45.16	54.84		
	Self-rated health status (E1)	Unhealthy and unable to take care of oneself	0.00	0.00	47.93	0.00
		Unhealthy but able to take care of oneself	70.00	30.00		
		Basically healthy	48.43	51.57		
		Healthy	44.17	55.83		

In terms of the gender, the proportion of timely medical treatment for the female migrants is 49.34% and the proportion for the male migrants is 40.30%, which indicates that women usually pay more attention to their health status than men. The X^2 test results also show that there is a significant difference in the proportion of timely medical treatment between migrants of different genders. In terms of age, the proportions of timely medical treatment for the middle-aged migrants between 30 and 39 years old and the young migrants between 20 and 29 years old are higher than that of the migrants aged 40 and above, and the X^2 test results are statistically significant, indicating that the proportion of timely medical treatment for the migrants gradually decreases with the increase of age. From the viewpoint of education level, the proportion of timely medical treatment for migrants with college and above education level (56.76%) is significantly higher than that of the migrants with below college education level, which indicates that the migrants with relatively high education level pay more attention to their own health and are more inclined to see a doctor promptly and actively when they are not feeling well. The X^2 test results show that there is a significant difference in the proportion of timely medical treatment among the migrants with different education levels (X^2=13.43, P<0.01). In terms of marital status, the proportion of timely medical treatment is higher for the migrants with spouses compared to those without spouses, and the X^2 test results show that there is a relatively significant difference, indicating that family responsibility and spousal supervision can effectively enhance the willingness of the migrants in health management and timely medical treatment. In terms of household registration category, the proportion of timely medical treatment for the migrants with urban household registration is 12.19% higher than that of the migrants with rural household registration, indicating that the migrants with urban household registration have stronger health awareness, and the X^2 test results show that the

difference of timely medical treatment caused by household registration has passed the significance test (X^2=22.01, P<0.01). In terms of the range of migration, the proportion of timely medical treatment for those migrate across cities within a province is significantly higher than those migrate across provinces. The X^2 test results are also statistically significant, indicating that the willingness to seek medical treatment is stronger for those with a smaller range of migration. In terms of the reason for migration, the proportion of timely medical treatment for those migrate out of old-age care is the highest, indicating that this group of migrants are more aware of health management and more focused on the quality of life.

In terms of household income, the proportion of timely medical treatment for the migrants whose household income is greater than the national per capita disposable income is 63.64%, while the proportion of timely medical treatment for the migrants whose household income is less than the national per capita disposable income is 36.36%. The proportion of timely medical treatment for the former group is significantly higher than that for the latter group, which indicates that the economic status is significantly related to the migrants' willingness to seek medical treatment, and the economic base is still a key factor influencing the migrant population to seek medical treatment. In terms of income growth, the proportion of timely medical treatment for the migrants with income growth is higher than that for the migrant with other income situations, and the X^2 test results show that there is a significant difference in timely medical treatment between migrants in different situations such as income growth and decrease (X^2=13.22, P<0.01). In terms of basic medical insurance participation, the proportion of timely medical treatment for the migrants who have participated in at least one medical insurance is 49.62%, which is higher than the proportion (44.09%) for the uninsured migrants. The X^2 test results are statistically significant, indicating that medical insurance helps to compensate for the financial loss arising from the risk of illness and therefore enhances the willingness of the migrants to seek medical treatment. As for the distance to get medical treatment, the smaller the distance, the stronger the willingness of the migrant population to seek timely medical treatment, and the proportion of timely medical treatment for the migrants who live within 15 minutes of the nearest medical institution is 45.16%. The X^2 test results show that there is a significant difference in the timely medical treatment among the migrant population with different distances to healthcare institutions (X^2=42.82, P<0.01).

The proportion of timely medical treatment for the migrants who proportion their health status as unhealthy but able to take care of themselves is as high as 70.00%, which is much higher than those who rate themselves to have good health. The X^2 test results show that there

is a significant difference in the timely medical treatment among the migrant population with different self-rated health status (X^2=47.93, P<0.01), indicating that the poorer the self-rated health status of the migrants, the stronger their willingness to seek medical treatment and the higher their needs for medical treatment.

4.1.2 Analysis of preference for general hospitals among the migrant population in the Pearl River Delta

Table 4.2 shows the results of the descriptive analysis of preference for general hospitals for the migrant population in the Pearl River Delta region under different influencing factors such as stress factors, predisposing characteristics, enabling characteristics and need characteristics. In terms of the perceived work stress, 21.20% of the migrants who perceive an increase in work stress tend to prefer general hospitals in case of discomfort, which is significantly higher than those who perceive the same and decreased stress. The X^2 test results show that there is a significant difference in the preference for general hospitals among the migrant population with different perceptions of work stress (X^2=21.84, P<0.01), indicating that the migrants with higher work stress tend to prefer general hospitals rather than ordinary clinics. In terms of the degree of perceived social stress, the proportion of preference for general hospitals in case of discomfort for migrants who perceive relatively high social stress is 44.11 %, which is significantly greater than that of the migrants with relatively low social stress, and the X^2 test results (X^2=14.00, P<0.01) indicate that there is a significant difference in the preference for general hospitals among migrants under different social stress. Therefore, the migrants who perceive high social stress tend to pay more attention to their health problems. In terms of the degree of perceived life stress, the proportion of preference for general hospitals for the migrants who perceive relatively high life stress is 19.54%, which is greater than that of the migrants who perceive relatively low life stress (14.25%), and the X^2 test results have passed the significance test level, indicating that the migrants with relatively high life stress tend to pay more attention to their health condition. In the case of high perceived work stress, life stress, and social stress, the migrants would prefer general hospitals in case of physical discomfort.

Table 4.2 Descriptive analysis of preference for general hospitals among the migrants in the PRD

Categorization	Variable	Attribute	Preference of general hospitals		X^2	P value
			Yes (%)	No (%)		
Stress factors	Work stress (B1)	Decrease in difficulty	13.75	86.25	21.84	0.00
		Basically the same	16.08	83.92		

Categorization	Variable	Attribute	Preference of general hospitals		X^2	P value
			Yes (%)	No (%)		
Predisposing characteristics	Social stress (B2)	Increase in difficulty	21.20	78.80	14.00	0.00
		Completely agree	19.72	80.28		
		Basically agree	39.06	60.94		
		Disagree	44.11	55.89		
		Completely disagree	0.00	100.00		
	Life stress (B3)	No difficulty	14.25	85.75	2.90	0.00
		With difficulty	19.54	80.46		
	Gender (C1)	Female	22.50	77.50	3.66	0.00
		Male	11.85	88.15		
	Age (C2)	20-29	20.81	79.19	21.32	0.00
		30-39	18.58	81.42		
		40-49	12.42	87.58		
		50-59	8.45	91.55		
		60 and above	0.00	100.00		
	Education level (C3)	Elementary school and below	11.11	88.89	10.84	0.00
		Middle school	15.12	84.88		
		High school/technical secondary school	15.19	84.81		
		College and above	30.27	69.73		
	Marital status (C4)	Without spouse	14.79	85.21	24.60	0.00
		With spouse	17.98	82.02		
	Category of household registration (C5)	Rural	16.95	83.05	19.29	0.00
		Urban	21.67	78.33		
	Range of migration (C6)	Cross-city migration within the same province	73.91	26.09	1.22	0.00
		Cross-province migration	6.61	93.39		
	Reason for migration (C7)	Work, further education or do business	16.61	83.39	67.21	0.00
		Move along with family members	22.45	77.55		
		Old-age care or others	43.48	56.52		
Enabling characteristics	Household income (D1)	Income less than the national per capita disposable income	17.20	82.80	38.26	0.00
		Income greater than the national per capita disposable income	31.82	68.18		
	Growth of income (D2)	Decrease	18.23	81.77	21.91	0.00
		Basically the same	17.57	82.43		
		Increase	26.82	73.18		
	Basic medical insurance (D3)	Not insured	14.55	85.45	38.63	0.00
		Insured	17.89	82.11		

Categorization	Variable	Attribute	Preference of general hospitals		X^2	P value
			Yes (%)	No (%)		
Need characteristics	Distance to get medical treatment (D4)	More than 15 minutes	8.33	91.67	44.40	0.00
		15 minutes and less	17.64	82.36		
	Self-rated health status (E1)	Unhealthy and unable to take care of oneself	0.00	0.00	69.98	0.00
		Unhealthy but able to take care of oneself	70.00	30.00		
		Basically healthy	17.61	82.39		
		Healthy	16.87	0.00		

In terms of gender, the proportion of preference for general hospitals in case of discomfort for female migrants is 22.50%, which is higher than that for the male migrants (11.85%), which indicates that women pay more attention to their health status than men. The X^2 test results show that there is a significant difference in the preference for general hospitals among migrants with different genders. In terms of age, the proportions of preference for general hospitals for both the middle-aged migrants between 30 and 39 and the young migrants between 20 and 29 are higher than that for migrants aged 40 and above, and the X^2 test results are statistically significant, indicating that the willingness of the migrants to prioritize general hospitals in case of discomfort gradually decreases as their age increases. In terms of education level, the proportion of preference for general hospitals for migrants with education level of college and above (30.27%) is significantly higher than that for migrants with education level of below college, which indicates that migrants with relatively high education level will prefer general hospitals in case of discomfort. The X^2 test results show that there is a significant difference in the preference for general hospitals among the migrants with different education levels (X^2=10.84, P<0.01). In terms of marital status, migrants with spouses have a higher proportion of preference for general hospitals in case of discomfort than those without spouses, and the X^2 test results show that there is a significant difference, indicating that family responsibility and spousal supervision can effectively drive the migrant population to prefer general hospitals when they feel unwell. In terms of category of household registration, migrants with urban household registration have a higher proportion of preference for general hospitals than those with rural household registration by 4.72%, indicating that the awareness of going to general hospitals for illness is stronger among urban migrants, which may be related to the fact that medical resources in China are mainly distributed in urban areas. The X^2 test results show that the preference for general hospitals is significantly different between migrants with different

household registrations (X^2=19.29, P<0.01). In terms of range of migration, the proportion of preference for general hospitals in case of discomfort is significantly higher among migrants who migrate across cities within a province than those who migrate across provinces. The X^2 test results are also statistically significant, indicating that migrants with smaller ranges of migration are more willing to choose general hospitals for medical treatment. In terms of reasons for migration, the proportion of preference for general hospitals in case of discomfort is highest for those who migrate because of old-age care, reaching 43.48%. The X^2 test results are also statistically significant, indicating that this group of migrants are more concerned about their health status. The details are shown as per Table 5.2.

In terms of household income, the proportion of preference for general hospitals for migrants with income greater than the national per capita disposable income is 31.82%, and the proportion is 17.20% for those with income less than the national per capita disposable income. Migrants with high income are significantly more likely to choose general hospitals in case of perceived physical discomfort, indicating that economic status is significantly related to the mode and location of medical treatment for the migrants, and economic base is still a key factor influencing their medical treatment. In terms of income growth, the proportion of preference for general hospitals is higher among the migrants with economic income growth than those with other income status. The X^2 test results show that there is a significant difference in the proportion of preference for general hospitals among the migrants in different situations such as income growth and decrease (X^2=21.91, P<0.01). In terms of basic medical insurance coverage, the proportion of preference for general hospitals among the migrants with at least one medical insurance is 17.89%, which is higher than those who have no medical insurance (14.55%). The X^2 test results are statistically significant, indicating that medical insurance has an important influence on the medical treatment chosen by the migrants in case of physical discomfort. In terms of the influence of the distance to get medical treatment on the proportion of preference for general hospitals for the migrants, the smaller the distance to medical institutions, the stronger the willingness for the migrants to prefer general hospitals. 17.64% of the migrants who live within 15 minutes of the nearest medical institution prefer general hospitals in case of illness. The X^2 test results show that there is a significant difference in the preference for general hospitals among the migrants with different distances to medical institutions (X^2=44.40, P<0.01).

The proportion of preference for general hospitals among the migrants who rate themselves as unhealthy but able to take care of themselves is as high as 70.00%, much higher than that

among the migrants who rate themselves to have good health. The X^2 test results show that there is a significant difference in the preference for general hospitals among the migrants with different self-rated health status (X^2=69.98, P<0.01), indicating that migrants with poorer self-rated health status are more likely to choose general hospitals in case of discomfort and have higher requirements for medical treatment.

4.1.3 Analysis of preventive healthcare utilization among the migrant population in the Pearl River Delta

Table 4.3 presents the results of the descriptive analysis of the preventive healthcare utilization among the mobile population in the PRD region under different influencing factors such as stress factors, predisposing characteristics, enabling characteristics, and need characteristics. In terms of work stress, 32.33% of the migrants who perceive no change in work stress tend to participate in free health examinations, while 11.25% of the migrants who perceive decreased work stress are ready to participate in free health examinations, and the proportions are significantly higher than the migrants who perceive increased work stress. The X^2 test results show that there is a significant difference in the participation of free health examinations among migrants with different work stress perceptions (X^2=41.13, P<0.01), indicating that migrants with less work stress are more inclined to actively participate in free health examinations. In terms of the degree of perceived social stress, the proportion of participation in free health examinations among the migrants who perceive low social stress is significantly greater than that among the migrants who perceive high social stress, and the X^2 test results (X^2=33.76, P<0.01) indicate that there is a significant difference in the utilization of preventive healthcare services among the migrants under different social stress. Those who perceive greater social stress are less likely to participate in free health examinations. In terms of the degree of perceived life stress, the proportion of participation in free health examination for the migrants who perceive relatively high life stress is 21.66%, which is smaller than the proportion for those who perceive low life stress (24.01%), and the X^2 test results have passed the significance test level, indicating that the migrants with less life stress pay more attention to monitoring their health condition changes. Therefore, the migrants will participate more actively in free health examinations when they perceive lower work stress, life stress and social stress.

Table 4.3 Descriptive analysis of preventive healthcare utilization among the migrants in the PRD

Categorization	Variable	Attribute	Participation of free health examination		X^2	P value
			Yes (%)	No (%)		
Stress factors	Work stress (B1)	Decrease in difficulty	11.25	88.75	41.13	0.00
		Basically the same	32.33	67.67		
		Increase in difficulty	6.96	93.04		
	Social stress (B2)	Completely agree	36.34	63.66	33.76	0.00
		Basically agree	37.50	62.50		
		Disagree	12.50	87.50		
		Completely disagree	7.14	92.86		
	Life stress (B3)	No difficulty	24.01	75.99	1.65	0.00
		With difficulty	21.66	78.34		
Predisposing characteristics	Gender (C1)	Female	25.14	74.86	1.43	0.00
		Male	19.61	80.39		
	Age (C2)	20-29	20.14	79.86	21.79	0.00
		30-39	24.45	75.55		
		40-49	25.53	74.47		
		50-59	36.90	63.10		
		60 and above	0.00	100.00		
	Education level (C3)	Elementary school and below	18.52	81.48	9.21	0.00
		Middle school	19.22	80.78		
		High school/technical secondary school	25.32	74.68		
		College and above	29.73	70.27		
	Marital status (C4)	Without spouse	29.58	70.42	21.18	0.00
		With spouse	31.39	68.61		
	Category of household registration (C5)	Rural	23.02	76.98	22.86	0.00
		Urban	29.17	70.83		
	Range of migration (C6)	Cross-city migration within the same province	32.30	67.70	19.29	0.00
		Cross-province migration	20.67	79.33		
	Reason for migration (C7)	Work, further education or do business	21.72	78.28	66.19	0.00
		Move along with family members	30.61	69.39		
		Old-age care or others	39.13	60.87		
Enabling characteristics	Household income (D1)	Income less than the national per capita disposable income	22.76	77.24	39.75	0.00
		Income greater than the national per capita disposable income	23.64	76.36		
	Growth of	Decrease	22.65	77.35	13.99	0.00

Categorization	Variable	Attribute	Participation of free health examination		X^2	P value
			Yes (%)	No (%)		
	income (D2)	Basically the same	18.07	81.93		
		Increase	34.55	65.45		
	Basic medical insurance (D3)	Not insured	24.55	75.45	34.65	0.00
		Insured	27.31	72.69		
	Distance to get medical treatment (D4)	More than 15 minutes	8.33	91.67	44.40	0.00
		15 minutes and less	22.73	77.27		
Need characteristics	Self-rated health status (E1)	Unhealthy and unable to take care of oneself	0.00	0.00	68.89	0.00
		Unhealthy but able to take care of oneself	10.00	90.00		
		Basically healthy	23.90	76.10		
		Healthy	22.45	77.55		

In terms of gender, the proportion of female migrants participating in free health examinations is 25.14%, which is greater than the proportion of male migrants (19.61%), as female are usually more concerned about their health than male. The X^2 test results show that there is a significant difference in the participation of free health examinations among migrants with different genders (X^2=1.43, P<0.01). The proportions of participation in free health examinations for migrants aged between 40 and 49 and between 50 and 59 are 25.53% and 36.90% respectively, and are higher than the proportion for migrants at other ages. The X^2 test results also show that there is a significant difference in the participation in free health examinations among migrants of different age groups (X^2=21.79, P<0.01), indicating that as age increases, the migrants are more likely to actively participate in free health examinations. In terms of education level, the proportion of participation in free health examinations among migrants with education level of college and above is higher than that among migrants with education level of below college, which shows that migrants with relatively high education level are more willing to actively participate in free health examinations and have stronger awareness of preventive healthcare. The X^2 test results show that there is a significant difference in the healthcare utilization of the mobile population with different education levels (X^2=9.21, P<0.01). In terms of marital status, the proportion of participation in free health examinations among the migrants with spouses is higher than those without spouses, and the X^2 test results are statistically significant (X^2=21.18, P<0.01). In terms of category of household registration, the proportion of participation in free health examinations among migrants with rural household registration is higher than those with rural household registration, and the X^2 test results show that there is a statistically significant difference in healthcare

utilization between migrants with urban and rural household registration (X^2=22.86, P<0.01). In terms of range of migration, the proportion of participation in free health examinations among the migrants who migrate across cities with a province is higher than those migrate across provinces. The X^2 test results have passed the significance test, indicating that the smaller the range of migration, the higher the level of healthcare utilization among the migrant population. In terms of the reason for migration, the proportion of participation in free health examinations among migrants who migrate out of old-age care is 39.13%, which is higher those who migrate out of other reasons, and the X^2 test results show that there is a significant difference in the preventive healthcare utilization among migrants with different reasons for migration (X^2=66.19, P<0.01). The details are shown as per Table 5.3.

In terms of household income, the proportion of participation in free health examinations for migrants with income greater than the national per capita disposable income is 23.64%, and the proportion of participation in free health examinations for migrants with income less than the national per capita disposable income is 22.76%. The proportion of participation in free health examinations is significantly higher among the migrants with higher economic income, indicating that economic status is significantly related to the healthcare utilization of the migrant population, and economic base is still a key factor influencing migrants' participation in free health examinations. The X^2 test results are also statistically significant (X^2=39.75, P<0.01). In terms of income growth, the proportion of participation in free health examinations is higher among the migrants with growing economic income than those with the same or reducing incomes, and the X^2 test results show that there is a significant difference in the healthcare utilization among the migrants under different scenarios such as income growth and decrease (X^2=13.99, P<0.01). In terms of basic medical insurance coverage, the proportion of participation in free health examinations among the migrants with at least one medical insurance is 27.31%, which is higher than those without insurance (24.55%). The X^2 test results are statistically significant, indicating that medical insurance has a significant impact on the healthcare utilization of the migrants. In terms of the influence of the distance to get medical treatment on the healthcare utilization of the migrants, the smaller the distance, the stronger the willingness of the migrants to participate in free health examinations. The proportion of participation in free health examinations for migrants live within 15 minutes of the nearest medical institution is 22.73%. The X^2 test results show that there is a significant difference in the participation of free medical health examinations among the migrants with different distances to medical institutions (X^2=44.40, P<0.01).

The proportion of participation in free health examinations for the migrants who rate themselves as unhealthy but able to take care of themselves is 10.00%, which is lower than those with good self-rated health status. The X^2 test results show that there is a significant difference in the participation of free health examinations among the migrants with different self-rated health status (X^2=68.89, P<0.01), indicating that migrants with better self-rated health status have higher level of preventive healthcare utilization.

4.2 Analysis of factors influencing the healthcare utilization of the migrant population

The afore-mentioned descriptive statistical analysis has comprehensively illustrated the basic situation of the migrant population in the PRD region, the status of the migrant population in timely medical treatment, preference for general hospitals, and the preventive healthcare utilization, as well as the differences of the influencing factors. On this basis, in this chapter, we integrate the Anderson healthcare utilization model and the psychological factor mechanism model with the CMDS data for three years from 2016 to 2018, and use stata15.0 to explore the effect of different influencing factors on the healthcare utilization of the migrant population from five aspects including socioeconomic factors, stress factors, predisposing characteristics, enabling characteristics, and need characteristics, so as to provide the basis and idea for the targeted improvement suggestions in the future.

4.2.1 Regression analysis of factors influencing timely medical treatment of the migrant population in the Pearl River Delta region

Table 4.4 presents the regression analysis results of the factors influencing timely medical treatment of the migrant population. The regression analysis results in the table contain a total of 5 models, including M1, M2, M3, M4 and M5, which gradually control social factors, stress factors, predisposing characteristics, enabling characteristics and need characteristics. M1 analyzes the influence of social factors on timely medical treatment of the migrant population, M2 analyzes the influence of stress factors on timely medical treatment of the migrant population on the basis of controlling social factors, M3 analyzes the influence of predisposing characteristics on the basis of controlling social factors and stress factors, M4 analyzes the influence of enabling characteristics on the basis of controlling social factors, stress factors and predisposing characteristics, and M5 analyzes the influence of need characteristics on timely

medical treatment of the migrant population on the basis of controlling the other four types of factors. Since the dependent variable of timely medical treatment is a binary variable, the binary logistic regression analysis method is chosen. Meanwhile, in order to present the results of the data analysis more intuitively, we focus on the change of one unit of the independent variable or the change of the odds in the model, and only the regression coefficient and the odds ratio are listed in the regression analysis table.

Table 4.4 Results of regression analysis of factors influencing timely medical treatment of the migrant population

	Explained variable: timely medical treatment									
	M1		M2		M3		M4		M5	
	B	Exp(B)	B	Exp(B)	B	Exp(B)	B	Exp(B)	B	Exp(B)
Social factors										
Socio-economic development level	-0.03	0.97	-0.05	0.96	-0.14	0.87	-0.16	0.86	-0.16	0.85
Stress factors										
Work stress (decrease)										
Unchanged			0.17**	1.18	0.18***	1.20	0.18***	1.20	0.18***	1.20
Increase			0.19**	1.22	0.20***	1.29	0.21***	1.30	0.21***	1.30
Social stress (low)										
High			0.05*	1.05	0.13**	1.14	0.14**	1.05	0.14**	1.04
Life stress (No)										
Yes			0.06*	1.16	0.05	1.15	0.05	1.12	0.04	1.30
Predisposing characteristics										
Gender (female)										
Male					-0.20***	0.83	-0.19**	0.95	-0.19***	0.94
Age (39 and below)										
40 to 49					-0.05	0.86	-0.05	0.88	-0.06	0.86
50 and above					-0.05	0.71	-0.05	0.70	-0.06	0.68
Education level (elementary school and below)										
Middle school-high school					0.27***	1.23	0.27**	1.12	0.27***	1.12
College and above					0.29***	1.34	0.28***	1.32	0.28***	1.30
Marital status (without spouse)										
With spouse					0.11**	1.10	0.11***	1.06	0.11***	1.07
Category of household registration (rural)										
Urban					0.09*	1.09	0.08*	1.07	0.07*	1.05
Range of migration (cross-city migration within a province)										
Cross-province migration					-0.29***	0.74	-0.29	0.78	-0.29**	0.80
Reason for migration (work or further education)										

	Explained variable: timely medical treatment									
	M1		M2		M3		M4		M5	
	B	Exp(B)	B	Exp(B)	B	Exp(B)	B	Exp(B)	B	Exp(B)
Old-age care and others					0.02	1.01	0.02	1.12	0.01	1.11
Enabling characteristics										
Household income (less than average)										
More than average							0.11**	1.11	0.10*	1.08
Income growth (no growth)										
Growth							0.06	1.07	0.07	1.09
Basic medical insurance (uninsured)										
Insured							0.10	1.21	0.11	1.23
Distance to get medical treatment (over 15min)										
Below 15min							0.01	1.01	001	1.02
Need characteristics										
Self-rated health status (unhealthy)										
Healthy									-0.10*	0.90
Sig value of H-L test	0.176		0.109		0.147		0.105		0.103	
R^2	0.271		0.220		0.231		0.272		0.264	

The results of the goodness-of-fit test of the regression model for the influencing factors of timely medical treatment of the migrant population can be analyzed at three levels. First, the sig value of overall X^2 of the analytical model of the influencing factors of timely medical treatment of the migrant population in the PRD region is 0.00, which is less than 0.01, indicating a statistical significance. Second, the sig values of the H-L test for the M1, M2, M3, M4 and M5 models are 0.176, 0.109, 0.147, 0.105 and 0.103 respectively, which are all greater than the critical value of 0.05, indicating that the models fit the data in a satisfactory manner. Third, the Nagelkerke R^2 values of the M1, M2, M3, M4 and M5 models that reflect the influencing factors of timely medical treatment of the migrant population all show that the fitting degree and explanatory power of the models to the data meet the basic requirements.

According to the regression analysis results in Table 4.4, from M1 to M5, with the increase in the number of control variables, the significance levels of some influencing factors change, but the action directions of the variables do not change substantially, so we mainly analyze the degree of influence of each factor in M5 on the timely medical treatment of the migrant population. In M5, in terms of social factors, the influence coefficient of the socioeconomic development level on timely medical treatment does not pass the significance level. Therefore, with timely medical treatment as the dependent variable, Hypothesis 1 is not supported.

As for stress factors, in terms of job stress, at the 1% significance level, the probabilities of timely medical treatment for the migrants perceiving unchanged job stress and increased stress rise by 20% and 30% respectively compared to the migrants perceiving less job stress. This result indicates that with the increase in perceived work stress, the migrants in the PRD region will be more sensitive to their own health problems and therefore will be more inclined to seek timely and active healthcare services when they feel unwell. In terms of social stress and life stress, at the 10% significance level, those who perceive greater social stress and life stress are 4% and 3% more likely to seek timely medical treatment respectively. This indicates that both the increase in social stress and life stress urge the migrant population to be more concerned about their health status and more willing to seek medical treatment when they feel unwell. Therefore, Hypothesis 5 is supported.

As for the predisposing characteristics, in terms of gender, at the 1% significance level, the willingness of the male migrants to seek timely medical treatment is 6% lower than that of female migrants, indicating that female migrants have a stronger awareness of health care compared to male migrants, which may be correlated with the social division of labor and the delicate character of women. In terms of education level, at the 1% significance level, the higher the education level, the higher the probability of timely medical treatment, and the probability

of timely medical treatment for the migrants with education level of middle school or high school is 12% higher than that for the migrants with education level of elementary school or below, and the probability of timely medical treatment for the migrants with education level of college or above is 30% higher than that for the migrants with education level of elementary school or below. A possible explanation may be that the migrants with relatively high level of education have a stronger awareness of health care and tend to take the initiative to see a doctor when they perceive physical discomfort. In terms of marital status, at the 1% significance level, the probability of seeking timely medical treatment for the migrants with spouses is 7% higher than that for the migrants without spouses, probably due to the responsibility for the family, which urges the migrants with spouses to be more concerned about their health status and more willing to seek timely medical treatment when they feel unwell. Compared to migrants with rural household registration, migrants with urban household registration are 5% more likely to seek timely medical treatment at the 10% significance level. In addition, compared to intra-provincial cross-city migration, the probability of those migrating across provinces to seek timely medical treatment is significantly lower by 20% at the 5% significance level, indicating that the smaller the range of migration, the stronger the willingness of the migrants to seek timely medical treatment. The reason may be the limitation of the unified management of medical insurance funds. The wide range of migration makes the migrants difficult to get reimbursement of medical insurance, so they choose to avoid seeking timely medical treatment. Therefore, Hypothesis 2 is supported.

Among the enabling characteristics, household income is an important influencing factor of timely medical treatment for the migrants. Specifically speaking, when the household income is higher, the probability of timely medical treatment will also be higher (8% higher at the 10% significance level). There is a positive correlation between economic capability and medical consultation behavior. Therefore, Hypothesis 3 is supported. As for the need characteristics, self-rated health status also has a significant effect on the timely medical treatment of the migrant population. In particular, at the 10% significance level, as the self-rated health status increases, the probability of timely medical treatment decreases. The probability of timely medical treatment decreases by 10% for the migrants who rate themselves as healthy compared to those who rate themselves as unhealthy, which indicates that the migrants with poorer self-rated health status are more sensitive to their own health conditions and will seek timely medical treatment once they feel unwell. Therefore, Hypothesis 4 is supported.

4.2.2 Regression analysis of factors influencing preference for general hospitals of the migrant population in the Pearl River Delta region

Table 4.5 presents the regression analysis results of the factors influencing preference for general hospitals of the migrant population. The regression analysis results in the table contain a total of 5 models, including M6, M7, M8, M9 and M10, which gradually control social factors, stress factors, predisposing characteristics, enabling characteristics and need characteristics. M6 analyzes the influence of social factors on preference for general hospitals of the migrant population, M7 analyzes the influence of stress factors on preference for general hospitals of the migrant population on the basis of controlling social factors, M8 analyzes the influence of predisposing characteristics on the basis of controlling social factors and stress factors, M9 analyzes the influence of enabling characteristics on the basis of controlling social factors, stress factors and predisposing characteristics, and M10 analyzes the influence of need characteristics on preference for general hospitals of the migrant population on the basis of controlling the other four types of factors.

Table 4.5 Results of regression analysis of factors influencing preference for general hospitals of the migrant population

	Explained variable: preference for general hospitals									
	M6		M7		M8		M9		M10	
	B	Exp(B)	B	Exp(B)	B	Exp(B)	B	Exp(B)	B	Exp(B)
Social factors										
Socio-economic development level	0.10*	1.10	0.10*	1.11	0.19*	1.21	0.16*	0.86	0.15*	0.85
Stress factors										
Work stress (decrease)										
Unchanged			0.17**	1.18	0.26**	1.30	0.25**	1.20	0.25**	1.20
Increase			0.20**	1.23	0.24**	1.33	0.24**	1.34	0.27**	1.38
Social stress (low)										
High			0.25***	1.08	0.28**	1.06	0.29**	1.05	0.28**	1.06
Life stress (No)										
Yes			0.15*	1.16	0.27**	1.32	0.27**	1.24	0.25*	1.23
Predisposing characteristics										
Gender (female)										
Male					-0.56***	0.57	-0.57***	0.95	-0.57***	0.86
Age (39 and below)										
40 to 49					-0.31*	0.74	-0.33**	0.88	-0.35**	0.89
50 and above					-0.24*	0.69	-0.26*	0.68	-0.27*	0.65
Education level (elementary school and below)										
Middle school-high school					0.34**	1.41	0.35**	1.42	0.36***	1.44
College and above					0.40**	1.48	0.41**	1.50	0.41**	1.53
Marital status (without spouse)										
With spouse					0.14*	1.15	0.12*	1.16	0.12*	1.17
Category of household registration (rural)										
Urban					-0.02	0.98	-0.05	0.95	-0.04	1.05
Range of migration (cross-city migration within a province)										
Cross-province migration					-0.15***	0.82	-0.15***	0.85	-0.15***	0.86
Reason for migration (work or further education)										

	Explained variable: preference for general hospitals									
	M6		M7		M8		M9		M10	
	B	Exp(B)	B	Exp(B)	B	Exp(B)	B	Exp(B)	B	Exp(B)
Old-age care and others					0.05	1.05	0.05	1.02	0.05	1.04
Enabling characteristics										
Household income (less than average)										
More than average							0.14*	1.11	0.14*	1.12
Income growth (no growth)										
Growth							0.16	1.07	0.14	1.09
Basic medical insurance (uninsured)										
Insured							0.09	1.21	0.02	1.23
Distance to get medical treatment (over 15min)										
Below 15min							0.05	1.06	0.02	1.04
Need characteristics										
Self-rated health status (unhealthy)										
Healthy									-0.15*	0.86
Sig value of H-L test	0.174		0.168		0.162		0.155		0.134	
R^2	0.235		0.291		0.231		0.333		0.552	

The results of the goodness-of-fit test of the regression model for the influencing factors of preference for general hospitals of the migrant population can still be analyzed at three levels. First, the sig value of overall X^2 of the analytical model of the influencing factors of preference for general hospitals of the migrant population in the PRD region is 0.00, which is less than 0.01, indicating a statistical significance. Second, the sig values of the H-L test for the M6, M7, M8, M9 and M10 models are 0.174, 0.168, 0.162, 0.155 and 0.134 respectively, which are all greater than the critical value of 0.05, indicating that the models fit the data in a satisfactory manner. Third, the Nagelkerke R^2 values of the five models that reflect the influencing factors of preference for general hospitals of the migrant population are 0.235, 0.291, 0.231, 0.333 and 0.552 respectively, all indicating that the fitting degree and explanatory power of the models to the data meet the basic requirements.

According to the regression analysis results in Table 4.5, from M6 to M10, with the increase in the number of control variables, the significance levels of some influencing factors change, but the action directions of the variables do not change substantially, so we mainly analyze the degree of influence of each factor in M10 on the preference for general hospitals of the migrant population. In M10, in terms of social factors, the influence coefficient of the socioeconomic development level on preference for general hospitals pass the significance test at the level of 10%, indicating that there is a positive influence of socio-economic factors on the willingness of migrants to prefer general hospitals for medical care. Therefore, Hypothesis 1 is supported. As for stress factors, in terms of job stress, at the 5% significance level, the probabilities of preference for general hospitals for the migrants perceiving unchanged job stress and increased stress rise by 19% and 38% respectively compared to the migrants perceiving less job stress. This result indicates that with the increase in perceived work stress, the migrants in the PRD region will be more sensitive to their own health problems and therefore will be more inclined to choose general hospitals when they feel unwell. In terms of social stress, at the 5% significance level, the migrants who perceive greater social stress are 6% more likely to prefer general hospitals. In terms of life stress, at the 10% significance level, the migrants who perceive greater life stress are 23% more likely to prefer general hospitals compared to those with less life stress. This indicates that both the increase in social stress and life stress urge the migrant population to be more concerned about their health status and more willing to prefer general hospitals when they feel unwell. Therefore, Hypothesis 5 is supported.

As for the predisposing characteristics, in terms of gender, at the 1% significance level, the willingness of the male migrants to prefer general hospitals is 14% lower than that of female migrants, indicating that female migrants have a stronger awareness of health care compared to

male migrants, which may be correlated with the social division of labor and the delicate character of women. In terms of the age factor, the older the migrants, the more reluctant they are to go to general hospitals in case of discomfort. At the 5% significance level, the probability of migrants aged from 40 to 49 to choose general hospitals in case of physical discomfort are 11% lower than those aged 39 and below. At the 10% significance level, the probability of migrants aged over 50 to choose general hospitals is 35% lower than those aged 39 and below. In terms of education level, at the 1% significance level, the higher the education level, the higher the probability of preference for general hospitals, and the probability of preference for general hospitals for the migrants with education level of middle school or high school is 44% higher than that for the migrants with education level of elementary school or below, and at the 5% significance level, the probability of preference for general hospitals for the migrants with education level of college or above is 53% higher than that for the migrants with education level of elementary school or below. A possible explanation may be that the migrants with relatively high level of education have a stronger awareness of the influence of hospital size on medical outcome and tend to go to the general hospitals when they perceive physical discomfort. In terms of marital status, at the 10% significance level, the probability of preference for general hospitals for the migrants with spouses is 17% higher than that for the migrants without spouses, probably due to the responsibility for the family, which urges the migrants with spouses to be more willing to seek medical treatment in general hospitals when they feel unwell. Compared to intra-provincial cross-city migration, at the 5% significance level, the probability of preference for general hospitals for those migrate across provinces is significantly lower by 14%, indicating that the smaller the range of migration, the stronger the willingness of the migrants to seek medical treatment in general hospitals. The reason may be the limitation of the unified management of medical insurance funds. The wide range of migration makes the migrants difficult to get reimbursement of medical insurance, so they choose to avoid seeking medical treatment in general hospitals. Therefore, Hypothesis 2 is supported.

Among the enabling characteristics, household income is an important influencing factor of preference for general hospitals for the migrants. Specifically speaking, when the household income is higher, the probability of preference for general hospitals will also be higher (12% higher at the 10% significance level). There is a positive correlation between economic capability and selection of places for medical treatment. Therefore, Hypothesis 3 is supported. As for the need characteristics, self-rated health status also has a significant effect on the preference for general hospitals of the migrant population. Therefore, Hypothesis 4 is supported. At the 10% significance level, as the self-rated health status increases, the probability of

preference for general hospitals decreases. The probability of preference for general hospitals decreases by 14% for the migrants who rate themselves as healthy compared to those who rate themselves as unhealthy, which indicates that the migrants with poorer self-rated health status are more sensitive to their own health conditions and will seek medical treatment in general hospitals with more comprehensive medical equipment once they feel unwell.

4.2.3 Regression analysis of factors influencing preventive healthcare utilization of the migrant population in the Pearl River Delta region

This section focuses on the factors influencing the utilization of preventive healthcare among the migrant population in the PRD region. Table 4.6 presents the regression analysis results of the factors influencing preventive healthcare utilization of the migrant population. The regression analysis results in the table contain a total of 5 models, including M11, M12, M13, M14 and M15, which gradually control social factors, stress factors, predisposing characteristics, enabling characteristics and need characteristics. M11 analyzes the influence of social factors on participation in free health examinations of the migrant population, M12 analyzes the influence of stress factors on participation in free health examinations of the migrant population on the basis of controlling social factors, M13 analyzes the influence of predisposing characteristics on the basis of controlling social factors and stress factors, M14 analyzes the influence of enabling characteristics on the basis of controlling social factors, stress factors and predisposing characteristics, and M15 analyzes the influence of need characteristics on participation in free health examinations of the migrant population on the basis of controlling the other four types of factors.

Table 4.6 Results of regression analysis of factors influencing preventive healthcare utilization of the migrant population

	Explained variable: preventive healthcare utilization									
	M11		M12		M13		M14		M15	
	B	Exp(B)	B	Exp(B)	B	Exp(B)	B	Exp(B)	B	Exp(B)
Social factors										
Socio-economic development level	0.28***	1.32	0.37***	1.45	0.39***	1.48	0.42***	1.52	0.42***	1.52
Stress factors										
Work stress (decrease)										
Unchanged			-0.37***	0.69	-0.37***	0.69	-0.38***	0.69	-0.38***	0.68
Increase			-0.16***	0.89	-0.17***	0.88	-0.18***	0.89	-0.18***	0.90
Social stress (low)										
High			-0.68***	0.51	-0.69***	0.50	-0.70***	0.50	-0.70***	0.50
Life stress (No)										
Yes			-0.05	0.96	-0.03	0.97	-0.03	0.98	-0.03	0.97
Predisposing characteristics										
Gender (female)										
Male					-0.13	0.88	-0.13	0.88	-0.12	0.88
Age (39 and below)										
40 to 49					0.04	1.06	0.02	1.02	0.01	1.06
50 and above										
Education level (elementary school and below)										
Middle school-high school					0.06	1.06	0.08	1.08	0.08	1.09
College and above					0.09	1.11	0.08	1.09	0.10	1.09
Marital status (without spouse)										
With spouse					0.15*	1.16	0.13*	1.12	0.13*	1.15
Category of household registration (rural)										
Urban					0.90**	1.33	0.87***	1.25	0.86**	1.23
Range of migration (cross-city migration within a province)										
Cross-province migration					-0.26***	0.77	-0.27***	0.77	-0.27***	0.77
Reason for migration (work or further education)										

	Explained variable: preventive healthcare utilization									
	M11		M12		M13		M14		M15	
	B	Exp(B)	B	Exp(B)	B	Exp(B)	B	Exp(B)	B	Exp(B)
Old-age care and others					0.05**	1.05	0.05**	1.05	0.04**	1.04
Enabling characteristics										
Household income (less than average)										
More than average							0.21**	1.01	0.21**	1.03
Income growth (no growth)										
Growth							0.12	1.13	0.13	1.14
Basic medical insurance (uninsured)										
Insured							0.13	1.18	0.13	1.18
Distance to get medical treatment (over 15min)										
Below 15min							0.06	1.06	0.06	1.06
Need characteristics										
Self-rated health status (unhealthy)										
Healthy									0.06*	1.24
Sig value of H-L test	0.130		0.111		0.132		0.140		0.141	
R^2	0.220		0.169		0.201		0.214		0.224	

The results of the goodness-of-fit test of the regression model for the influencing factors of preventive healthcare utilization of the migrant population can still be analyzed at three levels. First, the sig value of overall X^2 of the analytical model of the influencing factors of participation in free health examinations of the migrant population in the PRD region is 0.00, which is less than 0.01, indicating a statistical significance. Second, the sig values of the H-L test for the M11, M12, M13, M14 and M15 models are 0.130, 0.111, 0.132, 0.140 and 0.141 respectively, which are all greater than the critical value of 0.05, indicating that the models fit the data in a satisfactory manner. Third, the Nagelkerke R^2 values of the five models that reflect the influencing factors of participation in free health examinations of the migrant population are 0.220, 0.169, 0.201, 0.214 and 0.224 respectively, all indicating that the fitting degree and explanatory power of the models to the data meet the basic requirements.

According to the regression analysis results in Table 4.6, from M11 to M15, with the increase in the number of control variables, the significance levels of some influencing factors change, but the action directions of the variables do not change substantially, so we mainly analyze the degree of influence of each factor in M15 on the participation in free health examinations of the migrant population. In M15, in terms of social factors, the influence coefficient of the socioeconomic development level on participation in free health examinations pass the significance test at the level of 1%, indicating that there is a positive influence of socio-economic factors on the willingness of migrants to participate in free health examinations. Therefore, Hypothesis 1 is supported. As for stress factors, in terms of job stress, at the 1% significance level, the probabilities of participation in free health examinations for the migrants perceiving unchanged job stress and increased stress drop by 32% and 10% respectively compared to the migrants perceiving less job stress. This result indicates that with the increase in perceived work stress, the migrants in the PRD region will focus more on work and have less need for health care, and are more inclined to seek medical help when there are physical problems rather than pay attention to and monitor their health problems in advance. In terms of social stress, at the 1% significance level, the migrants who perceive greater social stress are 50% less likely to participate in free health examinations. This indicates that both the increase in work stress and social stress will lower the migrants' willingness to participate in free health examinations. As the migrants have to face greater stress, they will be more willing to seek timely medical treatment only when they feel unwell. Therefore, Hypothesis 5 is supported.

As for the predisposing characteristics, in terms of marital status, at the 10% significance level, the probability of participation in free health examinations for the migrants with spouses is 15% higher than that for the migrants without spouses, probably due to the responsibility for

the family, which urges the migrants with spouses to be more willing to monitor their health conditions in the daily life. Compared to migrants with rural household registration, migrants with urban household registration are 23% more likely to participate in free health examinations at the 5% significance level. Compared to intra-provincial cross-city migration, at the 1% significance level, the probability of participation in free health examinations for those migrate across provinces is significantly lower by 23%, indicating that the smaller the range of migration, the stronger the willingness of the migrants to participate in free health examinations. Finally, with regard to reason for migration, those who migrate for old-age care are 4% more likely to participate in free health examinations compared to those who move for other reasons at the 5% significance level. On the one hand, those who move for old-age care are more concerned about the quality of life, and health status is closely related to the quality of life. On the other hand, these migrants may have enough spare time and more opportunities to participate in free health examinations. Therefore, Hypothesis 2 is supported.

As for the enabling characteristics, household income is an important influencing factor of participation in free health examinations for the migrants. Specifically speaking, when the household income is higher, the probability of participation in free health examinations will also be higher (3% higher at the 3% significance level). There is a positive correlation between economic capability and migrants' willingness to participate in free health examinations. Therefore, Hypothesis 3 is supported. As for the need characteristics, self-rated health status also has a significant effect on the participation of free health examinations of the migrant population. Therefore, Hypothesis 4 is supported. At the 10% significance level, as the self-rated health status increases, the probability of participation in free health examinations increases. The probability of participation in free health examinations increases by 24% for the migrants who rate themselves as healthy, which indicates that the migrants with better self-rated health status are more sensitive to their own health conditions and tend to frequently monitor their health conditions. The results of hypothesis testing are as follows.

Hypothesis 1: *The level of economic development in the socio-economic environment exerts a significant impact on the healthcare utilization behavior of the migrant population.* Partly supported.

Hypothesis 2: *There is a significant impact of the predisposing factors represented by factors such as gender, age, education level, and marital status on the healthcare utilization behavior of the migrant population*. Supported.

Hypothesis 3: *There is a significant impact of the enabling factors represented by income status, health insurance participation, and convenience to get health care on the healthcare*

utilization behavior of the migrant population. Supported.

Hypothesis 4: *There is a significant impact of need factors represented by self-assessed health status on the healthcare utilization behavior of the migrant population*. Supported.

Hypothesis 5: *There is a significant impact of stress factors represented by work stress, social stress and life stress on the healthcare utilization behavior of the migrant population*. Supported.

According to the descriptive analysis and regression analysis of the influencing factors of the healthcare utilization of the migrant population in the PRD region, we know that there is a relatively continuous interaction between the dimensions of social factors and stress factors in the model. In order to further carry out a comparative analysis of the influences generated by different dimensions, we standardize the data of indicators under each dimension and integrate them by the principal component analysis on the four dimensions. Table 4.7 presents the weights, or score coefficients, of each dimension using the principal component analysis method.

Table 4.7 Distribution of component score coefficients based on the principal component analysis method

Indicator	Score coefficient
Stress factors	
Work stress	0.376
Social stress	0.304
Life stress	0.320
Predisposing characteristics	
Gender	0.175
Age	0.103
Educational level	0.182
Marital status	0.031
Category of household registration	0.021
Range of migration	0.281
Reason for migration	0.207
Enabling characteristics	
Household income	0.267
Income growth	0.186
Basic medical insurance	0.203
Distance to get medical treatment	0.344

Based on the weights of the indicators under each dimension derived from the principal component analysis method in Table 4.7, we further obtain the component values of the three dimensions of stress factors, predisposing characteristics, and enabling characteristics. The social factors and need characteristics are also included in the regression analysis model for comparative analysis of the influencing factors, and the results are shown as per Table 5.8. Table 5.8 presents the comparative analysis results of the influencing factors of preventive healthcare utilization among the migrant population in the PRD region. The regression analysis results in

the table include five models, and the M16, M17, M18, M19 and M20 gradually control the social factors, stress factors, predisposing characteristics, enabling characteristics and need characteristics. M16 analyzes the influence of social factors on the behavior of the migrant population to participate in free health examinations, M17 analyzes the influence of stress factors on the behavior of the migrant population to participate in free health examinations on the basis of controlling social factors, M18 analyzes the influence of predisposing characteristics on the basis of controlling social factors and stress factors, M19 analyzes the influence of enabling characteristics on the basis of controlling social factors, stress factors and predisposing characteristics, and M20 analyzes the influence of need characteristics on the behavior of the migrant population to participate in free health examinations on the basis of controlling all the other four factors.

Table 4.8 Results of comparative analysis of factors influencing healthcare utilization

Explained variable: healthcare utilization					
Variable	M 16	M 17	M 18	M 19	M 20
Social factors	0.016***(1.571)	0.016***(1.915)	0.019***(1.577)	0.017*** (1.594)	0.014*** (1.590)
Stress factors		-0.051*(1.571)	-0.050*(1.644)	-0.041*(1.705)	0.051*(1.671)
Predisposing characteristics			-0.175** (-1.916)	-0.176** (-1.951)	-0.191** (-4.100)
Enabling characteristics				0.059(1.446)	0.056(1.511)
Need characteristics					-0.055** (-1.611)
Constant term	0.155***(1.700)	0.154***(1.694)	0.165***(1.991)	0.161*** (1.951)	0.175*** (1.956)
R^2	0.511	0.571	0.595	0.590	0.565
N	993	993	993	993	993

Note:1. ***, ** and * means significance at the 1%, 5%, and 10% level. 2. The figure within () is the z-statistic.

The analysis results of Table 4.8 reveals that that among the five categories of influencing factors: social factors, stress factors, predisposing characteristic, enabling characteristics and need characteristics, the regression coefficient of the sub-dimension of predisposing characteristic is the largest and passes the significance test at the 5% level. It indicates that compared with other factors, the predisposing characteristics are the most important factors influencing the healthcare utilization of the migrant workers. The coefficient of influence of social factors on healthcare utilization of the migrant workers is significantly positive at the 1% level, and the regression coefficients of stress factors and need characteristics are significantly negative at the 10% level and 5% level respectively. The estimated coefficient of enabling characteristics is positive but not significant.

In addition, a comparative analysis of the absolute values of the estimated coefficients of social factors, stress factors and need characteristics shows that enabling characteristics are the

second most important factor influencing the healthcare utilization of the migrant workers after predisposing characteristics. The effects of the influence of need characteristics, stress factors and social factors decrease in order.

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Chapter 5: Conclusions and Policy Recommendations

The Pearl River Delta region is a city cluster with the largest migrant population in China. Research on the healthcare utilization of the migrant population with an aim to providing them with more equitable health services plays a crucial role in achieving the goal of equalizing basic health services and promoting the successful implementation of the Healthy China Initiative. It is also of great importance to promote equity and justice in the region and enhance the sense of gain for both the migrants and local residents in the shared development. Using the CMDS data for three years from 2016 to 2018, and based on the Andersen healthcare utilization model and the psychological factor mechanism model, we adopt macro-research analysis method to study the basic situation and differences in timely medical treatment, preference for general hospitals, and healthcare utilization among the migrant population, and use regression analysis to systematically explore the influence of social factors, stress factors, predisposing characteristics, enabling characteristics, and need characteristics on timely medical treatment, preference for general hospitals, and preventive healthcare utilization among the migrant population in the PRD region.

5.1 Research conclusions

5.1.1 The migrant population has a universal demand for public healthcare services

According to the results of this research, on the one hand, the education level of the migrant population in the sample is generally low and the percentage of those with an education level of high school and below is as high as 81.37%, indicating the extreme disadvantaged position of the migrants in the PRD region in terms of cultural literacy in receiving health knowledge and healthcare services. On the other hand, the migrants are under relatively high work and life stress. In terms of work stress, only 8.06% of the migrants believe that they are under relatively low work stress. In terms of social stress, 42.20% of the migrants believe that they are not yet under high social stress, but 57.8% of them believe that they are under high social stress. In terms of life stress, only 38.17% of the migrants believe that there are no difficulties in their lives, while 61.83% of them believe that they have difficulties in their lives and are facing high life stress.

5.1.2 There are significant differences in healthcare utilization among migrants with different characteristics

The results of mono-factor analysis show that the timely medical treatment, preference for general hospitals, and preventive healthcare utilization differ among migrants with different social factors, stress factors, predisposing characteristics, enabling characteristics, and need characteristics, and the differences are statistically significant.

First, as for the timely medical treatment for the migrant population in the PRD region, in terms of stress factors, migrants with higher work stress, social stress, and life stress are more likely to seek medical treatment in a timely manner. In terms of predisposing characteristics, those who have spouses, migrate for old-age care, have urban household registration, and female migrants are more likely to seek medical treatment in a timely manner; younger age, higher education level, and smaller migration range lead to higher probability of seeking medical treatment in a timely manner. As for the enabling characteristics, higher household income, better self-assessed economic status, shorter distance to get medical treatment, and participation in medical insurance leads to higher probability of seeking medical treatment in a timely manner. With regard to the need characteristics, the probability of seeking medical treatment in a timely manner is higher among the migrant population with poorer self-rated health status.

Second, as for the difference in the preference for general hospitals among the migrant population in the PRD region, in terms of stress factors, migrants with higher level of work stress, social stress and life stress are more likely to choose general hospitals. In terms of predisposing characteristics, those who have spouses, have urban household registration, migrate for old-age care, and female migrants are more likely to choose general hospitals; migrants with younger age, higher education level, and smaller migration range are more willing to visit general hospitals when they are not feeling well. In terms of enabling characteristics, migrants with higher family income, better self-assessed economic status, shorter distance to get medical treatment, and coverage of medical insurance are more willing to seek medical treatment in general hospitals. In terms of need characteristics, migrants with worse self-rated health status are more willing to seek medical treatment in general hospitals when they are not feeling well.

Third, as for the difference of preventive healthcare utilization among the migrant population in the PRD region, in terms of stress factors, migrants with lower level of work stress, social stress, and life stress have higher levels of preventive healthcare utilization. In

terms of predisposing characteristics, those who have spouses, have urban household registration, and migrate for old-age care as well as female migrants are more willing to participate in free health examinations; migrants with older age, higher education level and smaller migration range tend to have higher levels of preventive healthcare utilization in daily life. In terms of enabling characteristics, migrants with higher household income, better self-assessed economic status, shorter distance to get medical treatment, and coverage of medical insurance are more willing to participate in free health examinations. As for the need characteristics, migrants with better self-rated health status tend to have higher level of preventive healthcare utilization.

5.1.3 The healthcare utilization of the migrant population is affected by multiple factors

Regression analysis of the influencing factors show that there are both commonalities and differences in the influencing factors of timely medical treatment, preference for general hospitals and preventive healthcare utilization among the migrant population in the PRD region, and degrees of influence of social factors, stress factors, predisposing characteristics, enabling characteristics and need characteristics on different healthcare utilization behaviors are also different.

In terms of social factors, the level of socio-economic development has a certain influence on the level of healthcare utilization of the migrant population, but it is not the most important factor. In terms of stress factors, work stress, social stress and life stress are all important factors influencing the healthcare utilization of the migrant population, and work stress is the principal factor.

In terms of predisposing characteristics, gender, education level, category of household registration, range of migration, and reason for migration are the main factors affecting the healthcare utilization among the migrant population in the PRD region. Compared with male migrants, female migrants have a higher level of healthcare utilization, which may be attributed to the more delicate character of women compared with men and the difference in social division of labor. The education level determines health awareness to a certain extent. The highly-educated migrants generally have stronger health awareness and better access to information about health services. They have more in-depth knowledge and understanding of healthcare, and present higher level of timely medical treatment, preference for general hospitals, and preventive healthcare utilization. The category of household registration represents urban-rural differences, which may be closely related to the differences in the supply

of health service resources and access to healthcare between urban and rural areas. Generally speaking, urban areas have more abundant healthcare resources than rural areas. In other words, the accessibility to outpatient and general hospital services in the urban areas is higher, the quantity and service level of primary healthcare institutions in the urban areas have advantages over those in the rural areas, and the ability to provide preventive healthcare services such as free health examinations of the urban healthcare institutions is also stronger than of the rural healthcare institutions. The smaller the migration range, the higher the timely medical treatment, preference for general hospitals and preventive healthcare utilization for the migrant population. Due to the limitation of unified management of basic medical insurance funds, smaller migration range and the closer distance to the household registration residence means easier attainment of medical insurance reimbursement from the outpatient and inpatient service utilization and direct settlement of medical treatment and inpatient costs in the urban areas, and that is why their healthcare utilization level is relatively high. Free health examinations are the basic public health services provided by the government, which are of public interest and mainly provided by primary health service institutions, and the primary beneficiaries are local residents. The shorter the migration distance, the higher the accessibility and the level of healthcare utilization.

In terms of enabling characteristics, household economic status, medical insurance coverage and distance to get medical treatment are the main factors influencing timely medical treatment, preference for general hospitals and preventive healthcare utilization among the migrant population in the PRD region. To be specific, migrants with better self-rated economic status and closer distance to medical institutions are more likely to seek medical treatment in a timely manner, more willing to choose general hospitals in case of discomfort, and have higher preventive healthcare utilization, which indicates that the ability to pay for individual healthcare services is determined by economic capability. The closer the distance to the medical institutions, the higher the level of healthcare utilization for the migrant population. The distance reflects the geographical accessibility of healthcare resources, and the closer the distance to the medical institutions, the better the accessibility and the higher the healthcare utilization.

In terms of need characteristics, differences in self-assessed health status can significantly affect the healthcare utilization behaviors of migrant population in terms of timely access to medical treatment, preference for general hospitals and utilization of preventive health services. First, as self-assessed health status improves, the probability of migrants seeking timely medical care decreases. This means that individuals with better self-assessed health status are more

confident and less sensitive to changes in their health, and are prone to ignore changes in their own health. They have a relatively low willingness to seek timely medical treatment when they feel unwell. Second, migrants who have unhealthy self-assessed health status but can take care of themselves are more likely to prefer general hospitals than those with good self-assessed health status. In other words, from the need perspective, the worse the self-assessed health status, the higher the need for healthcare services. When they feel unwell, the migrants are more inclined to choose general hospitals, and they have higher demands for medical treatment. Third, the self-assessed health status also has a significant impact on the behavior of the migrant population in participating in free health examinations As the self-assessed health status improves, the probability of the migrant population in participating in free health examinations increases, which to a certain extent reflects the fact that the migrants with better self-assessed health status are more sensitive and attaches more importance to their own physical conditions, and are more inclined to frequently monitor their own physical conditions.

5.1.4 The coverage of public healthcare services among the migrant population in the PRD needs to be improved

According to the results of the descriptive statistical analysis of the sample, the proportion of migrants in the PRD who seek timely medical treatment is relatively low. In case of physical discomfort, only 45.12% of the migrants in the sample seek timely medical treatment. This result implies that although the PRD region has a large migrant population, the initiative of this group to utilize healthcare service needs to be further improved. In addition, the migrants in the PRD region are less likely to prefer general hospitals for medical treatment. To be specific, only 17.52% of the migrants prefer to go to general hospitals in case of discomfort. Furthermore, the probability of participating in health examinations is low among the migrant population in the PRD region. In terms of sample distribution, only 22.56% of the migrants are willing to participate in free health examinations, indicating that most of them have weak awareness of preventive healthcare.

5.2 Policy recommendations

In this research, we have comprehensively analyzed and explored the various factors affecting the healthcare utilization of the migrant population in the PRD region. On the basis of relevant theories and through the analysis of survey data, we have reached several research conclusions. The theoretical foundation, literature research, institutional context and development status, as

well as the empirical test, discussion and conclusions of this research are all centered upon the requirements related to the "Healthy China" strategy. We can consider introducing the concept of total quality management in the healthcare utilization of the migrant population, so as to promote the innovative development of the healthcare services. Total quality management is a comprehensive, full-participation, whole-process quality management method, which takes customer satisfaction as the core, and realizes the mutual benefit and win-win situation between the organization and the service users through the continuous improvement and enhancement of product quality. Therefore, we put forward the following specific policy recommendations at the macro, meso and micro levels.

5.2.1 Improve the basic public health service system benefiting the whole population

The results of the descriptive statistical analysis of the healthcare utilization of the migrant population in the PRD region show that the level of improvement in healthcare services for this group is relatively low, and that they have not yet benefited from the comprehensive health security system. Therefore, first, it is necessary to promote the equalization of basic public health services and gradually expand the national and regional basic public health service programs. For example, it is necessary to improve the system of prevention and control of diseases, especially major diseases, and establish a system of disease prevention and control with disease prevention and control institutions at all levels as the main body and other healthcare institutions and service organizations in the urban and rural areas as the partners. Second, the emergency response mechanism for public health emergencies should be further improved, and a multilevel information decision-making and command system for public health emergencies should be improved to ensure the normal and effective operation of the relevant emergency response mechanism. Third, it is necessary to carry out patriotic health campaigns, attach more importance to the migrant population, maternal and child health, strengthen corresponding health education, advocate the adoption of a healthy and civilized lifestyle by residents, and improve citizens' health literacy and self-care ability.

5.2.2 Promote the continuous improvement of the health literacy of the migrant population

There is a significant positive correlation between the health literacy level of the migrant population and their economic income. First, the economic sources of the migrant population should be expanded. It is found that the level of household economic income, work pressure

and life pressure are important factors affecting the healthcare utilization of the migrant population in the Pearl River Delta region. Therefore, relevant policies should be formulated to increase the economic income of migrants in the region and improve their affordability to healthcare. Second, we should make good use of grid-based management to intervene in family assistance. Grid-based management is the key to the reform of digital government services, and this innovative mechanism will provide an effective guarantee for local governments to realize the precise allocation of public resources. Therefore, local governments should make good use of digital means, and use the grid management model to incorporate the migrant population as the service targets. It can help overcome the difficulty in daily work caused by the high mobility and separation of actual location and household registration and provide timely and equitable services to them. It can also promote the coordinated development between different regions and between urban and rural areas, which can in turn promote the overall healthcare service in the region as a whole.

5.2.3 Promote the iterative upgrading of the healthcare service system for the migrant population

The healthcare service system consists of two aspects. One is to improve the basic medical security system, and the other is to upgrade the level of medical resource management. First, we should further improve the universal basic medical security system. On the one hand, a multi-level medical security system should be constructed to promote the orderly development of medical insurance and commercial health insurance on the basis of basic medical security; on the other hand, we should focus on the healthcare needs of the migrant population, improve the new type of rural cooperative medical care and the urban and rural medical assistance system, strengthen the collaboration between the various systems, and integrate the relevant resources of medical insurance, so as to provide a safe and effective basic medical service at a convenient and affordable price for the migrant population. Second, the medical resources management system should be further strengthened. The public hospitals should give full play to their advantage in providing public welfare services to the migrant population. In view of the current situation of the low rate of timely access to medical care and the low willingness to seek medical care for the migrant population, it is necessary to improve the urban community health service system with community health service centers (stations) as the mainstay, and primary medical care institutions as the supplement. Under the guidance and support of the public hospitals at the municipal and district levels, the migrant population should be able to enjoy the

same benefits as urban residents, including the right to receive primary diagnostic and treatment services for common and frequent diseases in community healthcare institutions.

5.2.4 Strengthen the monitoring of the health status of the migrant population

First, in industrial parks, enterprises, construction sites and other places where the migrant population is concentrated, according to the scale and composition of the migrant population in different areas and relying on the relevant service platforms, we should establish a number of places for health education for the migrant population, and regularly organize various forms of health promotion activities for them, such as inviting local medical experts to hold offline health knowledge lectures or using the digital medical service platform to carry out online health knowledge lectures. Second, the health of the migrant population can be effectively enhanced through the provision of free health examinations, opening of special healthcare windows, and visits and care for pregnant women. For example, free health examinations can be offered at the grass-roots level for the migrant population, and early-warning monitoring of infectious diseases can be strengthened. At the same time, uniform and standardized health records can be established for the migrant population, and medical volunteers can be organized to provide "one-on-one" private medical consultation services to help the migrant population resolve their problems which may be embarrassing to mention.

5.3 Research innovations

The innovation of this research is mainly manifested in three aspects as follows.

First, innovation of research targets. There has been plenty of research on migrant population; however, review of the existing literature shows that there are relatively few studies focusing on the migrant population within a certain region. The Pearl River Delta region has the largest migrant population in China and is the main generator of economic benefits. Focusing on the healthcare services of the migrant population in the Pearl River Delta region has important economic value and social significance for improving the employment environment and achieving a sustainable and healthy economic development pattern in this region.

Second, innovation theoretical perspective. Most of the researchers studying the healthcare utilization of the migrant population have adopted the Andersen healthcare utilization model, and their research on the influencing factors of individual healthcare utilization only involves the predisposing characteristics, enabling characteristics and need characteristics, neglecting

the influence of individual stress factors as well as social and economic factors. Therefore, this research integrates the psychological factor mechanism model and comprehensively explores the influencing factors of healthcare utilization of migrant population from five perspectives: social factors, stress factors, enabling characteristics, predisposing characteristics and need characteristics. By analyzing the key factors affecting the demand for and utilization of healthcare services, service providers, public service administrators, and relevant government decision-making departments can better carry out resource planning and management, improve the efficiency and quality of public healthcare services, and provide healthcare services with better quality to those in need.

Third, innovation in research breadth. After systematically reviewing the existing literature, it is found that most researchers tend to focus on "therapeutic" healthcare utilization in definition of indicators. In this study, we integrate the Andersen healthcare utilization model and the psychological factors mechanism model to expand the operational definition of the dependent variables to three aspects of outpatient, inpatient, and preventive healthcare. The focus has been expanded from the "therapeutic" to the "therapeutic+preventive" health care, which has enriched the content of the study and expanded the scope of research on the factors influencing the healthcare utilization of the migrant population.

5.4 Research outlook

Although we have completed the exploration of the factors influencing the healthcare utilization of the migrant population in this research and put forward some relevant policy recommendations, there are still deficiencies and issues that need to be studied in a more in-depth manner.

On the one hand, when analyzing the influencing factors of healthcare utilization of the migrant population, due to the difficulty of data acquisition, we only choose three years of data from 2016 to 2018. Although the sample size is relatively large, there are still limitations as these data are more than five years ago.

On the other hand, due to the limitations of the researcher in terms of data analysis ability and theoretical foundation, there may be deficiencies in the analysis and conclusion. In the future research, more theories and data analysis tools can be adopted to further explore healthcare utilization.

In the follow-up study, focuses can be put on the following aspects.

First, future researchers can deepen the research contents. In addition to traditional areas

such as the balance between supply and demand of medical services, the optimal allocation of medical resources, and the medical security system, future research should focus on the innovative model of health services for the migrant population, and the socialization of health management, with an aim to promoting the innovation and development of health services for the migrant population. The healthcare service of the migrant population is a complex social issue that requires in-depth research in multiple dimensions and perspectives. In terms of innovation mode, diversified medical service delivery methods can be explored, such as the construction of community health service centers and migrant population health stations, which can provide more convenient and efficient medical services for the migrant population. In addition, new service modes such as online consultation and telemedicine can be developed in conjunction with Internet technology to break the limitations of time and space and improve the accessibility and convenience of services. In terms of the socialization of health management, social forces can be guided to participate in the health management of the migrant population, such as carrying out health education activities and health promotion activities, to improve the health awareness and self-management ability of the migrant population. Cooperation among the government, medical institutions, and social organizations can also be strengthened to form a situation of joint participation and collaborative governance, which can improve the overall effectiveness of health services.

Second, future researchers can improve the research method. This research is mainly based on quantitative analysis, and more research methods, such as qualitative research and case study, can be introduced in the future to improve the comprehensiveness and depth of the research. In terms of qualitative research, in-depth interviews, observations and data analysis can be used to understand the real needs and experiences of the migrant population in healthcare services, the problems and difficulties they face in healthcare utilization, as well as their expectations and needs for health services. The data from these in-depth interviews can provide a more comprehensive understanding and enable healthcare service providers to give more targeted recommendations for improvement. In terms of case studies, some representative cases of the migrant population can be selected to gain an in-depth understanding of their experiences and difficulties in receiving healthcare services, and understand their health conditions, experiences in seeking healthcare services, and healthcare needs. The case study data can be used to assess the quality and effectiveness of existing healthcare services and provide a basis for improvement. In short, qualitative research and case studies can help us gain a deeper understanding of the real needs and experiences of the migrant population in healthcare services, and provide a more targeted decision-making basis for healthcare service providers, policy

makers, and service administrators.

Third, future researchers can strengthen the application of technology. With the development of information technology, technologies such as big data and artificial intelligence have been increasingly applied in the healthcare industry. Future research can explore how to use new technologies to improve the quality and efficiency of health services for the migrant population. In terms of big data technology, the health data of the migrant population can be analyzed to understand their health status and disease spectrum, which can provide healthcare providers with more accurate information for better resource allocation and disease prevention. For example, some common diseases and symptoms can be identified by analyzing the medical records and health data of the migrant population to provide reference for early detection and prevention. In terms of AI technology, personalized health advice and services can be provided to the migrant population through AI algorithms and data analysis. For example, the medical records and health data of the migrant population can be analyzed through AI algorithms to provide them with personalized disease prevention advice and health management plans. The use of new technologies can improve the quality and efficiency of health services for the migrant population, but we need to protect personal privacy and data security. Future research can further explore how to use new technologies to improve the quality and efficiency of health services for the migrant population and ensure protection of data security and privacy.

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