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Community General Practitioners Turnover: Mapping, Exploring, and Explaining Patterns in Shanghai Pudong New Area

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Doctor of Management

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March, 2024



BUSINESS
SCHOOL

Marketing, Operations and General Management Department

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Abstract

Following the achievements in the aftermath of the 2009 healthcare reform, the strengthening of primary healthcare requires now a stable and motivated General Practitioners (GP) workforce. Current models on turnover do not adopt a situated approach, i.e. fail to consider territorial factors in play which limits the effectiveness of extant theory and findings in China, as the Chinese characteristics of healthcare system differ from countries where many published models were generated and empirically tested.

This research focuses on the GP turnover, considering the specificities of territorial factors and individual features of GPs in Pudong New Area (PNA) in Shanghai. The first study depicts the flows of GPs among 47 hospitals based on official data, which showed there are four types of hospitals according to the patterns of inflow and outflow of GP (attractor, disperser, stable, rotation). A 2nd study was deployed with 54 interviews conducted on individuals working in 9 hospitals representing these types, to uncover the factors that closely link to the reality of the hospitals and GPs. Based on these findings, a conceptual model was developed and tested with a time lagged data of 1156 GPs from PNA on sequential mediation effects from work conditions to turnover intention via person-environment fit, work engagement and job satisfaction, moderated by work motivation (intrinsic, extrinsic, introjected). Findings fully support the process model with varying interactions depending on the type of motivation, that highlight job content plays an important role in the model.

Keywords: Employee turnover, General Practitioners, Work Environment, Work Motivation, Job content

JEL: M12 Personnel Management, I18 Government Policy, Regulation, Public Health

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Resumo

Na sequência dos resultados da reforma dos serviços de saúde de 2009 na China, o reforço dos cuidados de saúde primários exige atualmente uma mão-de-obra estável e motivada de médicos de clínica geral (MCG). Os modelos actuais sobre a rotatividade não adoptam uma abordagem situada, i.e. desconsideram os factores territoriais, o que limita a eficácia da teoria e das conclusões existentes, uma vez que as características chinesas do sistema de saúde diferem das países onde muitos modelos publicados foram gerados e testados.

Esta investigação centra-se na rotatividade dos MCG, tendo em conta os factores territoriais e as suas características individuais na Nova Área de Pudong (NAP, Shanghai). O primeiro estudo descreve os fluxos de MCG em 47 hospitais com base em dados oficiais, e revelou quatro tipos de hospital de acordo com os padrões de entrada e saída de MCG (atractores, atrito, estável, rotativo). Um segundo estudo com 54 entrevistas a indivíduos que trabalham em 9 hospitais que representam estes tipos, mostrou os factores que estão intimamente ligados à realidade dos hospitais e dos MCG. Com base nestes resultados, desenvolvemos e testámos um modelo concetual com 1156 MCG da NAP com efeitos de mediação sequenciais das condições de trabalho para a intenção de saída através da adequação pessoa-ambiente, do empenho no trabalho e da satisfação, moderados pela motivação no trabalho (intrínseca, extrínseca, introjectada). Os resultados apoiam o modelo de processo com interações variáveis, dependendo do tipo de motivação, que evidenciam o papel importante do conteúdo do trabalho no modelo.

Palavras-chave: Rotação externa, Médicos Clínica Geral, Ambiente de Trabalho, Motivação no trabalho, Conteúdo do trabalho

JEL: M12 Gestão de pessoas, I18 Políticas governamentais, Regulação, Saúde Pública

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摘要

继 2009 年医疗改革取得成果之后，加强基层医疗保健需要一支稳定、积极的全科医生队伍。目前关于全科医生流动的模型并没有采取一种情境化的方法，例如未考虑到地域因素的影响。由于中国的医疗保健系统特点不同于其他许多针对医疗系统已经构建了相关模型并进行了实践测试的国家，这也限制了现有理论和研究成果在中国的有效性。

本研究重点关注全科医生的流动情况，同时考虑到上海浦东新区的地域因素和全科医生的个体特征。第一项研究根据官方数据描绘了全科医生在 47 家医院中的流动情况，结果显示，根据全科医生的流入和流出模式，医院可分为四种类型（吸引型、流失型、稳定型、轮换型）。第二项研究对代表这些类型的 9 家医院的工作人员进行了 54 次访谈，以揭示与医院和全科医生的现实情况密切相关的因素。基于这些研究结果，开发并建立了一个概念模型，并利用来自浦东新区的 1156 名全科医生的时滞数据对该模型进行了测试。该模型探讨了从工作环境到离职意愿的连续中介效应，途径包括人-环境匹配度、工作投入和工作满意度，并由工作动机（内在动机、外在动机、内驱力）调节。研究结果完全支持了这一过程模型，其交互作用因工作动机的不同而异，并突显了工作内容在模型中的重要作用。

关键词：员工流失，全科医生，工作环境，工作动力，工作内容

JEL: M12 人事管理, I18 政府政策、监管、公共卫生

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Life is indeed a continuous learning process. Only through learning can one identify the blind spots in their knowledge and recognize their own shortcomings. Learning often feels tedious, especially considering the 4-5 years of doctoral study ahead, which requires courage, perseverance, as well as supportive mentors, friends, and a positive learning environment, all of which I am fortunate to have encountered. Although the journey of these four years has been extraordinary, with constant transitions between online and offline modes, from mid-term presentations with masks to the awkward situation of arriving in Guangdong in the evening and returning to Shanghai that night, shuttling between Shanghai and Guangdong during this special period has left deep memories. Despite the challenges, both bitter and sweet, the past is irreplaceable, and there will never be a future without it. As I complete my doctoral dissertation, I would like to express my sincere gratitude to all the teachers, classmates, and friends who have supported and helped me.

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人生确实不断学习，只有学习才会知道自己知识的盲区，才会感到自身的不足。学习常常也会感觉无味，更何况要经历 4-5 年的博士学习，需要勇气和毅力，更需要良师益友和积极向上的学习环境，很庆幸！这些都让我遇到了。虽然这四年学习历程不平凡，线下线上不断切换，有过戴着口罩的中期汇报，更有过当晚抵粤当夜返沪的窘境，我们在一个特殊的时期穿梭在沪粤之间，每每想来都是一种深深的回忆，苦并快乐着，过去没有未来也不会再有！在我博士学位论文完成之际，请允许我向所有支持和帮助过我的老师、同学和朋友们表示诚挚的谢意。

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Chapter 1: General Introduction

Health is one of the precious goods individuals wish for so to be able to attain all the other goodness in life for themselves and those around them. Therefore, healthcare is one of the most noble functions an individual can perform either per se as a healthcare professional or for the whole of society as a policy maker. Therefore, the goodness of the government of societies can be judged on how strongly such government provides to the people so to protect and guarantee health conditions and services. Although China has made great progresses in developing healthcare services and improving the general health conditions of people, in the process of continuous reform of the Chinese healthcare system, there are still several challenges.

The issues of difficulty and high cost in seeking medical treatment have not been fundamentally resolved, and the advancement of hierarchical medical treatment is hindered. The medical needs of the population follow a 'normal triangle' structure, with the base representing the population suffering from common diseases and the apex representing those with severe illnesses (F. Li, 2014). Therefore, priority should be given to selecting primary healthcare institutions for the diagnosis and treatment of common diseases, chronic diseases, and other prevalent ailments. For issues that primary healthcare institutions cannot resolve, targeted choices of secondary or tertiary medical institutions should be made. However, the current pattern of medical and health services in China has formed an inverted triangle structure. This is due to the weak service foundation of primary healthcare institutions and patient distrust of providers of primary medical and health services. According to statistics from the National Health Commission of the People's Republic of China (National Health Commission of the People's Reupublic of China, 2023), in 2022, the total number of medical consultations and treatments in medical and health institutions nationwide reached 8.42 billion. Among them, the number of consultations and treatments in township health centers and community health service centers (CHCs) was 2.04 billion, accounting for 24.2% of all consultations and treatments. It can be seen that the majority of patients still choose large hospitals for treatment, with fewer opting for primary healthcare institutions. The implementation of the hierarchical medical system still faces obstacles. In 2022, personal health expenditure accounted for 27.0% of the total health expenditure, a decrease of 0.6% compared to 2021. While there has been some improvement in medical expenses, there is still a gap compared to the equitable financing

system proposed by the World Health Organization of 10% to 15%. Dong and Zhao (2020) state that there are conflicts of interest between different medical institutions, which also hinder the implementation of hierarchical medical treatment. There are overlaps and conflicts of interest between primary healthcare institutions and higher-level medical and health institutions. However, for the development of their respective institutions, conflicts of interest and competition are inevitable, leading to obstacles in resource sharing.

The foundation of primary healthcare services is weak, and the level of medical and health services is relatively low. Despite China's efforts to increase the construction of primary healthcare infrastructure, there are still many shortcomings at present. In terms of healthcare resources, as of the end of 2022, there were a total of 97.5 million hospital beds nationwide, with hospitals accounting for 78.6% (76.63 million beds) and primary healthcare institutions accounting for 17.9% (17.44 million beds). Healthcare personnel are also mostly concentrated in hospitals, with the number of healthcare personnel in primary healthcare institutions being only half of that in hospitals (National Health Commission of the People's Republic of China, 2023). From the perspective of personnel quality in primary healthcare service institutions, there is still a lack of practicing physicians with bachelor's degrees or higher. In 2021, the proportion of practicing (assistant) physicians with bachelor's degrees or higher in community health service centers was 57.5%, which was lower than the national average (61.9%) (National Health Commission of the People's Republic of China, 2023). Furthermore, due to the lack of attractive professional and economic rewards, primary healthcare service institutions have less room for development compared to hospitals. As a result, talent loss is more severe, making them channels for transferring talent to higher-level hospitals.

In order to establish a multi-level medical service system from the community to hospitals and then to society, and to build an integrated medical and health service system, it is crucial to improve the quality of medical services at the grassroots level. General practitioners (GPs) serve as providers of primary healthcare services. Elevating the quality of GPs and attracting and retaining GP talents at grassroots healthcare institutions are key to addressing the issue. Local governments should improve the treatment and benefits of GPs at CHCs and provide opportunities for career advancement for them. Encouraging targeted medical student training, providing opportunities for further education for GPs, and building a high-quality workforce of primary healthcare professionals can achieve sustainable development in primary healthcare services. Simultaneously, this effort can enhance residents' trust in primary healthcare services, guiding them to independently adopt the primary care-first consultation model for minor ailments at the grassroots level.

The focus of healthcare system reform in China is continuously shifting towards primary healthcare. However, Chinese GPs still face challenges such as talent shortages and difficulty retaining personnel, which are closely linked to their intentions to leave their positions. Factors such as job satisfaction, working environment, and work motivation and career opportunities are crucial in determining GPs' intentions to leave (Feng et al., 2021; Y. Gan et al., 2020; Shen et al., 2020; Y. Zheng et al., 2019). Clarifying GPs' intentions to leave and identifying potential influencing factors are essential for improving the stability of primary healthcare institutions. Existing research lacks a combination of qualitative and quantitative analysis and often focuses on single influencing factors.

Based on these observations, the following research question has prompted this study: to construct a comprehensive model that explains the mobility patterns of GPs and, based on empirical data, elucidates the patterns and influencing factors of GP mobility. This approach aims to reduce GPs' intentions to leave their positions in a more targeted manner. Pudong New Area (PNA) is one district that can offer answers because it is diversified in nature (comprehends urban, sub-urban, and rural areas), covering one fifth of Shanghai dimension, with one fifth of the population, and producing one third of the economic output of Shanghai city (4.72 trillion RMB). It is also a pilot zone in implementing comprehensive reforms, among which, healthcare reforms.



Figure 1.1 Map of Shanghai

This study proposes the following specific inquiries:

1. What is the current mobility status of GPs in Pudong New Area, Shanghai?
2. What are the characteristics within CHCs in Pudong New Area, Shanghai, that affect the mobility of GPs?
3. What are the interrelationships between factors such as job satisfaction, working environment, work motivation, and the turnover intention among GPs?
4. What strategies and recommendations can be proposed to enhance job satisfaction among GPs and reduce their turnover intention?

This study will address the research questions through three distinct approaches: mapping the network of GP flow within PNA (study 1); differentiating factors of attractor hospitals: what are they doing that is seen as better than others? (study 2); towards an explanatory model of GPs turnover (study3). By employing these studies, the research seeks to provide comprehensive insights into the mobility patterns and influencing factors among GPs in PNA, Shanghai, and offer strategic recommendations to enhance job satisfaction and reduce turnover intentions.

Firstly, in study one, this research utilizes the mobility data of GPs from 2008 to 2022 in 47 CHCs in PNA. Based on social network analysis, a mobility network diagram of GPs in PNA is constructed to analyze the mobility patterns of GPs in PNA. This will provide insights into the flow of general practitioners within the area.

In study two, combined with relevant literature from Chinese and international sources, this research collects predictive variables, intermediary variables, moderating variables, and background variables related to GP's turnover intentions. Three sets of interview outlines are formed targeting three different groups: GPs, healthcare institution managers, and human resources personnel, considering their distinct characteristics. Targeted interviews conducted with medical and health personnel from several CHCs provide an insight into the dimensions and indicator items related to intentions to leave and job satisfaction. A consistency test (intra-class correlation coefficient ICC and Cohen's Kappa index) is used to offer stronger reliability to the analysis. This part of the study will explore the differential factors influencing the attractiveness, turnover, transition, and stability of CHCs in PNA, Shanghai. By identifying these factors, the study aims to understand the characteristics within community health service institutions that affect the mobility of GPs.

In study three, a survey questionnaire is developed to include indicators derived from the job satisfaction dimensions identified in study two, as well as basic information, intentions to leave, and potentially meaningful explaining variables of intentions to leave. This questionnaire

is administered in two rounds of surveys conducted one month apart among a large sample of GPs in PNA. Based on the data collected on the current status and influencing factors of turnover intention and, guided by Herzberg's Two-Factor Theory and Self-Determination Theory, a structural equation model will be employed to explore the current status of intentions to leave and the key factors influencing them among GPs in PNA, Shanghai. Additionally, beyond the conceptual model, strategies and recommendations are proposed on how to reduce turnover intentions among GPs thus applying the knowledge from the studies into the ultimate objective of contributing to the improvement of the healthcare reforms.

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Chapter 2: Literature Review

Literature review will ensue starting by showing how China's healthcare system is structured, how it has evolved and what current challenges it is facing. Once aware of this setting, the literature explored the critical role GPs play in this system and how its present situation deserves special research attention, namely their turnover decisions perspective from a systemic level.

2.1 China's healthcare system

2.1.1 Organizing structure

According to the World Health Organization report (World Health Organization, 2015), the Chinese health system is mainly composed of the health financing system, the health service provision system, and the health regulation system, and is subject to the constraints of the Chinese health legal system. The subsystems are relatively independent and interconnected, and different actors play their roles in each subsystem, with the overall organizational structure and connections shown in Figure 2.1. In March 2018, the Health and Family Planning Commission was reorganized and merged into the National Health Commission.

The organizational structure of the Chinese health system mainly includes health administrative management organizations, health service provider organizations, and other health organizations such as non-governmental organizations. Among them, general practitioners mainly serve at the primary medical institutions such as community health service centers, community health service stations, township health centers, and village clinics at the township level.

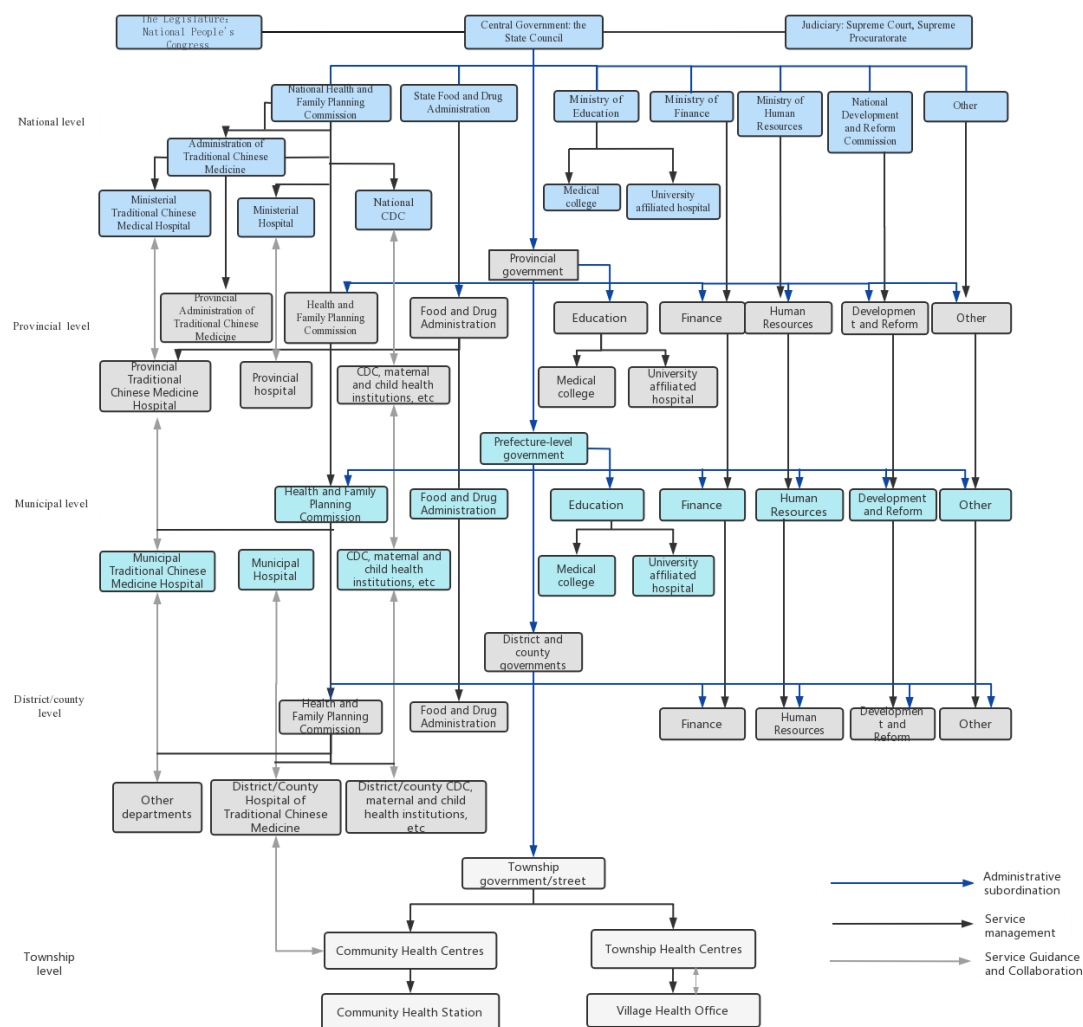


Figure 2.1 Organization of China's Health System

2.1.1.1 Health administration organization structure

The administrative organization system of China's health sector consists of four levels, namely the National Health Commission, the province (autonomous region, municipality) health department (bureau), the city health bureau, and the county health bureau. Generally, townships do not have independent health administrative departments.

The National Health Commission is the highest administrative body in the health sector and is affiliated with the State Council. It has 21 internal institutions, including the General Office, Personnel Department, Planning, Development and Information Technology Department, Finance Department, Legal Affairs Department, System Reform Department, Disease Control Bureau, Medical Administration Bureau, Primary Health Care Department, Health Emergency Office (Emergency Command Center for Public Health Emergencies), Science and Education Department, Comprehensive Supervision Bureau, Drug Policy and

Basic Drug System Department, Food Safety Standards and Monitoring Assessment Department, Elderly Health Department, Maternal and Child Health Department, Occupational Health Department, Population Testing and Family Development Department, Propaganda Department, International Cooperation Department (Hong Kong, Macao and Taiwan Office), Regulatory Bureau, Party-Related Affairs Department and the Retired Cadres Bureau.

The provincial, municipal, and county-level health administrative agencies are the health administrative functional departments of the same level of the people's government. They are responsible for the health administrative management work within the administrative area under the direct leadership of the same level of the people's government and receive business leadership from the superior health administrative agencies. Their internal organization structure is generally consistent with that of the National Health Commission and generally includes functional departments such as medical administration, primary health care, maternal and child health care, health supervision, disease control, planning and finance departments.

2.1.1.2 Organizational structure of health service delivery

The healthcare service provider organization in China is a diversified healthcare system mainly composed of institutions affiliated with the health department. Healthcare service providers can also be classified into four levels based on their administrative affiliations, including national, provincial, municipal, and district/county levels. Community (township) and village-level medical and health institutions are generally directly managed by district/county-level health administrative departments. Each level includes a medical service provider system (including traditional Chinese medicine services) and a public health service provider system.

The overall structure of the Chinese healthcare service provider organization is mainly composed of public medical and health institutions, with non-public institutions serving as a supplement. The medical and health service providers in urban and rural areas have their respective characteristics, but all services are based on primary medical institutions at the street/township level.

The rural healthcare service provider organization is led by county-level hospitals, with township health centers and village clinics as the foundation. County-level hospitals serve as the medical center in the county, not only providing basic medical and health services and emergency rescue for critically ill patients but also responsible for providing technical guidance and training to township health centers and village clinics. Township health centers are responsible for providing comprehensive diagnosis and treatment services for common and prevalent diseases, as well as business management and technical guidance for village clinics.

Village clinics are responsible for the diagnosis and treatment of general illnesses. At the same time, township health centers and village clinics jointly undertake the basic public health services for rural residents.

The urban healthcare service provider organization is based on community health services, and community health service institutions cooperate with urban hospitals. As the "gatekeeper" of residents' health, community health service institutions undertake the basic public health services for urban residents, as well as primary diagnosis and rehabilitation services for common and prevalent diseases. Large comprehensive hospitals at the national, provincial, and municipal levels undertake the diagnosis and treatment of critically ill and difficult diseases, medical education, and scientific research.

In addition, China's medical service system includes the traditional Chinese medicine service system, including ethnic traditional medicine such as Chinese medicine, Tibetan medicine, and Mongolian medicine. The Chinese medicine medical service system is mainly composed of public Chinese medicine hospitals and comprehensive medical institutions at the national, provincial, municipal, and county levels, as well as non-public Chinese medicine medical institutions.

The public health service system mainly includes disease control institutions, maternal and child health care institutions, health supervision institutions, mental health professional institutions, etc. It is also divided into four levels: national, provincial, municipal, and county. Townships and village-level institutions are not separately established, and their related functions are integrated into the corresponding level of medical and health service institutions, such as township health centers and village clinics.

2.1.2 History of reform

The establishment and development of the healthcare system are closely related to the changes in the national organization and governance model, as well as changes in the country's political, socio-economic, and administrative management systems. China's social and economic development and reforms have been divided into different stages, and the corresponding health system has shown different characteristics during each stage.

2.1.2.1 Equity-oriented health system during the planned economy (1949-1978)

During the early stages of the country's economic development, when the level of economic development was low, China implemented a planned economy system characterized by high centralization and administrative management. The state managed social and economic affairs

through administrative means, followed a principle of egalitarianism in income distribution and social welfare, and implemented a distribution system based on "to each according to his work". At this time, the healthcare system formed a top-down administrative management organization, and the medical and healthcare service system was organized by the government through unified planning, forming a relatively complete healthcare system. The institutional framework for China's healthcare service provision system was essentially formed during this period.

There were two types of primary healthcare service providers during this period: government-owned and state-owned enterprise-owned. The primary healthcare institutions owned by the government were fully subsidized by the government and open to the public, implementing welfare pricing. The primary healthcare institutions owned by state-owned enterprises were funded by the labor medical service system, but only open to enterprise employees and their families. During the planned economy period, these two types of primary healthcare institutions played an important role in providing primary health care and public health services to urban residents in China and were supported by society and the government. The rural cooperative medical care and the three-tiered rural medical network formed during this period were the organizational basis for various medical and healthcare services in rural areas, an important pillar for implementing primary healthcare, and highly praised by the World Health Organization. With government subsidies helping the majority of citizens bear the cost of medical treatment, primary healthcare institutions contributed significantly to improving the health of the Chinese people and reducing the burden of infectious diseases, maternal and child health, and newborn diseases (National Health and Family Planning Commission of the People's Republic of China, 2017).

However, limited by the level of socio-economic development, the educational level of health personnel is relatively low, and the capacity and quality of medical services provided are not high. On the one hand, there is a shortage of healthcare personnel, and on the other hand, at that time, primary healthcare personnel were mainly trained through short-term training programs, such as "barefoot doctors", leading to lower service capabilities of primary healthcare personnel. Moreover, under the planned economy conditions, the income of medical personnel was not directly related to their service provision, and their service enthusiasm and efficiency were low, resulting in an inability to meet the healthcare demands of the people.

2.1.2.2 Market-oriented health system after the Reform and Opening (1979-2002)

In 1978, China shifted from a planned economy to a socialist market economy, with a focus on economic development. This period witnessed significant changes in the political system,

administrative management system, economic system, and financial system, which deeply impacted the healthcare system and its governance.

To address the contradiction between the healthcare needs of the people and the efficiency of medical services during the planned economy period, the healthcare system in the reform and opening-up era introduced more market economy elements, such as changing the income distribution method of institutions, adjusting pricing policies and fees, and allowing private capital to open medical institutions to provide healthcare services. At the same time, some public medical institutions were privatized. During this period, China's healthcare industry developed rapidly, with a significant increase in healthcare personnel, institutions, beds, and equipment, and the capacity to provide healthcare services significantly improved.

However, this approach undermined the economic and social foundations of primary healthcare institutions and shifted their original functions within the healthcare system. Specifically, the government reduced subsidies to state-owned primary healthcare institutions, resulting in insufficient income that led to a cessation of public health and primary healthcare services. Some primary healthcare institutions went bankrupt, while survivors turned to profit-driven medical services and no longer emphasized primary healthcare and prevention. From 1997 to 2001, the number of advanced hospitals providing specialized nursing and high-tech services in the healthcare system increased, while the number of primary hospitals decreased significantly. According to data from the Chinese Ministry of Health, the number of primary hospitals decreased from 51,535 in 1997 to 48,643 in 2001, while during the same four-year period, the number of second and third-level hospitals increased by 405 (Center for Health Statistics and Information, 2003).

After the reform, local government budgets were separated from the central government budget. Unlike the central government's focus on health, local governments tended to emphasize economic development goals, further undermining investment in public health and primary healthcare. This has caused enormous financial difficulties for primary hospitals and reduced their willingness and ability to provide public service that are beneficial to society, such as immunization. In order to maximize profits, all primary hospitals narrowly focus on increasing income, resulting in primary public health services becoming fee-based projects and no longer focusing on broader healthcare goals. By the early 1990s, the availability of preventive services was only half of the expected level, and there was a huge difference in public health investment between regions. In 2001, per capita spending on prevention and immunization in Shanghai was 13.27 yuan, while in Chongqing it was only 1.97 yuan (H. F. Wang et al., 2011).

In 2003, the severe acute respiratory syndrome (SARS) epidemic spread across the country, posing a huge challenge to the Chinese healthcare system, and further healthcare reform became imminent.

2.1.2.3 Balancing fairness and efficiency in the health system after the SARS outbreak (2003-present)

After the SARS outbreak, the Chinese government began to reflect on the problems within the healthcare system and gradually began to address issues such as the prioritization of treatment over prevention, emphasizing public health services and promoting the construction of primary healthcare in both rural and urban areas. However, the government and market functions within the healthcare system have yet to be clearly defined, resulting in excessive reliance of medical institutions on market competition, leading to the persistent problem of "difficulty and expense in seeking medical treatment," and the failure to meet the diverse healthcare needs of the people.

To address the contradictions and issues within the healthcare system and achieve the goal of providing healthcare for all, a new round of healthcare reform was launched in 2009. Its long-term goal was to establish a basic healthcare system by 2020. The healthcare reform further clarified the government's responsibilities within the healthcare system, with the financing and compensation levels for basic medical insurance constantly improving, while increasing the encouragement of social capital to invest in medical services. However, unlike the second phase of reform (1997-2002), the encouragement of social and private capital to enter the medical field must be based on ensuring the public welfare and non-profit nature of government-run medical institutions.

Over the past decade, the new healthcare reform has achieved significant results. In 2011, over 92% of the Chinese population was guaranteed by health insurance (Yip et al., 2012). The government has taken many public health interventions to address infectious diseases (such as HIV/AIDS and tuberculosis) and non-communicable diseases (such as hypertension and diabetes) and established a well-funded community healthcare service system. The national essential drug system has been improved to enhance the rational use of drugs, improve quality and control costs, and significant progress has been made at the community level (S. Tang et al., 2014). There is greater emphasis on the role of urban community healthcare service centers, community healthcare service stations, rural township health centers, and village clinics in improving the equity and accessibility of basic healthcare. Furthermore, the government has formulated and implemented a series of measures to improve the service capacity of these healthcare facilities, including buildings and equipment standards, developing guidelines for

general practitioners, providing training for primary healthcare providers, and providing financial support from central and local governments to primary healthcare institutions (S. Tang et al., 2014).

2.1.3 Current challenges

Although China has made significant efforts and achievements since 2009, its primary healthcare system still needs significant strengthening to manage the rising burden of chronic non-communicable diseases and increasing healthcare expenditures. As the core of China's healthcare system reform launched in 2009, the strengthening of primary healthcare has been limited by the weak supply-side force of China's healthcare service provider system.

China faces a shortage and uneven distribution of healthcare personnel, and it is difficult to ensure that a sufficient number of professional staff have appropriate training, compensation, and performance. From 2010 to 2016, the number of primary healthcare workers in China increased from 3.3 million to 3.7 million, but their proportion of healthcare workers decreased from 40.0% to 33.0% (National Health and Family Planning Commission of the People's Republic of China, 2017). These challenges are more severe in rural areas and underdeveloped western and central regions (Anand et al., 2008). Due to low income and limited professional development opportunities at primary healthcare centers, it is difficult to recruit and retain healthcare workers at these centers. Qualified healthcare personnel in China are mainly concentrated in urban areas and hospitals. In 2013, the doctor density in urban areas was twice that of rural areas, and the qualifications of healthcare professionals in high-income areas were far higher than those in underdeveloped areas (National Health and Family Planning Commission of the People's Republic of China, 2014). In addition to the shortage of healthcare personnel, primary healthcare also faces a series of severe challenges such as low education level of primary healthcare workers, lack of qualifications, aging, high personnel turnover rate, and poor job performance.

The challenging conditions of grassroots medical and health positions have made it difficult to retain current general practitioners and attract new ones, further exacerbating the inadequate level of community healthcare. As a result, competition in the healthcare sector has become a competition for medical talent. In 2018, the State Council issued "Opinions on Reforming and Improving the Incentive Mechanism for Training and Utilizing General Practitioners," which clearly stated that the goal of training and utilizing general practitioners is to have 2-3 qualified general practitioners per 10,000 urban and rural residents by 2020 and increase this number to

5 by 2030. According to the requirements of the Opinion, there should be 700,000 general practitioners by 2030. However, according to data from the Chinese Medical Association, by 2019, there were only about 300,000 general practitioners in China, leaving a "gap" of 400,000 (Xinhua News Agency, 2019). In addition to making up for the quantity shortfall, attention should also be paid to improving the quality and structure of general practitioners.

The government's blueprint for health system development, the "*Healthy China 2030 Planning Outline*" emphasizes the importance of primary healthcare and underscores that strengthening the primary healthcare system will remain a key focus of healthcare system reforms in the near future.

2.2 The critical role of GPs in China's healthcare system

Also known as family doctors, general practitioners are defined by the Royal College of General Practitioners (RCGP) as doctors who provide humane, primary, continuity of care to individuals and families in the patient's home, clinic or hospital. The American Academy of Family Physicians (AAFP) defines a family physician as a physician who is educated and highly trained in the specialty of the family medical care and has the unique knowledge, perspective, and skills to provide continuous and comprehensive health care, health maintenance, and preventive services to each family member, regardless of gender, age, physical, psychological, or social issues. The World Organization of Family Doctors (WONCA) defines a general practitioner as a physician who provides high-quality, accessible, affordable and effective, integrated primary health care services to individuals, families and communities for the whole course and comprehensive responsible management of life, health and disease.

General practitioners are the foundation of the primary healthcare system and provide high-quality primary healthcare services to residents. They are the "gatekeepers" of residents' health (J. Wang, 2000). General practitioners are an important force in the development of China's community health services. After receiving professional training in general medicine, they can provide medical services that integrate prevention, medical care, health care, rehabilitation, health education, and family planning technologies for community residents. They are the providers of primary healthcare services and the guarantors of healthcare service quality (J. Wu, 2011). Strengthening the construction of the primary healthcare team centered on general practitioners is the key to forming the "community first diagnosis" and "graded diagnosis and treatment" service model. It is the basic way to achieve the strategic goal of providing basic medical and healthcare services for everyone (Y. W. Chen, 2016).

2.2.1 The embryonic stage of the development of general medicine in China (1986-1996)

In the 1980s, the concept of general practice was introduced to mainland China. Since 1986, leaders of the World Organization of Family Doctors (WONCA) and general practitioners from Canada, Australia, the United Kingdom, the United States, Hong Kong, and Taiwan have visited mainland China to promote the concept of general practice. In January 1989, the Beijing General Practice Society (General Practice Specialty Committee of the Beijing Medical Association) was established, and in October of the same year, the first general practitioner training center in China was established at the Capital Medical University (formerly known as the Beijing Medical College), officially launching the promotion and dissemination of the concept of general practice across the country. In November of the same year, with the support of WONCA, the Chinese Medical Association and the Beijing General Practice Society held the first International Conference on General Practice in Beijing. The following year, China became an associate member of WONCA. In November 1993, the General Practice Branch of the Chinese Medical Association was established, and the second International Symposium on General Practice was held in Beijing, marking the establishment of general practice as a new clinical discipline in China. In 1995, China became a full member of WONCA and actively engaged in international exchanges, striving to develop the cause of general practice.

The first national on-site study meeting on general practice education and service was held in Jinhua, Zhejiang Province in the early 1990s. In 1992, Capital Medical University began to train the first batch of undergraduate general practitioners, while Zhejiang Medical University and Jinhua Vocational School started to train general practitioners at the college and secondary vocational levels, respectively. In 1996, the General Practice Teaching and Research Section was established at Capital Medical University.

With the formal establishment of the discipline of general medicine, pilot explorations of the general medical service model were initiated in several provinces, municipalities, and regions throughout China, including Beijing, Tianjin, Zhejiang, Shanghai, Shandong, and Henan. General practitioners began to provide services officially. In 1991, Chaoyangmen Hospital in Dongcheng District, Beijing, established general practitioner work stations in two residential areas, initiating a trial of general medical services. The first trial of town-level general medical services in China was also launched in the same year in Sidu Town, Jiangshan City, Zhejiang Province. In 1992, the pilot of general medical services was conducted throughout He Dong District, Tianjin. In September 1994, Shanghai Medical University Affiliated Zhongshan Hospital became the first comprehensive hospital to establish a

department of general medicine in China, dedicated to providing general medical services and education. In October 1995, the Ministry of Personnel conducted a pilot project in Tianjin, adding the general practice profession to the health professional title series, marking the beginning of the era of Chinese general practitioners (N. Wu et al., 2018).

During this period, the development of general medicine in China was limited to pilot projects in certain areas and had not been widely implemented nationwide. It was still in the stage of spreading the concept of general medicine and exploring its theoretical foundations. The exploration of the general practitioner training model and the construction of the educational system during this period accumulated effective experience for the subsequent establishment of the general practitioner system.

2.2.2 Primary stage of the development of general medicine in China (1997-2008)

With the process of Reform and Opening, China's medical and health care industry developed rapidly, and the health condition of the people continued to improve. However, problems such as unreasonable allocation of medical and health resources and high medical costs gradually emerged. It was urgent to strengthen the construction of the primary medical and health care service system, establish a primary service team with the core of general practitioners, and quickly form a hierarchical diagnosis and treatment model with primary care, two-way referral, quick and slow treatment, and vertical linkage to effectively promote the fairness, accessibility, and high efficiency of primary medical and health care services.

In 1997, the "Decision on Health Reform and Development" by the CPC Central Committee and the State Council made an important decision to "accelerate the development of general practice medicine and train general practitioners", clearly stating that "the urban health service system should be reformed, and community health services should be actively developed, gradually forming a health service network that is functionally reasonable and convenient for the masses". Subsequently, various supporting policies for community health services were introduced. In July 1999, the former Ministry of Health and nine other departments issued the "Opinions on the Development of Urban Community Health Services", which proposed "to strive to cultivate a high-quality community health service team with general practitioners as the backbone to meet the needs of residents for community health services". In December, the former Ministry of Health held the "National General Practice Medicine Education Working Conference", marking the official start of general practice medicine education work and entering the stage of standardized development (Y. Y. Zhang et

al., 2012). Also in 1999, Nanjing Medical University began enrolling full-time undergraduate clinical medicine students in the general medicine field.

In 2000, the Ministry of Health issued several documents, including "Opinions on the Development of General Practice Medical Education," "General Practitioner Training Program," "Trial Measures for Standardized Training of General Practitioners," and "Trial Program for Standardized Training of General Practitioners." These documents proposed a "three-step" development goal for general practice medical education in China, which aimed to establish a Chinese-characteristic general practice medical education system that could meet the needs of health care reform and development, cultivate a large number of general practice medical personnel capable of meeting the basic health care needs of the people, and construct a basic framework for the general practice medical education system by 2000. By 2005, the goal was to establish the general practice medical education system, and by 2010, to establish a more complete general practice medical education system nationwide (X. Zhang & Han, 2004). Since then, Beijing, Zhejiang, Shanghai, and other places have successively carried out standardized training for general practitioners and gradually unified the training period to three years based on practice.

In 2000, the Ministry of Health established the General Practice Medical Training Center affiliated with the Capital Medical University to undertake the guidance work of general practice medical education nationwide. Twenty-eight provinces (regions, municipalities) in China have established provincial training centers, forming a national general practice medical education training cooperation network, which has played an important role in promoting the development of general medicine. In 2001, the Ministry of Health and the Ministry of Personnel issued the "Interim Regulations on Qualification Examination for Preventive Medicine, General Practice Medicine, Pharmacy, Nursing, and Other Health Technical Personnel," which clearly divided the general practice medical profession into intermediate and advanced qualifications and began the national unified examination. In 2003, Fudan University Shanghai Medical College started the general practice medical master's degree graduate education. In 2006, the Capital Medical University took the lead in carrying out general practice medical doctoral degree graduate education.

On February 24, 2006, the State Council held the National Urban Community Health Work Conference and issued the "Guiding Opinions of the State Council on the Development of Urban Community Health Services", which required the education sector to be responsible for the education of general practitioners and community nursing disciplines, and to make community health service skills an important content of medical education. In May 2006, the

former Ministry of Personnel and four other departments jointly issued the "Guiding Opinions on Strengthening the Construction of the Urban Community Health Talents Team", which required the strengthening of general practitioner and community nursing education and discipline construction, the implementation of job training for community health service personnel, and the vigorous promotion of continuing education activities that feature the characteristics of general practice medicine and have strong pertinence and practicality.

During this period, the government issued a series of supporting documents, which greatly improved the policy environment for the development of general practice medicine, and the policy environment for the development of general practice medicine had initially formed. At the same time, the education of general practice medicine in Chinese colleges and universities was further strengthened, the exploration of post-graduation education was accelerated, and various forms of continuing education and job training were constantly increasing. The number of general practitioners continued to grow, and their ability and quality were further improved.

2.2.3 The accelerated stage of development of general medicine in China (2009 - present)

Since the initiation of the new healthcare reform in 2009, the development of general practice medicine in China has entered an accelerated phase. In March 2009, the "Opinions of the Central Committee of the Communist Party of China and the State Council on Deepening the Reform of the Medical and Health Care System" proposed the working path of "ensuring basic medical services, strengthening primary care, and establishing mechanisms", explicitly requiring the strengthening of the talent team for primary healthcare, especially the training and cultivation of general practitioners, to address the serious health care needs of the aging population. In March 2010, the "Construction Plan for the Primary Health Care Workforce with a Focus on General Practitioners" was formulated by six ministries including the National Development and Reform Commission, which clearly stated the goal of training 300,000 GPs through various means by 2020, and gradually forming a primary healthcare workforce that is appropriate in number, of high quality, structurally reasonable, and meets the needs of the basic medical and healthcare system. In May 2010, Vice Premier Li Keqiang proposed at the National Working Conference on Deepening the Reform of the Medical and Health Care System and the Special Training Course for Provincial Leaders to Deepen the Reform of the Medical and Health Care System that "ensuring basic medical services, strengthening primary care, and establishing mechanisms" should be the focus of the healthcare reform.

In 2010, the former Ministry of Health launched training programs for the conversion of non-GP medical practitioners (assistants) who were working in primary healthcare institutions but had not yet met the requirements of a qualified GP. This training was based on the theory of general practice medicine, guided by the demand for primary healthcare services, and lasted no less than 12 months. In the same year, five departments, including the National Development and Reform Commission, launched the free training of rural medical students with targeted orders, focusing on training healthcare personnel engaged in general practice medicine in township health centers and lower-level medical institutions.

In May 2011, the Department of General Practice Medicine was established at Peking University School of Medicine. In June 2011, Premier Wen Jiabao proposed the establishment of a general practitioner system during an executive meeting of the State Council. The meeting called for the formation of a unified and standardized GP training model, namely the "5+3" model, which involves five years of clinical medicine (including traditional Chinese medicine) undergraduate education followed by three years of standardized GP training. This greatly promoted the development of general practice medicine and the training of GPs. In July 2011, the State Council issued the "Guiding Opinions on Establishing a General Practitioner System," which provided guidance on establishing a unified and standardized GP training system, cultivating qualified GPs through multiple channels, reforming GP practice methods, and establishing GP incentive mechanisms. Various measures were taken, such as job transfer training, assistant GP training, targeted free training, on-the-job training, and targeted support, to accelerate the development of the GP workforce, with the aim of achieving the goal of having 2-3 qualified GPs per 10,000 urban and rural residents by 2020. With the improvement of the GP system, the aim is to gradually control the number of service contracts for each GP to around 2,000 people.

In 2012-2013, a series of guiding documents were issued. The former Ministry of Health, Ministry of Education, and State Administration of Traditional Chinese Medicine successively formulated and issued national standards, such as the "Standardized Training Standards for General Practitioners (Trial)," "Assistant GP Training Standards (Trial)," "Standardized Training Standards for Traditional Chinese Medicine Category GPs (Trial)," and "Assistant GP Training Standards for Traditional Chinese Medicine Category (Trial)." These standards provided guidance for the strict and standardized training of GPs in various regions. In September 2015, the State Council General Office issued the "Guiding Opinions on Promoting the Construction of a Graded Diagnosis and Treatment System," which pointed out that the establishment of a graded diagnosis and treatment system is an important measure for rational

allocation of medical resources and promoting equalization of basic medical and health services. To implement the graded diagnosis and treatment system, it is important to strengthen the construction of the primary medical and health personnel team, especially the GP team, and vigorously improve the capacity of primary medical and health services.

In March 2016, the "Outline of the Thirteenth Five-Year Plan for National Economic and Social Development of the People's Republic of China" was released, which called for the strengthening of the healthcare workforce and the implementation of the National Health and Hygiene Talent Security Project and the training and utilization plan for general practitioners and pediatricians, as well as the improvement of the standardized training system for hospital physicians. In June, the State Council issued the "Guiding Opinions on Promoting Family Doctor Contract Services," which launched family doctor contract services in 200 pilot cities for comprehensive reform of public hospitals, and explicitly stated that family doctors at this stage mainly include registered general practitioners (including assistant general practitioners and general practitioners in traditional Chinese medicine) in primary medical and health institutions, as well as physicians in township health centers and rural clinics who have the ability. At the same time, priority was given to general practitioners in terms of staffing, personnel hiring, promotion, on-the-job training, and awards and incentives, and excellent personnel were included in the scope of preferential government talent introduction policies to enhance the professional attractiveness of general practitioners and accelerate the construction of the general practitioner team.

In October 2017, the report of the 19th National Congress of the CPC clearly stated the need to implement the Healthy China strategy, strengthen the primary healthcare service system and the construction of the general practitioner team. In November 2017, General Secretary Xi Jinping presided over the first meeting of the 19th Central Leading Group for Comprehensively Deepening Reform and approved the "Opinions on Reforming and Improving the Incentive Mechanism for Training and Using General Practitioners." It was emphasized that the reform of the training and incentive mechanisms for general practitioners should follow the laws of medical and health services and the growth of clinical medical talents, adhere to government leadership, give full play to the role of market mechanisms, improve the general practitioner training system adapted to the characteristics of the industry, and innovate the incentive mechanism for using general practitioners. Furthermore, it was necessary to strengthen the construction of general practitioner teams in impoverished areas. In January 2018, the General Office of the State Council issued the "Opinions on Reforming and Improving the Incentive Mechanism for Training and Using General Practitioners," which proposed a series of important

reform measures to accelerate the establishment of a general practitioner training system and innovate the incentive mechanism for using general practitioners. It was pointed out that general practitioners are the "gatekeepers" of residents' health and control of medical expenses, and play an important role in basic medical and health services. The target for general practitioner training and use was to have 2-3 qualified general practitioners per 10,000 urban and rural residents by 2020, increasing to 5 by 2030.

In 2019, the National Health Commission issued the " Notice on Doing a Good Job in Signing Services for Family Doctors in 2019 " which proposed that family doctor teams should align with the service needs of contracted residents and provide integrated and continuous medical and health services that incorporate medical and health disease prevention. It required the Chinese general practitioner work mode to move closer to "medical and health disease prevention integration." In February 2020, General Secretary Xi Jinping clearly stated at the 12th meeting of the Committee for Comprehensively Deepening Reform that China should continue to strengthen the training of general practitioners' capabilities and qualities to meet the gradually growing demand for medical and health services of the Chinese people. The 19th Central Committee of the CPC in 2020 also issued guidance on the talent team building and service quality of primary public health service institutions.

The issuance of these series of guiding documents marks the institutionalization of China's general practice medicine and general practitioner construction, which is maturing and progressing towards a higher stage of development. This plays a crucial role in building community health service centers, promoting medical reform, and solving the problem of difficult and expensive medical treatment for residents.

Chapter 3: Mapping the Patterns of GP Flow within PNA - Pudong New Area (Study 1)

3.1 Introduction

Healthcare workers may leave a hospital or transfer to another hospital within the same region, thus involving both voluntary and involuntary turnover, as well as internal and external movements. These movements are expectable, and they have both advantages and disadvantages to organizations and the professional services system (Siebert & Zubanov, 2009). Although costs are easily anticipated (e.g. replacement costs, loss of tacit knowledge), research suggests that in cases of involuntary turnover, employee departures can revitalize organizations by clearing underperforming employees and welcoming new ones, thus contributing to improved organizational performance and fostering innovation (Hancock et al., 2013). According to Siebert and Zubanov (2009), an optimum level of employee turnover can be conceived as an equilibrium between the benefits and costs where the HRM philosophy (control versus commitment HR) is the contextual determinant of how employee turnover relates to productivity. In a control HR system, the relationship describes an inverted curvilinear U-shape while in the commitment HR system, the relation is linear negative. In healthcare professions, the nature itself of the activity fosters a commitment HR philosophy that implies high-involvement (Boxall et al., 2019) and hence the costs are usually depicted as outweighing benefits.

Hence, any form of personnel turnover incurs costs for healthcare organizations, as the cost of recruiting new staff into hospital labor forces is high (Brook et al., 2019). As a consequence, in the context of voluntary turnover among healthcare personnel, it is valuable to consider strategies for reducing turnover rates and increasing retention rates. Additionally, in considering objective turnover rates that do not differentiate between voluntary or involuntary turnover, it may be valuable to consider the consequences of symmetric or asymmetric flows.

Currently, research on healthcare personnel turnover mostly focuses on the determinants of turnover intentions, but there is limited research describing the inflow and outflow within a region, or examining the potential impacts of such movement. A review on nurse turnover suggests that it may have both non-economic and economic impacts, such as negative effects

on hospital care processes and outcomes, and the costs associated with turnover are very high, even up to three times the average nurse's salary (Bae, 2022). Moreover, if vacant positions are not filled immediately, healthcare personnel turnover may lead to understaffing in medical units. In the case of GPs, the departure of GPs from the profession not only increases societal investments in training new GPs but also results in significant losses of time and money invested in young general practitioners (Bardoel et al., 2020). Strategies to reduce personnel turnover can also play a role in alleviating the anticipated shortage of GPs workforce.

Current research has found that different types of hospitals also affect healthcare personnel turnover rates because different workplaces have different abilities to attract and retain employees. A study on nurse turnover involving 2958 units in the United States found differences in nurse turnover rates between attractive and unattractive hospitals and their related reasons. Due to environmental reasons, the nurse turnover rate in non-magnet hospital units was higher than that in magnet hospital units. The turnover rate in non-magnet hospital wards due to staffing/workload was 4.684 times higher, and the turnover rate due to scheduling was 1.439 times higher, than that in magnet hospital wards (Park et al., 2016).

Currently, there is still a shortage of GPs in China, while healthcare is shifting its focus from hospitals to homes and communities. The current shortage of GPs may exacerbate competition for existing HR resources. GPs are the largest workforce in primary healthcare institutions, so reliable information on the relative stability and attractiveness of various types of hospitals, especially for GPs, is crucial. Analyzing the differences in healthcare personnel turnover rates between attractive and unattractive hospitals can help further understand the factors influencing their turnover rates.

However, there may be shortcomings in defining the attractiveness of a specific environment. One approach is to directly analyze individuals' intentions to leave through surveys. A common alternative indicator for measuring attractiveness at the workplace level is turnover rates. Literature suggests that determining an "appropriate" turnover level is complex; excessively high levels may increase costs, reduce productivity, lower employee morale, and harm patient outcomes; excessively low levels abandon cost savings and productivity gains from replacing older workers with younger ones, innovation, and better individual-job matches (Alameddine et al., 2006). Additionally, consistent and accurate measurement of turnover rates is an important step in addressing organizational work environments and workforce policies (Kovner et al., 2014). Therefore, this study discusses the flow of GPs, what it entails as positive and negative consequences, that there is a natural inflow and outflow but that asymmetric flows can increase the disadvantages compared to the advantages and they can also indicate problems

with specific hospitals or with specific tiers in the healthcare system. It ends with signaling social network analysis as a useful tool to gain a general understanding of the system dynamics.

Current research on healthcare workforce analyzes the quantity, structure, distribution, and turnover of healthcare workers from both macro and micro perspectives; and studies their attribute characteristics including job satisfaction, burnout, and competency. However, less attention is paid to the relational characteristics of healthcare workers, and the measurement of relational characteristics still focuses on psychological measurement or qualitative descriptions (Fu et al., 2019). Social networks can be understood as a network structure composed of multiple points and the connections between them, considered as a collection of actors and their interrelations. As a community, healthcare practitioners operate in an endogenous environment where personal networks and professional activities fuse into a system of communication and dynamics. To capture these dynamics and network system, Social Network Analysis (SNA) is the most suited approach. Therefore, this study analyzes the turnover of GPs in Pudong New Area, Shanghai through social network analysis, understands the overall characteristics of network structure, identifies the role of key medical institutions in social networks, classifies medical institutions based on different inflow and outflow degrees, and further identifies attractive and unattractive institutions.

3.2 Social network analysis approach

SNA is an analytical approach that offers a comprehensive view of how elements are connected in a given network. Its use in health studies has been sharply increasing since the 1990s, especially in the latest years (Chapman et al., 2022). According to these authors, SNA in health has been targeting relational patterns within the population that are connected to specific diseases, but also how health-related beliefs are spread out through networks of people, from a sociological perspective. It has also been used to map patterns of patients' preferences for getting healthcare (Strozzi et al., 2019), and to gauge the scenario for different patient referral system in China (Y. X. Xiao et al., 2021).

SNA has been first mapped in the famous Hawthorne studies under the guidance of Fritz Roethlisberger and gained ground in sociology with Jacob Moreno's Sociogram although it was only regularly adopted in management studies after the late 1980s (Brass, 2022).

With the development of SNA theory, measurement, and software (Borgatti et al., 2002) a researcher can count on a set of indicators that are intended to depict several dimensions that offer an understanding of its current situation and eventually its dynamics. According to

O'Malley and Marsden (2008) in SNA terminology, the elements that compose the network are called “nodes” and their connections are called “ties”. Networks can be represented with the direction of the ties (where the ties flow from) which is named “directed networks” or without such directions (“undirected networks”).

Currently, the most usable analytical indicators are degree measure, and centrality measures. For clarity sake's we will explain these below, according to O'Malley and Marsden (2008).

3.2.1 Degree measure

In a social network diagram, two nodes are said to be adjacent if they are connected by a line. Those nodes adjacent to a node are called "neighbors" of the nodes, and the number of neighbors of a node is called the degree of the node, also called the degree of association. In a directed network, the degree is divided into in-degree and out-degree, which are the number of directed edges in the network ending at the node and the number of directed edges starting at the node, respectively. The value of a node in the network depends on its position in the network, and the more central the position, the greater the value of the node.

3.2.2 Centrality measure

The study analyzes the inflow and outflow of general practitioners from each institution based on the structure of individual networks, and describes the opportunities and constraints of individuals based on their local association structure in the whole network. In this SNA, each institution is an "ego node", and there are as many ego nodes as there are individuals in a complete network. The combination of ego nodes and all nodes directly associated with ego nodes is a one-step neighborhood, which includes all relationships among all actors associated with the ego. When the distance between some nodes and the ego node is not greater than 2, then all the relationships between these nodes are considered, and the extended 2-step neighborhood is obtained.

The metrics within the 1-step neighborhood include size (size), number of directed relations (ties), number of ordered pairs (pairs), density (density), number of weak components, and the number of normalized weak components.

Where the size (size) of the individual net is the number of points in the 1-step neighborhood excluding the ego node itself.. The number of directed relations is the number of associations between all points in the individual net excluding the ego node, and the number of ordered pairs is the number of possible directed relations in each individual net. The density is

the actual number of relationships divided by the theoretical maximum number of relationships, i.e., the number of directed relationships divided by the number of ordered pairs.

In order to understand the role that the self plays in its neighborhood and its positional advantages and disadvantages, two indicators are used to represent them: the number of weak components and the number of normalized weak components. Without considering the direction of the relationship, a weak component is considered if the number of associated actors reaches a maximum. As shown in Figure 3.1, if the ego node (E) is associated with both A and B (they are interrelated), and with both C and D (they are interrelated), but A and B are not directly associated with C and D, then there are two "weak components" in the neighborhood of the ego node E.

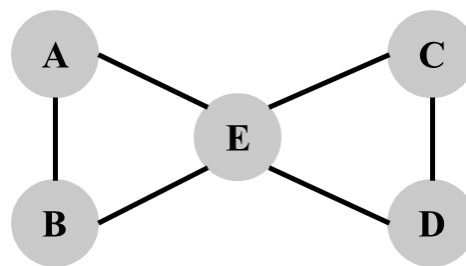


Figure 3.1 The actor E neighborhood contains two weak components

If there are multiple weak components in an individual network, it is shown that after removing the ego node, the whole network separates into disjoint sets of multiple actors. If the association is random, then the probability of having more than one weak component in the ego neighborhood is a function of the neighborhood size, and thus the number of weak components needs to be normalized by the individual network size in order to be comparable across individual networks.

The metrics of 2-step neighborhood include 2-step reach, reach efficiency, number of brokers, normalized brokerage, betweenness, and normalized betweenness. (normalized betweenness). These metrics show how the embeddedness of an actor can be an advantage for itself.

The 2-step reachability number is the percentage of points reachable in 2 steps from the self to the number of all actors in the overall network. Reach efficiency is the normalization of 2-step reachability, obtained by dividing the 2-step reach by the total number of sizes of each actor in the individual network. If the reach efficiency is high, it indicates that the unit input used to maintain primary ties can reach a wider network and more returns can be obtained. Similarly, if the share of shared associations between self and neighbor is higher, the reach efficiency is lower.

By definition, in an individual network, the ego is associated with every other actor, but if these actors are not directly associated with each other, but are associated through the ego point, then the ego point is a "broker" and acts as a broker, which is represented by the number of ordered logarithms in the individual network that are not directly associated with each other. The standardized broker behavior is obtained by dividing the number of broker behaviors by the total number of ordered logarithms, which can evaluate the extent to which the ego point acts as a broker.

In an individual network, an ego point is said to be "in the middle" if it is located on the shortest directed path (shortcut) from one actor to another. The centrality of an individual's network indicates the sum of the number of shortcuts via the ego node as a proportion of the total number of shortcuts on each pair of actors. In addition, the actual centrality of the ego point is divided by the maximum possible value to obtain the normalized centrality. The maximum centrality is obtained when the ego is at the center of a "star" network, when any neighboring point has to pass through the ego point to be connected.

3.3 Method

This section will detail the methodological options as regards the data collection, and data analysis strategy.

3.3.1 Source

All data was collected covering the period from 1st January 2008 until 3rd August 2022. As stated, this time period was selected as it covers some years before the GP reform (2010, effective after 2011) and the subsequent period up to current time. It covers then a period of almost 15 years. All data originated from the official archives of Health National Commission. The required authorizations were obtained to access such data.

3.3.2 Target data

Data concerns all the community health centers (CHC, here forth called hospitals) that were in operation since 2008 in the PNA. The list of hospitals is the following: 01Beicai, 02Caolu, 03Chuanshahuaxia, 04Chuansha, 05Datuan, 06Dongming, 07Gaodong, 08Gaoqiao, 09Gaoxing, 10Hangtoughesha, 11Hangtou, 12Heqing, 13Hudong, 14Huamu, 15Huinan, 16Jichang, 17Jiangzhen, 18Jinqiao, 19Jinqiao, 20Kangqiao, 21Laogang, 22Lianyang,

23Lingqiao, 24Liuzao, 25Luchaogang, 26Lujiazui, 27Nanmatou, 28Nicheng, 29Puxing, 30Sanlinkangde, 31Sanlin, 32Shanggang, 33Shuyuan, 34Sunqiao, 35Tangzhen, 36Tangqiao, 37Wanxiang, 38Wanggang, 39Weifang, 40Xinchang, 41Xuanqiao, 42Yangjing, 43Yingbo, 44Zhangjiang, 45Zhoujiadu, 46Zhoupu, 47Zhuqiao.

A total of 2135 GPs were comprehended in this database with an estimated number of flows (changes from one hospital to the other) reaching 2286 times.

3.3.3 Data curation

Because the time period covers enough length to observe relevant changes in the composition of the hospitals in PNA and due to the purpose of the study we have excluded data from some cases. Namely, we have excluded data from inflows directly from the universities and we have also opted not to consider inflows and outflows outside the PNA because they are uncommon and regulated by higher level authorities and therefore, they do not play an important role in the macro levels flow analysis.

3.3.4 Data analysis

SNA was processed with UCINET6 software (Borgatti et al., 2002). This software is commonly used in research and allows us to produce the matrix that relates all participants to find the frequency of occurrences that link them as pairs in the network. Each hospital is then a node and each relation between two nodes depicts either an inflow or outflow of a GP. This is a very complete software from an analytical viewpoint as it provides centrality measures and other that are key into SNA.

3.4 Results

This section shows findings organized by the leading questions: How stable are the GP flows position within PNA? (density), Are hospitals in PNA homogeneous as regards this stability/dynamic? Is there any geographic anchor associated with the patterns observed? Have the flows followed similar patterns before and after the GP bill of 2014? Are there asymmetric realities in the PNA attraction or losing GP? If positive, what are the leading hospitals as regards inflow? What are the leading hospitals as regards outflow? Are there hospitals that are only attracting or only losing GP?

"Health Eight Reform". This reform aimed to improve the healthcare service provided by GPs in remote areas, encouraging them to practice in rural areas, and had a certain impact on the flow of GPs. The flow of GPs before and after the policy was introduced is shown in Figure 3.3.

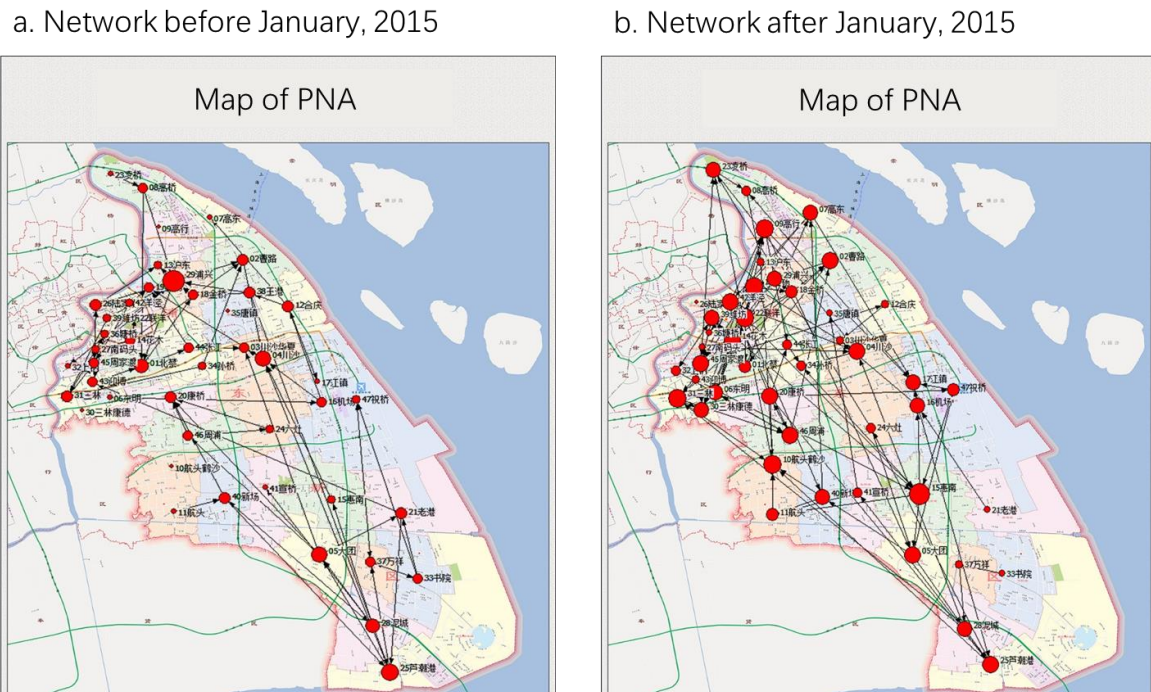


Figure 3.3 Comparison of GP network before and after 2015

The upper left part of the PNA map represents the main urban area of the district, which has a better economic situation and a larger population. Before the policy reform, there was less mobility among GPs in the main urban area, with most of them moving within the urban area itself, and fewer moving to the suburbs and rural areas. However, after the policy was introduced, the frequency of mobility among GPs within the main urban area increased, and more arrows pointing from the urban area to the suburbs or rural areas appeared, indicating that more GPs were moving from the urban area to the suburbs or rural areas voluntarily.

This study considered the influence of the 8-entries policy implemented in 2014. Before and after the implementation of the policy in 2014, the flow of GPs became more frequent. Before 2014, GPs mainly transferred from Class A (remote rural) and Class B (general rural) areas of Pudong New Area to Class C (urban-rural) and Class D (urban) areas, while after 2014, the main flow of GPs was reversed, mainly from Class C and D areas to Class A and B areas. Possibly due to the subsidies for suburban areas and the implementation of the rural health personnel special reward policy in the 8-entries policy, GPs in remote areas received more subsidies and compensation, which may be the cause of this phenomenon. However, hospitals

classified as loss type do not necessarily mean a decrease in the total number of GPs, as cases of direct hiring from universities have been excluded.

3.4.2 Individual level analysis

Individual level indicators are depicted in Table 3.1. According to the size of the individual networks and the number of directed relationships, it can be found that #Puxing, #Luchang, #Chuansha, #Datuan and #Sanlin are the five individual networks with the largest number of size and directed relationships, indicating that the inflow and outflow of general practitioners within these five institutions radiates the widest range. In contrast, there are no other actors in #Tangzhen's individual network except for the ego-node, indicating that there are no personnel flow links between this institution and other institutions.

The individual network density of institutions in Pudong New Area is generally low, and the degree of connection among institutions is more fragmented, with the highest individual network density in the #Shuyuan, which is more likely to be in a smaller group with closer ties, and GPs flow more closely with each other within that small group.

Among the individual networks connected by each institution, #Lingqiao and #Zhangjiang played a higher brokerage behavior in their individual networks, with more GPs flowing in or out through the institution to other institutions, acting as a link to other institutions. #Shuyuan, on the other hand, had less standardized economic behavior, indicating that fewer GPs flowed through the institution to other institutions. #Wanxiang has a higher standardized intermediate degree than other institutions, indicating that it is in a strategic position to act as a bridge to other institutions in the network in the individual network.

Table 3.1 SNA indicators for hospitals

Institutions	Size	Ties	Pairs	Densit	nWeakC	pWeakC	2StepR	ReachE	Broker	nBroke	EgoBet	nEgoBe
01Beicai	9	6	72	8.33	4	44.44	73.91	52.31	33.00	0.46	37.00	51.39
02Caolu	9	9	72	12.50	1	11.11	76.09	46.67	31.50	0.44	40.00	55.56
03Chuanshahuaxia	5	2	20	10.00	3	60.00	58.70	64.29	9.00	0.45	3.00	15.00
04Chuansha	11	10	110	9.09	3	27.27	84.78	48.15	50.00	0.45	50.17	45.61
05Datuan	11	14	110	12.73	3	27.27	76.09	42.17	48.00	0.44	63.67	57.88
06Dongming	6	4	30	13.33	3	50.00	63.04	60.42	13.00	0.43	12.00	40.00
07Gaodong	6	1	30	3.33	5	83.33	69.57	82.05	14.50	0.48	8.00	26.67
08Gaoqiao	5	2	20	10.00	3	60.00	58.70	72.97	9.00	0.45	7.00	35.00
09Gaoxing	7	3	42	7.14	4	57.14	67.39	62.00	19.50	0.46	12.00	28.57
10Hangtouhesha	7	5	42	11.90	4	57.14	71.74	62.26	18.50	0.44	6.00	14.29
11Hangtou	4	1	12	8.33	3	75.00	45.65	72.41	5.50	0.46	4.00	33.33
12Heqing	6	3	30	10.00	3	50.00	52.17	72.73	13.50	0.45	6.00	20.00
13Hudong	4	2	12	16.67	2	50.00	45.65	72.41	5.00	0.42	3.00	25.00
14Huamu	8	8	56	14.29	1	12.50	56.52	43.33	24.00	0.43	34.50	61.61
15Huinan	10	7	90	7.78	4	40.00	82.61	52.78	41.00	0.46	45.67	50.74
16Jichang	8	7	56	12.50	2	25.00	78.26	59.02	24.50	0.44	12.00	21.43
17Jiangzhen	6	2	30	6.67	4	66.67	63.04	76.32	14.00	0.47	5.00	16.67
18Jinqiao	6	7	30	23.33	1	16.67	60.87	53.85	11.50	0.38	15.00	50.00
19Jinqiao	9	8	72	11.11	3	33.33	69.57	43.84	32.00	0.44	38.50	53.47
20Kangqiao	9	11	72	15.28	2	22.22	73.91	48.57	30.50	0.42	22.00	30.56
21Laogang	5	2	20	10.00	3	60.00	54.35	64.10	9.00	0.45	10.00	50.00
22Lianyang	8	8	56	14.29	2	25.00	65.22	51.72	24.00	0.43	28.00	50.00
23Lingqiao	5	0	20	0.00	5	100.00	63.04	80.56	10.00	0.50	10.00	50.00
24Liuzao	5	5	20	25.00	2	40.00	56.52	57.78	7.50	0.38	5.50	27.50
25Luchaogang	12	17	132	12.88	2	16.67	80.43	44.05	57.50	0.44	50.00	37.88
26Lujiazui	4	2	12	16.67	2	50.00	47.83	64.71	5.00	0.42	3.00	25.00
27Nanmatou	3	1	6	16.67	2	66.67	54.35	78.13	2.50	0.42	3.00	50.00
28Nicheng	8	8	56	14.29	2	25.00	76.09	49.30	24.00	0.43	20.50	36.61
29Puxing	13	19	156	12.18	1	7.69	69.57	38.55	68.00	0.44	60.67	38.89
30Sanlinkangde	5	4	20	20.00	1	20.00	56.52	61.90	8.00	0.40	0.00	0.00
31Sanlin	11	7	110	6.36	4	36.36	84.78	50.00	51.50	0.47	50.50	45.91
32Shanggang	4	1	12	8.33	3	75.00	56.52	76.47	5.50	0.46	5.00	41.67
33Shuyuan	3	2	6	33.30	2	66.67	23.91	73.33	2.00	0.33	2.00	33.33

Institutions	Size	Ties	Pairs	Densit	nWeakC	pWeakC	2StepR	ReachE	Broker	nBroke	EgoBet	nEgoBe
34Sunqiao	5	3	20	15.00	2	40.00	65.22	63.83	8.50	0.43	12.00	60.00
35Tangzhen	1	0	0	/	1	100.00	8.70	100.00	0.00	/	0.00	/
36Tangqiao	3	1	6	16.67	2	66.67	41.30	86.36	2.50	0.42	3.00	50.00
37Wanxiang	4	2	12	16.67	2	50.00	36.96	58.62	5.00	0.42	10.00	83.33
38Wanggang	4	1	12	8.33	3	75.00	65.22	81.08	5.50	0.46	3.00	25.00
39Weifang	7	5	42	11.90	2	28.57	76.09	55.56	18.50	0.44	13.00	30.95
40Xinchang	8	9	56	16.07	3	37.50	73.91	52.31	23.50	0.42	21.00	38.99
41Xuanqiao	4	1	12	8.33	3	75.00	34.78	64.00	5.50	0.46	4.00	33.33
42Yangjing	7	5	42	11.90	3	42.86	82.61	62.30	18.50	0.44	15.00	35.71
43Yingbo	5	2	20	10.00	4	80.00	58.70	71.05	9.00	0.45	8.00	40.00
44Zhangjiang	6	0	30	0.00	6	100.00	69.57	72.73	15.00	0.50	11.00	36.67
45Zhoujiadu	8	4	56	7.14	4	50.00	69.57	58.18	26.00	0.46	20.50	36.61
46Zhoupu	8	5	56	8.93	4	50.00	78.26	58.06	25.50	0.46	25.00	44.64
47Zhuqiao	6	4	30	13.33	3	50.00	56.52	60.47	13.00	0.43	20.00	66.67

Considering the contrast between attractiveness (indegree versus outdegree) we have classified the hospitals according to the median point in the respective measures.

Table 3.2 shows the classification of hospitals. This classification shows that most hospitals in PNA may be labeled as “Stable” because their indegree and outdegree both fall below the cutoff. There are 16 hospitals in total that fall under this type. The second largest group comprehends “Attractor” hospitals, these have high indegree and low outdegree and count 13 cases. The third largest group is “Rotation” hospitals, which have a relatively higher frequency of flow and count 10 hospitals. The smallest group is the “Disperser” hospitals that tend to attract less GPs than the number they lose.

Table 3.2 Classification of hospitals according to in vs out degree (In=3 Out=4)

Degree	Low in-degree	High in-degree
Low out-degree	07 Gaodong; 12 Heqing; 13 Hudong; 21 Laogang; 24 Liuzao; 26 Lujiazui; 27 Nanmatou; 32 Shanggang; 33 Shuyuan; 34 Sunqiao; 35 Tangzhen; 36 Tangqiao; 38 Wanggang; 41 Xuanqiao; 43 Yingbo; 44 Zhangjiang (16 CHCs)	01 Beicai; 02 Caolu; 03 Chuanshahuaxia; 04 Chuansha; 06 Dongming; 10 Hangtouhesha; 11 Hangtou; 17 Jiangzhen; 23 Lingqiao; 30 Sanlinkangde; 37 Wanxiang; 45 Zhoujiadu; 47 Zhuqiao (13 CHCs)
	08 Gaoqiao; 09 Gaoxing; 14 Huadong; 16 Jichang; 18 Jinqiao; 22 Lianyang; 39 Weifang; 42 Yangjing (8 CHCs)	05 Datuan; 15 Huinan; 19 Jinyang; 20 Kangqiao; 25 Luchaogang; 28 Nicheng; 29 Puxing; 31 Sanlin; 40 Xinchang; 46 Zhoupu (10 CHCs)

To explore some plausible macro level factors of this dynamics suggested in literature we have depicted our network and respective geographical position in PNA in the following Figure 3.4.

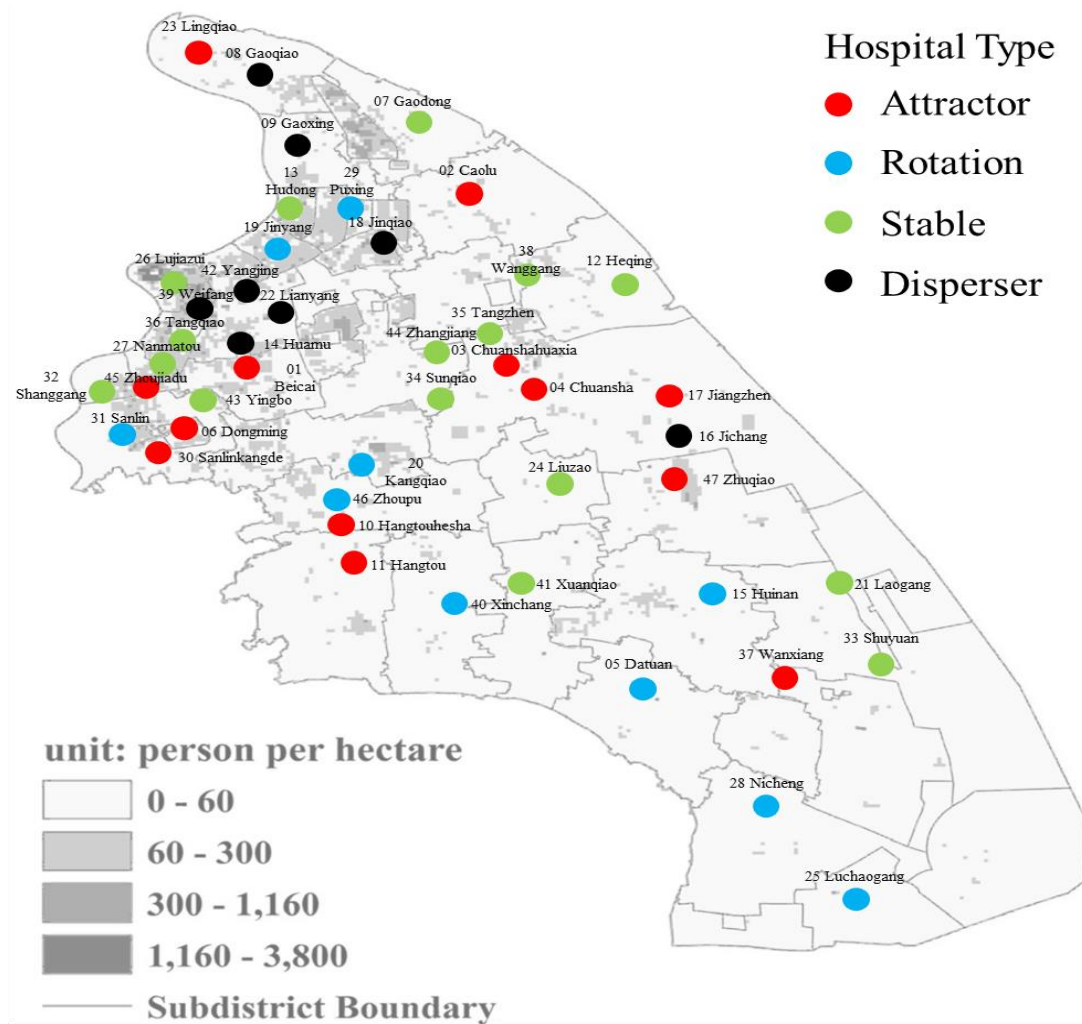


Figure 3.4 Geolocated Hospital type and population density

3.5 Discussion and conclusion

The purpose of this study is to uncover patterns of GPs flows through the organizational healthcare system in PNA to gain an insight into the hospital-level differences linked to distinct levels of inflow and outflow as well as to explore possible macro level variables that can influence such patterns. To attain this objective, this study analyzed the data of general practitioners' flows within 47 hospitals in Pudong New Area, Shanghai, from January 1, 2008, to August 3, 2022, using social network analysis.

The results show that the overall network density of GP flows is low, and there are significant differences in the specific density of nodes. However, overall, the network is stable during this period. Based on the different outflow and inflow of each hospital, they are classified into four types, including attraction type (inflow > outflow), loss type (inflow < outflow), rotation type (inflow > 3 and outflow > 4), and stability (inflow < 3 and outflow < 4).

There are geographical distribution characteristics of GP flows within the Pudong New Area of Shanghai. Highlighting some case hospitals and examples, #Shuyuan is located in a relatively remote area of Pudong New Area, with the highest individual network density, possibly forming a closely connected small group. #Tangzhen is located in the suburban area with the least number of flows, and the flow of personnel with other hospitals is also the sparsest. Hospitals located in urban-rural areas or areas with dense surrounding hospitals have frequent GP flows, mostly rotation type, attraction type, or loss type. Stable hospitals are mostly concentrated in remote rural or general rural areas. These cases illustrative the four types of hospital and their respective geographical location indicate that the presence of densely populated hospitals at the same level may lead to easier GP flows, and the economic development of urban areas has a siphoning effect on GP flows (i.e. a first movement tends to drag out GPs and produce more individual exits).

#SanLinkangde and #Tangzhen are two hospitals with only inflows and no outflows, with the former having more inflows. The influencing factors of #SanLinkangde as an attraction hospital can be further analyzed. The main hospitals with outflows include #Weifang and #Airport. They are distributed in both downtown and suburban areas. Therefore, the causes of outflows may not only depend on geography but may also be related to the internal environment and management system of the hospitals. The reasons for the flow of GPs in these hospitals deserve further exploration via qualitative research.

A stable workforce of GPs is one of the important factors to ensure the quality of primary health care services. Through the study, it can be found that stable hospitals are the most numerous, being twice the number of loss type hospitals. From this perspective, most hospitals are in a stable state of GP flow, with neither significant outflows nor significant inflows, possibly indicating the relative stability of the GP workforce in the area. At the same time, hospitals in different regions may have different flow characteristics, with more rotation type, attraction type, and loss type in Class A and B areas, and more stable type in Class C and D areas. For cases where nursing staff frequently flow bidirectionally between certain medical institutions, relevant departments should focus on monitoring to avoid unreasonable flow of general practitioners and ensure the quality of primary health care services.

This study has limitations that must be acknowledged. Firstly, a mere quantitative depiction of GP flows in PNA may offer some insights into the plausible causes of specific inflows and outflows but it is too wide to understand the lower-level causes of such movements. As an example, team dynamics can pass without any scrutiny in this level of analysis. However, team dynamics is known to be an important factor as peer relations do have an impact on doctor's

satisfaction (Hou, 2023) or the quality of doctor-patient relationship is also impactful (D. Chen et al., 2023) but these factors, and other alike, are not visible in a macro level approach. Future research may probe with a more qualitative and micro-level focus on behavioral domains so to gain better understanding.

Chapter 4: Differentiating Factors of Attractor Hospitals: What are They Doing that is seen as Better than Others? (Study 2)

4.1 Introduction

Although there are plenty of theories and explanatory models of employee turnover, as well as healthcare staff turnover, these models are designed to explain behavior in a general way. This implies that much literature must be put together to gauge the different populations targeted by the empirical studies, so to understand the variations due to sociodemographic profile of the samples, occupational profile, local job market economics, work culture and other contingency factors that can modulate turnover intention.

Therefore, although general models are useful to gain a broad understanding of the main factors at play, especially those that are transversal, they can also be misleading because they do not consider the unique context where the model is being applied to understand or predict employee turnover intention. A situated approach (i.e. acknowledging that there are territorial factors in play) implies such models should be adapted to the specific region and country where the study is conducted.

China's healthcare system has specificities that do not overlap with the places where many published models were generated. Albeit there are many empirical studies conducted on the topic of employee turnover in China they do not adopt a situated approach. Likewise, consideration of the individual is also required to understand such behavioral decisions. Therefore, there is an opportunity to further develop a model that takes the Chinese characteristics of healthcare system together with the individual GPs motivations.

4.2 Literature review

4.2.1 China's specificities in healthcare system

China's healthcare system has specificities that should be considered when conducting empirical research. Namely, in developed Western countries, a tiered medical care system is generally implemented. However, in China, the construction and improvement of the tiered medical care model is still in progress. There is a common phenomenon where secondary and

tertiary hospitals are overcrowded, while primary medical institutions are relatively empty (L. Li, Wang, et al., 2021). Although local governments encourage patients to seek medical treatment at primary healthcare service institutions such as village health clinics or community health service centers, it is not mandatory. Therefore, if residents prefer, they can also choose to seek medical care at secondary or tertiary hospitals. In China, citizens typically do not need a referral to directly see outpatient specialists.

Likewise, Chinese citizens primarily obtain universal healthcare through government-supported health insurance plans, with private healthcare serving as a supplement. In 2021, among China's total health expenditures, 27% came from government spending (allocated for various services such as healthcare services, medical security subsidies, administrative management of health and medical security, population and family planning, etc.), 45% from social spending (including social medical security expenses, commercial health insurance premiums, expenses of social medical institutions, social donations and aid, administrative and institutional charges, etc.), and 28% from individual out-of-pocket expenses (National Health Commission of the People's Republic of China, 2023). As of 2022, the participation rate in China's basic medical insurance has remained stable at over 95% (National Health Security Administration of the People's Republic of China, 2023). Urban Employee Basic Medical Insurance requires mandatory participation for urban employees, and its funds primarily come from payroll taxes paid by both employees and employers. Urban-Rural Resident Basic Medical Insurance covers residents in both urban and rural areas, including individuals, children, students, and the elderly. Participation in this insurance is voluntary, and the funds come from annual fixed premiums.

An additional feature of Chinese healthcare concerns the more general work values that are specific of Chinese workforce. Although there is limited research on work values in China, with existing studies primarily focusing on the work values of nurses (K. Y. Wang et al., 2019), Chinese healthcare workers are influenced by traditional cultural values that prioritize the family, and the health of family members can significantly impact the psychological well-being and economic life of healthcare workers. Healthcare workers in China place a strong emphasis on interpersonal relationships, particularly the doctor-patient relationship (Tan et al., 2017). Some studies have found that the employment relationship is also a crucial aspect of the work values of nurses (S. Li et al., 2015). As a transversal cultural value, stability of relations is central in people's choices in China and the family-like relationships establish at work as well as the long-term employment expectations stems from Confucius (S. Kim et al., 2017). In China, the employment relationship can be categorized into two types: officially budgeted posts and

contract. "Officially budgeted posts " is a unique organizational management method in China, and compared to contract employment, it offers more stability with better job bonuses and welfare benefits. As a result, healthcare workers in China tend to place a higher value on officially budgeted posts which indicates job security and stability is valued.

4.2.2 GP turnover in China

Although stability is rooted in Chinese cultural tradition, there is also a concomitant value placed on dynamism that entails the idea that reality is produced by opposing forces in continuous harmonious movement (道). This means that Chinese work values also accept the flow through employers or jobs so to progress in knowledge, skills or opportunities (Y. Lu & Samaratunge, 2016). Therefore, employee turnover can be perceived as a result of the balances between job security motivation and professional development motivation. It is therefore not surprising to learn that China's healthcare system witnessed a large number of professional movements.

Currently, there is a high willingness to resign among GPs in China, and there is limited research on this topic compared to western countries. China's studies on the resignation intentions of GPs include quantitative and qualitative research.

Quantitative research is primarily applied to investigate the current status and influencing factors of turnover intention, while qualitative research involves interviews with resigned doctors or an analysis of their resignation reports.

In terms of the current status survey of resignation intentions, Zheng et al. (2019) conducted a questionnaire survey on 3,244 doctors from 12 provinces in eastern, central, and western China to understand the current status and influencing factors of resignation intentions among Chinese GPs. The results showed that 35.20% of GPs had a high willingness to resign, reporting main factors influencing the high resignation intentions as low job satisfaction, severe emotional exhaustion, and high depersonalization (burnout). Gan et al. (2020) collected data from 3,236 Chinese GPs from October 2017 to February 2018, showing that over 70.0% of GPs had moderate or high resignation tendencies. Although the turnover rate varies there is a consensus that it is high level among GPs. Eventually the most probable figure is in the middle of these, as found in a meta-analysis conducted by Shen et al. (2020) that stated the turnover rate among GPs in China is in the 47% level.

According to Shen et al. (2020) the correlates of GP turnover were low salary (those with salary below 5000 RMB have the highest turnover rate showing a 38% higher chance of moving

from a job), also those with lowest job satisfaction (showing a 35% higher change of moving from a job), those with lower morale (showing a 168% higher chance of moving from a job), with lower individual development opportunities (showing a 61% higher chance of moving from a job).

According to Gan et al. (2020) large survey in China, the factors affecting the turnover intention of Chinese GPs mainly include demographic characteristics, job satisfaction, salary and benefits, and organizational identification. Additionally, interpersonal relationships play a unique role in China. In the cultural context of Chinese society, factors related to human relationships, such as patient trust and leadership styles, are crucial elements influencing the job satisfaction of general practitioners (S. Zhao et al., 2020).

One emerging issue in literature pertains to presenteeism which has been observed in medical staff due to loyalty to coworkers and professional identity (Andres et al., 2021) and was found by Ning et al. (2023) to mediate the relation between job stress and turnover intention.

According to Deng et al. (2022), job stress, material satisfaction, and growth satisfaction are all predictive factors influencing turnover intention. Additionally, Liu et al. (2019) found that job stress indirectly affects turnover intention among GPs. A study focusing on GPs in Pudong New Area found that the higher the job position, the lower the turnover intention. In terms of interpersonal relationships, the level of family support and the attitudes of local residents towards GPs also influence turnover intention (Y. Li et al., 2019). Tang et al. (2021) similarly found in their study of GPs in Nanjing that job titles and family relationships affect turnover intention. Additionally, their research indicated that job compensation and the ability to receive commendations also significantly impact turnover intention. Besides the heavy medical tasks, GPs also have to undertake public health-related work. The frequent overtime work leads to a high levels of work stress, which, combined with lower income levels, results in a mismatch between working conditions and compensations, thus becoming factors affecting the turnover intention of GPs (S. Zhao & Meng, 2015). Zhang et al. (2020) discovered in their study of rural GPs in China that work engagement played a mediating role between job satisfaction and turnover intention, and between resilience and turnover intention. Career growth opportunities are also important factors influencing the turnover intention of GPs in China. Previous studies have found that the fewer the career development opportunities, the stronger the turnover intention among GPs (Y. Cao & Song, 2018; Feng et al., 2021; S. Zhao & Meng, 2015).

One of the important takeaways from Gan et al. (2020) study is that each region in China has its own set of predictors of GP turnover, depending on local conditions. Therefore, a situated

approach to GP turnover intention should not only consider the Chinese context versus the Western context but also the specific region in China as the local challenges and conditions vary.

4.3 Method

4.3.1 Semi-structured interview method

4.3.1.1 Developing the interview script

The interview script mainly concentrates on the issue of the turnover of GPs and the related factors emerging from literature review, including job satisfaction, work environment, and work motivation. Job satisfaction mainly involves satisfaction with the characteristics of the job, including job intensity, working hours, salary and benefits, career advancement, interpersonal relationships, and doctor-patient relationships. The work environment of GPs is divided into internal and external environments, with the internal environment including institutional regulations, organizational management, workload, equipment facilities, supervision measures, compensation, practice risks, working conditions, and training and promotion opportunities, and the external environment mainly referring to the socioeconomic environment, including doctor-patient relationships, public health needs, healthcare manpower, and respect from others. Work motivation factors mainly include both job-related and personal factors, including workplace characteristics and working conditions, personal characteristics, personal priorities, and personal internal psychological states.

To avoid social desirability and create conditions for more thoughtful answers we requested interviewees to answer taking the perspective of their colleagues in the GP profession. We fully consider the content related to the turnover of GPs that we want to understand when determining the interview outline, and determine the corresponding questioning content based on characteristics of the three types of personnel, including GPs, medical institution managers, and human resources personnel. Therefore, there are three adjusted interview scripts. See Annex A for details.

4.3.1.2 Eligibility criteria

In order to thoroughly consider the opinions from various perspectives, the interview contents cover all aspects related to the turnover of GPs. The interviewees of this study include GPs, their upper-level managers, and human resources personnel, and we require interviewees to

have worked as a GP for three years or more. At the same time, in the selection process, we try to ensure that the ages and professional titles of all interviewees are not the same to expand the coverage of the interviews.

Based on the classification results obtained in Study 1, the 47 community health service centers in Pudong New District were divided into four categories: 16 centers were classified as stable, 13 as attractive, 10 as rotation, and 8 as attritional (disperser). Interviewees had to be working in one of two representative community health service centers in each category.

4.3.1.3 Sample of interviewees

A total of 54 participants were interviewed, including 20 GPs, 21 medical institution managers, and 13 human resources personnel. There were 16 male and 38 female interviewees. The reason for the significantly higher number of female interviewees than male interviewees was only due to the gender distribution in the targeted healthcare population although this was a convenience sample. Interviewees came from nine community health service centers, two from those centers categorized as attractive, rotation, and disperser and three from those categorized as stable. Stable centers were the most commonly observed and therefore we opted to overrepresent them in the interview sample.

The average age of the interviewees was 42.5 years old, and the average working experience was 21 years. Most of the interviewees have worked in the relevant field for more than 10 years. Their professional titles are mostly intermediate and deputy senior, and most of them have a bachelor's degree or above. Most of the interviewees also hold administrative positions, and most of them have clinical or clinical management comprehensive backgrounds (Table 4.1).

Table 4.1 Basic information of sample

Characteristics		N/M±SD
Gender	Male	16
	Female	38
Age (M±SD)		42.48±6.17
Title	Senior	5
	Deputy senior	25
	Intermediate	19
	Junior or below	3
Education	Master	14
	Bachelor	39
	College	1
Work experience (Years)	1-9	5

Characteristics	N/M±SD
10-19	16
20-29	22
≥30	11
Administrative Positions	
President	1
Vice President	5
Director	12
Deputy Director	9
Department Head	11
Team Leader	4
None	10
Professional Background	
Clinical Specialty	21
Management Specialty	11
Combined Clinical and Management Specialty	22

4.3.2 Data collection and analysis methods

4.3.2.1 Data collection

Following Barriball and While (1994) recommendations, to ensure that no critical information was missed during the interviews, two researchers were present during each interview, using semi-structured interviewing techniques. In some occasions, the author of this thesis was purposefully absent and delegated this task to prevent biasing answers due to his hierarchical position in the healthcare system. The author participated directly in the interviews conducted with lower-level echelons but was not in those where intermediate or upper leadership level participated.

The interviews lasted for approximately 40 minutes, and a relaxed and harmonious atmosphere was created. The interviewees were informed that the information would be kept confidential and would not be used for any purpose other than academic research. With the interviewees' consent, the entire interview process was recorded using a recording pen, and on-site text records were also kept.

During the interview, one researcher first introduced the basic information and purpose of the interview, and then asked questions in sequence according to the interview outline (Annex A). The researchers actively guided the interviewees to consider from their colleagues' perspectives and to avoid losing information due to personal concerns. After the interviews were completed, the researchers jointly improved the interview records based on the recorded audio, coded and sorted the records, and formed the indicators of factors influencing resignation intention. The occurrence frequency and the number of people mentioning relevant words related to the indicators were identified and counted, and qualitative analysis was performed.

4.3.2.2 Consensus calculation

The coding of the data proceeded, and six dimensions emerged comprehending 30 categories. These were defined and revised by the coder in a recurrent manner to judge on its non-overlapping and also on its qualitative fit to the dimension. These are described in detail in section 4.4.1 but the category dictionary is already set and included in Annex B Table b.1.

Because this is a preliminary coding, we set a consistency test on the categories derived from the interview records to determine the reliability of the solution obtained. It is important to determine appropriate indices based on the level of measurement of the categories used to assess inter-rater consistency. For the data used in this study, suitable indices are the intraclass correlation coefficient (ICC) and Cohen's Kappa coefficient (Gisev et al., 2013).

Cohen's Kappa coefficient was calculated based on the observed and expected frequencies in a 2x2 contingency table's diagonal (Table 4.2), where $\text{Pr}(a)$ represents the observed agreement and $\text{Pr}(e)$ represents the expected agreement (McHugh, 2012). ICC is calculated based on a formula that considers the Average Mean Squares Between Subjects (MSBS), the Mean Square Error (MSE) for the k observations (Liljequist et al., 2019). For clarity's sake both formulae are depicted below.

$$K = \frac{\text{Pr}(a) - \text{Pr}(e)}{1 - \text{Pr}(e)} \quad (4.1)$$

$$ICC(C, 1) = \frac{MSBS - MSE}{MSBS + (k - 1)MSE} \quad (4.2)$$

The selection of the calculation type for ICC is as follows: 1) a two-way mixed model is used because there are two fixed experts and 20 randomly selected sentences in the study, and each expert rates each sentence and classifies it into its corresponding indicator category; 2) absolute consistency is calculated because this study plans to evaluate convergence, including systematic and random residual errors, which requires the calculation of the convergence between each expert rating and the average rating of the two experts (Table 4.2).

Table 4.2 Summary of the results of consensus analysis

Dimension	Category	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13	S14	S15	S16	S17	S18	S19	S20
Working conditions	Resources (equipment/human resources)			X; Y																	
	Working hours																				
	Staffing level									Y							X; Y				
	Workload intensity						X														
	Commuting time																				
	Workload distribution																				
Compensation (costs-benefits)	Salary																				X
	Performance bonus		X							X											
	Policy-based subsidy				X; Y	X; Y															
	Status of GP																				
	Professional identity and belongingness																	Y		Y	
Relationships	Relations with patients							X; Y					X; Y			X; Y					
	Recognition from patients																			X	
	Relations with managers/superiors									X											
	Relations with colleagues																				
	Recognition from superiors																				

Community General Practitioners turnover: Mapping, exploring, and explaining patterns in Shanghai Pudong New Area

Dimension	Category	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13	S14	S15	S16	S17	S18	S19	S20
Work content	Paperwork																				
	Follow-up																	X			
	Diagnosis and treatment																				
	Requirements of performance evaluation	X; Y	Y						Y												
	Case mix (range of patient problems)																				
Growth	Professional title progression opportunities													X; Y					X; Y		Y
	Current professional title																				
	Training opportunities										X; Y										
	Degree program opportunities																				
External factors	Family member distance							Y													
	Housing cost											X; Y									
	Pandemic-related special responsibility														X; Y						
	Attractiveness of other careers																				
	Residents' demand for health services																				

*X is the result from the one independent expert and Y is the result from the other independent expert.

The 20 descriptions that were randomly chosen are the following:

S1 – “I think we should be in scientific research. Tasks like clinical teaching, for some of young general practitioners are still required, because you have pressure when you are required to do so, and then you will continue to make progress.”

S2 – “Different hospitals have different assessment. If your assessment result is good, the bonus will be high.”

S3 – “Basically we can meet the clinical and outpatient needs, but we can't meet the national requirements yet.”

S4 – “Before the “Eight Health Measures” policy, many people left. At that time, their income was very low. Although our income is still lower than GPs in other hospitals, the gap is not so huge after the implement of the policy.”

S5 – “There used to be project incentives in the town, but they are cancelled in recent years due to the requirements in the policy.”

S6 – “Most GPs in our hospital are in this age group. They have families to take care of. Then they are more tired considering working intensity and occasions when their own kids get sick. For example, Dr. Fang’s life is not easy: not local, two children, both of the parents are doctor. The elders in their family also live in other cities.”

S7 – “Then they [conflicts] are mainly verbal, not physical, and they are rare.”

S8 – “The hospital also assesses them, and then try to set them apart, but if the gap is huge, there will be complaint, so it has to be like that.”

S9 – “The structure is written, but it's not actually done this way.”

S10 – “It will take a long period of time if they go for training.”

S11 – “Most of the reasons –three or four doctors are considering where they are living. Although he works in Lujiazui, he can't afford to buy a house there, even with his parents' money or his parents-in-law 'money all together.”

S12 – “There may be occasionally verbal (conflict), but it seems that we never have physical conflict. Verbally, for example, the medicine is not enough. We can only prescribe medicine for three diseases, he may need more, so there could be some verbal conflicts.”

S13 – “For ordinary doctors, the demand for promotion is almost the only important thing. Publications aren’t one of the core requirements anymore, but they are needed if you want to do better than others.”

S14 – “The biggest part is the pandemic prevention, because you are constantly on standby to work overtime. I think it must have an impact. Before the pandemic, it was OK, basically regular, because the work is arranged well, so your life and work can still be separated.”

S15 – “There is no physical fighting in our hospital, but it exists in some hospitals. Our community is relatively small, this is also a small place. Because the neighbors know each other, so it may be relatively better. A few family members of the patient may not be satisfied, but you cannot prescribe medicine randomly. So, the family may scold you a few words, two or three times, but generally the conflicts are not so many.”

S16 – “We are still short of doctors of traditional Chinese medicine, but the overall general practitioners are still beyond the standard, so we can only recruit a doctor of traditional Chinese medicine after the retirement of some doctor of Western medicine. And we are not allowed to have more doctors of Western medicine. Because the quota is based on the resident population, not the floating population.”

S17 – “I feel like work in CHCs is not very pure sometimes. There are a lot of tasks related to other things, like all kinds of assessments, sometimes home care services. Sometimes you feel like you're not doing very pure medical stuff, I think sometimes I don't feel like a doctor.”

S18 – “Our personnel seem to be a lot less than before, and then the promotion quota is actually relatively small. You may have to go out to take exams. In our hospital, you need to compete with others, may be three or five people competing for one or two positions of the title. And you must wait until there is a vacant to hire, and then there will be competition in recruitment or assessment.”

S19 – “GPs probably serve a wider group of people. It is not like the second and third level hospitals. Their specialty focus on the disease, and the GPs should be patient-centered. It is a comprehensive and continuous care for a person from cradle to grave, which may not be possible for the second and third level hospitals. Especially contracted doctors, if the patient has a good relationship with the doctor, he will always come to the doctor, then the doctor will have a sense of accomplishment.”

S20 – “If you are a young master, now generally speaking, a higher degree is needed. For a young master, it is 10 years after an addition of 3-year training, because a 3-year of general practice-based training staff's income and salary is very little, you are almost purely learning in these years. Ten years later, you enter a CHC, becoming a newcomer again. You have to work in different departments. There are costs, it's time-consuming.”

The results of consensus analysis show that the intraclass correlation coefficient (ICC) is 0.689, with $p=0.004$, Cohen's kappa 0.624, $p<0.001$, CI95 [.246; .875] indicating a good consistency of the framework.

4.4 Results

4.4.1 Categories extraction

We have identified one large category that we named “working conditions”. This category pertains to the aspects that comprise working conditions and can be subcategorized as follows: resources (equipment but also HR) (I-1), working hours (I-2), staffing level (I-3), workload intensity (I-4), commuting time (I-5), workload distribution (I-6). Some examples of these subcategories are:

“In our outpatient department, these daily facilities and equipment can still meet the requirements because we also have demands for year-end assessments, and they are all adequately equipped according to the standards.” (subcategory, I-1)

“Many times, it is necessary to complete chronic disease follow-up tasks after work or during free time.” (subcategory, I-2)

“In fact, we have always had a team because the capabilities of an individual doctor are limited. Our team consists of family physicians, public health physicians, a nurse, and our clinical pharmacist—all working together within the team. Each person has their own role, as it is truly impossible for a doctor to work alone.” (subcategory, I-3)

“The workload and intensity of work for general practitioners are significantly higher than those in other positions within the hospital.” (subcategory, I-4)

“The individual's residence is quite far away, and they feel that the working hours are also relatively long.” (subcategory, I-5)

“The workload distribution is not very fair, and there hasn't been much attention or recognition, leading to a lack of appreciation from the hospital.” (subcategory, I-6)

Another emerging category was named “Compensation (costs-benefits)” and it comprises Salary (II-1), Performance bonus (II-2), Policy-based subsidy (II-3), Status of GP (II-4), Professional identity and belongingness (II-5). Some examples of these subcategories are:

“New doctors who join tend to spend more time in the wards, and they may not have the opportunity to consistently work in the outpatient department. This can result in a perception of lower income for them.” (subcategory, II-1)

“In terms of income, it depends on performance. If you perform well in assessments, your income will likely be higher compared to those with lower assessments.” (subcategory, II-2)

“Compared to Class A regions (categorized by the 8 healthcare policies), the annual income in our area is 72,000 less.” (subcategory, II-3)

“I think, in our center, the status of general practitioners is actually quite high.” (subcategory, II-4)

“When patients say that I treat them well, I feel a sense of accomplishment in contributing to society. (subcategory, II-5)

A third large category pertains to the relational dimension and was thus named “Relationships” comprising the Relations with patients (III-1), Recognition from patient (III-2), Relations with managers/ superiors (III-3), Relations with colleagues (III-4), Recognition from superiors (III-5). Some examples of these subcategories are:

“The doctor-patient relationship is particularly good, and everyone understands the hard work of the doctors.” (subcategory, III-1)

“Many of our patients are “fans” of the doctors, and the relationships are quite good.” (subcategory, III-2)

“I feel that both the hospital's level of emphasis on our department and the mutual assistance among colleagues within our department contribute to a comfortable working environment.” (subcategory, III-3; III-4)

“I believe both salary and recognition from leadership can influence decisions regarding resignation.” (subcategory, III-5)

A fourth category concerns “Work content” and comprises Paperwork (IV-1), Follow-up (IV-2), Diagnosis and treatment (IV-3), Requirements of performance evaluation (IV-4), Case mix (range of patient problems) (IV-5). Some examples of these subcategories are:

“I am not particularly satisfied with the data statistics work, and I feel it would be more appropriate to focus solely on outpatient and clinical work.” (subcategory, IV-1)

“The various chronic disease follow-ups for family doctors require fragmented time to complete, as it's not possible to finish them during regular working hours. This may involve utilizing some time after work hours. (subcategory, IV-2)

“Nowadays, outpatient hours are relatively limited, typically once a week, at most twice a week, and not very frequent. (subcategory, IV-3)

“The pressure from various assessments is actually quite significant.” (subcategory, IV-4)

“As a general practitioner, the diseases encountered are relatively simple, and I feel there's a noticeable decline in my personal clinical diagnostic and treatment skills.” (subcategory, IV-5)

A fifth category concerns “Promotion” and comprises “Professional title progression opportunities” (V-1), “Current professional title” (V-2), “Training opportunities” (V-3), “Degree program opportunities” (V-4). Some examples of these subcategories are:

"We don't have intense competition for promotions here; we have a relatively large number of slots available." (subcategory, V-1)

"In fact, income and professional titles are not entirely linked." (subcategory, V-2)

"We offer opportunities for further training for general practitioners, but some people are not very willing to participate because, regardless of whether they attend or not, their bonuses will be issued as usual." (subcategory, V-3)

"This year, we have a project for general practitioners, and a portion of the funding can be used to support the improvement of their academic qualifications." (subcategory, V-4)

External factors category comprises "Family member distance" (VI-1), "Housing cost" (VI-2), "Pandemic-related special responsibility" (VI-3), "Attractiveness of other careers" (VI-4), and "Residents' demand for health services" (VI-5). Some examples of these subcategories are:

"I feel that the mobility of general practitioners is still related to geographic location. Our colleague Xiao Wei transferred here because it's close to home." (subcategory, VI-1)

"In the first two years, there was a housing subsidy, but it was discontinued afterward. Therefore, for newly graduated general practitioners, the cost of renting is quite high." (subcategory, VI-2)

"Last year and this year, a significant amount of our time has been occupied by epidemic prevention and control work" (subcategory, VI-3)

"Moreover, the treatment in institutions in other areas is quite good, so if there are new opportunities, some people choose to go there directly." (subcategory, VI-4)

"Many people have the understanding that a family doctor is someone who should come to their homes to provide medical care. However, in reality, we cannot meet the demand for house calls in many cases. This is a source of many conflicts." (subcategory, VI-5)

4.4.2 What are the satisfying and dissatisfying aspects in GP's work? Why are GPs leaving?

According to the job satisfaction and reasons behind turnover of interviewed GPs, we found a total of 30 categories of 6 dimensions. Based on Herzberg's Two-Factor Theory, the categories were classified into satisfying factors (motivating) and dissatisfying aspects (hygiene). The index for each factor was computed as the product of frequency (F) and the number of interviewees that mentioned it (N). The resulting index was found to vary between 0 to 357. For interpretation purposes we have set the percentile 86 as the cutoff (which matches a 100-index value, albeit all values are taken into consideration when performing the contrast analysis

between the four types of hospital). This cutoff was set considering the overall distribution of frequencies, where the largest drop in observed from this value down.

The results of attractors show that GPs working in these centers are mainly satisfied (total > 100) with policy-based subsidies (including contract service fee, subsidies for medical and nursing services, subsidies related to the “Eight Health Measures”, incentives for new employees, housing subsidies, and other preferential policies for GPs) (F=14, N=8, Total=112), doctor-patient relationship (F=13, N=10, Total=130) and training opportunities (F=11, N=10, Total=110). They were mainly dissatisfied (Total > 100) with the intensity of work (heavy pandemic prevention tasks) (F=16, N=11, Total=176) and special work related to the pandemic (heavy workload after the pandemic breaks out and the impact of the pandemic on their work) (F=18, N=11, Total=198). The total frequency of dissatisfaction is higher than that of satisfaction in terms of inadequate equipment and facilities (inadequate equipment, insufficient health staff, insufficient information technology) (F=9, N=7, Total=63), work intensity (F=16, N=11, Total=176), and housing rents (F=5, N=5, Total=25). Other categories are more about satisfying aspects. See Table 4.3 for details.

Table 4.3 Frequency per category for satisfaction-dissatisfaction of type A (attractors)

Type A (attractor)		Satisfaction				Dissatisfaction			
Dimension	Category	Description	Freq	Int	Total	Description	Freq	Int	Total
Working conditions	Resources (equipment/human resources)	Adequate equipment and staff	2	2	4	Inadequate equipment and staff, lack of information technology equipment	9	7	63
	Working hours	Reasonable before the pandemic	1	1	1	Frequent consultations after work	1	1	1
	Staffing level	Perfect organization, a combination of GPs and specialists, GP team consists of GPs, public health personnel and nurses with a reasonable structure and clear division of responsibilities, close ties between team members	10	8	80		0	0	
	Workload intensity	Reasonable before the pandemic, less pressure than second and third level hospitals, work-life balance	11	8	88	Heavy burden of pandemic prevention	16	11	176
	Commuting time		0	0			0	0	
Compensation (costs-benefits)	Workload distribution	Reasonable	3	3	9	Heavy workloads for GPs	1	1	1
	Salary	Income and expenditure are separated which is reasonable and able to guarantee GP's income, (01 Beicai) above the average compared with other CHCs, higher than other positions	7	6	42	Average salary, should be higher considering the workload intensity, lower than second and third level hospitals, different salary between doctors of traditional Chinese medicine and those of western medicine	6	4	24
	Performance bonus	Increase in contract service fee, guaranteed performance bonuses	4	3	12	Not proportional to workload, the evaluation of performance should be adjusted in TCM departments	3	2	6
	Policy-based subsidy	Contract service bonus, incentives for new employees, subsidies according to	14	8	112	“Eight Health Measures” still needs improvement	1	1	1

Type A (attractor)		Satisfaction				Dissatisfaction			
Dimension	Category	Description	Freq	Int	Total	Description	Freq	Int	Total
Relationships	Professional identity and belongingness	the “Eight Health Measures”, subsidies for the combination of medical and nursing service, preferential policies for GPs, rent subsidies							
		Status of GP High	4	4	16		0	0	
		Hospital characteristics, a fair and just environment, strong sense of identity, belonging and achievement	12	6	72	Lack of sense of achievement; more willing to do clinical work	2	2	4
	Relations with patients	Good	13	10	130	The role of general practitioners is limited and patients are not satisfied; relatively more conflicts, mainly verbal	2	2	4
	Recognition from patients	Stable, even “fans” of GPs	9	5	45		0	0	
	Relations with managers/ superiors	Superiors attach high importance to GPs	2	2	4		0	0	
	Relations with colleagues	Help each other, healthy competition	9	6	54		0	0	
	Recognition from superiors		0	0		Some superiors are dismissive of GPs, ignoring GP’s needs and are demanding	2	1	2
Job content	Paperwork		0	0			0	0	
	Follow-up	Including hypertension, diabetes and other chronic diseases and mental diseases, good management in postpartum housecall	1	1	1	Tedious follow-up work	1	1	1
	Diagnosis and treatment	Attract patients by household contract, good health management, active signing, convenient consultation, wide range of service and a large number of patients	6	5	30	CHC’s clinical operation ability is weak, insufficient health education due to the pandemic	4	2	8

Type A (attractor)		Satisfaction			Dissatisfaction				
Dimension	Category	Description	Freq	Int	Total	Description	Freq	Int	Total
Promotion	Requirements of performance evaluation	Performance evaluation incentives, balanced assessment and income	3	3	9	Lack of clear rules for performance evaluation; GPs are at a loss; too much evaluations	2	2	4
	Case mix (range of patient problems)	Health management, correct concept of GPs	2	2	4		0	0	
	Professional title progression opportunities	Fast, many opportunities, less competition pressure	10	8	80	GP's career development is limited	1	1	1
	Current professional title		0	0			0	0	
	Training opportunities	Training rotation system benefits a lot; more training opportunities	11	10	110	Less enthusiasm for training, lack of opportunities, less training on clinical treatment	3	3	9
External factors	Degree program opportunities		0	0			0	0	
	Family member distance	Some GPs come because they live nearby; most of GPs are local; working near home enable them to take care of the families	5	5	25	Some GPs left because the hospital is far from their home	4	4	16
	Housing cost	Low housing price	1	1	1	High rent	5	5	25
	Pandemic-related special responsibility	The pandemic makes doctors even more united	2	1	2	Heavy workload related to pandemic prevention; work is limited by the pandemic	18	11	198
	Attractiveness of other careers		0	0			0	0	
	Residents' demand for health services	The demand can be met	6	5	30		0	0	

For rotation hospitals the results (Table 4.4) show that GPs in working there are mainly satisfied (Total > 100) with salaries (higher salaries comparing to other CHCs; the income is reasonable and more work represents higher compensation) (F=12, N=9, Total=108), patient recognition (F=12, N=9, Total=108), professional title progression opportunities (sufficient senior professional titles, more opportunities for promotion, fairer promotion system, preferential policy for promotion) (F=12, N=9, Total=108). They are dissatisfied (Total > 100) with pandemic-related special responsibility (the pandemic stops the assessment; work overload due to the pandemic; time for outpatient service is taken by pandemic-related work) (F=17, N=8, Total=136). In addition, they are not satisfied with the working conditions, including insufficient equipment and human resources (F=14, N=7, Total=98), long working hours and overtime work (F=8, N=5, Total=40), unreasonable staffing (F=3, N=3, Total=9), high workload intensity (F=10, N=5, Total=50), long commute time (F=7, N=7, Total=49) and unreasonable workload distribution (F=6, N=2, Total=12). They were satisfied with training opportunities (F=12, N=8, Total=96).

Table 4.4 Frequency per category for satisfaction-dissatisfaction of type B (rotation)

Type B (rotation)		Satisfaction				Dissatisfaction			
Dimension	Category	Description	Freq	Int	Total	Description	Freq	Int	Total
Working conditions	Resources (equipment/human resources)	Sufficient staff for daily work, sufficient equipment	11	8	88	Inadequate consulting rooms, inadequate specialized equipment, out-of-date equipment; staff is old on average; insufficient GPs, lack of follow-up facilities, lack of front-line personnel, lack of doctors of traditional Chinese Medicine	14	7	98
		Working hours	Acceptable	3	3	9	Too much overtime, 24h on call	8	5
	Staffing level	Reasonable staffing in teams	3	2	6	Lack of supporting staff in GP team, unreasonable doctor-nurse ratio	3	3	9
		Workload intensity	Acceptable before the pandemic	5	4	20	Heavy follow-up workload, overloaded	10	5
	Commuting time	Near to the family	1	1	1	Long commuting time	7	7	49
		Workload distribution		0	0	0	Urgent tasks, difficult balance between clinical work and primary health care, unfair distribution of workload	6	2
Compensation (costs-benefits)	Salary	Higher salaries comparing to other CHCs; the income is reasonable and more work represents higher compensation	12	9	108	Income has fallen; no increase in salary; salary is not detailed enough; a mismatch between work and income	15	5	75
	Performance bonus	Performance bonuses are related to workload; bonus for contract services	9	7	63	Gap between fees for contract services; bonus is always on the way	2	2	4
	Policy-based subsidy	“Eight Health Measures” gives strong support to GPs in the subsidy; preferential policies	6	5	30	Large income gap with/ without the“Eight Health Measures”, no subsidies for talents, tax required for the subsidy in“Eight Health Measures”	5	4	20
	Status of GP	GPs are respected	7	6	42		0	0	0
	Professional identity and belongingness	Sense of achievement	3	2	6	Lack the sense of being needed, no sense of achievement	3	1	3

Type B (rotation)		Satisfaction				Dissatisfaction			
Dimension	Category	Description	Freq	Int	Total	Description	Freq	Int	Total
Relationships	Relations with patients	Less conflicts, good relationship	12	8	96		0	0	
	Recognition from patients	High recognition during the pandemic, trust from patients	12	9	108	Low recognition of doctor's capability	3	2	6
	Relations with managers/ superiors	Strong capability of managers, much communication and collaboration	2	2	4	Managers know little about front-line doctors' thoughts	1	1	1
	Relations with colleagues	Good interpersonal relations	3	3	9		0	0	
	Recognition from superiors		0	0		Lack of attention from superiors	1	1	1
Job content	Paperwork	Dissatisfaction with statistic work, expectations of tasks mainly about clinical work	1	1	1		0	0	
	Follow-up		0	0		Follow-up takes time after work	10	6	60
	Diagnosis and treatment		0	0		Little fixed outpatient services	6	3	18
						opportunity for new doctors; lack of specialties; diagnosis and treatment technology cannot meet the standards; emphasizing specialties over GPs and such mindset is deeply rooted; limited drugs, insufficient outpatient time			
	Requirements of performance evaluation	Reasonable and with characteristics	2	2	4	GPs are not enthusiastic about performance evaluation	1	1	1
Promotion	Case mix (range of patient problems)		0	0		Mainly dispensing work, which is a waste professional skill	2	1	2
	Professional title progression opportunities	Sufficient senior professional titles, more opportunities for promotion, fairer promotion system, preferential policy for promotion	12	9	108	Limited professional title; unable to get promotion due to the lack of vacancy, hard promotion for front-line staff	9	6	54

Type B (rotation)		Satisfaction			Dissatisfaction				
Dimension	Category	Description	Freq	Int	Total	Description	Freq	Int	Total
External factors	Current professional title	Satisfied with current titles	1	1	1		0	0	
	Training opportunities	Actively send GPs for specialty training, emphasize training opportunities home and abroad, more training opportunities	12	8	96	The training direction is not satisfying or applicable; GPs are reluctant to take part in training; lack of training opportunities, no time for participation	10	5	50
	Degree program opportunities	Opportunities for high education	1	1	1		0	0	
	Family member distance		0	0		Difficult to take care of children; far from family members	4	4	16
	Housing cost		0	0		No rent subsidies anymore, high housing cost for non-local doctors	6	3	18
	Pandemic-related special responsibility		0	0		The pandemic stops the assessment; work overload due to the pandemic; time for outpatient service is taken by pandemic-related work	17	8	136
	Attractiveness of other careers		0	0		Leave for jobs with higher salary; other jobs have a more promising future	5	3	15
	Residents' demand for health services	The demand for dispensing can be met; most of the demand can be met	4	4	16	Demands for referral cannot be met; some door-to-door demands cannot be met; demands for health management cannot be met; demands for emergency and operation cannot be met	10	4	40

The research results of disperser type show that the GPs are mainly satisfied (Total > 100) with policy-based subsidies (including contract service fee, subsidies for medical and nursing services, subsidies related to the “Eight Health Measures”, housing subsidies and educational resources unique to Weifang (39) due to its location in central urban area) (F=14, N=9, Total=126) and doctor-patient relationship (F=12, N=10, Total=120). The dissatisfaction is mainly about equipment or human resources (lack of equipment, out-of-date facilities, insufficient staff, less office space) (F=13, N=8, Total=104), working hours (overtime working) (F=13, N=10, Total=130), staffing (personnel shortage due to limited officially budgeted posts and the inability to recruit new doctors, aging trend and the imbalance of age cohort of GPs in Airport (16), lack of doctors of traditional Chinese medicine) (F=25, N=10, Total=250), workload intensity (too many indicators need to be met, high work intensity, heavy pandemic prevention tasks) (F=24, N=9, Total=216), workload distribution (heavy workload) (F=21, N=10, Total=210), salary (unattractive, not matching workload) (F=13, N=9, Total=117), evaluation requirement (F=19, N=11, Total=209), career growth (fixed budgeted posts, little room for promotion, lack of professional titles, fierce competition) (F=14, N=8, Total=112) and pandemic-related special responsibility (heavy pandemic prevention work) (F=14, N=9, Total=216) (Total > 100). In addition, the total frequency of dissatisfaction is higher than that of satisfaction in performance bonus, housing cost, paperwork, diagnosis and treatment, distance between family members, and residents’ demand for health services. See Table 4.5 for details.

Table 4.5 Frequency per category for satisfaction-dissatisfaction of type C (Disperser)

Type C (disperser)		Satisfaction				Dissatisfaction			
Dimension	Category	Description	Freq	Int	Total	Description	Freq	Int	Total
Working conditions	Resources (equipment/human resources)	Fully equipped	3	3	9	Lack of equipment, outdated facilities; insufficient manpower; limited office space.	13	8	104
	Working hours		0	0		Occupies after-work hours	13	10	130
	Staffing level	Forming a team with general practitioners, public health personnel, and nurses; having a well-organized system and structure.	9	8	72	strictly controlled staff size , no recruitment of new personnel, shortage of staff; aging general practitioners, imbalance in talent development; lack of traditional Chinese medicine practitioners.	25	10	250
	Workload intensity	Reasonable before the pandemic; less stressful compared to secondary and tertiary hospitals	6	5	30	Need to fulfill numerous indicators, high workload; heavy burden in epidemic prevention work.	24	9	216
	Commuting time		0	0		Some GPs resign due to long commuting times	1	1	1
	Workload distribution		0	0		Heavy workload; superiors suddenly assign a large number of tasks, causing high stress	21	10	210
Compensation (costs-benefits)	Salary	Strong preference for GPs; stable	5	4	20	Lacks attractiveness, small salary increase, not commensurate with workload; the overall allocation leans towards general practitioners, but not significantly; some doctors leave due to compensation issues	13	9	117
	Performance bonus	More work, more pay; have a minimum guarantee, even GPs with fewer signed contracts can receive the guaranteed amount; standardized regulations	4	3	12	Multiple indicators linked to performance, heavy workload; almost saturated with signed contracts, performance improvement is needed	4	4	16

Type C (dispenser)		Satisfaction			Dissatisfaction				
Dimension	Category	Description	Freq	Int	Total	Description	Freq	Int	Total
Relationships	Policy-based subsidy	Abundant educational resources in the city center; housing subsidies; signing service fees; subsidies for compliance with “Eight Health Measures” policy; subsidies for the integration of medical and elderly care	14	9	126	Non-coverage of “Eight Health Measures” policy; unreasonable allocation of personnel quotas	4	4	16
	Status of GP	High	4	4	16		0	0	
	Professional identity and belongingness	High	4	3	12		0	0	
	Relations with patients	Good	12	10	120	Few conflicts, but more prevalent are language conflicts	4	4	16
	Recognition from patients	High	1	1	1	Not understood by patients	1	1	1
	Relations with managers/ superiors	Cared by superiors	2	2	4		0	0	
	Relations with colleagues		0	0		Intense competition pressure	2	1	2
	Recognition from superiors		0	0			0	0	
	Paperwork		0	0		Heavy and complex workload	3	3	9
	Follow-up		0	0			0	0	
Job content	Diagnosis and treatment	Rich variety of medications; large outpatient volume	2	1	2	Limited updates in clinical experience; fewer young patients visit community health service centers; numerous miscellaneous tasks, limited focus on diagnosis and treatment; community health consultations, screening, and diagnosis affected by the pandemic	7	4	28

Type C (dispenser)		Satisfaction			Dissatisfaction				
Dimension	Category	Description	Freq	Int	Total	Description	Freq	Int	Total
Promotion	Requirements of performance evaluation		0	0		Numerous assessment indicators	19	11	209
	Case mix (range of patient problems)		0	0			0	0	
	Professional title progression opportunities	Fair scoring mechanism, equal opportunities for competition, leaning towards GPs; providing a development platform; reasonable allocation of slots	7	6	42	Fixed staffing, limited upward mobility, insufficient professional titles; intense competition pressure; low willingness for promotion	14	8	112
	Current professional title		0	0			0	0	
	Training opportunities	Abundant	10	9	90	Flexible continuing education, not fully released from work; reduced training due to the pandemic; some doctors have low willingness for training	6	5	30
External factors	Degree program opportunities		0	0			0	0	
	Family member distance		0	0		Some doctors resign due to the distance of family members	3	3	9
	Housing cost	Affordable housing prices	1	1	1	High cost of living, expensive housing and rental costs	4	2	8
	Pandemic-related special responsibility		0	0		Heavy workload in epidemic prevention work	14	9	126
	Attractiveness of other careers		0	0		Some GPs are inclined towards other higher-paying enterprises	1	1	1
	Residents' demand for health services	Satisfied	2	2	4	Some necessary medications are not available, and there is a lack of new drugs; pediatric and young adult needs are not fully covered or met	5	4	20

The stable research results are shown in Table 4.6. Stable healthcare institutions' general practitioners are mainly satisfied in terms of equipment and human resources (equipment meeting requirements, sufficient manpower, overstaffed general practitioners, and guaranteed funding) (F=15, N=12, Total=180), workload intensity (F=12, N=10, Total=120), salary (F=14, N=10, Total=140), doctor-patient relationships (F=21, N=17, Total=357), patient approval (F=12, N=10, Total=120), and promotion opportunities (priority and more opportunities for general practitioners, epidemic work included in the evaluation criteria) (F=22, N=11, Total=242) (Total > 100).

They express dissatisfaction in terms of equipment and human resources (insufficient equipment; small consultation room space; personnel shortages during the epidemic; having equipment but not fully utilized) (F=14, N=12, Total=168), working hours (having phone duties after work, affecting post-work life; overtime due to the epidemic) (F=13, N=9, Total=117), workload intensity (high pressure; tedious work) (F=26, N=13, Total=338), salary (low income; dual financial pressures; slow salary increase) (F=17, N=8, Total=136), promotion opportunities (promotion quotas for general practitioners cannot be transferred to other doctors; no development prospects; high promotion requirements, difficult to meet research requirements; unclear policy support) (F=16, N=10, Total=160), and special epidemic work (intense workload during the epidemic; epidemic prevention and control occupying outpatient time; fewer training opportunities during the epidemic) (F=24, N=14, Total=336) (Total > 100).

Table 4.6 Frequency per category for satisfaction-dissatisfaction of type D (stable)

Type D (stable)		Satisfaction				Dissatisfaction			
Dimension	Category	Description	Freq	Int	Total	Description	Freq	Int	Total
Working conditions	Resources (equipment/human resources)	Equipment meets requirements; sufficient manpower; overstaffed general practitioners; guaranteed funding	15	12	180	Insufficient equipment; small consultation room space; personnel shortages during the epidemic; equipment is available but not fully utilized	14	12	168
	Working hours	Acceptable; reasonable	5	5	25	Having phone duties after work, affecting personal life; overtime due to the pandemic	13	9	117
	Staffing level	Reasonable organizational system; rational team composition	4	4	16	Lack of teamwork spirit; inconsistency between theoretical organizational structure and practice; few young members; the team system is not rational	8	3	24
	Workload intensity	Acceptable; reasonable	12	10	120	Heavy pressure; tedious work	26	13	338
	Commuting time	Close to home, short commuting time	1	1	1	Long commuting time	9	5	45
	Workload distribution	Fair distribution; not a heavy workload	4	3	12	Unequal distribution of workload; significant workload in chronic disease control	6	4	24
	Compensation (costs-benefits)	Fairly satisfied	14	10	140	Low income; dual financial pressures; slow salary increase	17	8	136
	Performance bonus	Providing pandemic subsidies; signing service fees are at a medium to high level; reasonable regulations with incentive systems	11	5	55	Lack of incentives; new doctors do not receive signing service fees; low bonuses	6	5	30
	Policy-based subsidy	Policy support; subsidies for compliance with “Eight Health Measures” policy; introduction incentives	11	8	88	No subsidies for compliance with “Eight Health Measures” policy	1	1	1
	Status of GP	Respected	6	6	36		0	0	0

Type D (stable)		Satisfaction				Dissatisfaction			
Dimension	Category	Description	Freq	Int	Total	Description	Freq	Int	Total
Relationships	Professional identity and belongingness	Feels a sense of accomplishment	2	2	4		0	0	
	Relations with patients	Not many doctor-patient disputes	21	17	357	No institutional safeguards, conflicts between doctors and patients are more likely; insufficient harmony in doctor-patient communication	3	3	9
	Recognition from patients	The vast majority of patients approve; high patient satisfaction	12	10	120	Some patients lack trust in primary healthcare providers	2	2	4
	Relations with managers/ superiors	Smooth communication	1	1	1	Managers do not understand the difficulties at the frontline	1	1	1
	Relations with colleagues	Harmonious relationships	2	2	4		0	0	
Job content	Recognition from superiors	High approval from superiors	1	1	1		0	0	
	Paperwork		0	0		Heavy workload, time-consuming; doctors handle paperwork themselves, affecting other tasks	2	2	4
	Follow-up		0	0		Difficult to set up home-based care beds; heavy follow-up tasks, occupying after-work hours; low technical proficiency; patients follow the medications, making follow-ups challenging; one family signed up with multiple doctors	15	5	75
	Diagnosis and treatment	Reduction in intravenous therapy	1	1	1	Low patient compliance; insufficient outpatient time	5	4	20
	Requirements of performance evaluation		0	0		Unreasonable indicators, difficult to measure; pressure in assessment indicators; few theoretical exams, insufficient rewards and penalties; lack of systematic requirements; unfair assessment; frequent assessments	10	7	70

Type D (stable)		Satisfaction			Dissatisfaction				
Dimension	Category	Description	Freq	Int	Total	Description	Freq	Int	Total
	Case mix (range of patient problems)		0	0		Most of them only prescribe medication and neglect their skills; they cannot genuinely care for patients; they have to deal with diseases from various specialties, making it challenging to specialize	4	3	12
Promotion	Professional title progression opportunities	Priority and more opportunities for the promotion of general practitioners; including epidemic work in the evaluation criteria.	22	11	242	The promotion quotas for general practitioners, which are in surplus, cannot be transferred to other doctors; there is a lack of development prospects; high promotion requirements, and it is difficult to meet the research requirements; the policy support is not evident	16	10	160
	Current professional title		0	0		Work at a higher professional title does not differ from a regular professional title; professional titles are not linked to signing service fees	3	2	6
	Training opportunities	Abundant training opportunities	11	8	88	Not many opportunities; patient loss during training; specialized training has limited impact on work; online training is not effective; low willingness for further education	11	9	99
	Degree program opportunities	Providing opportunities for pursuing part-time graduate studies	1	1	1		0	0	
External factors	Family member distance		0	0		Family members are far away; need to take care of children	5	4	20
	Housing cost		0	0		High housing prices in the city center	4	3	12
	Pandemic-related special responsibility		0	0		Intense workload during the epidemic; epidemic prevention and control occupying outpatient time; fewer	24	14	336

Type D (stable)		Satisfaction			Dissatisfaction				
Dimension	Category	Description	Freq	Int	Total	Description	Freq	Int	Total
	Attractiveness of other careers		0	0		training opportunities during the epidemic Working in private hospitals has lower pressure, simple job tasks, opportunities for technical improvement, good development prospects, and a year-on-year increase in salary	9	6	54
	Residents' demand for health services	Fairly satisfied	10	10	100	Unable to meet health management needs, lacks institutional support; patients demand immediate attention, which is difficult to fulfill; many medication requests are challenging to meet	8	6	48

The comparative results between various types of institutions are presented in Table 4.7. Attractive institutions demonstrate relatively higher satisfaction levels in personnel allocation, relationships with colleagues, patient diagnosis and treatment, assessment indicator requirements, professional identity and sense of belonging, and training opportunities, among many other aspects. Among the four types of institutions, attractive ones have the highest number of relatively satisfying factors and the lowest number of relatively dissatisfying factors.

Conversely, the disperser institutions have a relatively higher number of dissatisfying indicators, consistent with their characteristic of experiencing high turnover. Rotation-type and stable-type institutions share similar characteristics, with a comparable number of relatively satisfying and dissatisfying factors. This similarity might be attributed to the fact that general practitioners in these institutions do not exhibit significant mobility.

Table 4.7 A comparison between the four types of hospitals (satisfaction-dissatisfaction)

Dimension	Category	Satisfaction				Dissatisfaction				Contrasts			
		Att	Rot	Disp	Stab	Att	Rot	Disp	Stab	Att	Rot	Disp	Stab
Working conditions	Resources (equipment/human resources)	4	88	9	180	63	98	104	168	-59	-10	-95	12
	Working hours	1	9	0	25	1	40	130	117	0	-31	-130	-92
	Staffing level	80	6	72	16	0	9	250	24	80	-3	-178	-8
	Workload intensity	88	20	30	120	176	50	216	338	-88	-30	-186	-218
	Commuting time	0	1	0	1	0	49	1	45	0	-48	-1	-44
	Workload distribution	9	0	0	12	1	12	210	24	8	-12	-210	-12
Compensation (costs-benefits)	Salary	42	108	20	140	24	75	117	136	18	33	-97	4
	Performance bonus	12	63	12	55	6	4	16	30	6	59	-4	25
	Policy-based subsidy	112	30	126	88	1	20	16	1	111	10	110	87
	Status of GP	16	42	16	36	0	0	0	0	16	42	16	36
Relationships	Professional identity and belongingness	72	6	12	4	4	3	0	0	68	3	12	4
	Relations with patients	130	96	120	357	4	0	16	9	126	96	104	348
	Recognition from patients	45	108	1	120	0	6	1	4	45	102	0	116
	Relations with managers/ superiors	4	4	4	1	0	1	0	1	4	3	4	0
	Relations with colleagues	54	9	0	4	0	0	2	0	54	9	-2	4
Job content	Recognition from superiors	0	0	0	1	2	1	0	0	-2	-1	0	1
	Paperwork	0	1	0	0	0	0	9	4	0	1	-9	-4
	Follow-up	1	0	0	0	1	60	0	75	0	-60	0	-75
	Diagnosis and treatment	30	0	2	1	8	18	28	20	22	-18	-26	-19
Promotion	Requirements of performance evaluation	9	4	0	0	4	1	209	70	5	3	-209	-70
	Case mix (range of patient problems)	4	0	0	0	0	2	0	12	4	-2	0	-12
	Professional title progression opportunities	80	108	42	242	1	54	112	160	79	54	-70	82
	Current professional title	0	1	0	0	0	0	0	6	0	1	0	-6
	Training opportunities	110	96	90	88	9	50	30	99	101	46	60	-11
External factors	Degree program opportunities	0	1	0	1	0	0	0	0	0	1	0	1
	Family member distance	25	0	0	0	16	16	9	20	9	-16	-9	-20
	Housing cost	1	0	1	0	25	18	8	12	-24	-18	-7	-12
	Pandemic-related special responsibility	2	0	0	0	198	136	126	336	-196	-136	-126	-336
	Attractiveness of other careers	0	0	0	0	0	15	1	54	0	-15	-1	-54
	Residents' demand for health services	30	16	4	100	0	40	20	48	30	-24	-16	52

The analysis highlights the unique cases (those that have a contrasting negative or positive valuation and are singled out from the from types of hospital) as well as those that are shared but distinctive (at least two cases of high frequency) and, finally, those that are shared. The analysis also indicates the factors that are not operating due to low frequency and indistinctiveness.

For attractor hospitals de unique factors are satisfaction with staffing level, the positive peer relations, high sense of professional identity and belongingness. There is no unique negative factor that has resulted from the analysis. Conversely, the disperser hospitals have a wide range of negative factors, namely: the dissatisfaction with staffing level, also with the workload distribution, and salary. The rotation hospitals have a single factor that is unique: the performance bonus with which GPs are satisfied. Lastly, the stable hospitals have only external factors that are unique: low satisfaction with the attractiveness of other careers outside but high satisfaction with the resident's demand for health services. Some factors are commonly shared as global experiences, independently, of the typology of the hospitals, namely: an overall dissatisfaction with the special responsibilities due to pandemics, and an overall satisfaction with the doctor-patient relationship.

The strongest contrasts are observable in some unique and distinctive factors, both attractor and disperser types of hospitals experiment difficulties with resources (equipment and HR sufficiency) as well as with workload intensity and the pandemic-related special responsibilities, but disperser hospitals experience it with stronger magnitude as regards resources and workload intensity. Both types of hospital also experience positive factors such as policy-based subsidy, relationship with patients, and training opportunities but the attractors tend to report it with greater magnitude especially the training opportunities. A distinctive factor that may explain the difference between attractors and disperser hospitals is the workload distribution, salary, career opportunities and performance appraisal requirements.

Disperser hospitals profile is characterized as, despite having good policy-based subsidies, good relationship between doctors and patients, and interesting training opportunities, these hospitals have insufficient staffing levels, high workload intensity, a low sense of distributive fairness in workload, low salaries, unsatisfactory requirements for performance appraisal, and not very good prospects for career development additional to the commonly experience sense of pandemic-related responsibilities.

Attractor hospitals profile is characterized by, despite having a sense of insufficient resources and the shared negative experience of having to assure the pandemic-related responsibilities, these hospitals have good staffing level, good peer relations, strong

opportunities for training, and a heightened sense of professional identity and belongingness in line with a good sense of career opportunities alongside with the commonly shared good doctor-patient relationships.

When focusing on the large categories (work conditions, compensation, relationships, work content, growth and external factors), clearly the disperser hospitals are characterized by a negative experience in work conditions.

Some factors were not much mentioned and may be taken as relatively indistinctive and not central in measuring GPs work experience. These are: relations with managers, recognition received from superiors, paperwork, case mix (the range of patient problems), current professional title, and degree program opportunities. Some of these factors are in fact universal in all hospitals, such as paperwork and current title. Because these are so common, they lose distinctiveness. Another case of an infrequent factor is the Degree program opportunities which seemed to be subsumed inside the general Training opportunities. Two of these factors may hid the experience due to being collected in a face-to-face interview, namely the relations and recognition from supervisor.

4.5 Discussion and conclusion

As stated, a situated approach to studying employee behavior is a must to better grasp the real factors at play in each country or region. This also applies in studying GPs turnover intentions and patterns as the weight of the factors included in the general turnover models will vary according to such local circumstances (Y. Gan et al., 2020).

According to self-determination theory, the factors identified can be categorized into intrinsic motivation and extrinsic motivation. Intrinsic motivation involves actions driven by personal interest and a sense of accomplishment, while extrinsic motivation involves actions taken to achieve specific goals and outcomes. In the workplace, factors that stimulate intrinsic motivation are often related to job nature and personal growth, while those stimulating extrinsic motivation are often associated with material rewards and the work environment (Y. Zhao et al., 2016). In this study, six dimensions were extracted based on interview content: working conditions, compensation (cost-benefits), relationships, work content, growth, and external factors. Among these, growth and relationships are considered intrinsic motivational factors, while working conditions, compensation, work content, and external factors are considered extrinsic motivational factors.

Overall, GPs in PNA are relatively satisfied with compensations, relationships and growth, but they express lower satisfaction levels regarding working conditions, work content, and external factors. From the perspective of the Two-Factor Theory, in this study, intrinsic motivational factors such as relationships and growth serve as motivators for GPs, while extrinsic motivational factors like working conditions and compensation act as hygiene factors. This is consistent with previous research findings (Yasin et al., 2020). Factors such as work pressure and work resources, acting as hygiene factors, can increase satisfaction, but their enhancing effect is temporary. The factors contributing to long-term satisfaction are intrinsic motivational factors such as personal development and a sense of responsibility. This may explain why the overall large dynamics of GPs turnover in PNA (as found in the first study) indicates an overall stable professional population (despite the specific attractor, rotation and disperser hospitals in PNA).

Among intrinsic motivational factors, relationships are highly valued by GPs in China. In this study, relationships between doctor and patients were considered satisfactory by GPS across all four types of hospitals. Additionally, patient recognition and relationships with colleagues were also relatively satisfactory factors, consistent with the findings of Hou (2023). Research has shown that the more satisfied general practitioners are with doctor-patient relationships, the higher their job satisfaction (D. Chen et al., 2023). As gatekeepers of community health, establishing good doctor-patient relationships helps facilitate information exchange and reduce conflicts between doctors and patients.

In this study, promotion opportunities and training opportunities in the growth dimension were found to significantly impact job satisfaction. Being satisfied with personal growth opportunities can enhance job satisfaction and motivation among GPs. Research has shown that the more training sessions attended within a year, the higher the job satisfaction (D. Chen et al., 2023). Therefore, actively providing continuing education or promotion opportunities for GPs, enriching training content and dimensions, and improving training quality are measures that can help enhance job satisfaction among GPs.

External motivation factors mainly include factors related to the work environment such as working conditions, work content, compensation, and external factors. External motivation factors primarily serve as hygiene factors, and increasing these factors can help maintain job satisfaction among GPs.

In this study, the level of resources, working hours and intensity, and the fairness of staffing and workload allocation are all important factors affecting the job satisfaction of GPs, and they are often factors leading to decreased satisfaction. Similarly, a study conducted on GPs in PNA

found that due to being the earliest and most heavily aged district in Shanghai with the largest elderly population, GPs in this area face significant work pressure, leading to emotional exhaustion, work alienation, and a lack of job satisfaction (J. Fang et al., 2023). Currently, many CHCs in PNA assign nurses or public health personnel to assist GPs on a one-to-one basis, but due to issues such as insufficient nursing staff, incomplete performance evaluation systems for nurses, and low social recognition, the assistance provided is often limited (Ma & Chen, 2020). There is also a gap in staffing compared to mature GPs teams abroad (Jabbarpour et al., 2020). Excessive working hours can cause physical and psychological stress for GPs. Multiple studies have shown that GPs with fewer overtime hours tend to have higher job satisfaction, and those who occasionally work overtime have higher job satisfaction than those who do so frequently (H. W. Wang et al., 2023; Yang, 2017).

In this study, factors such as follow-up visits and performance evaluations within the scope of job responsibilities are identified as contributing to the lower job satisfaction among GPs. Conversely, professional identity and sense of belonging are aspects where most GPs express higher levels of satisfaction. Given that the primary responsibility of grassroots GPs involves long-term management of residents' chronic conditions, follow-up visits constitute a major part of their workload, which can be both extensive and intricate. Additionally, in China, residents have considerable freedom in choosing their healthcare providers and often prefer hospitals with more abundant medical resources, leading to relatively lower recognition and compliance with GPs (J. Fang et al., 2023). Consequently, the demands of follow-up work can impose great pressure on GPs. The degree of professional identity and sense of belonging among this professionals influences their attitudes and behaviors at work, playing a facilitating role in enhancing job satisfaction and reducing turnover intentions (H. Zheng et al., 2021). Research indicates that professional identity positively affects retention intentions and mediates the impact of job satisfaction on retention intentions (Hou, 2023).

GPs exhibit lower satisfaction with salary but higher satisfaction with performance and policy subsidies in this study. Salary is typically a crucial factor influencing the attitudes of GPs towards their work. In China, the income of GPs is much lower than that in developed countries such as the United Kingdom (Y. J. Liu et al., 2018). Low-income levels can adversely affect job satisfaction and the attractiveness of the profession. In PNA, the government encourages family doctors to practice in suburban community health service centers by categorizing these centers into four types based on regions: remote rural areas (Type A), general rural areas (Type B), urban-rural fringe areas (Type C), and urban areas (Type D). Rural health personnel special subsidies are provided according to these categories. For

instance, general practitioners working in Type A institutions can receive a monthly subsidy of 6000 yuan. Research has shown that general practitioners in suburban areas of PNA tend to experience lower occupational burnout (J. Fang et al., 2023).

In this study, external factors such as epidemic-related work, other more attractive job opportunities, and public health demands significantly influence the job satisfaction of GPs. During the COVID-19 pandemic, GPs took on the primary responsibility for screening and managing residents, leading to significantly extended work hours. Additionally, due to manpower shortages during the pandemic, many GPs had to continue working even when ill, increasing the risk of emotional exhaustion due to the prolonged hours spent dealing with the epidemic (J. Fang et al., 2023). In China, grassroots positions are often seen as the last resort, and the attractiveness of GPs roles in grassroots settings is relatively low. Therefore, GPs are more susceptible to being attracted to other jobs with better prospects for development or higher salaries (Zhu, 2018).

Attractor hospitals have more factors contributing to intrinsic motivation, such as relationships and growth, while there are dissatisfying factors in extrinsic motivation areas like working conditions and external factors. In contrast, dissatisfying factors for disperser hospitals are concentrated in extrinsic motivation areas such as working conditions and work content, with only a few satisfying factors primarily found in intrinsic motivation areas like relationships and growth. Intrinsic motivators have a stronger motivating effect on general practitioners, while extrinsic motivators are more likely to have negative effects on employees, leading to distress and dissatisfaction, consistent with previous research findings (Kohnen et al., 2024; Van den Broeck et al., 2021). This is also consistent with the perspective of the Self-Determination Theory, which states that behavior driven by intrinsic motivation is entirely self-determined. In such cases, people engage in activities purely out of autonomous interest rather than external control, thereby having a stronger motivating effect. In this study, intrinsic motivational factors such as personal skill development and social status improvement change the attitude of general practitioners towards their work by imparting meaning to the work itself, turning it into a self-determined behavior.

These findings and conclusions should consider the limitations of the study. As per definition, the situated approach implies special attention to the context as a modulating factor of phenomena under study. PNA has specificities that justify this approach, but its findings cannot be assumed to mirror what may be the reality in similar mixed urban and rural areas. Still, the value of such findings is not in its generalizability but rather in showing precisely how context matters. Another limitation pertains to the cross-sectional view that the study offers.

Although temporal considerations may have emerged in the mind of the interviewees so to make judgments about current situation, only a time lagged set of interviews can establish temporal patterns that can ascertain how the current status can lead to future trends. Albeit interesting, the temporal frame that could allow for identifying these macro-level trends and more central factors of GP turnover is not compatible with the time frame for such a doctoral study as it may require years. Still, future studies can take on this challenge and conduct longitudinal research on such factors within the same situated approach. Likewise, inferring the factors from a qualitative viewpoint is a suitable approach to gain awareness of the overall relations but as interviews cannot be conducted to a large population, a quantitative study is called for, and this is precisely the next step into this research.

Chapter 5: Towards an Explanatory Model of GPs Turnover (Study3)

5.1 Introduction

Although China has achieved significant progress in medical reforms since 2009, the weakness in the supply side of the Chinese healthcare delivery system and limitations in strengthening the primary healthcare system persist. Due to the improvement in current healthcare standards, the accelerated aging population, changes in family structure, and disease spectrum, there is a growing demand from residents for long-term, continuous health care. This has shifted the focus of healthcare reform from a hospital-centered, quantity-focused service model to a primary care-centered, value, and health-centric approach (State Council Information Office of the People's Republic of China, 2017). GPs are clinically trained doctors working at the grassroots level, providing preventive healthcare and health education services to patients of all ages. They play a supportive role in the primary healthcare system and act as "gatekeepers" for residents' health. Therefore, the stability of the GP workforce is crucial for the realization of primary healthcare services.

In recent years, global research has increasingly identified the recruitment and retention of GPs as a key issue in primary healthcare (Lown et al., 2015). The recruitment of new doctors is decreasing, and existing doctors are continuously leaving, indicating a lack of stability in the GP profession. While the focus of China's healthcare system reform continues to shift towards primary healthcare, Chinese GPs still face issues such as talent shortages and difficulties in staff retention, which are closely related to the willingness of GPs to leave their positions.

According to the qualitative interviews conducted in this study, the multidimensional work environment (including working conditions, compensation, relationships, job content, promotion, external factors) is considered to be closely related to the turnover intention of GP, but the specific mechanisms remain to be explored. From the literature review, it is understood that job satisfaction (Y. Liu & Duan, 2023), work engagement (Slåtten et al., 2022), work motivation (H. Li et al., 2022), and person-environment fit (Y. Y. Xiao et al., 2021) may be critical factors influencing GP turnover intention. The connection between the work environment and turnover intention is not direct but may be mediated by related variables such

as job satisfaction (Al Sabei et al., 2020). Similarly, the literature review suggests that work motivation often serves as a moderating variable affecting turnover intention (Fernet et al., 2017). Therefore, we adopted a mediation-moderation model, incorporating the work environment, job satisfaction, work motivation, work engagement, person-environment fit, and turnover intention. The aim is to form a comprehensive model explaining the flow patterns of GPs, and theoretically explain how to manage the flow of GPs more effectively and reduce their turnover intention.

5.2 Literature review

5.2.1 Medical staff turnover

5.2.1.1 Current status of medical staff turnover

Although healthcare professionals' turnover has been extensively studied, it is important to understand that under this large category of "healthcare professionals" there are specific profiles that experience different work environments and challenges related to the clinical responsibilities. Therefore, it is important to understand the domains of responsibility and turnover experiences differentiating general practitioners, nurses, and other medical personnel.

5.2.1.2 General practitioners

There is limited research on the turnover rate of general practitioners abroad, with only a few studies exploring gender differences in GP turnover rates. For example, Bardoel et al. (2020) conducted a survey on GP cohorts in Australia to investigate turnover rates, and found that, after controlling for the intention to leave, the turnover rate for female GPs was 85% higher than that for male GPs. There are few studies that specifically describe the current situation of GP turnover. In China, some studies have investigated the mobility rate and influencing factors of GPs. For instance, Cao et al. (2014) used basic data on GP staff in a community health service center in a certain district of Beijing to calculate their mobility rate and destinations. The results showed that the outflow rate in 2011 and 2012 was 5.12% and 6.66%, respectively, which were higher than the inflow rate. The main reasons for leaving were related to issues with remuneration, employment status, and career prospects. Zhang et al. (2017) conducted a survey on the mobility status and reasons for GPs in medical institutions throughout Zhejiang Province from 2011 to the first half of 2016. The results showed that 56% of mobile GPs left the GP workforce, and the most significant influencing factor was low remuneration, followed by

career development factors. Overall, there is limited research on GP turnover rates, both in China and internationally, and most studies focus on GPs' turnover intention and related factors, with turnover intention being the most powerful indicator for predicting turnover rates.

Differences in the willingness of general practitioners (GPs) to leave their jobs vary greatly across countries, but overall, the occupational stability of GPs is poor. A review showed a global turnover intention rate of 47%, with 46% in Asia, 43% in Australia and New Zealand, and 51% in Europe (Shen et al., 2020). A survey of GPs in the United States found that 30% of GPs and 41% of staff would choose to leave after 2-3 years (Willard-Grace et al., 2019). In Canada, only 6.6% of family GPs had a desire to leave (Vanasse et al., 2009). The occupational stability of GPs in Europe is even worse, with 70.51% of GPs having moderate or high willingness to leave (Fletcher et al., 2017). Research has shown that more than half (53.9%) of GPs in the Netherlands have thought about leaving (Kuusio et al., 2013). Sibbald et al. (2003) surveyed GPs in the United Kingdom and found that the proportion of GPs with a willingness to leave increased from 14.0% in 1998 to 22.0% in 2001. Owen et al. (2019) surveyed 929 GPs in the United Kingdom and found that 48.5% had a willingness to leave, with the intention to leave/retire in the next two years increasing from 13% in 2014 to 18% in 2017, and the intention to continue working in the next five years decreasing from 63.9% to 48.5%. A study in Australia found that 52.7% of GPs had moderate or high willingness to leave (Gardiner et al., 2005). A lack of job satisfaction is the main reason for a willingness to leave (Rittenhouse et al., 2004). In addition, research has shown that personal psychological stress (Kuusio et al., 2013), age, gender and marital status (Vanasse et al., 2009), as well as job compensation (Pathman et al., 2002), workplace violence (Eneroth et al., 2017), and teamwork pressure (Heponiemi et al., 2013) also have a significant impact on the willingness to leave. Most of the research on turnover rate abroad is quantitative, with few qualitative studies. There are significant differences in the willingness of GPs to leave their jobs in various regions overseas, with few researches focused on the factors affecting the willingness to leave among GPs. Most of the research has explored the impact of job satisfaction on the willingness to leave, with some studies examining the pressures inherent in the job and compensation. However, there are few studies on the impact of social practice environment, job rewards and organizational management on GPs' turnover intention.

5.2.1.2.1 Nurses

Nursing is an essential component of the healthcare workforce, and a global shortage of nursing personnel has been a long-standing challenge. The high turnover rate of nurses is a prevalent issue in healthcare organizations and is one of the significant factors leading to the shortage of

nurses. The high nurse turnover not only affects hospitals negatively, but also has adverse effects on residents' health, as the recruitment and replacement costs are higher, and it is related to the quality of nursing care. There have been many studies on the current situation and turnover intention of nurses, both in China and internationally, which can provide some comparison and reference for the study of the current situation of general practitioners' turnover. Studies have found that the average turnover rate of nurses in Canadian hospitals is 19.9% (O'Brien - Pallas et al., 2010). According to a study in 2016, the estimated turnover rate of registered nurses in US hospitals was 16.5%, up from 14.7% in 2012 (Yarbrough et al., 2017). A comparative study mentioned that the turnover rate of nurses in Australia was 15.1%, and in New Zealand, it was as high as 44.3% (Duffield et al., 2014). In Korea, the average turnover rate of hospital nurses in 2020 remained at 15.2%, which was only slightly lower than that in 2013, by 1.7% (Y. T. Kim et al., 2021). In Japan, the number of licensed nurses has increased in the past decade. However, the annual turnover rate of full-time nurses has remained stable at around 11% in recent years (Sato et al., 2018). In terms of nurses' intention to leave, a review involving 23 countries and 23,140 critical care nurses showed an intention to leave rate of 3.0% to 75.0%, with an overall turnover intention rate of 27.7% (G. Xu et al., 2023). Wang and Yuan (2018) conducted a survey on the turnover intention of nursing staff in Shanghai hospitals, and the results showed that 41.3% of nurses had the intention to leave.

Research on nurse turnover in China mainly focuses on exploring its influencing factors, and the research setting is limited to a specific hospital. For example, Huang (2018) surveyed the turnover of nurses in a tertiary hospital from 2014 to 2016, and found that high job stress was the main reason for their turnover, and 59.09% of the nurses did not continue to work in nursing after leaving. Some studies focused on the turnover situation of several hospitals in a province or city. For example, Lv and Li (2016) surveyed nurses in five comprehensive hospitals in Nanjing, and found that the average turnover rate from 2010 to 2015 was 1.89%. Shi (2016) surveyed 110 tertiary hospitals in Guangdong Province and found that the turnover rates of nurses from 2011 to 2014 were 6.66%, 7.25%, 6.72%, and 5.54%, respectively, and 7.7% of tertiary hospitals had turnover rates exceeding 10%, with the highest being 46.25%. Nationwide studies, such as Gan's (2020) study, used data from 940 hospitals in 30 provinces, autonomous regions, and municipalities in China in 2017, analyzed the voluntary turnover of nurses, and found that the turnover rate of nurses in China was 2.15% in 2017, with turnover rates ranging from 0.75% to 4.60% in different provinces. Chinese research on nurse turnover rates varies widely, which may be related to regional economy differences, hospital levels, differences in the research objects, and differences in the definition of turnover rates.

5.2.1.2.2 Other medical personnel

Research on the current situation of medical personnel leaving their jobs in China has focused more on the study of turnover intention rather than actual turnover rates. Tang and Fang (2015) conducted on-site surveys of medical personnel, including doctors, nurses, pharmacists, laboratory technicians, and other healthcare professionals, in 12 county hospitals in 4 provinces of China, and found that 51.9% of them had the intention to leave, with higher-level talents having a higher intention to leave. Yan (2021) and others surveyed 15,243 emergency doctors in 31 provinces of China and found that 49.75% of them had a tendency to leave. Yu (2016) and others investigated the staff turnover at a private hospital in Shenyang, showing that the annual average turnover rate of medical personnel from 2013 to 2015 was 10.86%, with nurses having the highest turnover rate, followed by doctors, and technicians having the lowest. Sun and Fang (2014) investigated 20 private hospitals in 5 provinces in China and collected the annual turnover rate of medical personnel in 2011, showing that the annual turnover rate of medical personnel in private hospitals was 36.6%, with an intention to leave rate of 47.7%. A review of 37,672 primary healthcare workers in China showed that their intention to leave was 30.4% (R. He et al., 2020).

International research on the turnover situation of medical personnel also focuses on turnover intention. A review of doctor turnover intention in five countries showed that about 3.2%-53.7% of doctors have a tendency to leave (Degen et al., 2015). A national survey of family doctors in the UK showed that 11.8% of them had the intention to leave, and the turnover rate was 16.5% during a 5-year follow-up, indicating a correlation between higher intention to leave and higher turnover rate (Hann et al., 2011).

5.2.1.3 Consequences of medical personnel turnover

While many studies have investigated the reasons for employee turnover, only a few have explored the consequences of turnover. The loss of medical personnel can result in significant costs, including the direct costs associated with the departure of staff, temporary replacement costs (such as overtime and agency personnel), recruitment costs, and onboarding costs, which include the "loss" of productivity until the replacement personnel achieve the same level of productivity as the departing staff. Many studies have explored the relationship between the willingness of nurses to leave their jobs and the associated costs. For instance, in a Canadian study, O'Brien-Pallas et al. (2006) found an average turnover rate of 9.49%, with an average cost of CAD 21,514 per nurse, where the highest direct cost was associated with temporary replacements, while the highest indirect cost was associated with the reduced initial

productivity of new employees. A high turnover rate at the organizational level can threaten the job satisfaction, psychological well-being, and burnout of individual medical personnel, and may also impact the quality of patient care.

Recently, China has continued to face talent shortages and severe personnel losses among general practitioners, which has greatly affected the construction of primary healthcare service systems and the improvement of primary healthcare service capabilities. However, there have been relatively few studies on the current status of turnover, particularly the turnover rate, among general practitioners, in contrast to the extensive and in-depth research conducted on nurses. As the backbone of primary healthcare services, general practitioners are responsible for residents' disease prevention, health care, and treatment, and the stability of the general practitioner workforce is essential for ensuring the effective operation of hospitals. Research on general practitioners' willingness to leave their jobs, analyzing the current status and reasons for turnover, can help maintain the stability of the general practitioner workforce, ensure the quality of medical services, and reduce the social burden of disease.

The above discussion provides insights into the current global situation of medical personnel turnover and its consequences, which must be considered together with the complex external contingencies. Still, literature provides a good understanding of the plausible factors that drive GPs turnover which shall be reviewed below.

5.2.2 Antecedents of employee turnover

As stated, there is a wide range of literature on the topic of healthcare worker turnover, which proposes various explanatory models and focuses on possible causes and effects. In the broader context of employee turnover, there has been deeper exploration into the reasons and strategies for reducing employee turnover, which can help to gain a better understanding of healthcare worker turnover. Employee turnover research first emerged in the 1920s and gradually developed into more standard research designs in the 1960s to 1970s, where factors such as job satisfaction, work environment were found to affect turnover rates. In the 1980s, more complex theoretical models were proposed. Research in the 21st century has focused on theory testing and refinement (Hom et al., 2017). A review suggests that employee turnover literature can be divided into three groups: sources of employee turnover, the consequences of employee turnover, and strategies to reduce employee turnover. The sources of employee turnover, or causes, include job-related factors such as job stress, organizational commitment, job satisfaction, personal factors such as locus of control, powerlessness, and role ambiguity, and

economic factors such as local labor market conditions and unemployment rates. Organizational factors, such as organizational stability, communication systems, work atmosphere (related policies and procedures), compensation, and individual performance, also play a role. In terms of the consequences of employee turnover, turnover creates additional costs including replacement costs and reduced output. High turnover rates can also negatively impact an organization's profitability. Strategies to reduce employee turnover involve treating employees as assets and providing more attention, identifying the causes of employee turnover and adequately compensating employees (Ongori, 2007). In another review that concerned research from China and other countries, the causes of employee turnover were categorized into three areas: personal factors, organizational and job-related factors, and socioeconomic factors. Personal factors include age, gender, education level, marital status, years of experience, personal abilities, and responsibilities, which can directly or indirectly affect turnover intentions or rates. Organizational and job-related factors include organizational culture and policies, benefits and prospects, organization size, salary, promotion, relationships with others, training, employee commitment, individual work attitudes, and organizational justice. Socioeconomic factors include the level of economic development, labor market conditions, employment policies, job opportunities, corporate assets, transportation, housing, education and medical facilities, cost of living, and quality of life. Corresponding strategies proposed include optimizing job design to improve employees' sense of professional achievement, adopting scientific methods to actively understand employees' real needs, establishing communication feedback mechanisms to handle employees' complaints timely, developing fair compensation and benefit systems, and effective performance mechanisms, establishing a sound training and promotion system, improving employees' benefits and working conditions, building organizational culture, coordinating relationships between different departments, and establishing management approaches to prevent the turnover of key talents (Y. J. Zhang, 2016).

The above summarizes some reviews on employee turnover, opening up perspectives for studying the turnover status and influencing factors of medical personnel. The influencing factors of medical personnel turnover mainly concentrates on professional environment, job-related factors, personal factors, as well as socioeconomic factors.

Eventually the most researched factor of employee turnover is job satisfaction.

5.2.2.1 Job satisfaction

Research on job satisfaction of general practitioners started earlier, with the UK's National Health Service conducting a GP Worklife Survey every two years since 1999. Most current

studies on job satisfaction are large-sample, multi-center cross-sectional studies. One study comparing GPs' job satisfaction across 34 countries found significant differences in satisfaction levels, with Danish GPs reporting the highest job satisfaction and GPs from Southern European countries ranking in the lowest third, particularly those from Spain (Stobbe et al., 2021). Another study comparing GPs from 11 countries similarly found substantial variation in job satisfaction, with the proportion of highly satisfied GPs ranging from 9.2% to 39.5%, with countries reporting high job satisfaction levels consistent with the previous study (Cohidon et al., 2019). Research on influencing factors mostly explores specific factors and attempts to incorporate new variables into causal networks. Research conducted outside China identified two categories of factors influencing job satisfaction: personal traits and work characteristics. In terms of personal traits, female GPs are thought to report higher job satisfaction than male GPs (Chambers & Campbell, 1996; Nørøxe et al., 2018). Some studies suggest that age is positively associated with job satisfaction, possibly due to the "healthy worker effect," as GPs dissatisfied with their job tend to retire early (Chambers & Campbell, 1996). Among work characteristics, workload has a significant negative impact on job satisfaction, particularly administrative tasks, which have a greater effect on job satisfaction, while diversifying activities can improve GPs' job satisfaction (Long et al., 2020). Work hours are a factor affecting job satisfaction, with weekly work hours negatively correlated with job satisfaction, and the number of vacation weeks per year positively correlated (Chambers & Campbell, 1996). Interpersonal relationships have a significant impact on GPs' job satisfaction, with good relationships with colleagues or collaboration with other doctors having a positive effect on job satisfaction (Long et al., 2020). The doctor-patient relationship is an important factor affecting the job satisfaction of general practitioners, which is better when GPs spend more time with their patients (Long et al., 2020). Studies conducted abroad often use data from existing databases or mature questionnaires to investigate this topic. Qualitative interviews have also been used in some studies.

In China, research on job satisfaction started relatively late and mainly focused on healthcare professionals such as doctors and nurses. However, there is a growing body of research on the job satisfaction of general practitioners, although the overall quantity is still limited. Existing studies on general practitioners' job satisfaction cover multiple regions of China, with significant variations in satisfaction levels. The results also vary across different researchers conducting the studies. Overall, the job satisfaction of general practitioners in China is at a medium to low level (Z. Li, 2020). Explorations of the factors that influence job satisfaction among Chinese general practitioners have mainly taken a broad approach,

analyzing multiple factors simultaneously. These factors can be divided into personal traits and job characteristics. In terms of personal traits, common factors that affect job satisfaction include gender (F. Yu et al., 2019), age, physical exercise and drinking habits (X. Zhang et al., 2020), education level (T. Zhang, 2019), and professional title (G. Kong et al., 2020). Additionally, some studies have found that general practitioners' satisfaction with work intensity, compensation and benefits, and professional promotion has a positive impact on overall job satisfaction (H. Kong et al., 2021). Among job characteristics, workload (Zou et al., 2019), compensation, whether the practitioner is in a central position within the team, whether they hold administrative positions (Hao et al., 2022), employment conditions and overtime hours (S. Wang et al., 2022), and doctor-patient relationships (S. Huang et al., 2018) have all been identified as factors that affect the job satisfaction of general practitioners. In China, studies on the factors that affect job satisfaction among general practitioners are mostly quantitative in nature, and researchers often use the Minnesota Satisfaction Questionnaire (MSQ) short form to assess job satisfaction levels. Some studies have developed their own questionnaires based on existing scales.

In terms of the impact of job satisfaction on the turnover intention, Sibbald et al. (2003) conducted a study on job satisfaction and intention to quit among a sample of 1,949 general practitioners, and found that job satisfaction was an important factor affecting their intention to quit. Vanasse et al. (2009) investigated the intention to quit and related factors among 8,537 family physicians in Canada, and found that job satisfaction and practice background had a significant impact on their turnover intention. L. Li et al. (2021) applied structural equation model to empirically analyze the quantitative relationship among job satisfaction, turnover intention, and occupational burnout after fully understanding the job satisfaction and intention to quit of general practitioners, and proposed relevant policy recommendations. The results showed that job satisfaction was more likely to induce general practitioners to have the intention to quit than occupational burnout.

Therefore, the following hypothesis is proposed for this study:

H1: There is a negative correlation between job satisfaction and turnover intention.

5.2.2.2 Work environment

Work environment usually refers to the development of an occupation in the general social environment, its skill levels, social status, and prospects. It can also refer to the working environment, social characteristics, and physical conditions that affect well-being, work relationships, collaboration, efficiency, and health.

There is no clear definition at present, both nationally and internationally. With regard to the work environment of medical workers, studies conducted outside China mention that the work environment refers to employees' perceptions of organizational elements that underlie the shaping of individual behavior and reflect the characteristics of an environment or organization (Hall, 2005). The work environment includes four basic elements: workload, supportive supervision, availability of supplies and equipment, and community and health system's respect for medical staff's productivity, and improving the professional environment can increase medical staff's work efficiency (Jaskiewicz & Tulenko, 2012).

The work environment in this study refers to the external and internal environment in which GPs work, with the external environment referring to the general social environment and the internal environment referring to the institutional and organizational management and other elements of the health care institution in which they work.

Research on the work environment of healthcare workers began mostly focusing on the nursing profession. These studies primarily examine the impact of the occupational environment on nurses' job satisfaction and burnout, as well as how the occupational environment affects patient outcomes through nurses. They also explore the relationship between the occupational environment and safety culture, missed nursing care, and other related factors, primarily in developing countries. Most of these studies are cross-sectional studies. In China, related studies also mostly concentrate on the nursing profession, with a few exploring the professional environment of other healthcare workers. Compared to research conducted outside China, Chinese studies on healthcare workers' occupational environment are mainly descriptive analyses, with fewer variables and primarily focused on job satisfaction and burnout. A few studies have examined the turnover intention. Studies conducted outside China have explored these issues more comprehensively and broadly. Researchers both focused on International settings and in China have adopted mature scales, such as the Practice Environment Scale of the Nursing Work Index (PES-NWI) and the Gallup Workplace Audit (GWA) when measuring the occupational environment, with fewer studies developing their own scales. Chinese studies, in particular, face challenges of single research methodology, limited sample sizes, and fewer dimensions, which are less in studies conducted outside China. Furthermore, there is a lack of in-depth research on the professional environment of general practitioners both in China and internationally.

Current explorations of the occupational environment of general practitioners mostly consider it as a factor influencing job satisfaction and turnover intention, with limited description of its current status or in-depth investigation as the key variable. For instance,

Alrawashdeh et al. (2021) investigated the burnout rate and job satisfaction of general practitioners during the COVID-19 pandemic in Jordan, finding that external factors such as the pandemic crisis and economic impact, as well as internal factors such as workload and hospital protective equipment, affect their burnout. A study conducted by H. Zhang et al. (2021) on the job satisfaction of rural doctors in Jiangsu Province showed that organizational environment is a necessary condition for improving job satisfaction.

Although there has been limited exploration of the professional environment for general practitioners, studies on the professional environment for other healthcare professionals, such as nurses, can provide useful insights. Research on the professional environment outside China has mainly focused on exploring job satisfaction, burnout, and turnover intention among nurses. For instance, Nantsupawat et al. (2017) conducted a cross-sectional study of 1,351 nurses in Thailand and used the Nursing Work Environment Scale to collect data on work environment. The results showed that work environment is an important factor affecting nurse retention, and improving the work environment could enhance job satisfaction, reduce turnover intention, and decrease burnout levels. Similarly, Al-Hamdan et al. (2017) carried out a cross-sectional study and found a positive correlation between the work environment of 650 registered nurses in three hospitals in Jordan and their intention to stay in their jobs and job satisfaction. Al Sabei et al. (2020) conducted a study on nurses in a public hospital in Oman, investigating their work environment, burnout, turnover intention, nursing quality, and job satisfaction. The results showed that only in the context of high job satisfaction, working in a good work environment was associated with less inclination to leave. Some studies have explored the relationship between work environment and patient outcomes, safety culture, and nursing quality. For instance, Aiken et al. (2021) conducted a multi-level cross-sectional study of hospital nurses in Chile and linked their work environment to patient satisfaction surveys and hospital discharge data. The results showed that nurse staffing was significantly related to all outcomes, including mortality rates, and work environment was related to patient experience and nursing quality. Dutra and Guirardello (2021) collected variables related to the working environment, reasons for misdiagnosis, safety climate, and job satisfaction among nurses, and conducted descriptive, correlation, and comparative analyses. The results indicated that leadership in the work environment has an impact on reducing misdiagnosis, improving perceptions of safety climate, and job satisfaction.

In China, research on the occupational environment of healthcare workers has mostly focused on nurses, with some studies including other types of medical personnel. Typically, these studies involve surveys and analyses of the current status of the occupational environment,

or explore the relationship between the work environment and job satisfaction, burnout, and turnover intention. For example, Qin et al. (2009) used the Q12 to analyze the current status of the occupational environment of 629 nurses in a hospital. L. Zhang (2014) et al. conducted a survey on work burnout, job satisfaction, and turnover intention among 9,698 nurses in 181 hospitals in China, and explored the relationship between the work environment and nursing outcomes. The results showed that high burnout and low job satisfaction were prominent issues facing Chinese nurses, and improving the work environment could be an effective strategy for improving nursing outcomes in Chinese hospitals. Yang and Cheng (2022) analyzed the distribution of GPs workforce in China to find that occupation conditions is a factor for the choice of work location by GPs, namely with preference for big cities where these conditions are better.

In terms of the factors that influence the turnover intention among general practitioners in their work environment, work stress and salary are considered to be important factors. Pit and Hansen (2016) found that moderate psychological stress is a risk factor for absenteeism among general practitioners. In Iran, there is significant income and salary inequality among general practitioners, and those with lower incomes exhibit lower work enthusiasm (Bayati et al., 2019). Additionally, Vanasse et al. (2009) found that working in a rural or remote area increases the mobility intention of general practitioners in Canada. Workplace violence has a significant impact on the intention to resign, as previous studies have found that tense doctor-patient relationships increase the risk of resignation. Eneroth et al. (2017) found that threats and/or violence from patients increase the intention to resign among general practitioners, while the authorization from leadership can reduce the intention to resign. Y. W. Chen (2016) analyzed the relationship between job satisfaction, burnout, workplace violence, and the turnover intention among general practitioners in 359 primary healthcare institutions in Hubei Province. The results showed that workplace violence and other factors are related to the intention to resign.

Therefore, the following hypotheses are proposed for this study:

H2: There is a positive correlation between the work environment satisfaction and the job satisfaction.

H2a: There is a positive correlation between workload satisfaction and job satisfaction.

H2b: There is a positive correlation between compensation satisfaction and job satisfaction.

H2c: There is a positive correlation between relationships satisfaction and job satisfaction.

H2d: There is a positive correlation between job content satisfaction and job satisfaction.

H2e: There is a positive correlation between promotion satisfaction and job satisfaction.

H2f: There is a positive correlation between external factors satisfaction and job satisfaction.

Although work conditions can be directly linked to job satisfaction there are other emerging constructs in the literature that add to the process theory by highlighting individuals' differences as regards what is the degree of fit between the person and the existing environment in any given organization. Therefore, person-environment fit has gained a central role in employee turnover models.

5.2.2.3 Person-Environment Fit

The alignment between employees and their work environment is of paramount significance, as it exerts an influence on various aspects of employee decision-making across the different stages of an organizational life cycle. These stages encompass decisions related to joining the organization (Cable & Judge, 1996), behaviors and attitudes exhibited during the tenure within the organization (Tziner, 1987), and the manifestation of intentions to leave the organization (O'Reilly et al., 1991).

The concept of person-environment fit (PE fit) determines the degree to which an individual matches with their environment, specifically the alignment between an individual's personality traits and skills with the requirements of the environment. It gauges the extent to which an individual can successfully adapt to the demands of their surroundings. The notion of PE fit is deeply rooted in interactionist behavior theory. According to this theory, as proposed by Pervin (1968), when the environment corresponds to the individual, most of the time, it leads to improved performance, higher satisfaction, and reduced stress for the individual. Since Pervin's initial work, an increasing body of research has focused on various manifestations of fit and has substantiated the effectiveness of PE fit (Kristof-Brown, 1996).

The PE fit model posits that the perception (subjective) or actual (objective) mismatch between an individual and their environment can result in detrimental outcomes in terms of specific tasks, job performance, satisfaction, and the quality of one's professional and personal life (Caplan & Van Harrison, 1993).

Most studies consider PE fit to be multidimensional, encompassing dimensions such as person-organization fit (PO fit), person-job fit (PJ fit), person-group fit (PG fit), and person-supervisor fit (PS fit) (Andela & van Der Doef, 2019; J. A. Edwards & Billsberry, 2010; Jansen & Kristof-Brown, 2006; Wheeler et al., 2005). Researchers argue that studying fit from a single dimension is inadequate because individuals are embedded in multiple facets of their environment simultaneously. According to Ostroff et al. (2005), focusing on just one or a few

dimensions of fit is insufficient for understanding the effects of fit, as different dimensions of fit have varying impacts on individual attitudes and behaviors.

Person-job fit (PJ fit) is defined as the compatibility between an individual and a specific job (Kristof-Brown, 1996). J. R. Edwards (1991) further elaborated on PJ fit, defining it as the match between job requirements and individual capabilities (demand-ability fit or DA fit), or the alignment between an individual's needs and what the job offers (need-supply fit or NS fit).

Person-organization fit (PO fit) is defined as the congruence between an individual and their organization on dimensions such as values and goals (Kristof-Brown, 1996). The attraction-selection-attrition framework, theoretically suggests that individuals are attracted to and selected by organizations that share their values and attributes (Schneider, 1987). This alignment subsequently leads to PO fit. When this fit is absent, individuals show stronger intentions of leaving the organization (Andela & van Der Doef, 2019).

Person-group fit (PG fit) is defined as the compatibility between an individual and their work group (Kristof-Brown, 1996), suggesting that individuals are typically attracted to those who are similar to them in their social environment. Research has shown that similarity in personality traits can facilitate communication and social integration among employees (Schaubroeck & Lam, 2002).

Person-supervisor fit (PS fit) refers to the compatibility between an individual and their supervisor within the work environment (Kristof-Brown et al., 2005). Interpersonal attraction theory suggests that one person is attracted to another based on similarities in life goals, personality, activity preferences, values, and other characteristics (Huston & Levinger, 1978). Based on this similarity, the mutual attraction between subordinates and supervisors is referred to as fit. Research has shown that PS fit is associated with role performance (X. Huang & Iun, 2006), job satisfaction (Ostroff et al., 2005), and turnover intentions (Ostroff et al., 2005; Van Vianen, 2000).

Overall, research indicates that PE fit is related to employee attitudes and behaviors, reflecting the extent to which employees can meet their physiological and psychological needs under organizational reinforcement and fulfill organizational requirements based on their abilities. Therefore, the satisfaction of employee needs enhances job satisfaction, which, in turn, predicts turnover intentions. Conversely, if the needs of employees or the organization are not met, one or both parties may engage in adaptive behaviors to satisfy their respective needs (Dawis & Lofquist, 1984).

Therefore, the following hypotheses are proposed for this study:

H3: There is a positive correlation between the work environment and the PE-fit.

H3a: There is a positive correlation between workload and the PE-fit.

H3b: There is a positive correlation between compensation and the PE-fit.

H3c: There is a positive correlation between relationships and the PE-fit.

H3d: There is a positive correlation between job content and the PE-fit.

H3e: There is a positive correlation between promotion and the PE-fit.

H3f: There is a positive correlation between external factors and the PE-fit.

Considering the role PE-fit can play in bridging work environment to job satisfaction it is suitable to give this variable the status of an intervening factor, and thus we hypothesize that:

H4: work environment has a positive indirect effect on job satisfaction via PE-fit.

H4a: Workload has a positive indirect effect on job satisfaction via PE-fit

H4b: Compensation has a positive indirect effect on job satisfaction via PE-fit

H4c: Relationships has a positive indirect effect on job satisfaction via PE-fit

H4d: Job content has a positive indirect effect on job satisfaction via PE-fit

H4e: Promotion has a positive indirect effect on job satisfaction via PE-fit

H4f: External factors has a positive indirect effect on job satisfaction via PE-fit

Another important construct in employee turnover models that has emerged concerns work engagement.

5.2.2.4 Work engagement

Kahn (1990) initially conceptualized employee work engagement, stating that work engagement is being physically, cognitively, and emotionally involved in their work role and experiencing a sense of meaning, psychological security, and availability. Some studies mentioned that work engagement is diametrically opposed to burnout (Macey & Schneider, 2008). But later Schaufeli's study refuted this and argued that work engagement is the positive opposite of burnout but it is a separate and distinct concept (Schaufeli et al., 2002), which is the most well accepted view to date in research. The definition of work engagement mentioned in this study is a positive, intact emotional and cognitive state related to work, characterized by vigor, dedication, and absorption. According to these authors, vigor refers to the level of energy – both physical and mental – that individuals have while working and their endurance in facing adversity, in short vigor refers to high levels of stamina and endurance. Dedication refers to how much individuals experience enthusiasm and are challenged, proud of or inspired by their work while experiencing a sense of significance. Absorption refers to individuals experiencing a strong focus while working, being fused with the task at hand to the point of not being aware of the flow of time.

There are fewer studies on work engagement for general practitioners, and most studies have focused on groups of nurses, exploring the current status of their work engagement and the influencing factors, as well as the relationship with other work state indicators such as job satisfaction, psychological resilience, and turnover intention. Schaufeli et al. (2003) developed the Utrecht Work Engagement Scale (UWES), which is commonly used internationally and has been validated in China (Fong & Ng, 2012). Compared with other countries, the research on work engagement of medical workers in China started later. The current research has gradually expanded to the influence of work environment on work engagement, and the research variables are further deepened (Möckli et al., 2020; Ruiz-Frutos et al., 2022). The current studies show that people with high work engagement show positive attitudes toward jobs and organizations, including their job satisfaction (Mache et al., 2014), work motivation (Ferraro et al., 2020), commitment to the organization (Y. Tang et al., 2022), and lower turnover intention (Zhou et al., 2022). Work engagement may be an indispensable predictor of turnover intention that can complement job satisfaction, and work motivation.

In Chinese research, there are fewer studies on GPs' work engagement, and only a few studies have explored its relationship with job satisfaction and competence. For example, Jiao and Wang (2020) analyzed the correlation of three dimensions of job satisfaction, psychological capital, and work engagement of GPs in Shanghai, and the results showed that internal satisfaction and psychological capital had positive impacts on work engagement, which was measured using UWES. In discussing the higher overtime work found in GPs associated with professional identity, Li et al. (2020) highlight the effect of professional identity consistency with one's role which increases work engagement. Also, Ge (2023) found with a structural equation modeling that work engagement plays a mediating role in the process of career development affecting service value. Explorations in the nurse population, on the other hand, involved larger sample sizes and richer dimensions. Several studies have explored the relationship between work engagement and a variety of work environment indicators and psychological variables. Studies have demonstrated significant correlations between work engagement and multiple indicators of work status like organizational commitment (X. He et al., 2023), job satisfaction (B. Zhang et al., 2023), psychological resilience (J. Zeng et al., 2022), and workplace violence (Lin & Li, 2023). In the research on the current status of work engagement, some studies show that in the whole group of nurses, the level of work engagement of nurses in China is lower than that of Europe and the United States, and it is generally low. The influencing factors of work engagement mainly include age, marriage, job matching, job

characteristics, organizational environment, work-family conflict and job satisfaction. The research is more comprehensive and systematic.

There are also relatively few studies in other countries on work engagement in general practice, focusing mainly on nurse groups. The following four main themes were included: organizational antecedents of work engagement, personal antecedents, influential characteristics of nurse managers' work engagement, and outcomes of engagement (García-Sierra et al., 2016). In terms of organizational antecedents, the 22.1% variance in work engagement could be explained by six work environment indicators including workload, control, rewards, community, equity, and person-environment fit (PE-fit), and there was a significant association between personal factors such as psychological well-being, locus of control, and job satisfaction and work engagement (Porter & Wang, 2022). In terms of personal antecedents, there were mainly personal characteristics, including optimism, self-efficacy, and occupational characteristics, including occupational status, social interaction, and turnover intention. In terms of the outcomes of work engagement, work engagement tended to correlate with nurses' performance. It has also been suggested that work engagement is a significant predictor of job satisfaction and turnover intention, and other studies have found that work engagement mediated organizational acumen and willingness to stay.

As regards the effect on turnover intention, work engagement is often used as a mediator variable to bridge psychological indicators with turnover intention among healthcare workers. For example, Y. Tang et al. (2022) used the UWES to measure nurses' work engagement and linear regression to explore the relationship between security and turnover intention, and the mediating role of work engagement. There are also studies exploring the relationship between work environment and turnover intention and the mediating role of work engagement, such as B. Li et al. (2019) survey on nurses' expenditures in community health centers, which showed that work engagement mediated the relationship between work environment and turnover intention.

Although work engagement has been given the status of a direct intervening variable between work conditions and job satisfaction, we reason that when PE-fit is considered, it would be more theoretically sustained to conceive work engagement as a direct consequence of a better PE-fit. Additionally, work engagement is known to strongly relate to job satisfactions. Therefore, considering the conceptual model that has been drafted, we posit that work engagement is an intervening variable between PE-fit and job satisfaction.

Therefore, we hypothesize that:

H5: PE-fit has a positive indirect effect on job satisfaction via Work Engagement.

Looking back to the hypotheses stated so far, we trust the sequential process that links work environment to turnover intention can be already proposed. Therefore, we hypothesize that:

H6: Work environment has a negative indirect effect on turnover intention via a sequential mediation through PE-fit, and Job satisfaction.

H6a: Workload has a negative indirect effect on turnover intention via PE-fit, and job satisfaction

H6b: Compensation has a negative indirect effect on turnover intention via PE-fit, and job satisfaction

H6c: Relationships has a negative indirect effect on turnover intention via PE-fit, and job satisfaction

H6d: Job content has a negative indirect effect on turnover intention via PE-fit, and job satisfaction

H6e: Promotion has a negative indirect effect on turnover intention via PE-fit, and job satisfaction

H6f: External factors have a negative indirect effect on turnover intention via PE-fit, and job satisfaction

And considering the stated intervening role of work engagement in the fifth hypothesis, we hypothesize that:

H7: Work environment has a negative indirect effect on turnover intention via a sequential mediation through PE-fit, Work Engagement, and Job satisfaction.

H7a: Workload has a negative indirect effect on turnover intention via PE-fit, WEng, and job satisfaction

H7b: Compensation has a negative indirect effect on turnover intention via PE-fit, WEng, and job satisfaction

H7c: Relationships has a negative indirect effect on turnover intention via PE-fit, WEng, and job satisfaction

H7d: Job content has a negative indirect effect on turnover intention via PE-fit, WEng, and job satisfaction

H7e: Promotion has a negative indirect effect on turnover intention via PE-fit, WEng, and job satisfaction

H7f: External factors have a negative indirect effect on turnover intention via PE-fit, WEng, and job satisfaction

These general behavioral models depict an abstract conception of the individual, without considering the specific motivational profile of each GP, which should be accounted for in a

closer-to-reality explanatory model. Therefore, the literature review will ensue by exploring individual work motivations as a possible modulating factor in the whole process.

5.2.2.5 Work motivation

Work motivation is a key construct for the efficiency, quality outcomes, and productivity of healthcare organizations, and is closely related to medical personnel's turnover intention and job satisfaction. Within the long research record that work motivation has, many theories have been proposed and widely adopted across the years, with Self-Determination Theory being currently the most comprehensive and therefore, it is the first choice to understand the intentions of employees to stay or leave, as it can provide a more in-depth analysis. However, despite its classic nature Herzberg's Dual-Factor Theory also deserves exploration due to its intuitive and simple approach that can easily leverage decisions related to work context within the reach of decision makers. Therefore, this section will explore Herzberg's Dual-Factor Theory and Deci and Ryan's (2012) Self-Determination Theory as the most central and comprehensive in understanding voluntary turnover.

5.2.2.6 Motivation theory: Herzberg's Dual-Factor Theory

The Dual-Factor Motivation Theory was proposed by Herzberg (1959), an American behavioral scientist. Herzberg classified the factors that affect people's motivation into two categories: hygiene factors and motivators. Hygiene factors are the preventive factors that can lead to employee dissatisfaction, including company policies and management, technical supervision, salary, working conditions, and interpersonal relationships, which are related to the atmosphere and environment of the work and are external factors. The absence of hygiene factors can reduce job satisfaction, though hygiene factors have no significant effect on improving job satisfaction. Motivators include the work itself, recognition, achievement, and responsibility, which are related to the content of the work itself. Increasing motivators can greatly improve employee's job satisfaction and enthusiasm. However, only by continuously increasing motivators on the premise of meeting hygiene factors can motivation be effective and job satisfaction be promoted. According to the Dual-Factor Theory, there are four possible combinations: high hygiene + high motivator, which is an ideal situation with high employee's enthusiasm and few complaints; high hygiene + low motivator, where employees rarely complain but have low enthusiasm, and this job is seen as a salary; low hygiene + high motivator, where employees have high enthusiasm but many complaints, and the job is exciting and challenging but the salary and

working conditions do not meet the standards; and low hygiene + low motivator, which is the worst situation where employees have no enthusiasm and many complaints.

The Dual-Factor Theory has been widely applied in various areas such as employee motivation systems, job satisfaction, working environment, and psychological states. In the medical field, it has mainly focused on the job satisfaction, turnover intention, occupational burnout, and work motivation of nurses and doctors. Research based on Herzberg's Dual-Factor Theory has mostly utilized qualitative methods such as semi-structured interviews, in addition to quantitative analysis through surveys. Job satisfaction studies have predominantly centered on the nurses. For instance, Holmberg et al. (2018) used semi-structured interviews to investigate the job satisfaction of psychiatric nurses in Sweden, analyzing the relationship between Herzberg's Dual-Factor Theory and their job satisfaction. The theory was found to be useful in exploring job satisfaction in this context, and clinical ladder programs should be established to recognize and motivate nurses' ongoing professional development. Hunt et al. (2012) surveyed nurses in American nursing homes to explore retention strategies, employee benefits, work environment characteristics, and the relationship between these factors and nurses' retention. They utilized Herzberg's Dual-Factor Theory to explain the research framework of nursing home retention.

Van de Klundert et al. (2018) explored the turnover intention of healthcare workers in rural Ethiopia through qualitative methods such as interviews and focus group discussions, using Herzberg's Dual-Factor Theory to categorize four mobility mechanisms: lack of social and personal opportunities, disharmony between management and professional logic, difficulty in accepting service operation standards, and lack of financial improvement opportunities. In terms of occupational burnout, Alrawashdeh et al. (2021) used semi-structured interviews based on Herzberg's Dual-Factor Theory and the job demands-resources model, in addition to questionnaire, to examine the burnout and job satisfaction of Jordanian doctors during the COVID-19 period. The results showed that evidence-based decision-making at the institutional and national levels and appropriate utilization of financial and human resources are crucial for the sustainability of the healthcare workforce, especially during epidemics.

As regards the application of this theory to the Chinese healthcare context, Xiao et al. (2017) analyzed the work motivation of medical personnel in a pilot healthcare reform unit in Beijing, using the Dual-Factor Theory that covers factors related to the work itself, reporting mechanisms, and the work environment. The results showed that the work motivation of medical personnel mainly stemmed from intrinsic factors, with varying levels among different positions. Han et al. (2019) surveyed 317 clinical medical personnel in Beijing Children's

Hospital and assessed work motivation from the perspectives of management systems, competency, career development, and social environment. The overall work motivation score was high, and factors such as gender, personal relationships, position, and length of service had a significant impact on the score. Yuan et al. (2010) explored the current status and influencing factors of intrinsic work motivation among rural health service personnel under the current incentive mechanism. They proposed a framework in which external incentive mechanisms could affect intrinsic work motivation and, thus, change behavior and performance. The results indicated that rural health service personnel tended to work hard, but their work abilities were still lacking, requiring reforms in their incentive mechanism. Likewise, studies on work motivation in China have explored nurses' groups more than other healthcare professionals. Besides exploring the current situation, they have also investigated the relationships between work motivation and work engagement, innovative behavior, nurse empathy, and self-efficacy, which categorize work motivation into the classic dimensions: intrinsic and extrinsic motivation and applied existing scales. In a study conducted by Mu and Qian (2021) on the current status of work motivation among nurses in the disinfection center of medical institutions in Nantong City, a job preference scale was used, and the results showed that the work motivation scores of disinfection center nurses were low, indicating a need for corresponding intervention measures. Song and Shen (2022) found that both intrinsic and extrinsic motivation have a positive effect on nurses' job engagement. M. Dong (2012) found a significant positive correlation between internal motivation and nurses' innovative behavior. In a study by Jin and Zhang (2015), it was suggested that nurses' work motivation is positively correlated with their empathy and can indirectly affect the organizational climate.

In relation to turnover intention, motivational-based studies have mostly focused on rural doctors. For example, Y. Chen et al. (2022) reviewed the factors affecting the turnover intention and job satisfaction of Chinese rural doctors, using Herzberg's Dual-Factor Theory to analyze the factors, which were classified into sociodemographic factors, motivational factors, and healthcare factors combining with China's traditional culture and national conditions.

This theory is a classic and fundamental one that has laid the foundation for more detailed theories, such as the most comprehensive Self-Determination Theory.

5.2.2.7 Self-Determination Theory

Self-Determination Theory (SDT) is a motivational process theory proposed by American psychologists Deci and Ryan in 2000, which focuses on human autonomy in decision-making (Deci & Ryan, 2012). Self-determination is a potential for experiential choice, where

individuals make free choices in light of their personal needs and environmental information. The theory posits that humans are inherently positive and possess potential for psychological growth and development. It suggests that all individuals have three basic psychological needs - autonomy, competence, and connection - which serve as the foundation for growth and development. When these psychological needs are satisfied, individuals tend to develop in a positive and healthy direction. The theory assumes that humans have an innate tendency to pursue psychological growth and development, striving to cope with ongoing challenges and integrate external experiences with self-concept. However, this innate tendency does not automatically operate, but rather requires continuous nurturing and support from the social environment to function effectively. In comparison to prior motivational theories, SDT highlights the importance of the organic interaction between individuals and their social environment and considers this dialectical relationship as the basis for predicting individual behavior, experience, and growth (J. D. Liu et al., 2013). Figure 5.1 shows SDT motivation continuum.

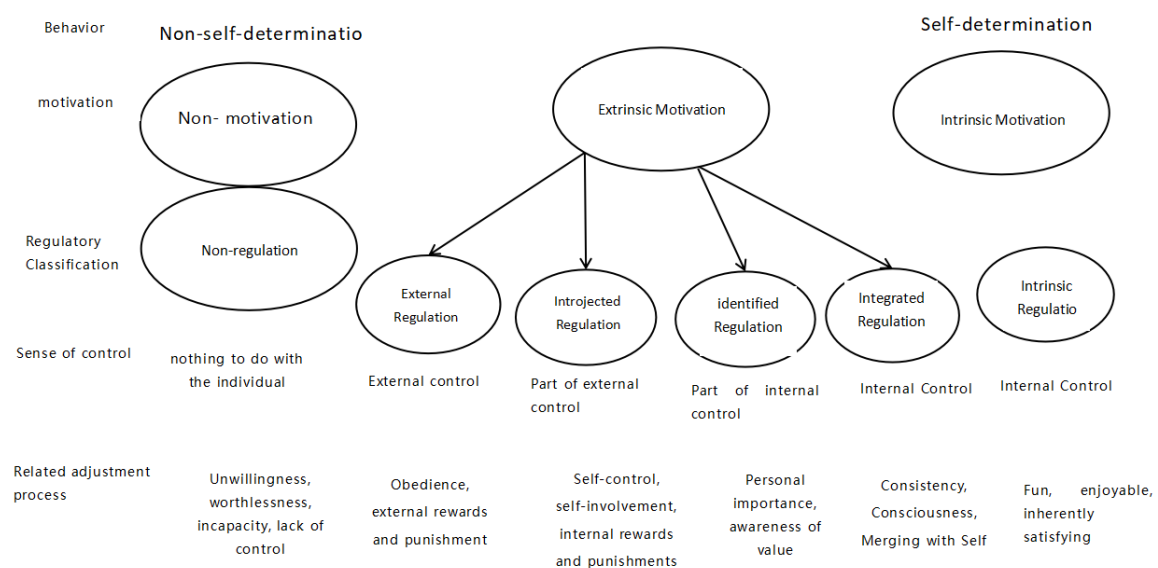


Figure 5.1 SDT motivation continuum

A fundamental postulate of SDT states that individuals' internal motivation for work is based on the inherent attractiveness of the work itself, and when individuals are in a high state of self-determination, their motivation is internally driven.

Currently, research on SDT mainly focuses on four areas according to Liu and Zhang (2010). First, in the context of students' learning, education, and training, numerous studies grounded in SDT have investigated the effects of parental and teachers' support for autonomy on students' motivation, psychological health, learning, and academic achievement. Second, in the area of psychological therapy, incorporating SDT principles into intervention measures can

increase individuals' life satisfaction and fulfillment of psychological needs. Third, SDT theory has been applied to examine the motivational and persistence changes of athletes receiving self-support. Finally, in the realm of employees' job quality and satisfaction, there is a positive correlation between autonomous management and positive work outcomes, and good self-motivation is positively related to job satisfaction.

In the context of healthcare professionals, research has mostly focused on medical students' education and training, nurses' management, and healthcare workers' work motivation. The SDT has been applied to the measurement of self-motivation among nurses (Toode et al., 2015), doctors (Moller et al., 2019), and healthcare workers (H. Li et al., 2022).

A review showed that there are five main factors affecting nurses' work motivation: workplace characteristics, working conditions, personal characteristics, personal priorities, and internal psychological states (Toode et al., 2011). Multiple studies have also explored the relationship between nurses' work motivation and their turnover intention (Galletta et al., 2011), job satisfaction (Gaki et al., 2013; Hoonakker et al., 2013), work behavior (Galletta et al., 2019), workplace (Koch et al., 2014), internal psychological states (Toode et al., 2014), work engagement (D. Zeng et al., 2022), and fatigue (Austin et al., 2020). Perlman et al. (2018) investigated the relationship and impact of motivational measures on the stigmatization of pre-registration nurses, and the results supported the importance of professional self-determination and its potential linkage to high-quality nursing. They suggested that future research should adopt an SDT perspective to understand its application and significance in nurse education. Perlman et al. (2020) conducted a study using the SDT to examine the effects of a self-supportive learning environment on the learning effect of undergraduate nursing students. The study found that teaching and learning in a self-supportive environment were effective in enhancing students' skills and educational development. Toode et al. (2015) also used the SDT to investigate the motivation of nurses in Estonian hospitals, as well as how individual and organizational background factors influence their work motivation. The study described the quantity and direction of work motivation among hospital nurses and emphasized the background factors that should be considered to maintain and increase their intrinsic work motivation. For example, Moller et al. (2019) used the Work Extrinsic and Intrinsic Motivation Scale (WEIMS) based on Self-Motivation Theory to survey 2,247 American physicians, exploring the relationship between physicians' work motivation and occupational health (including job satisfaction, burnout, and intention to leave), and the results showed that physicians with more autonomous motivation had better occupational health, and creating a healthcare work environment that supports autonomous motivation may benefit the well-being

of physicians and patients. In addition, there are studies that explore the impact of work motivation on job satisfaction (Lambrou et al., 2010; Peters et al., 2010) and turnover intention (Galletta et al., 2011).

In Chinese research on the medical field, the application of SDT is still relatively scarce, mainly focusing on nurses and exploring nurse management, occupational burnout, and psychological resilience. For example, J. Li et al. (2019) explored the effects of management methods based on SDT on ward nurses and found that applying it in nurse management can effectively improve nurses' motivation, work status, and psychological health. S. Zhao et al. (2020) analyzed the factors affecting the occupational burnout of medical staff based on SDT and classified them into internal and external motivation factors according to the theory, comparing their impact on occupational burnout. The results showed that intrinsic motivation has a greater impact on occupational burnout than extrinsic motivation. Based on SDT, Xue et al (2023) supported an indirect effect of moral distress on burnout via psychological capital in a nursing population. However, there is currently no research on the application of SDT to general practitioners in China, and the SDT-based turnover intention model of Chinese general practitioners still needs to be explored.

The work motivation of GPs refers to the intrinsic drive to be highly committed to work, which determines their psychological degree of willingness to work with high quality. The work process of GPs involves close contact with community residents, and as part of primary healthcare organizations, their work is more focused on health care, rehabilitation, and prevention. Compared with specialist doctors, the work content is more process-oriented, repetitive, and proactive intrinsic motivation can help general practitioners maintain their enthusiasm for work (S. Wang et al., 2022). Due to its general nature of work responsibilities, the construction of a turnover intention model for general practitioners, based on SDT should be designed as a general model considering internal and external motivation, and include motivation as a moderating variable considering the individual differences in motivation.

Studies specifically exploring the work motivation of GPs are lacking, although one study discussed it as a dimension of their implicit competency. P. Wang et al. (2022) proposed that improving the self-awareness of general practitioners, clarifying the rewards and punishments system in medical institutions, and enacting policies that favor their development are effective ways to enhance their work motivation and competency. Most studies on work motivation among healthcare professionals are descriptive studies and analyses of influencing factors, with a relatively small number based on SDT.

In considering these studies and findings, one must mind how motivation was measured in relation to SDT. Currently, there are international studies that have proposed a work motivation scale specifically for healthcare professionals based on SDT, called the Work Motivation Scale for Health Workers (WMSHW), which contains both intrinsic and extrinsic motivation. Lohmann et al. (2017) conducted a cross-sectional study of 1,142 nurses in Burkina Faso to validate and evaluate the effectiveness of the scale, and the results showed that the scale could measure motivation effectively. H. Li et al. (2022) translated, revised, and validated the scale, and surveyed 1,341 Chinese healthcare workers, showing that the Chinese version of WMSHW has good reliability and validity, and can be used as a tool to measure and evaluate the work motivation of Chinese healthcare workers.

Regarding the specific influence of work motivation on turnover intention, Galleta et al. (2011) used a sample of 442 nurses and cross-validated their results to demonstrate a significant correlation between work motivation and turnover intention, with affection commitment serving as a significant mediator between the two. H. Li et al. (2022) conducted a survey of 1341 primary healthcare workers in six provinces in China, using the translated and validated WMSHW instrument, and categorized them into four levels of motivation. The results showed that both controlled and autonomous motivation could reduce turnover intention, with autonomous motivation having a stronger effect. Bonenberger et al. (2014) surveyed 256 healthcare workers in Ghana and found that the turnover intention rate was as high as 69%. They also found that work motivation and job satisfaction were significantly correlated with turnover intention, with higher levels of both reducing the risk of healthcare workers leaving their jobs. Fernet et al. (2021) analyzed longitudinal data from Canadian nurses over 12 months and found that the relationship between occupational commitment and turnover intention was mediated by autonomous motivation. Their another study found that autonomous motivation, defined as nurses completing their work primarily for the pleasure and satisfaction it brings them or because they personally endorse the importance or value of their work, negatively predicted turnover intention through goal-specific affective commitment, while controlled motivation (nurses completing their work mainly due to internal or external pressure) is positively correlated with the sustained commitment to profession and organization, but it predicts turnover intention positively (Fernet et al., 2017). A conceptual model of nurses' turnover intention suggests that indirect predictors of turnover intention through job satisfaction include motivation and intrinsic motivation (Smokrović et al., 2022).

Although SDT presents a rich array of motivations, the most contrasting ones seem to be Extrinsic versus Intrinsic. These are the ones that might be more easily grasped by managers

and decision makers to design measures conducive to improve the system as regards employee turnover.

Therefore, we hypothesize that:

H8: There is an interaction between work environment and motivation in such a way that when more motivation strengthens the direct positive effect of work environment on PE-fit.

Considering the main motivations in SDT (Extrinsic motivation, Intrinsic motivation, introjected motivation) this hypothesis entails three sub-hypotheses as follows:

H8a: There is an interaction between work environment and intrinsically motivation in explaining PE-fit in such a way that more intrinsic motivation strengthens the direct positive effect.

Therefore, considering all of the dimensions within work environment the following sub-hypotheses are proposed:

H8a1: There is an interaction between workload effort and intrinsic motivation in explaining PE-fit in such a way that more intrinsic motivation strengthens the direct positive effect.

H8a2: There is an interaction between compensations and intrinsic motivation in explaining PE-fit in such a way that more intrinsic motivation strengthens the direct positive effect.

H8a3: There is an interaction between relationships and intrinsic motivation in explaining PE-fit in such a way that more intrinsic motivation strengthens the direct positive effect.

H8a4: There is an interaction between job content and intrinsic motivation in explaining PE-fit in such a way that more intrinsic motivation strengthens the direct positive effect.

H8a5: There is an interaction between promotion and intrinsic motivation in explaining PE-fit in such a way that more intrinsic motivation strengthens the direct positive effect.

H8a6: There is an interaction between external factors and intrinsic motivation in explaining PE-fit in such a way that more intrinsic motivation strengthens the direct positive effect.

As regards extrinsic motivation, we posit that the nature of this driver (comprehending both material gains and social recognition gains) is prone to having a modulating effect on the turnover model. Therefore, we hypothesize that:

H8b: There is an interaction between work environment and extrinsic motivation in explaining PE-fit in such a way that more extrinsic motivation strengthens the direct positive effect.

H8b1: There is an interaction between workload effort and extrinsic motivation in explaining PE-fit in such a way that more extrinsic motivation strengthens the direct positive effect.

H8b2: There is an interaction between compensations and extrinsic motivation in explaining PE-fit in such a way that more extrinsic motivation strengthens the direct positive effect.

H8b3: There is an interaction between relationships and extrinsic motivation in explaining PE-fit in such a way that more extrinsic motivation strengthens the direct positive effect.

H8b4: There is an interaction between job content and extrinsic motivation in explaining PE-fit in such a way that more extrinsic motivation strengthens the direct positive effect.

H8b5: There is an interaction between promotion and extrinsic motivation in explaining PE-fit in such a way that more extrinsic motivation strengthens the direct positive effect.

H8b6: There is an interaction between external factors and extrinsic motivation in explaining PE-fit in such a way that more extrinsic motivation strengthens the direct positive effect.

As regards introjected motivation, we posit that the nature of this driver (comprehending both material gains and social recognition gains) is prone to having a modulating effect on the turnover model. Therefore, we hypothesize that:

H8c: There is an interaction between work environment and introjected motivation in explaining PE-fit in such a way that more extrinsic motivation strengthens the direct positive effect.

H8c1: There is an interaction between *workload effort* and introjected motivation in explaining PE-fit in such a way that more *introjected motivation* strengthens the direct positive effect.

H8c2: There is an interaction between *compensations* and introjected motivation in explaining PE-fit in such a way that more *introjected motivation* strengthens the direct positive effect.

H8c3: There is an interaction between *relationships* and introjected motivation in explaining PE-fit in such a way that more *introjected motivation* strengthens the direct positive effect.

H8c4: There is an interaction between job content and introjected motivation in explaining PE-fit in such a way that more introjected motivation strengthens the direct positive effect.

H8c5: There is an interaction between promotion and introjected motivation in explaining PE-fit in such a way that more introjected motivation strengthens the direct positive effect.

H8c6: There is an interaction between external factors and introjected motivation in explaining PE-fit in such a way that more introjected motivation strengthens the direct positive effect.

Finally, by integrating these conditions effects stated in the previous hypothesis with the sequential mediation as stated in hypothesis 7, we posit a moderated sequential mediation model that indirectly links work environment to turnover intention via PE-fit, work engagement and job satisfaction considering the interaction with motivation.

For parsimony's sake, we will not state all of the sub-hypotheses but they will follow the same rationale as stated in hypothesis 8. Therefore, we hypothesize that:

H9a: Intrinsically motivated individuals will be steady as regards all the indirect effects of Work Environment on Turnover Intentions to the exception of job content, where more intrinsic motivation strengthens the direct positive effects.

H9b: There is an interaction between the indirect effect of work environment on turnover intentions with the extrinsic motivation in such a way that more extrinsic motivation strengthens the indirect positive effect.

H9c: There is an interaction between the indirect effect of work environment on turnover intentions with the introjected motivation in such a way that more introjected motivation strengthens the indirect positive effect.

5.2.2.8 Contextual variables

In the field of management, all factors that constitute the macro environment and are beyond the control of an organization are considered background variables. This means that even factors that are far removed from the organization and beyond its control can impact its performance, strategy, and decision-making processes. Background variables may include economic conditions, demographics, social factors, political factors, legal factors, and technological factors. Economic background may encompass economic growth, unemployment rates, and inflation rates. Demographic background may include population size, gender ratio, and population density. Social background may include people's lifestyles, societal values, social stability, and culture. Political and legal background may encompass economic policies, labor laws, incentives policies, and social systems. Technological background may include technological innovation, patent protection, research incentives, and development.

Background variables in the healthcare field are often related to community characteristics, healthcare resources (McCall-Hosenfeld et al., 2012), hospital leadership type and leadership (Zaheer et al., 2021). Background variables related to employee turnover, job satisfaction, and

job performance also focus on organizational culture (Rofcanin et al., 2017), fairness (Oluwafemi, 2013), and management support (Sadaqat et al., 2022). However, there has been limited exploration of background variables in the area of healthcare personnel turnover. A study on the turnover intentions of healthcare personnel in Critical Access Hospitals (CAHs) in the United States proposed the hospital's financial distress as a background variable and investigated how it affects the relationship between interpersonal support, supervisor support, employee dedication, and turnover intentions. The results showed statistically significant differences in these relationships among hospitals experiencing financial distress and high levels of financial distress, demonstrating the value of using organizational financial distress as a background variable when studying motivating factors for employee turnover (Boakye et al., 2021). In addition, when considering factors related to turnover among general practitioners, national policies such as economic and incentive policies, societal values such as the level of respect for general practitioners in the community, and community environment and population density can be further explored as background variables.

5.2.3 Specific studies of GP attrition

Currently, research on the attrition of general practitioners is mainly focused on investigating the turnover rate or intention of GPs, identifying the factors influencing GP turnover, and proposing strategies to retain GPs. Some examples of such research are summarized below.

Review studies have systematically summarized the current situation of GP turnover in some countries. Shen et al. (2020) conducted a review of GP turnover intention, which included 25 cross-sectional studies with a total of 27,285 participants. They summarized the global prevalence of GP turnover intention and its related factors, finding that about half of GPs globally have plans to leave their current positions. Factors related to turnover intention were higher professional titles, lower income levels, lower job satisfaction, and lower morale. R. He et al. (2020) conducted a review of 16 cross-sectional studies conducted in China involving 37,672 primary healthcare workers. They summarized the prevalence and influencing factors of turnover intention among primary healthcare workers in China. The results showed that the turnover intention rate of primary healthcare workers in China was 30.4%, with the highest rate in eastern provinces and community primary healthcare institutions. Twenty-one factors were significantly associated with turnover intention, including gender, age, education level, marital status, professional title, length of service, salary, social status, organizational affiliation, work

stress, and job satisfaction. These factors also included opportunities for learning and training, interpersonal relationships, working conditions, and the work environment.

Cross-sectional and cohort studies have extensively explored the factors affecting the turnover rate of general practitioners. Gan et al. (2020) employed a multi-stage stratified random sampling method and structured questionnaires to survey 3,236 Chinese general practitioners between October 2017 and February 2018, and used multivariate linear stepwise regression analysis to identify factors related to turnover intention. They found that over 70.0% of Chinese general practitioners had moderate to high turnover intention and observed significant gender and regional differences in turnover intention among general practitioners. Bardoel et al. (2020) conducted a turnover rate survey of a cohort of 1,900 female and 2,000 male general practitioners in Australia, and determined the factors related to labor force attrition rates of female and male general practitioners respectively, with a particular focus on part-time work and parenting, and distinguishing between planned and unplanned turnover factors. The results showed that part-time work was associated with turnover intention and actual turnover rates, and male general practitioners who worked part-time had higher turnover intention and actual turnover rates than female general practitioners. Female general practitioners were more likely to experience unplanned turnover than male practitioners, and those under the age of 40 and with children had the highest rates of unplanned turnover. Parisi et al. (2021) quantified the turnover rate of UK general practitioners from 2007 to 2019, describing its temporal trends, regional differences, and association with practice characteristics. The results showed that the turnover rate increased over time, with the 75th percentile rising from 11% in 2009 to 14% in 2019, and reaching a peak of 18.2% in 2013-2014. The proportion of clinics with turnover rates of 10%-40% within a year almost doubled from 14% in 2009 to 27% in 2019, and the poorest regions had the highest turnover rates of general practitioners. Y. Fang et al. (2022) conducted a cross-sectional study of 303 Singaporean general practitioners and interviewed some participants to explore the factors related to their job satisfaction and turnover intentions, as well as recommendations for retaining general practitioners. The results showed that 14.4% of general practitioners planned to permanently leave the profession, 12.6% planned to take a break, and 51.3% planned to reduce their clinical hours. Higher salary, recognition of general medicine and family medicine as medical specialties, and alleviation of litigation pressure in medical practice were identified as the most important factors for retaining general practitioners. Assefa et al. (2016) observed 2,300 Ethiopian doctors (84.2% of whom were general practitioners) for six years, describing their training opportunities, distribution, and mobility rates, and analyzed the factors affecting the turnover rate of general practitioners. The results

showed that female, young and inexperienced doctors, and those working in remote areas had high turnover rates.

Several studies have explored the relationships between multiple independent variables, such as job satisfaction and occupational burnout, and the intention to leave. T. Zhang et al. (2021) applied a structural equation model to investigate the interrelationships between professional identity, job satisfaction, occupational burnout, and turnover intention among Chinese general practitioners, and examined whether job satisfaction and occupational burnout mediated the relationship between professional identity and turnover intention. The results indicated that professional identity had an indirect negative effect on intention to leave through the mediating roles of job satisfaction and occupational burnout. Ran et al. (2020) conducted a cross-sectional survey of 1,279 primary healthcare workers in Wuhan, China, using a structural equation model to examine the mediating role of job satisfaction in the relationship between job burnout and intention to leave. The results showed that job satisfaction played a mediating role between job burnout and intention to leave, and that job burnout, job satisfaction, age, education level, monthly income, employment status, and night shifts had significant effects on intention to leave. Feng et al. (2023) used hierarchical regression analysis to explore the interrelationships between job satisfaction, professional identity, occupational burnout, and intention to leave among Chinese general practitioners, and evaluated the mediating role of job satisfaction in the relationship between occupational burnout and intention to leave, as well as the moderating role of professional identity in the relationship between occupational burnout and job satisfaction. The results showed that the impact of emotional expression and job intentions on turnover intention was moderated by job satisfaction, and the impact of emotional expression on job satisfaction was moderated by professional identity. Heponiemi et al. (2013) conducted a four-year prospective study of 1,581 Finnish general practitioners to investigate the effect of organizational justice. The study found that new general practitioners experienced decreased job satisfaction and job involvement, but high levels of organizational justice could buffer these negative effects. However, compared with other physician positions, new public general practitioners were 2.8 times more likely to have intention to leave, while those who continued to work as general practitioners were 1.6 times more likely to have intention to leave. Organizational justice did not moderate these effects, indicating the need to focus on the fairness of management for new general practitioners. Zhou et al. (2022) conducted a survey of 348 British general practitioners and used logistic regression to explore the interrelationships between diagnostic uncertainty, occupational burnout, job satisfaction, and turnover intention.

The results showed that diagnostic uncertainty had a negative impact on the health and intention to leave of general practitioners.

Qualitative studies have mainly proposed relevant strategies to reduce the turnover rate and encourage the retention of general practitioners. Chilvers et al. (2019) developed a set of policies and strategies aimed at improving GP retention rates using the RAND/UCLA expert consensus method and tested their appropriateness. A panel of 28 GP experts completed two online surveys to test 54 potential policies and strategies, focusing on factors that influence job satisfaction such as happiness, workload, incentives and remuneration, flexible work arrangements, and human resources systems. The results showed that 24 of these policies were considered appropriate and could potentially improve job satisfaction and work-life balance to enhance GP retention rates. Wieland et al. (2021) conducted a meta-analysis of qualitative studies on GP retention in remote areas of Canada and Australia, summarizing the factors affecting GP turnover rates, including peer and professional support, organizational support, remote lifestyle and work uniqueness, burnout and vacation, personal and family issues, and cultural and gender issues. They proposed that a central coordinating agency could be arranged to implement multifactorial strategies to retain GPs.

Currently, research on GPs is mostly conducted in China, the UK, Australia, and other high-income countries. The research types are mostly cross-sectional studies that investigate turnover rates and related influencing factors. Some studies use structural equation models to explore the relationship between job satisfaction, occupational burnout, professional identity, organizational fairness, and turnover intentions. There is less research on cohort studies, and they mostly focus on exploring factors affecting turnover intentions. Qualitative research uses expert consensus methods and interview methods to propose specific strategies for retaining GPs.

5.3 Method

5.3.1 Data analysis strategy

Two attention control items (e.g. for attention control please answer this item as "5") were included in the questionnaire to gauge quality of answers (See Annex C for specific questionnaire). The poorer quality questionnaires were first eliminated based on the results of both quality control questions. Missing values were found ranging between 0.09% to 2.85%

which, according to Hair et al. (2019) were replaced considering the type of data. Thus, the mean was used to fill in for continuous variables, and for discrete variables by mode.

Psychometric analyses were deployed to verify the validity and reliability of the measures. The reliability of the scale was tested by Joreskog's Composite Reliability (Jöreskog, 1971) and Cronbach-alpha where values of .70 or above are indicative of acceptable reliability (Nunnally & Bernstein, 1994). Construct validity was tested with Confirmatory Factor Analysis and the fit was judged based on Hair et al. (2019) recommendations as follows: a non-significant X^2 suggests good fit, a normed X^2 below 3, Comparative Fit Index (CFI, >.95), Tucker-Lewis Index (TLI, >.95), Root Mean Square Error of Approximation (RMSEA, <.07), and Standardized Root Mean Square Residual (SRMR, <.08). Convergent validity was tested with the Average Extracted Variance (AVE, .50 minimum) (Fornell & Larcker, 1981), and discriminant validity with HTMT (Henseler et al., 2015) with the liberal threshold of .90 and the strict threshold of .85.

The overall measurement model was tested with CFA joining all the latent variables and respective items into a single CFA, and the comparison models were designed to fuse latent constructs adjacent in the conceptual model especially those that were collected simultaneously in time. The measurement models and structural equations modelling adopts the same fit indices and thresholds than the construct validity guidelines from Hair et al. (2019).

5.3.2 Procedure

Paper questionnaires were distributed to a total of 1,806 GPs in Pudong New Area for the survey, with a one-month interval between the first and second waves of questionnaires. After the paper questionnaires were collected, data were entered and exported through Epidata. The input data entry quality control was conducted with a twin data entry with two independent individuals, contrasting at the end both entry versions to check precision. In case any mismatch was found, a check against the paper version was made to guarantee data accuracy. The time for data collection was May 2023 and the end of June 2023. Considering the hectic professional life of GPs, it is reasonable to expect some questionnaire filling can be done too quickly without due attention. To guarantee data quality we excluded all cases where at least one of the answers to two attention-control items (e.g. "just for control purposes of attention please answer this item as 5") was wrong. We also excluded answers that streamlined, i.e. had monotonous answer where some within-scale variation was expectable (negatively written items).

5.3.3 Sample

The first wave of data generated a total of 1,786 questionnaires retrieved (98.9% response rate), and the second wave of data generated a total of 1,768 questionnaires (97.9% response rate) from which 1,705 matching questionnaires were retrieved. This shows 94.4% of the total number of GPs from Pudong New Area invited to participate in the study participated consistently in the two waves. After excluding the poor-quality questionnaires, a valid sample of 1,156 questionnaires were retained after the two rounds, with an effective response rate of 64% of the universe of GPs in Pudong New Area which is within the normal range of response rate to questionnaire as found by Holtom et al. (2022).

5.3.4 Measures

5.3.4.1 Turnover intention

The turnover intention (wave 2) scale is a 3-item scale developed by Michaels and Spector (1982), which comprises questions about the subject's willingness to leave a job ("1. I have often given serious thought to leaving my current job; 2. I intend to resign from my current job; and 3. I have begun to look for another job"). Each entry was rated on a seven-point Likert scale from 1 (strongly disagree) to 7 (strongly agree) with higher scores indicating greater willingness to leave.

The confirmatory factor analysis (Figure 5.2) showed a case of just identification (Hair et al., 2019) with all items' loading significantly on the factor ($It1=.741$, $It2=.980$, $It3=.771$). Additionally, the solution has good convergent validity ($AVE=0.701$) as well as reliability ($CR=.874$).

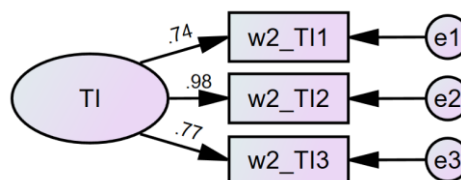


Figure 5.2 The CFA for turnover intention

5.3.4.2 Work environment

The work environment scale (wave 1) was constructed forming indicators based on the content analysis results of the interviews in Study 2, containing 30 items divided into six

dimensions: **workload effort** (6 items, “Resources (equipment/human resources)”, “Working hours”, “Staffing level”, “Workload intensity”, “Commuting time”, “Workload distribution), **compensation** (5 items, “Salary”, “Performance bonus”, “Policy-based subsidy”, “Status of GP”, “Professional identity and belongingness”), **relationships** (5 items, “Relations with patients”, “Recognition from patients”, “Relations with managers/ superiors”, “Relations with colleagues”, “Recognition from superiors), **job content** (5 items, “Paperwork”, “Follow-up”, “Diagnosis and treatment”, “Requirements of performance evaluation”, “Case mix (range of patient problems)”, **promotion** (4 items, “Professional title progression opportunities”, “Current professional title”, “Training opportunities”, “Degree program opportunities”) and **external factors** (5 items, “Family member distance”, “Housing cost”, “Special work related to pandemic”, “Attractiveness of other professions”, “Health demand of local residents”). A five-point Likert scale was used to evaluate the work environment from 1 (very dissatisfied) to 5 (very satisfied) with higher scores indicating greater satisfaction with the work environment.

A confirmatory factor analysis (Figure 5.3) of the original structure showed poor fit indices ($X^2(390)=4883.669$; $X^2/df=12.522$ $p<.001$; CFI=.823 ; TLI=.803 , RMSEA=.100 CI90[.097,.102], $PClose<.001$; SRMR=.0702). By using Lagrange multipliers, offending item were sequentially removed to find a good fitted model ($X^2(175)=862.906$; $X^2/df=4.931$ $p<.001$; CFI=.958 ; TLI=.949 , RMSEA=.058 CI90[.054,.062], $PClose<.001$; SRMR=.0484) that retained 22 items and did not change the original 6-factor structure. All latent constructs have acceptable reliability ($CR_{working\ conditions}=.875$; $CR_{compensation}=.912$; $CR_{relationships}=.856$; $CR_{jobcontent}=.888$; $CR_{promotion}=.883$; $CR_{externalfactors}=.753$) as well as convergent validity ($AVE_{working\ conditions}=.586$; $AVE_{compensation}=.724$; $AVE_{relationships}=.604$; $AVE_{jobcontent}=.726$; $AVE_{promotion}=.717$; $AVE_{externalfactors}=.604$). The factor solution also has good discriminant validity with no value reaching the .85 threshold (the highest HTMT is .745 observed between working conditions and compensation).

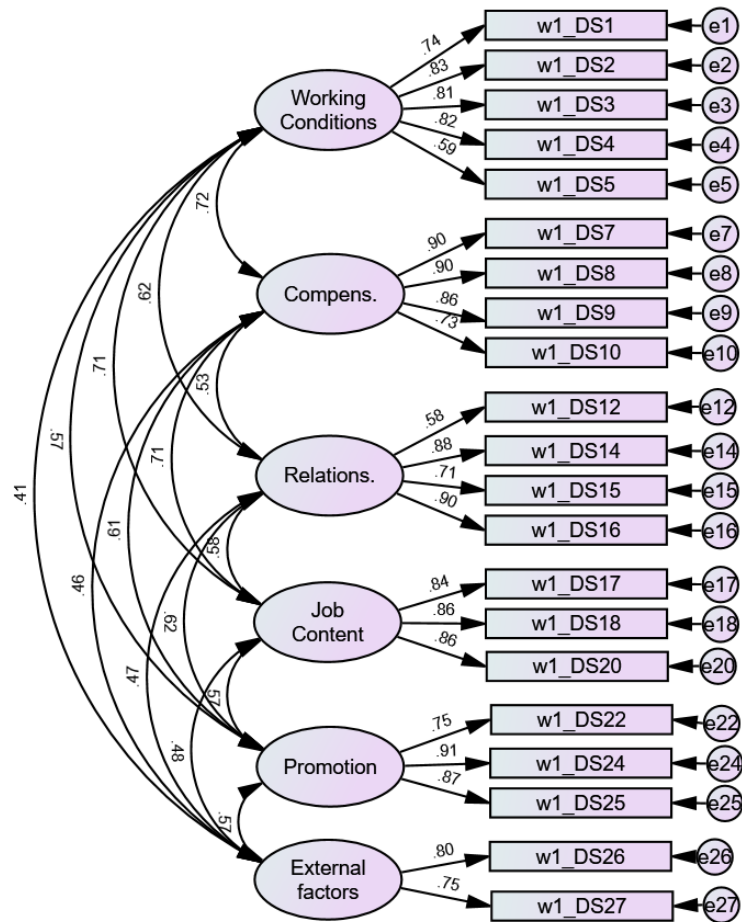


Figure 5.3 CFA for work environment

5.3.4.3 Job satisfaction

Overall job satisfaction (wave 2) was measured with the Short Index of Job Satisfaction (SIJS-5) (Judge et al., 2000) that comprises five items (e.g. “I feel fairly satisfied with my present job.”). The confirmatory factor analysis (Figure 5.4) showed unacceptable fit indices ($X^2(5)=311.569$; $X^2/df=62.314$ $p<.001$; CFI=.864 ; TLI=.729 , RMSEA=.230 CI90[.209,.252], PClose<.001; SRMR=.1096) and Lagrange multipliers indicate the reverse items should be excluded. By excluding these and inserting an additional identification, the model showed good fit ($X^2(1)=3.939$; $X^2/df=3.939$ $p=.047$; CFI=.998; TLI=.995; RMSEA=.050 CI90[.005,.107], PClose=.388; SRMR=.0069) as well as acceptable convergent validity (AVE=.694) and reliability (CR=.872).

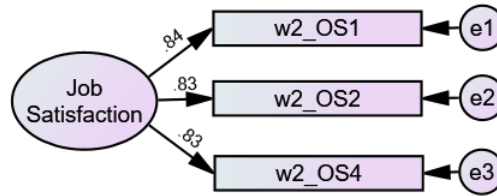


Figure 5.4 CFA for Overall Job Satisfaction

5.3.4.4 Work engagement

Work engagement was measured (wave 1) with Work Engagement (UWES) (Schaufeli & Bakker, 2003) that comprises nine items (e.g. “At my job, I feel strong and vigorous”). The Confirmatory factor analysis (Figure 5.5) showed unacceptable fit indices ($X^2(24)=461.769$; $X^2/df=19.240$ $p<.001$; CFI=.956 ; TLI=.934, RMSEA=.126 CI90[.116, .136], $PClose<.001$; SRMR=.0069) concomitant with indication of indistinguishable factors ($HTMT_{vigour/dedication}=.904$; $HTMT_{vigour/absorption}=.864$; $HTMT_{dedication/absorption}=.918$) which suggest items aggregate on a single factor. This solution was tested but we found issues also with unacceptable fit indices and a 2nd order factor showed a Haywood case (Hair et al., 2019). Lagrange multipliers suggested systematic covariances between errors within the same 1st order factor, which indicated measurement redundancy. Therefore, by subsequently removing the offending items, a simple three-item solution was found that has acceptable fit indices ($X^2(1)=5.432$; $X^2/df=5.432$ $p<.001$; CFI=.998; TLI=.994; RMSEA=.062 CI90[.020, .117], $PClose=.264$; SRMR=.0069). This solution also has good convergent validity (AVE=.740) and reliability (CR=.895) and the retained items were: “At my job, I feel strong and vigorous”, “I am enthusiastic about my job”, “I am immersed in my work”.

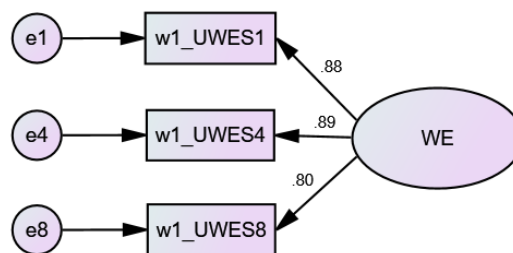


Figure 5.5 CFA for Work Engagement

5.3.4.5 Work motivation

Work motivation was measured (wave 2) with Work Motivation Scale for Health Workers (WMSHW) that comprises five factors: intrinsic motivation (IM) (3 items, e.g. “Because I enjoy

doing what I do at work every day.”), integrated regulation (IDEN) (3 items, e.g. “Because being a health worker is a fundamental part of who I am.”), introjected regulation (INTRO) (2 items, e.g. “In order to feel good about myself”), external regulation-social (EXT-S) (3 items, e.g. “Because of the appreciation I receive from my patients and the community.”), External regulation-economic (EXT-E) (4 items, e.g. “Because of the benefits that come with my job.”). Participants answered on a Likert scale ranging from 0 (Strongly disagree) to 10 (Strongly agree).

We have tested work motivation scale and found a suitable shorter structure in the CFA as follows (Figure 5.6). The Confirmatory factor analysis showed good structural validity ($X^2/df=3.598$, $p<.001$; CFI=.994; TLI=.991, RMSEA=.047 CI90[.037;.058] $PClose=.000$, RMR=0.079). Likewise, the measure has good convergent validity ($AVE_{IM}=0.915$, $AVE_{INTRO}=0.706$, $AVE_{EXT-E}=0.770$). The factors also have acceptable reliability ($CR_{IM}=0.970$, $CR_{INTRO}=0.877$, $CR_{EXT-E}=0.909$).

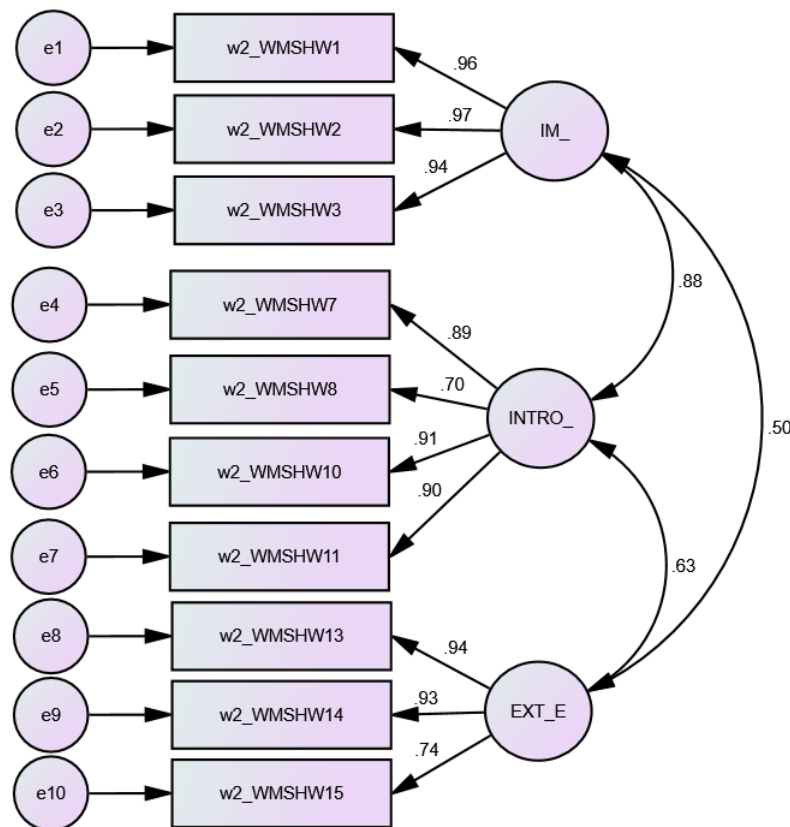


Figure 5.6 CFA for Work Motivation

5.3.4.6 Person-Environment Fit

Person-Environment Fit was measured (wave 1) with Person-Environment Fit Scale (PPEFS) by Chuang et al. (2016) that comprises four factors: Person-Job Fit Scale (PJFS) (3 items, e.g. “How would you describe the match between your professional skills, knowledge, and abilities and those required by the job?”), Person-Organisation Fit Scale (POFS) (7 items, e.g. “How would you describe the match between your emphasis and your organisation’s emphasis on the following values?”), Person-Group Fit Scale (PGFS) (11 items, e.g. “How would you describe the match between your emphasis and your group’s emphasis on the following values?”). Person-Supervisor Fit Scale (PSFS) (5 items, e.g. “How would you describe the match between the things you value in life and the things your supervisor values?”). Because total scores are not usually calculated for this scale, we conducted a validated factor analysis by dimension. Participants answered on a scale ranging from 1 (Strongly unfit) to 7 (Strongly fit).

By replicating the factor structure tested by Chuang et al. (2016) the CFA showed acceptable fit indices ($\chi^2(291)=2644.252$, $\chi^2/df=9.087$, $p<.001$; CFI=.953; TLI=.948, RMSEA=.084 CI90[.081;.087] PClose=.000, SRMR=0.046) albeit with slight indication for improvement. By adding a covariance between the first couple items from Person-Job fit we ended with a better fitted model ($\chi^2(290)=2352.231$, $\chi^2/df=8.111$, $p<.001$; CFI=.959; TLI=.954, RMSEA=.078 CI90[.076;.081] PClose=.000, SRMR=0.044) depicted in Figure 5.7.

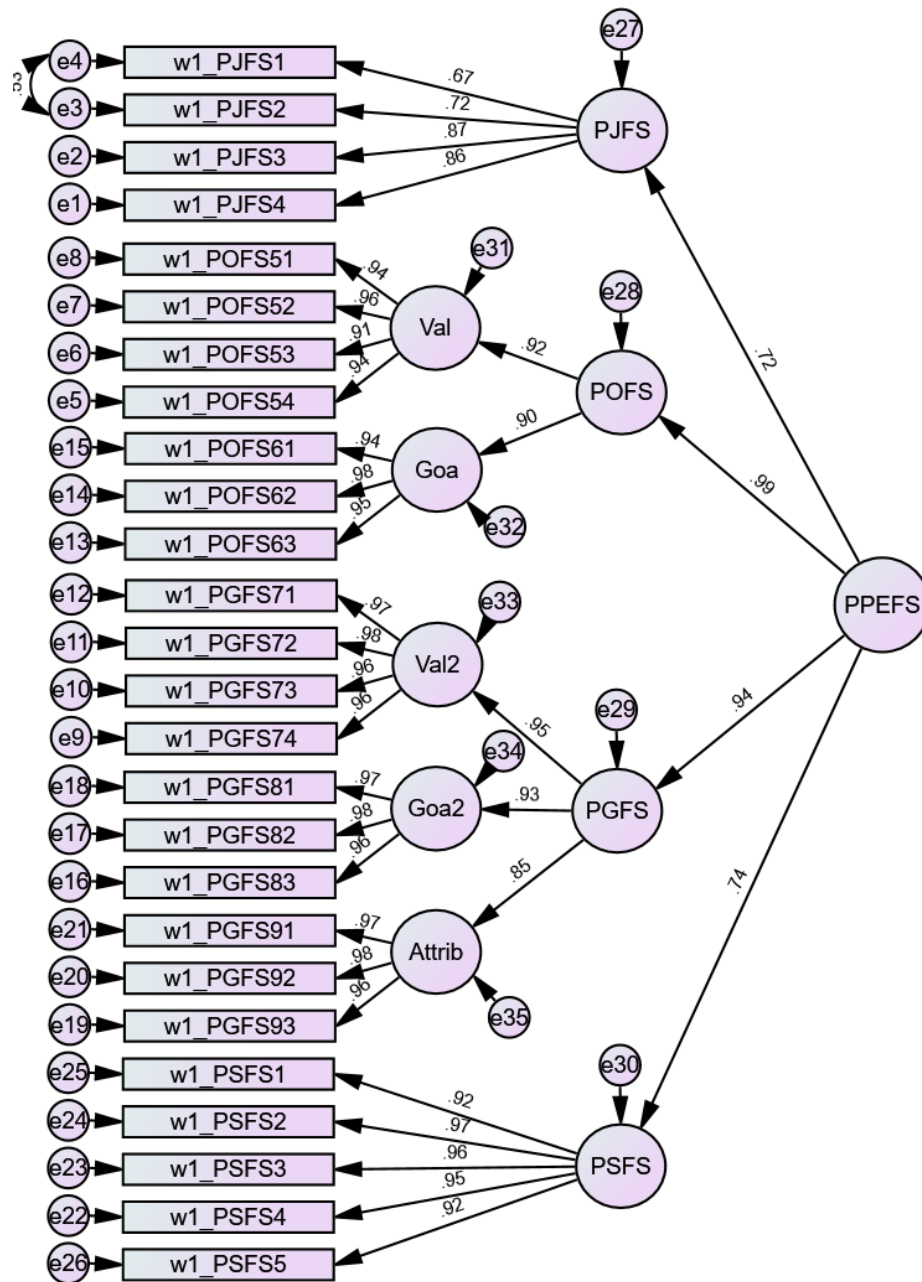


Figure 5.7 CFA for Person-Environment Fit

5.3.5 Measurement model

The CFA for the overall measurement model comprising Turnover intention, Work environment, job satisfaction, work engagement, work motivation, and P-E fit has acceptable fit taken all latent constructs as 1st order factors (baseline 1 ($X^2(3150)=8475.515$, $p<.001$, Normed $X^2=2.691$; CFI=.952; TLI=.946, RMSEA=.038 CI90[.037;.039] $PClose=1.000$, SRMR=.0387) and also considering the original 2nd order factors (baseline 2 ($X^2(3244)=8971.868$, $p<.001$, Normed $X^2=2.766$; CFI=.948; TLI=.944, RMSEA=.039

CI90[.038;.040], $PClose=1.000$, $SRMR=.0445$). Alternative models were: A model (Work Environment fused with Work engagement), B model (work environment fused with p-E fit), C model (Work environment fused with Work engagement and P-E fit), D model (Job satisfaction fused with Turnover intention), E Model (Models C and D fused), F Model (Model E fused with work motivation), G Model (Model F fused with Workload), and Model I (all factors fused into a single latent factor, includes Burnout). No alternative model showed better fit than the original measurement model (Table 5.1) which is evidence that the conceptual model is the most robust of all as regards construct validity.

5.3.6 Common Method Variance

Although the data collection design is lagged so to prevent common method variance, some of the variables were collected simultaneously which renders this bias possible. Therefore, as recommended by Podsakoff et al. (2003) we conducted a Common Latent Factor analysis which implies adding a latent common factor to all the constructs jointly analyzed as per the overall measurement model. The test showed the latent common factor loaded with non-significant coefficients ($-.02$, $p=.696$) and it has no better fit than the measurement model ($\Delta\chi^2(\Delta df)=0.423(2)$, $p=.809$, and $\Delta CFI=.000$). This shows no common method bias occurs in the model (Table 5.1).

Table 5.1 Measurement model comparison

Model	χ^2/df	CFI	TLI	RMSEA	CI90	PCLOSE	SRMR	AIC	Holter .05/.01	$\Delta\chi^2(\Delta df)$ Baseline2	ΔCFI
Baseline (1 st order factors) X ² 8475.515 (3150)	2.691	.952	.946	.038	[.037;.039]	1.000	.0387	9483.515	448/455	-	-
Baseline (2nd order factors) X ² 8971.868 (3244)	2.766	.948	.944	.039	[.038;.040]	1.000	.0445	9791.868	435/443	-	
Model A X ² 9428.297 (3260)	2.892	.944	.940	.040	[.040;.041]	1.000	.0505	10216.297	416/423	456.429(16)***	.004
Model B X ² 11421.096 (3335)	3.425	.926	.923	.046	[.045; .047]	1.000	.0688	12059.096	351/357	2449.228 (91)***	.022
Model C X ² 11868.141 (3344)	3.549	.923	.919	.047	[.046;.048]	1.000	.0716	12488.141	339/345	2896.273 (100)***	.025
Model D X ² 10398.617 (3259)	3.191	.935	.931	.044	[.043;.044]	1.000	.0465	11188.617	377/384	1426.749(15)** *	.013
Model E X ² 12669.676 (3359)	3.772	.915	.912	.049	[.048;.050]	.967	.0766	13259.676	319/324	3697.812(115)* **	.033
Model F X ² 14083.8 (3374)	4.174	.903	.899	.052	[.052;.053]	.000	.0814	14643.816	288/293	5111.932(130)* **	.045

*** $p < .001$, A model (Work Environment fused with Work engagement), B model (work environment fused with p-E fit), C model (Work environment fused with Work engagement and P-E fit), D model (Job satisfaction fused with Turnover intention), E Model (Models C and D fused), F Model (Model E fused with work motivation).

5.4 Results

Results sections comprehends findings pertaining to the descriptive statistics on all of the variables in the conceptual model together with their bivariate associations so to understand their specific incidence (how strongly they are reported) and also how they establish association patterns among themselves. Afterwards, the results section proceeds to show all of the hypotheses testing.

5.4.1 Descriptive and bivariate statistics

The Table 5.2 and Table 5.3 shows descriptive and bivariate statistics for sociodemographic variables and with conceptual model variables. Work environment means range from close to the scale's midpoint (work environment compensation, $M=2.98$, $SD=0.75$ and job content $M=3.04$, $SD=0.77$) to relatively higher values (Relationships, $M=3.68$, $SD=0.55$). The average participant reports modest levels of work engagement judging by their means ($M=3.11$, $SD=0.97$) but relatively higher level of job satisfaction ($M=3.34$, $SD=.072$). Participants report average levels of work motivation above the scale's midpoint (5) with the highest observed in extrinsic motivation ($M=6.52$, $SD=1.93$; $t(1155)=26.797$, $p<.001$) followed by Introjected ($M=5.97$, $SD=1.88$; $t(1155)=17.628$, $p<.001$) and intrinsic motivation ($M=5.53$, $SD=2.18$; $t(1155)=8.339$, $p<.001$). It is worth noticing that the sample comprises contrasting individuals as regards intrinsic motivation as suggested by the large standard deviation. The overall person-environment fit is relatively high ($M=5.01$, $SD=1$) with the highest component being person-group fit ($M=5.17$, $SD=1.13$) closely followed by person-job fit ($M=5.16$, $SD=0.99$) and the lowest is person-supervisor fit ($M=4.66$, $SD=1.25$) but still above the scale's midpoint (4) as found with the single-sample t test ($t(1155)=17.935$, $p<.001$). Participants report on the average, a relatively low intention to leave ($M=2.07$, $SD=1.27$) but a closer look into the distribution provides more detail showing that about 37% of the sample has no intention to leave at all, and approximately 5% of the sample report a strong intention to leave with the remaining participants falling in between these positions.

The general correlation patterns between sociodemographic variables and those in the conceptual model are all of modest magnitude and can be observed mostly regarding age, income, number of workdays and workhours. These are found mostly between workdays and workhours with work environment (negatively correlated), job satisfaction (also negatively correlated), and

person-environment fit (all dimensions, also negatively correlated). In a logical way, workdays and workhours have positive correlations with turnover intentions. Income was also found to have many significant correlations, all positive, with some dimensions of work environment, also work engagement and job satisfaction, but only one pertaining to person-fit dimensions (person-job fit) and lastly a negative one with turnover intentions. There are almost no correlations between gender and the variables in the conceptual model and the same occurs as regards education level and having children or the partner being working in healthcare industry or not. How people were appointed to the job also does not make much difference judging from the almost inexistent correlations (only one or very modest magnitude was found with job satisfaction).

As expected, there are many significant correlations between variables comprehended in the conceptual model. The first correlations that stand out are those found between job satisfaction and turnover intention ($r = -.419$, $p < .01$) as well as between PEnv-fit dimensions and job satisfaction (all positive and significant, ranging from .408 to .514, $p < .01$) which encourages the expected link from PEnv-fit to turnover intention. As regards Work engagement, it is both correlated positively with job satisfaction ($r = .559$, $p < .01$) and all the dimensions from PEnv-fit (all positive and significant, ranging from .473, to .592, $p < .01$). From this sequence of correlations, the indirect effects posited in the conceptual model starting from PEnv-fit to turnover intentions are encouraged especially because the magnitude of the correlations is substantial (in the .400 to .500) which suggests the indirect effect may be observed as expected. The departing point of the conceptual model is Work Environment comprehending six dimensions and the correlations observed between these and PEnv-fit are all positive and significant with the weakest magnitudes being observed with the External Work Environment (ranging from .299 and .354, $p < .01$) while all the others stand higher than $r = .406$ ($p < .01$) and have magnitude around .500 ($p < .01$). Likewise, the correlations found between PEnv-fit and job satisfaction follow a similar pattern being all positive and significant with the lowest found between External Work Environment ($r = .306$, $p < .01$) and all the others settling above $r = .350$ ($p < .01$). This also encourages the posited indirect effect between work environment and job satisfaction and, eventually, it may extend to the whole of the conceptual model from work environment to turnover intentions as the magnitude of the correlations is seemingly consistent and strong enough to anticipate such indirect path. Still, as in any correlational analysis, this serves only the purpose of understanding patterns and gauging to which extent they are logical and follow the expected valence across the conceptual model. The

last variable, work motivation, has also a set of correlations with other variables in the conceptual model with the logical relation with job satisfaction for intrinsic motivation ($r=.750, p<.01$), for introjected motivation ($r=.676, p<.01$) although the one with extrinsic motivation has considerably weaker magnitude ($r=.373, p<.01$). A similar pattern is found with work engagement (intrinsic motivation $r=.556, p<.01$; introjected motivation $r=.504, p<.01$; extrinsic motivation $r=.250, p<.01$).

Table 5.2 Descriptive and bivariate statistics for sociodemographic variables

Variable	$\bar{X}$	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Gender	71.5 % F	-	1													
2. Age	40.5 6	7.5 6	-.118*	1												
3. Educ	2.17	.47	.108**	-.379**	1											
4. Income	2.64	.75	-.130*	.262*	-.081**	1										
5. Marriage	1.89	.42	-.043	.435*	-.106**	.128*	1									
6. Children	0.68	.69	-.069*	-.008	.112*	.017	.329*	1								
7. Partner	1.79	.40	.260**	-.061*	.029	-.051	-.131**	-.124**	1							
8. Position	1.80	.40	.083**	-.143**	-.055	-.146**	-.061*	-.010	-.003	1						
9. Title	3.05	.66	.070	.504*	.005	.214*	.278*	.090*	-.073	-.358*	1					
10. Appointment	1.01	.18	.046	.129*	-.087**	-.024	.010	-.024	-.079*	.045	.015	1				
11. Tenure	16.8 2	9.1 5	-.087*	.959*	-.433**	.280*	.420*	-.059*	-.041	-.143*	.484*	.117*	1			
12. Workdays	2.22	0.4 3	-.071*	.006	.007	.041	-.017	.029	.000	-.103*	.086*	-.052	-.006	1		
13. Workhours	40.3 8	9.9 5	-.116*	-.053	.027	.042	-.044	.019	-.006	-.101*	.018	-.076*	-.056	.245*	1	
14. EHM_poll	1.16	0.3 6	.021	-.055	.121*	-.067*	-.045	-.009	.040	-.062*	.076*	-.021	-.065*	.023	.065*	1
15. WE_effort	3.41	0.6 5	-.002	-.147**	.085*	.028	-.026	.011	.005	.051	-.068*	.021	-.150**	-.237**	-.126*	-.054
16. WE_Comp	2.98	0.7 5	-.006	-.025	-.014	.156*	-.002	-.006	.009	-.033	-.019	.019	-.030	-.147**	-.083*	-.076**
17. WE_Rel	3.68	0.5 5	-.037	-.088**	.028	.079*	.038	.080*	-.021	-.041	.013	.016	-.090**	-.060*	-.063*	-.030

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18.WE_Job C	3.04	0.7 7	.043	-.028	-.037	.038	.004	-.028	.006	.084**	-.084 **	.029	-.027	-.132 **	-.087* *	-.084 **
19.WE_Pro m	3.34	0.6 8	.009	.005	.031	.117* *	.013	.009	-.034	-.145* *	.191* *	.004	.001	-.082 **	-.032	.012
20.WE_Ext r	3.41	0.7 7	.014	.151* *	-.076 **	.118* *	.131* *	.021	-.040	-.096* *	.122* *	.005	.157* *	-.105 **	-.067* *	-.065 *
21.WE_ng	3.11	0.9 7	-.072*	.029	.014	.072* *	.064* *	.039	-.081 **	-.033	.054	.041	.008	-.049	.002	-.074 *
22.JobSat	3.34	0.7 2	-.014	.075* *	-.054	.067* *	.097* *	.003	-.023	-.013	.004	.069* *	.067* *	-.093 **	-.120* *	-.092 **
23.Mot_Int	5.53	2.1 8	-.033	.052	.002	.070* *	.071* *	.028	-.037	-.010	.030	.035	.034	-.083 **	-.089* *	-.001
24.Mot_Ijet	5.97	1.8 8	-.034	.073* *	-.031	.103* *	.054	-.010	-.013	-.043	.083* *	.033	.068* *	-.044	-.045	.023
25.Mot_Ext	6.52	1.9 3	-.051	-.002	-.050	.101* *	.018	-.031	.020	-.059* *	.003	-.031	-.008	-.029	.005	-.013
26.PJ_fit	5.16	0.9 9	-.049	.088* *	-.052	.069* *	.105* *	.042	-.030	-.002	.048	.035	.073* *	-.072 *	-.021	-.061 *
27.PO_fit	5.06	1.2 1	-.029	.019	-.056	.055	.022	-.007	.001	-.056	.027	.027	.006	-.111 **	-.036	-.059 *
28.PG_fit	5.17	1.1 3	-.032	-.020	-.043	.017	-.005	-.006	-.010	-.039	.003	.018	-.026	-.105 **	-.030	-.068 *
29.PS_fit	4.66	1.2 5	-.020	-.001	.002	.014	.051	.062* *	-.028	-.028	.013	.030	-.012	-.134 **	-.041	-.050
30.PEnv_fit	5.01	1.0 0	-.036	.022	-.041	.043	.048	.026	-.019	-.037	.025	.031	.009	-.123 **	-.037	-.068 *
31.TI	2.07	1.2 7	-.044	-.084 **	.038	-.072 *	-.082 **	.048	.013	.009	-.029	.037	-.093 **	.096* *	.119* *	.063* *

*p<.05; **p<.01

Table 5.3 Descriptive and bivariate statistics with conceptual model variables

Variable	$\bar{X}$	SD	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
15.WE_effort	3.41	0.65	1															
16.WE_Comp	2.98	0.75	.662**	1														
17.WE_Rel	3.68	0.55	.556**	.510**	1													
18.WE_JobC	3.04	0.77	.621**	.660**	.535**	1												
19.WE_Prom	3.34	0.68	.521**	.570**	.567**	.524**	1											
20.WE_Extr	3.41	0.77	.345**	.406**	.418**	.398**	.474**	1										
21.WE_ng	3.11	0.97	.444**	.463**	.504**	.515**	.434**	.344**	1									
22.JobSat	3.34	0.72	.417**	.436**	.428**	.462**	.350**	.306**	.559**	1								
23.Mot_Int	5.53	2.18	.363**	.364**	.382**	.412**	.318**	.276**	.556**	.750**	1							
24.Mot_Ijet	5.97	1.88	.340**	.347**	.408**	.393**	.359**	.282**	.504**	.676**	.834**	1						
25.Mot_Ext	6.52	1.93	.185**	.215**	.231**	.200**	.229**	.176**	.250**	.373**	.455**	.562**	1					
26.PJ_fit	5.16	0.99	.424**	.415**	.472**	.465**	.406**	.332**	.592**	.507**	.483**	.461**	.303**	1				
27.PO_fit	5.06	1.21	.505**	.529**	.539**	.534**	.517**	.301**	.499**	.469**	.438**	.470**	.291**	.625**	1			
28.PG_fit	5.17	1.13	.458**	.462**	.558**	.490**	.484**	.299**	.494**	.408**	.392**	.453**	.285**	.601**	.853**	1		
29.PS_fit	4.66	1.25	.464**	.431**	.514**	.504**	.433**	.301**	.473**	.413**	.401**	.418**	.183**	.551**	.674**	.696**	1	
30.PEnv_fit	5.01	1.00	.535**	.531**	.601**	.576**	.532**	.354**	.588**	.514**	.491**	.518**	.302**	.783**	.914**	.912**	.854**	1
31.TI	2.07	1.27	-.237**	-.230**	-.196**	-.253**	-.201**	-.183**	-.207**	-.419**	-.312**	-.324**	-.203**	-.261**	-.291**	-.259**	-.250**	-.305**

*p<.05; **p<.01

5.4.2 Hypotheses testing

Due to the relatively large number of hypotheses, Table 5.4, Table 5.5 and Table 5.6 shows all the main statistics with the hypotheses and empirical test results paired with the respective statistic.

The **first hypothesis** establishes a direct negative effect of job satisfaction on turnover intention. Findings show a statistically significant coefficient ($B=-.737$, $t=13.77$, $p=.001$), thus supporting H1.

The **second hypothesis** posits a direct positive effect of work conditions on job satisfaction comprehending six sub-hypotheses pertaining to each component. Findings show job satisfaction is directly and positively related to workload effort ($B=.078$, $t=1.817$, $p=.035$), also to compensation ($B=.077$, $t=1.805$, $p=.036$), relationships ($B=.084$, $t=1.791$, $p=.037$), and job content ($B=.066$, $t=1.747$, $p=.041$) but neither to promotion ($B=-.052$, $t=1.277$, $p>.05$) nor external factors ($B=.029$, $t=0.910$, $p>.05$) which supports H2a to H2d and rejects both H2e and H2f.

The **third hypothesis** mirrors the previous one but targeting person-environment fit. Findings show person-environment fit is directly and positively related to workload effort ($B=.173$, $t=3.516$, $p=.001$), also to compensation ($B=.093$, $t=2.062$, $p=.020$), relationships ($B=.530$, $t=10.403$, $p=.001$), job content ($B=.275$, $t=6.422$, $p=.001$), and promotion ($B=.209$, $t=4.518$, $p=.001$) but not to external factors ($B=-.035$, $t=0.929$, $p>.05$) which supports H3a to H3e and rejects H3f.

The **fourth hypothesis** posits an indirect positive effect of working conditions on job satisfaction via person-environment fit. Findings show this indirect effect is significant through workload effort ($B=.011$, $t=2.840$, $p=.002$), also to compensation ($B=.012$, $t=1.840$, $p=.033$), relationships ($B=.067$, $t=4.401$, $p=.001$), job content ($B=.035$, $t=3.906$, $p=.001$), and promotion ($B=.026$, $t=3.150$, $p=.001$) but not via external factors ($B=-.004$, $t=0.907$, $p>.05$) which supports H4a to H4e and rejects H4f.

The **fifth hypothesis** proposes a positive indirect effect of person-environment fit on job satisfaction through work engagement which was found to be supported by findings ($B=.140$, $t=8.806$, $p=.001$).

The **sixth hypothesis** proposes a sequential mediation where the indirect effect of work conditions on turnover intention occurs via person-environment fit and job satisfaction respectively. This is expected to be a negative sequential indirect effect. Findings show this sequential indirect effect is significant through workload effort ($B=-.016$, $t=2.661$, $p=.004$), also

via compensation ($B=-.009$, $t=1.794$, $p=.037$), relationships ($B=-.049$, $t=3.921$, $p=.001$), job content ($B=-.026$, $t=3.557$, $p=.001$), and promotion ($B=-.019$, $t=2.868$, $p=.002$) but not via external factors ($B=.003$, $t=0.893$, $p>.05$) which supports H6a to H6e and rejects H6f.

The **seventh hypothesis** posits work engagement is an intervening variable in the sequential mediation effect stated in the previous hypothesis. Namely, considering the fifth hypothesis, that work engagement operates between person-environment fit and job satisfaction. Findings show the full sequential indirect effect is significant through workload effort ($B=-.018$, $t=3.130$, $p=.001$), also via compensation ($B=-.010$, $t=2.007$, $p=.023$), relationships ($B=-.055$, $t=6.665$, $p=.001$), job content ($B=-.028$, $t=5.029$, $p=.001$), and promotion ($B=-.022$, $t=3.813$, $p=.001$) but not via external factors ($B=.004$, $t=0.931$, $p>.05$) which supports H7a to H7e and rejects H7f.

The **eighth hypothesis** introduces the moderator effect of intrinsic (H8a), extrinsic (H8b) and introjected (H8c) motivation establishing a conditional direct effect where stronger motivation is expected to reinforce the direct effects between working conditions and person-environment fit. As regards intrinsic motivation, findings show no significant interaction effect with workload effort ($B=-.016$, $t=0.740$, $p>.05$), also non-significant with compensation ($B=-.014$, $t=0.643$, $p>.05$), relationships ($B=.021$, $t=0.869$, $p>.05$), promotion ($B=-.036$, $t=1.648$, $p>.05$) and external factors ($B=-.008$, $t=0.499$, $p>.05$) thus rejecting all sub-hypotheses H8a1 to H8a6 to the exception of job content ($B=.029$, $t=1.691$, $p<.05$), which mostly rejects H8a to the exception of H8a4. As regards extrinsic motivation, findings also show no significant interaction effect with both workload effort ($B=.044$, $t=1.600$, $p>.05$) and compensation ($B=-.021$, $t=0.884$, $p>.05$) but significant with relationships ($B=-.046$, $t=1.788$, $p=.037$), job content ($B=.037$, $t=2.030$, $p=.021$), promotion ($B=-.042$, $t=1.810$, $p=.035$) and external factors ($B=.038$, $t=1.693$, $p=.045$) thus rejecting sub-hypotheses H8b1, H8b2, H8b3 (due to the negative coefficient) and H8b5 (also due to the negative coefficient). H8b4 and H8b6 were both supported, thus offering partial support to this hypothesis. As regards introjected motivation, findings show no significant interaction effect with workload effort ($B=.014$, $t=0.542$, $p>.05$), also non-significant with compensation ($B=-.037$, $t=1.497$, $p>.05$), relationships ($B=.018$, $t=0.674$, $p>.05$), job content ($B=.026$, $t=1.191$, $p>.05$), and external factors ($B=-.009$, $t=0.466$, $p>.05$) thus rejecting all sub-hypotheses H8c1 to H8c6 to the exception of promotion ($B=-.045$, $t=1.840$, $p<.05$). This mostly rejects H8c to the exception of H8c5.

The **ninth hypothesis** brings together the previous one with the seventh hypothesis proposing an interaction effect of motivation on the full sequential process that links working conditions to turnover intention via person-environment fit, work engagement, and job satisfaction. As regards **intrinsic motivation**, findings show no significant interaction effect

with workload effort ($B=.002, t=0.730, p>.05$), also non-significant with compensation ($B=.001, t=0.641, p>.05$), relationships ($B=-.002, t=0.858, p>.05$), promotion ($B=.004, t=1.638, p>.05$) and external factors ($B=.001, t=0.498, p>.05$) but a significant one with job content albeit with a negative valence ($B=-.003, t=1.660, p=.049$), thus rejecting all sub-hypotheses H9a (H9a4 due to the negative coefficient). This fully rejects H9a. As regards *extrinsic motivation*, findings show no significant interaction effect with workload effort ($B=-.005, t=1.572, p>.05$), compensation ($B=.002, t=0.864, p>.05$) and external factors ($B=-.004, t=1.627, p>.05$) which rejects H9b1, H9b2, and H9b6. H9b4 concerning job content is also rejected as the coefficient is significant but negative ($B=-.004, t=1.978, p=.024$). This mostly rejects H9b because findings pertaining to relationships ($B=.005, t=1.713, p=.043$) and promotion ($B=.004, t=1.736, p=.041$) support the sub-hypotheses H9b3 and H9b5 results offer partial support to hypothesis H9b.

As regards *introjected motivation*, findings show no significant interaction effect with workload effort ($B=-.001, t=0.535, p>.05$), compensation ($B=.004, t=1.428, p>.05$), relationships ($B=-.002, t=0.670, p>.05$), job content ($B=-.003, t=1.179, p>.05$), and external factors ($B=.001, t=0.463, p>.05$). A moderated sequential mediation effect was for promotion ($B=.00, t=1.806, p=.036$), which rejects H9c1 to H9c6 to the exception of H9c5. This mostly rejects H9c.

Table 5.4 Direct effects

<i>Control variables</i>	Med1: PE-fit				Med2: WEng				Med3: JobSat				DV: Turnover Int.			
	Coeff.	t	p	HH	Coeff.	t	p	HH	Coeff.	t	p	HH	Coeff.	t	p	HH
Age	.020	1.963	.025		.013	1.239	.108		.007	0.959	.169		.011	0.642	.261	
Gender	-.034	0.747	.228		-.098	1.819	.035		.042	1.162	.123		-.147	1.861	.032	
Education	-.055	1.122	.131		.081	1.448	.074		-.019	0.458	.324		-.042	0.499	.309	
Children	.016	0.512	.304		.011	0.310	.378		-.008	0.332	.370		.077	1.535	.063	
Tenure	-.008	0.959	.169		-.011	1.323	.093		.002	0.323	.373		-.019	1.394	.082	
Position	-.070	1.323	.093		.024	0.392	.348		-.022	0.461	.323		-.030	0.301	.382	
Appoint.	.053	0.317	.376		.133	1.408	.080		.122	1.429	.077		.487	1.822	.034	
Income	-.068	2.148	.016		.057	1.695	.045		.003	0.110	.456		-.052	1.129	.130	
Title	-.025	0.604	.273		.047	1.076	.141		-.058	1.624	.052		.004	0.065	.474	
<i>Direct effects</i>																
Job Satisfaction													-.737	13.77	.001	H1
WEnv_WorkloadEffort	.173	3.516	.001	H3a					.078	1.817	.035	H2a				
WEnv_Compensation	.093	2.062	.020	H3b					.077	1.805	.036	H2b				
WEnv_Relationships	.530	10.403	.001	H3c					.084	1.791	.037	H2c				
WEnv_JobContents	.275	6.422	.001	H3d					.066	1.747	.041	H2d				
WEnv_Promotion	.209	4.518	.001	H3e					-.052	1.277	.101	H2e				
WEnv_ExternalFactors	-.035	0.929	.176	H3f					.029	0.910	.182	H2f				
PE-fit					.570	21.321	.001		.126	4.785	.001					
Work Engagement									.246	9.503	.001					

Table 5.5 Indirect effects

<i>Indirect effects</i>	Med1: PE-fit				Med2: WEng				Med3: JobSat				DV: Turnover Int.			
	Coeff.	t	p	HH	Coeff.	t	p	HH	Coeff.	t	p	HH	Coeff.	t	p	HH
WEnv_WorkloadEffort-PEfit-JS									.022	2.840	.002	H4a				
WEnv_Compensation-PEfit-JS									.012	1.840	.033	H4b				
WEnv_Relationships-PEfit-JS									.067	4.401	.001	H4c				
WEnv_JobContents-PEfit-JS									.035	3.906	.001	H4d				
WEnv_Promotion-PEfit-JS									.026	3.150	.001	H4e				
WEnv_ExternalFactors-PEfit-JS									-.004	0.907	.182	H4f				
PEfit-WEng-JobSat									.140	8.806	.001	H5				

Sequential indirect effects

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<i>Indirect effects</i>	Med1: PE-fit				Med2: WEng				Med3: JobSat				DV: Turnover Int.			
	Coeff.	t	p	HH	Coeff.	t	p	HH	Coeff.	t	p	HH	Coeff.	t	p	HH
WEnv_WorkloadEffort-PEfit-JS-TI													-.016	2.661	.004	H6a
WEnv_Compensation-PEfit-JS-TI													-.009	1.794	.037	H6b
WEnv_Relationships-PEfit-JS-TI													-.049	3.921	.001	H6c
WEnv_JobContents-PEfit-JS-TI													-.026	3.557	.001	H6d
WEnv_Promotion-PEfit-JS-TI													-.019	2.868	.002	H6e
WEnv_ExternalFactors-PEfit-JS-TI													.003	0.893	.186	H6f
WEnv_Workload->PE-fit->WEng->JS->TI													-.018	3.130	.001	H7a
WorkEnv_Compt->PE-fit->WEng->JS->TI													-.010	2.007	.023	H7b
WEnv_Relat->PE-fit->WEng->JS->TI													-.055	6.665	.001	H7c
WEnv_JobCont->PE-fit->WEng->JS->TI													-.028	5.029	.001	H7d
WorkEnv_Promot->PE-fit->WEng->JS->TI													-.022	3.813	.001	H7e
WEnv_ExternalFactors->PE-fit->WEng->JS->TI													.004	0.931	.176	H7f
Adjusted R ²	51.6%				35.5%				40.1%				19.1%			

Table 5.6 Conditional direct and indirect effects

<i>Conditional direct effects</i>	Med1: PE-fit				Med2: WEng				Med3: JobSat				DV: Turnover Int.			
	Coeff.	t	p	HH	Coeff.	t	p	HH	Coeff.	t	p	HH	Coeff.	t	p	HH
IntMot*WorkEnv_Workload->PE-fit	-.016	0.740	.230	H8a1												
IntMot*WorkEnv_Compensat->PE-fit	-.014	0.643	.260	H8a2												
IntMot*WorkEnv_Relations->PE-fit	.021	0.869	.193	H8a3												
IntMot*WorkEnv_JobContent->PE-fit	.029	1.691	.046	H8a4												
IntMot*WorkEnv_Promotion->PE-fit	-.036	1.648	.050	H8a5												
IntMot*WorkEnv_ExternFact->PE-fit	-.008	0.499	.309	H8a6												
ExtMot*WorkEnv_Workload->PE-fit	.044	1.600	.055	H8b1												
ExtMot*WorkEnv_Compensat->PE-fit	-.021	0.884	.189	H8b2												
ExtMot*WorkEnv_Relations->PE-fit	-.046	1.788	.037	H8b3												
ExtMot*WorkEnv_JobContent->PE-fit	.037	2.030	.021	H8b4												
ExtMot*WorkEnv_Promotion->PE-fit	-.042	1.810	.035	H8b5												
ExtMot*WorkEnv_ExternFact->PE-fit	.038	1.693	.045	H8b6												
<i>Conditional indirect effects</i>																
IntMot*WorkEnv_Workload->PE-fit->WEng->JSat->TI													.002	0.730	.233	H9a1
IntMot*WorkEnv_Compensat->PE-fit->WEng->JSat->TI													.001	0.641	.261	H9a2
IntMot*WorkEnv_Relations->PE-fit->WEng->JSat->TI													-.002	0.858	.196	H9a3
IntMot*WorkEnv_JobContent->PE-fit->WEng->JSat->TI													-.003	1.660	.049	H9a4
IntMot*WorkEnv_Promotion->PE-fit->WEng->JSat->TI													.004	1.638	.051	H9a5
IntMot*WorkEnv_ExternFact->PE-fit->WEng->JSat->TI													.001	0.498	.309	H9a6
ExtMot*WorkEnv_Workload->PE-fit->WEng->JSat->TI													-.005	1.572	.058	H9b1
ExtMot*WorkEnv_Compensat->PE-fit->WEng->JSat->TI													.002	0.864	.194	H9b2

<i>Conditional direct effects</i>	Med1: PE-fit				Med2: WEng				Med3: JobSat				DV: Turnover Int.			
	Coeff.	t	p	HH	Coeff.	t	p	HH	Coeff.	t	p	HH	Coeff.	t	p	HH
ExtMot*WorkEnv_Relations->PE-fit->WEng->JSat->TI													.005	1.713	.043	H9b3
ExtMot*WorkEnv_JobContent->PE-fit->WEng->JSat->TI													-.004	1.978	.024	H9b4
ExtMot*WorkEnv_Promotion->PE-fit->WEng->JSat->TI													.004	1.736	.041	H9b5
ExtMot*WorkEnv_ExternFact->PE-fit->WEng->JSat->TI													-.004	1.627	.052	H9b6
InjMot*WorkEnv_Workload->PE-fit->WEng->JSat->TI													-.001	.535	.296	H9c1
InjMot*WorkEnv_Compensat->PE-fit->WEng->JSat->TI													.004	1.428	.077	H9b2
InjMot*WorkEnv_Relations->PE-fit->WEng->JSat->TI													-.002	.670	.252	H9c3
InjMot*WorkEnv_JobContent->PE-fit->WEng->JSat->TI													-.003	1.179	.119	H9c4
InjMot*WorkEnv_Promotion->PE-fit->WEng->JSat->TI													.005	1.806	.036	H9c5
InjMot*WorkEnv_ExternFact->PE-fit->WEng->JSat->TI													.001	.463	.322	H9c6

The overall findings are presented in the following figures. When using extrinsic job motivation as a moderator, the findings are the following (Figure 5.8):

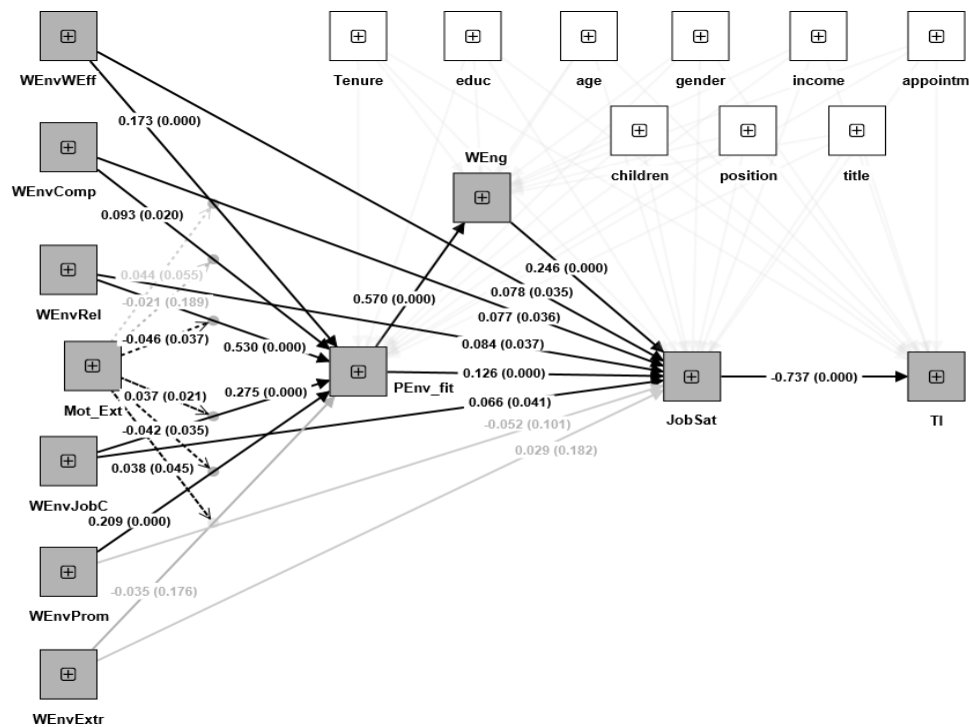


Figure 5.8 Conceptual model coefficients for extrinsic job motivation as moderator

When using intrinsic job motivation as a moderator, the findings are the following (Figure 5.9):

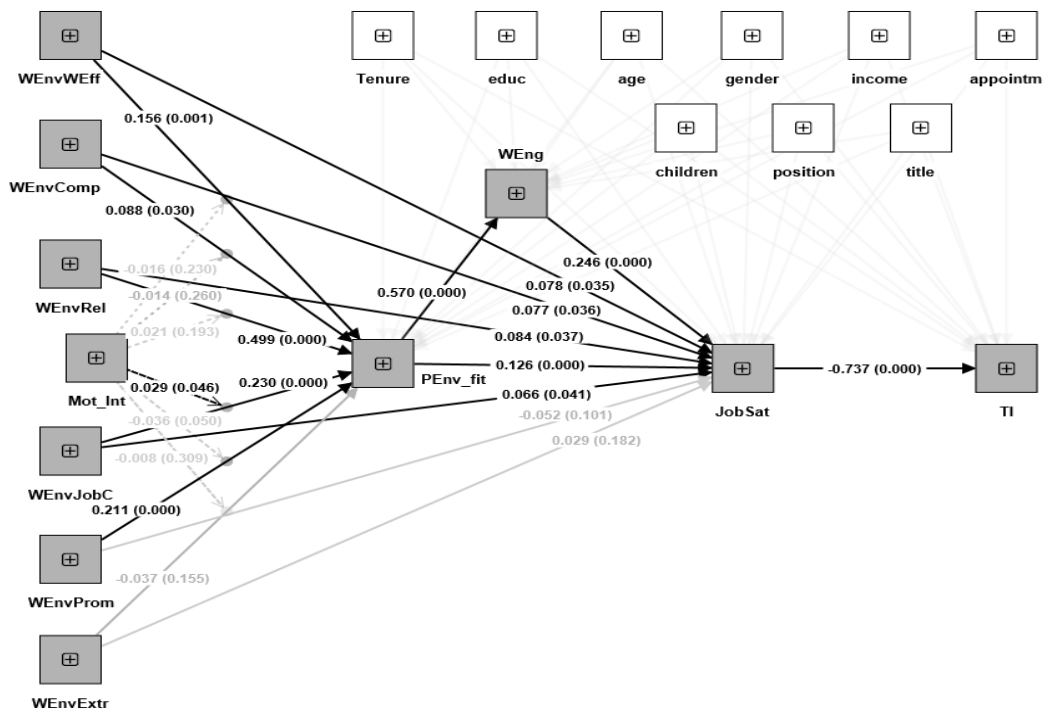


Figure 5.9 Conceptual model coefficients for intrinsic job motivation as moderator

When using introjected job motivation as a moderator, the findings are the following (Figure 5.10):

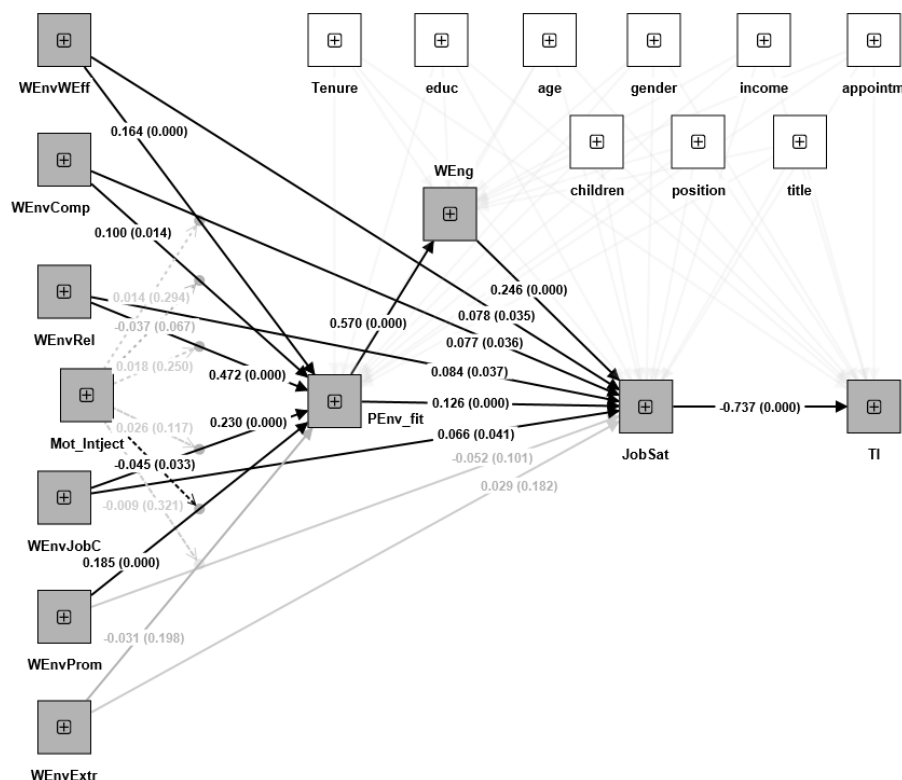


Figure 5.10 Conceptual model coefficients for introjected job motivation as moderator

5.5 Discussion and conclusion

This study aims to examine the influencing factors on the turnover rate and turnover intention of GPs in Pudong New Area, Shanghai. Simultaneously, it seeks to test an explanatory model with work environment as the independent variable, turnover intention as the dependent variable, and person-environment fit, work engagement, and job satisfaction as mediating mechanisms, with work motivation as a moderating variable, with this conceptual model comprising nine hypotheses. The first two hypotheses propose direct effects between work environment and job satisfaction, respectively, and turnover intention. The third, fourth, and fifth hypotheses examine the interaction effects between work environment, person-environment fit, and job satisfaction. The sixth hypothesis states the mediating role of multiple variables between work environment and turnover intention. The seventh and eighth hypotheses articulate the mediating and moderating roles of work motivation in the model. The

final hypothesis connects the seventh and eighth hypotheses, stating the interaction of work motivation with other variables and its role in the overall moderated mediation model.

With data derived from general practitioners in 47 community health service centers in Pudong New Area, findings concerning the direct impact of job satisfaction on turnover intention, show a significant direct negative impact of job satisfaction on turnover intention. The higher the job satisfaction among general practitioners, the lower their turnover intention. Some studies, including W. Deng et al. (2021), Halcomb and Bird (2020), and Haipeng Wang et al. (2020), have already demonstrated the relationship between job satisfaction and turnover intention. This study further validates similar results within the population of general practitioners in China.

The study reveals that the work environment has a direct positive impact on job satisfaction, including factors such as workload, compensation, relationships, and job content. However, promotions and external factors show no significant correlation with job satisfaction. Research has found a significant association between workload levels exceeding occupational norms and symptoms of depression (Ford & Jin, 2015) and occupational burnout (Wen et al., 2016), leading to lower job satisfaction. This implies that employees' perceptions of workload are crucial for organizational productivity and turnover rates, and proper workload management can contribute to increased job satisfaction (Inegbedion et al., 2020).

The study's compensation includes wages, bonuses, and subsidies. Many studies on factors influencing the job satisfaction of healthcare workers highlight the significant correlation between compensation, such as financial rewards and benefits, and job satisfaction, often summarized as benefits packages (C. Liu et al., 2022; Merga & Fufa, 2019). This aligns with the results of this study.

Harmonious human relations, related to factors involving interactions between individuals, can have a positive impact on job satisfaction (Verplanken, 2004). This includes doctor-patient relationships (T. Li et al., 2023; Yong Lu et al., 2016), supervisor-employee interpersonal relationships (López-Ibort et al., 2022), and collegial solidarity (Kılıç & Altuntaş, 2019). Studies also emphasize that providing a favorable work environment requires attention to interpersonal relationships, including improving work climate and supportive supervision, to enhance healthcare workers' job satisfaction (Jayasuriya et al., 2012).

In terms of job content, the study includes factors such as paper work, follow-up work, and treatment work. The results show that the arrangement and perceived value of these job

contents are related to the job satisfaction of general practitioners. Some research suggests that additional tasks beyond core responsibilities may lead to lower job satisfaction (Jerković - Čosić et al., 2012), and a sense of professional value has a positive impact on job satisfaction (Karanikola et al., 2018). This is consistent with this study's results, indicating that general practitioners who perceive their job content as more valuable and well-arranged tend to have relatively higher job satisfaction.

The research suggests that promotions may have a positive short-term impact on job satisfaction, but this effect is unlikely to last beyond one year, with job satisfaction eventually returning to its baseline. Job satisfaction operates according to the homeostatic principle, meaning that even if satisfaction increases due to promotion, it will eventually revert to its fundamental level. Employers should not view job promotions as a tool to enhance job satisfaction; instead, they should focus on additional human resource practices, such as improving work engagement (Otto et al., 2022). External factors in this study, including proximity of family members and housing expenses, show no significant correlation with job satisfaction. This lack of correlation may be because these factors are common challenges across various occupations.

In this study, the higher the satisfaction of GPs with various aspects of their work environment, the more it indicates that subjectively they perceive the objective environment to be in alignment with their expectations. Based on the P-E Fit theory, a higher level of fit between the environment and the individual suggests that the individual's characteristics, such as professional skills, personality, values, etc., are more aligned with the internal aspects of the job, organization, group, and supervisor's requirements (Pervin, 1968), which is consistent with the results of this study. External factors mainly refer to factors outside the work environment, such as the distance of family members, housing costs, etc., and therefore have no impact on the P-E fit.

A higher level of person-environment fit contributes to better individual performance and higher satisfaction (Pervin, 1968). Many studies in other fields have also demonstrated the relationship between the two (Hinami et al., 2013; Y. Y. Xiao et al., 2021), and our findings are no exception. Additionally, we observed that the work environment plays a facilitating role in person-environment fit. Therefore, the work environment may indirectly contribute to overall job satisfaction by enhancing person-environment fit. External factors in the work

environment do not directly impact person-environment fit; thus, they cannot influence overall job satisfaction by affecting person-environment fit.

Many studies have found that an increase in person-environment fit can enhance an individual's commitment and performance in the workplace (Kristof-Brown et al., 2005; Morrow & Brough, 2017). This includes engagement in job tasks, positive attitudes towards work, and pursuit of work-related goals. Additionally, high levels of work engagement have a positive impact on job satisfaction (Lee & Yu, 2023). Individuals who are highly engaged in their work tend to have more passion and are willing to exert effort to achieve success (W. L. Wu & Lee, 2020). Therefore, as the degree of individual adaptation to the environment increases, it is likely to enhance job satisfaction by increasing engagement in work.

Job satisfaction has long been considered a significant factor influencing turnover intention, and numerous studies have confirmed the relationship between the two (Gedik et al., 2023; Haywood et al., 2023; Ofei et al., 2023). Individuals with lower job satisfaction may hold negative attitudes towards their work, making them inclined to seek new career opportunities. Combining the positive impact of the work environment on person-environment fit, as well as the positive effect of person-environment fit on job satisfaction, the work environment may contribute to higher job satisfaction by improving person-environment fit, consequently reducing turnover intention. However, external factors in the work environment do not significantly affect person-environment fit and, therefore, do not exert an influence on turnover intention through this pathway.

Similarly, combining the results of the hypothesis testing mentioned earlier, apart from external factors, other dimensions of the work environment have a positive impact on person-environment fit. Therefore, it can be inferred that the work environment may influence turnover intention through the positive impact of person-environment fit on work engagement, the positive impact of work engagement on job satisfaction, and the negative impact of job satisfaction on turnover intention. External factors, due to their lack of a significant impact on person-environment fit, cannot influence turnover intention through this pathway.

Regarding hypothesis 8, which explores the role of turnover intention as an important variable in the factors influencing healthcare workers, this study chooses work motivation as a potential moderating variable, categorizing it into intrinsic motivation, extrinsic motivation, and introjected motivation. Previous research has demonstrated significant results when work motivation is used as a moderating variable. The study's results support the moderating role of

work motivation in the relationship between work environment and turnover intention. However, only extrinsic motivation supports more hypotheses, while intrinsic motivation and introjected motivation play limited moderating roles. Intrinsic motivation and introjected motivation in this study primarily reflect the actions of general practitioners due to the inherent value of their work, emphasizing joy derived from the work process and the self-worth and sense of achievement gained from work, respectively. Extrinsic motivation refers to actions driven by the desire for external rewards, such as earning money and supporting a family (H. Li et al., 2022). Research indicates that purely intrinsic motivation, where individuals enjoy their tasks and find them interesting, is relatively rare, and even if it occurs, it may not last long. Therefore, external motivation is more likely to exert potential influence. Many employees or their organizations strive to internalize external reasons for task pursuit, and person-environment fit plays a role in this process (Karanikola et al., 2018).

When explaining the moderating role, it is observed that general practitioners with high external motivation decrease the positive impact of work environment, including interpersonal relationships and promotions, on person-environment fit. They also enhance the positive impact of job content and external factors on person-environment fit. This may be because general practitioners with high external motivation are less influenced by interpersonal relationships in terms of fit, and they are more likely motivated by surface-level benefits. As for promotions, as mentioned earlier, their long-term impact is limited, similar to interpersonal relationships, and general practitioners with high external motivation may perceive a limited role of promotions in aligning with their values and environment. The job content of general practitioners, including work arrangements and values, is often related to specific allowances and benefits, and the person-environment fit of general practitioners with high external motivation is more likely to be influenced by these factors. The study's external factors include housing expenses and proximity of family members, and general practitioners with high external motivation may perceive these factors as more influential in determining whether their values align with the environment.

Lastly, regarding hypothesis 9, which holds significance in the overall model, the study finds that only external motivation can produce the positive moderating effect of work motivation throughout the entire continuum between work environment and turnover intention. In contrast to hypothesis 8, when general practitioners have strong external motivation, it actually reinforces the impact of interpersonal relationships and promotions in the work

environment on turnover intention. This could be due to the inclusion of work involvement and job satisfaction, as well as the specificity of turnover intention as a variable.

Chapter 6: General Conclusion

This study aims to investigate and analyze the current status of turnover intention among GPs in Pudong New Area, Shanghai, and the related influencing factors.

According to the definition of the World Organization of Family Doctors, a GP is a doctor responsible for providing high-quality, convenient, cost-effective, integrated primary healthcare services to individuals, families, and communities. They are responsible for the overall, comprehensive management of life, health, and disease. GPs not only provide residents with high-quality primary healthcare services but also serve as guardians of resident health. With the recent shift in China's government healthcare reform towards grassroots prevention, GPs have become a crucial force in the development of China's primary healthcare system. Given the limited number of healthcare professionals with qualifications as GPs in China, this study refers to GPs as grassroots healthcare professionals currently engaged in general medical work.

However, in recent years, Chinese GPs still face issues such as talent shortages and personnel turnover, significantly impacting the construction of the grassroots healthcare service system and the enhancement of grassroots healthcare service capabilities. Currently, there is still a significant gap in the number of GPs in China, and the goal of having 5 GPs per ten thousand urban and rural residents remains distant. While addressing quantity, attention should also be given to improving the quality of GPs. Therefore, considering the current needs of Chinese residents for preventive healthcare and the instability in the quantity and quality of GPs, it is necessary to conduct a comprehensive exploration and analysis of the current status of GPs' turnover intention and the related influencing factors.

The turnover intention of GPs is often influenced by various factors. Currently, several studies have explored many variables related to turnover intention among nursing staff, including job satisfaction, work motivation, and the work environment. The work environment is a crucial factor, encompassing external factors at the macro-social level of the working environment. Medical staff's working environment faces challenges from aspects such as doctor-patient relationships, public health demands, and healthcare workforce (D. Chen et al., 2023). At the internal environmental level, factors such as compensation, organizational systems, and professional risks also exert an impact (Shen et al., 2020; W. Tang et al., 2021).

However, there is still limited exploration of the relationship between turnover intention and the work environment among Chinese GPs. Specifically, there is a lack of a comprehensive model explaining the turnover patterns of GPs in China and theoretically explaining how to manage their turnover more effectively, with a focus on the context dependencies.

Therefore, exploring the mechanisms between the work environment and turnover intention among Chinese GPs, and clarifying the quantitative relationships among variables such as job satisfaction, work environment, work motivation, work engagement, person-environment fit, and turnover intention, is crucial for enhancing the professional stability of GPs. This is also a main purpose of this study.

Based on Herzberg's Two-Factor Theory and Self-Determination Theory, this study utilizes a mixed-methods approach, combining qualitative and quantitative perspectives, to explore the turnover rate, turnover intention, and a comprehensive model among general practitioners in Pudong New Area, Shanghai, China.

The first empirical study employed social network analysis methods to examine the inflow and outflow data of general practitioners in 47 community health centers in Pudong New Area from 2008 to 2022. A network diagram depicting the internal mobility of GPs in Pudong New Area was created, with 47 nodes representing 47 community health service centers and a total of 194 flows. The overall mobility of GPs showed stability. From an individual analysis perspective, hospitals were classified based on attractiveness (the comparison between indegree and outdegree) and their respective median points. This classification included stable hospitals with 16 institutions (low indegree and outdegree), attractor hospitals with 13 institutions (low outdegree and high indegree), rotation hospitals with 10 institutions (high indegree and outdegree), and disperser hospitals with the least number, only 8 institutions (high outdegree and low indegree). This classification provided a reference for the subsequent qualitative analysis.

The second study aimed to analyze the factors influencing attractor hospitals through semi-structured interviews, to provide insights to reduce GPs' turnover intentions. Through interviews with 54 individuals, including GPs, healthcare institution managers, and human resources personals, this study extracted high-frequency indicators reflecting GPs' satisfaction or dissatisfaction to construct the "work environment" variable. This variable encompassed six dimensions, namely workload effort, compensation, relationships, job content, promotion, and external factors, with a total of 30 specific factors. Furthermore, these 30 categories were classified into satisfied and dissatisfied based on the two-factor theory. The study allows us to conclude that the main factors influencing attractor hospitals' satisfaction included policy-based

subsidies, doctor-patient relationships, and training opportunities. Conversely, the most dissatisfying aspects included workload intensity, inadequate equipment and facilities, and housing rents. The successful experiences of attractor hospitals provide valuable insights for formulating relevant policy recommendations.

The third study builds on the previous ones to conduct an analysis of the related model of turnover intention based on a structural equation model. The data involved 1156 GPs questionnaires from two waves of surveys conducted to address common method bias. Nine related hypotheses were proposed and validated in the structural equation model, examining the interrelationships among the work environment, job satisfaction, work motivation, person-environment fit, work engagement, and turnover intention. Specifically, the model tested was an explanatory model with the work environment as the independent variable, turnover intention as the dependent variable, and person-environment fit, work engagement, and job satisfaction as mediating mechanisms, with work motivation as a moderating variable.

In the initial hypotheses tested, it was observed that workload, compensation, and interpersonal relationships, as indicators of the work environment, were significantly and positively associated with job satisfaction. A positive work environment enhances job satisfaction, subsequently reducing turnover intention (Hypotheses 1 and 2). The satisfaction of GPs with various aspects of the work environment indicated a perceived alignment between their subjective expectations and the objective environment (Hypothesis 3). The work environment indirectly increases overall job satisfaction by improving person-environment fit (Hypothesis 4) and the higher the individual's adaptation to the environment, the more likely an increase in work engagement produces higher job satisfaction (Hypothesis 5). Likewise, findings showed work environment enhances job satisfaction by improving person-environment fit, thus reducing turnover intention (Hypothesis 6). This model offers an insight into the process that helps explaining how work environment produce psychological and behavioral states that lead to the decision to stay or leave a hospital. Additionally, the study found that external factors in the work environment did not significantly impact these relationships. These results led to Hypothesis 8, suggesting that, apart from external factors, other dimensions of the work environment positively influenced person-environment fit. This could affect turnover intention through the positive impact of person-environment fit on work engagement, the positive impact of work engagement on job satisfaction, and the negative impact of job satisfaction on turnover intention. Hypothesis 9 highlighted the moderating role of external motivation in the overall model, supporting additional research hypotheses.

The comprehensive model's results indicate that when GPs possessed strong external motivation, it strengthened the impact of interpersonal relationships and promotion in the work environment on turnover intention. In conclusion, this study connected the work environment indicators identified through qualitative research with turnover intention and explored the specific mechanisms underlying these relationships.

This study provides both theoretical and practical contributions. Firstly, it utilizes a longitudinal large-scale dataset to showcase the mobility patterns of GPs in Pudong New Area over the past decade. This presentation helps us better understand the existing issues and the variations in hospital environments. Secondly, the study integrates qualitative and quantitative research, which is uncommon but innovative in related literature. This integration provides a solid foundation for the quantitative analysis part of the study. The qualitative research results, using attractor hospitals as an example, suggest recommendations on how to increase job satisfaction among GPs to reduce turnover intention.

Moreover, the study employs a complex structural equation model to elaborate on turnover intention, the relationships among various variables, and the underlying mechanisms. This contributes to the theoretical foundation of turnover intention research, emphasizing the moderating role of work motivation (and how self-determination theory does have an important role into probing these issues) and the mediating roles of job satisfaction, work engagement, and person-environment fit.

On a practical level, this study holds significance for future managers or policymakers who should focus on influencing the turnover intention of general practitioners through their work environments.

Possible recommendations based on our findings concern the following:

The GPs flow patterns in CHCs should be monitored – Not all CHC have the same GPs flow patterns, and therefore policies should be differentiated according to the type of hospital.

The profile of GPs' work motivation should be assessed – GPs differ as regards their dominant type of motivation and this changes the relevance of factors.

A preventive approach to GPs HR management is positive – Just like healthcare has been moving from a curative approach towards a preventive approach so GPs' HRM could put more emphasis on monitoring some key psychological variables that relate with work, namely the Person-Environmental Fit that has played such a central role in the model. Likewise, the scale used to assess working conditions is also promising in a future HRM monitoring strategy.

Career planning is strategic - Proposed interventions and policies may include providing better career planning, broadening career development prospects for GPs. The Healthy China

2030 plan also emphasizes the need to focus on general practitioners and strengthen the training of general practice, a shortage of professionals.

Income concerns should be acknowledged - Life subsidies, and addressing income concerns by increasing levels fairly and reasonably.

Cooperative work environment is required - Humane care, fostering a fair and cooperative environment to enhance team cohesion and professional identity.

Workload distribution guarantees reasonability - Easing workload through unified assessment criteria, and adjusting recruitment quotas based on the actual conditions of each community.

On another note, the study's contribution lies in recognizing the increasing importance of GPs in grassroots health services. As their quantity and quality become crucial, this research serves as a relevant reference for future studies on turnover intentions among GPs or other healthcare professionals. Future research should focus on the work issues of GPs in different types of hospitals and locations in China to explore how much this model remains valid in most similar locations to PNA and ultimately to improve GPs working conditions, which was found to be a crucial variable in promoting the stability and high-quality development of the GPs workforce.

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Annex A: The Interview Outline

There are three interview scripts targeting three professional types: general practitioners, medical institutions managers, and HR personnel.

1. GENERAL PRACTITIONERS

Introduction: The purpose of this interview is to understand the current situation of general practitioners' mobility in Pudong New Area, explore the factors influencing their operation and willingness to leave, and collect opinions from general practitioners, medical institution managers, and human resource personnel on various factors. Your conversation record is for research purposes only and be strictly confidential, so please feel free to express your true thoughts. Sincerely thanks for your cooperation.

1.1 Personal Basic Information

Institution name and level

Professional Title

Gender

Age

Whether holding administrative position

Whether had experience of leaving previous job

1.2 Main Questions

For Questions 1 and 2, please consider how your general practitioner colleagues think.

1.2.1 Current Work Environment:

- (1) Do you consider the organizational management system to be reasonable?
- (2) Is the workload and working hours acceptable, and do they affect your life after work?
- (3) Are you satisfied with the salary and benefits, training and promotion system?
- (4) Have you experienced verbal abuse, threats, or physical violence from patients or their families while at work? If so, how frequent and what type of violence?
- (5) Can the equipment and facilities in the workplace meet the needs of your work?
- (6) How do you perceive the doctor-patient relationship currently? Are general practitioners meeting the health needs of the public? Is there a sufficient healthcare workforce? Is the

average consultation time for general practitioners adequate? Are community and health systems respectful of medical personnel (if not, please explain why)?

1.2.2 Overall, are you satisfied with the job you are doing? What are the main aspects of your satisfaction and dissatisfaction?

1.2.3 Why did you choose this job, and what motivates you to work? What do you think are the factors that affect the work motivation of the group of general practitioners?

1.2.4 In your opinion, how many career development, promotion, and training opportunities are there for general practitioners? Are there any differences between different community health service centers?

1.2.5 It is normal for general practitioners to leave their job due to personal reasons or to find a better job. Have you considered leaving for another job, and what are the factors that led to this consideration? What is the main cause for staying in your current organization?

1.2.6 What do you think are the main reasons why general practitioners have a desire to leave their job? Do you have any suggestions for reducing the turnover intention among general practitioners?

1.2.7 Do you have any additional insights or comments about the flow and turnover of the group of general practitioners?

2. MEDICAL INSTITUTION MANAGERS

Introduction: The purpose of this interview is to understand the current situation of the mobility of general practitioners in Pudong New Area, explore the factors influencing their mode and willingness to leave, and collect opinions from general practitioners, healthcare institution managers, and human resources personnel on various factors. The conversation records are for research purposes only. We will strictly protect confidentiality, please feel free to express your true thoughts. Sincerely thanks for your cooperation.

2.1 Personal Basic Information

Institution name and level

Professional title

Gender

Age

2.2 Main Questions

2.2.1 What do you think about the current working environment for general practitioners?

(1) Are the organizational management systems reasonable?

(2) Are the work intensity and working hours reasonable, and do they affect their after-work life?

(3) Are the salary and benefits, training and promotion systems reasonable?

(4) How much verbal abuse, threats or attacks have you heard of or experienced during work as a general practitioner? If any, were they verbal or physical violence? How frequent?

(5) Can the equipment and facilities in the workplace meet the work needs?

(6) What do you think about the current doctor-patient relationship? Are general practitioners meeting the health needs of the public? Is the healthcare workforce sufficient? Does the community and healthcare system respect medical staff (if not, please explain why)?

2.2.2 How is the morale of general practitioners in your hospital? Are they satisfied with their work intensity, working hours, salary and benefits, and interpersonal relationships?

2.2.3 As a hospital leader, what do you think are the main reasons affecting their work enthusiasm? What measures has your hospital taken to improve the motivation of medical staff, and what is the effectiveness?

2.2.4 How many career development, promotion and training opportunities do general practitioners have? Are there differences between different community health service centers?

2.2.5 Regarding the phenomenon of employee turnover, it is normal for general practitioners to leave due to personal reasons or seeking better jobs. Please discuss the situation in your community health service center:

(1) Have any general practitioners left or expressed a strong desire to leave in the past year?

Please discuss the specific reasons.

(2) Has the hospital conducted exit interviews? (i.e., conversations with employees who are voluntarily leaving to understand their motivations)

(3) Even if such interviews were not conducted, what do you think are the reasons for the resignation of general practitioners? What factors would affect the willingness of general practitioners to leave?

2.2.6 In the face of new situations and competitive environments, what do you think we can do to better motivate doctors and retain these talents in the future? What are some practical solutions? Which areas need to be strengthened?

2.2.7 Do you have any additional comments or insights on the mobility and willingness to leave of the group of general practitioners?

3. HUMAN RESOURCE PERSONNEL

Introduction: The purpose of this interview is to understand the current situation of the mobility of general practitioners in Pudong New Area, explore the factors influencing their mode and willingness to leave, and collect opinions from general practitioners, healthcare institution managers, and human resources personnel on various factors. The conversation records are for research purposes only. We will strictly protect confidentiality, please feel free to express your true thoughts. Sincerely thanks for your cooperation.

3.1 Personal Basic Information

Institution name and level

Title

Gender

Age

3.2 Main Questions

3.2.1 How do you think about the working environment for general practitioners?

(1) Is the organizational management system reasonable?

(2) Is the workload and working hours reasonable, and does it affect their personal life after work?

(3) Is the salary, benefits, training, and promotion system reasonable?

(4) How much verbal abuse, threats, or physical violence have general practitioners experienced in their work? How frequent is it?

(5) Can the equipment and facilities in the workplace meet their job requirements?

(6) How do you think about the doctor-patient relationship currently? Are general practitioners meeting the health needs of the public? Is there sufficient manpower in the healthcare system? Do the community and healthcare system respect medical personnel (if not, please explain the reasons)?

3.2.2 How do you think about the morale of general practitioners in this hospital? Are they satisfied with their workload, working hours, salary, benefits, and interpersonal relationships?

3.2.3 To your knowledge, how is the motivation of general practitioners in this hospital? Is there any difference between other community health service centers? What do you think is the specific reason?

3.2.4 How many career development, promotion, and training opportunities do general practitioners have? Is there any difference between different community health service centers?

3.2.5 Regarding employee turnover, it is normal for organizations to have personnel turnover due to personal reasons or seeking better jobs. Please talk about the situation in your community health service center:

(1) In the past few years, has this hospital experienced general practitioner turnover? How many? What are the main reasons? Is there any difference between different community health service centers in this region?

(2) Has the hospital conducted exit interviews? (i.e., talking with voluntarily leaving employees to understand their motives)

(3) Even if such interviews are not conducted, do you think the factors mentioned above will affect the willingness of general practitioners to leave? What is the employment situation in the medical market?

3.2.6 Based on your understanding, what incentive measures has the government taken to improve the motivation of doctors and retain core technical personnel? What aspects still need improvement and what strategies can be implemented in the future?

3.2.7 Do you have anything else to add or any feelings about the flow and turnover of the general practitioner group

Annex B: Dictionary of the Categories

Table b.1 Dictionary of the categories

Dimension	Category	Definition	Example
Working conditions	Resources (equipment/human resources)	It refers to the material and human resources available to do the work	<i>"In our outpatient department, these daily facilities and equipment can still meet the requirements because we also have demands for year-end assessments, and they are all adequately equipped according to the standards." (subcategory, I-1)</i>
	Working hours	The total sum of hours worked in a determined time period (day/week)	<i>"Many times, it is necessary to complete chronic disease follow-up tasks after work or during free time." (subcategory, I-2)</i>
	Staffing level	The fit between required HR needs and available HR	<i>"In fact, we have always had a team because the capabilities of an individual doctor are limited. Our team consists of family physicians, public health physicians, a nurse, and our clinical pharmacist—all working together within the team. Each person has their own role, as it is truly impossible for a doctor to work alone." (subcategory, I-3)</i>
	Workload intensity	The quantity and effort required to the worker in normal work time	<i>"The workload and intensity of work for general practitioners are significantly higher than those in other positions within the hospital." (subcategory, I-4)</i>
	Commuting time	The average time an individual takes from home to the workplace	<i>"The individual's residence is quite far away, and they feel that the working hours are also relatively long." (subcategory, I-5)</i>
	Workload distribution	The homogeneity of the individual workload as compared to the team	<i>"The workload distribution is not very fair, and there hasn't been much attention or recognition, leading to a lack of appreciation from the hospital." (subcategory, I-6)</i>
Compensation (costs-benefits)	Salary	Monetary value due to the work based on the contract	<i>"New doctors who join tend to spend more time in the wards, and they may not have the opportunity to consistently work in the outpatient department. This can result in a perception of lower income for them." (subcategory, II-1)</i>
	Performance bonus	Extra monetary value due to worker based on goal attainment	<i>"In terms of income, it depends on performance. If you perform well in assessments, your income will likely be higher compared to those with lower assessments." (subcategory, II-2)</i>

Relationships	Policy-based subsidy	Subsidies officially previewed that are due to the worker based on special conditions	<i>“Compared to Class A regions (categorized by the 8 healthcare policies), the annual income in our area is 72,000 less.” (subcategory, II-3)</i>
	Status of GP	The level of social prestige that is connected to GPs	<i>“I think, in our center, the status of general practitioners is actually quite high.” (subcategory, II-4)</i>
	Professional identity and belongingness	The degree with which a given profession has unique qualities socially acknowledged and shared by those that perform that profession	<i>“When patients say that I treat them well, I feel a sense of accomplishment in contributing to society. (subcategory, II-5)</i>
	Relations with patients	The quality of the personal relationship established between the doctor and patient	<i>“The doctor-patient relationship is particularly good, and everyone understands the hard work of the doctors.” (subcategory, III-1)</i>
	Recognition from patients	The level of acknowledgment a patient gives to a GP concerning the professional or personal value in the occupation	<i>“Many of our patients are “fans” of the doctors, and the relationships are quite good.” (subcategory, III-2)</i>
	Relations with managers/ superiors	The quality of the personal or professional relationship between individuals placed in distinct hierarchical levels	<i>“I feel that both the hospital's level of emphasis on our department and the mutual assistance among colleagues within our department contribute to a comfortable working environment.” (subcategory, III-3; III-4)</i>
	Relations with colleagues	The quality of the personal or professional relationship between peers	<i>“I feel that both the hospital's level of emphasis on our department and the mutual assistance among colleagues within our department contribute to a comfortable working environment.” (subcategory, III-3; III-4)</i>
Work content	Recognition from superiors	The level of acknowledgment a GP receives from an individual placed above in the hierarchical chain	<i>“I believe both salary and recognition from leadership can influence decisions regarding resignation.” (subcategory, III-5)</i>
	Paperwork	The amount of time and effort bureaucratic / administrative formal task require	<i>“I am not particularly satisfied with the data statistics work, and I feel it would be more appropriate to focus solely on outpatient and clinical work.” (subcategory, IV-1)</i>
	Follow-up	The ongoing contact between GP and patients to monitor the evolution of clinical indicators	<i>“The various chronic disease follow-ups for family doctors require fragmented time to complete, as it's not possible to finish them during regular working hours. This may involve utilizing some time after work hours. (subcategory, IV-2)</i>

Growth	Diagnosis and treatment	The identification of health conditions and respective intervention to correct any clinical problem	<i>"Nowadays, outpatient hours are relatively limited, typically once a week, at most twice a week, and not very frequent. (subcategory, IV-3)</i>
	Requirements of performance evaluation	Criteria used to appraise the professional performance of workers	<i>"The pressure from various assessments is actually quite significant." (subcategory, IV-4)</i>
	Case mix (range of patient problems)	The degree of clinical heterogeneity a given GP is expected to deal with	<i>"As a general practitioner, the diseases encountered are relatively simple, and I feel there's a noticeable decline in my personal clinical diagnostic and treatment skills." (subcategory, IV-5)</i>
	Professional title progression opportunities	The degree with which one has the chance of receiving a promotion as regards a new professional category	<i>"We don't have intense competition for promotions here; we have a relatively large number of slots available." (subcategory, V-1)</i>
	Current professional title	The formal name given to a professional category that indicates a determined level of responsibilities and rights	<i>"In fact, income and professional titles are not entirely linked." (subcategory, V-2)</i>
	Training opportunities	The degree with which one has the chance of doing training activities within the offers made by the employer	<i>"We offer opportunities for further training for general practitioners, but some people are not very willing to participate because, regardless of whether they attend or not, their bonuses will be issued as usual." (subcategory, V-3)</i>
	Degree program opportunities	The degree with which one can enroll in official education system (e.g. university) and find support from the employer to successfully conclude the program	<i>"This year, we have a project for general practitioners, and a portion of the funding can be used to support the improvement of their academic qualifications." (subcategory, V-4)</i>
External factors	Family member distance	The physical space that separates the individual from his or her family members	<i>"I feel that the mobility of general practitioners is still related to geographic location. Our colleague Xiao Wei transferred here because it's close to home." (subcategory, VI-1)</i>
	Housing cost	Market price of housing (mortgage / rent)	<i>"In the first two years, there was a housing subsidy, but it was discontinued afterward. Therefore, for newly graduated general practitioners, the cost of renting is quite high." (subcategory, VI-2)</i>
	Pandemic-related special responsibility	Unique set of administrative or clinical responsibilities that emerged from the special pandemic situation	<i>"Last year and this year, a significant amount of our time has been occupied by epidemic prevention and control work" (subcategory, VI-3)</i>

Attractiveness of other careers	and that had to be ascribed to health professionals The individual judgment about the relative goodness of a given professional position other than GP domain compared to the one proportionated by GP career	<i>"Moreover, the treatment in institutions in other areas is quite good, so if there are new opportunities, some people choose to go there directly." (subcategory, VI-4)</i>
Residents' demand for health services	The level of resources (clinical and administrative) that the overall population requires to face their health needs.	<i>"Many people have the understanding that a family doctor is someone who should come to their homes to provide medical care. However, in reality, we cannot meet the demand for house calls in many cases. This is a source of many conflicts." (subcategory, VI-5)</i>

Annex C: The Questionnaire

Inquiry matters (please fill in the answer or number in the answer column)		Answer column					
I. Basic situation survey		—					
Code: _____							
Gender: ①Male ②Female							
Age: _____ years old							
Education: ①College and below ②Bachelor ③Master ④Doctor							
Major: ①Western Medicine ②Chinese Medicine ③Combination of Chinese and Western Medicine ④Preventive medicine ⑤Nursing ⑥Medical testing ⑦Medical technology, such as medical imaging ⑧Dental medicine ⑨Pharmacy ⑩Others, _____							
Monthly income (include benefits) ①≤5000 ②5001-10000 ③10001-15000 ④>15000							
Marriage: ①unmarried ②married ③divorced ④widowed ⑤Others, _____							
Number of your children under the age of 18 () (please enter directly in the box to the right)							
Does your spouse work in health care? ①Yes ②No							
Do you currently hold an administrative position? ①Yes ②No							
Current title: ①No title ②Junior ③Intermediate ④Sub-senior ⑤Senior							
Mode of appointment: ①Formal staffing ②Contractual ③Temporary employment ④ Re-employment							
Years of work: () years (please fill in the space directly to the right)							
Number of working days per week: () hours (please fill in the space directly to the right)							
Have you participated in any training in your institution? ①Yes ②No							
Does your institution have “Eight Health Measures” Policy? ①Yes ②No							
II. Turnover Intention							
Please tick “√” in the corresponding option according to your actual situation, with scores from 1 (disagree strongly) to 7 (agree strongly)	1	2	3	4	5	6	7
I often seriously consider leaving my current job							
I intend to quit my current job.							
I have started to look for other jobs							
Just for control purposes of attention please answer this item with the “5”							
III. Multi-dimensional satisfaction survey							
Please rate your satisfaction with the following items in relation to your current working conditions, compensation, relationships, job content, promotion, and external factors. Please tick the “√” under the corresponding option according to your actual situation.							
How satisfied are you with the following items?	Very dissatisfied	Unsatisfied	Average	Satisfied	Very satisfied		
working conditions							
Resources (equipment/human resources)							

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Working hours					
Staffing level					
Workload intensity					
Commuting time					
Workload distribution					
compensation					
Salary					
Performance bonus					
Policy-based subsidy					
Status of GP					
Professional identity and belongingness					
relationships					
Relations with patients					
Recognition from patients					
Relations with managers/ superiors					
Relations with colleagues					
Recognition from superiors					
job content					
Paperwork					
Follow-up					
Diagnosis and treatment					
Requirements of performance evaluation					
Case mix (range of patient problems)					
promotion					
Professional title progression opportunities					
Current professional title					
Training opportunities					
Degree program opportunities					
external factors					
Family member distance					
Housing cost					
Pandemic-related special responsibility					
Attractiveness of other careers					
Residents' demand for health services					
IV. 5-item Short Index of Job Satisfaction (SIJS-5)					
Please tick “√” in the corresponding option according to your actual situation.	Strongly disagree	Disagree	Undecided	Agree	Strongly agree
I feel fairly satisfied with my present job.					
Most days I am enthusiastic about my work.					

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Each day at work seems like it will never end.											
I find real enjoyment in my work.											
I consider my job to be rather unpleasant.											
V. Work Engagement (UWES)											
State how much the following statements express what you feel about your job.	0 Never	1 Almost never	2 Rarely	3 Sometimes	4 Often	5 Very often	6 Always				
At my job, I feel strong and vigorous											
At my work, I feel that I am bursting with energy											
When I get up in the morning, I feel like going to work											
I am enthusiastic about my job											
My job inspires me											
I am proud of the work that I do											
I feel happy when I am working intensely											
I am immersed in my work											
I get carried away when I'm working											
Just for control purposes of attention please answer this item as "Often")											
VI. Work Motivation Scale for Health Workers (WMSHW)											
Please answer the question "Why are you motivated to work?" based on the following options This question. Tick the appropriate option on a scale from 0 (no, I totally disagree) to 10 (yes, I agree) as appropriate.											
Why are you motivated to work?	0	1	2	3	4	5	6	7	8	9	10
Because I enjoy doing what I do at work every day.											
Because I enjoy my work tasks.											
Because the work that I do is very interesting.											
Because being a health worker is a fundamental part of who I am.											
Because my work is extremely important for my patients.											
Because I want to make a difference in people's lives.											
In order to feel good about myself											
Because my reputation depends on my work.											

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Because of the appreciation I receive from my patients and the community.															
So I do not let my team down.															
Because my supervisor recognizes and appreciates me.															
Because of the benefits that come with my job.															
In order to be able to provide for my family.															
Because of the financial security my job provides me with.															
In order to earn money.															
VII. Person-Environment Fit Scale (PPEFS)															
Please tick “√” in the corresponding option according to your actual situation, with scores from 1 (not match) to 7 (exact match)	1	2	3	4	5	6	7								
Person-Job Fit Scale (PJFS)															
How would you describe the match between your professional skills, knowledge, and abilities and those required by the job?															
How would you describe the match between your personality traits (e.g., extrovert vs. introvert, agreeable vs. disagreeable, and dependable vs. undependable) and those required by the job?															
How would you describe the match between your interests (e.g., social vs. unsocial, artistic vs. inartistic, and conventional vs. unconventional) and those you desire for a job?															
Person-Organisation Fit Scale (POFS)															
How would you describe the match between your emphasis and your organization’s emphasis on the following values? (1=not match to 7=exact match)															
(1) honesty															
(2) achievement															
(3) fairness															
(4) helping others															
How would you describe the match between your goals and your organization’s goals on the following dimensions? (1=not match to 7=exact match)															
(1) reward															
(2) the amount of effort expected															
(3) competition with other organizations															
Person-Group Fit Scale (PGFS)															
How would you describe the match between your emphasis and your group’s emphasis on the following values? (1=not match to 7=exact match)															
(1) honesty															
(2) achievement															
(3) fairness															
(4) helping others															

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How would you describe the match between your goals and your group's goals on the following dimensions? (1=not match to 7=exact match)							
(1) reward							
(2) the amount of effort expected							
(3) competition with other groups							
How would you describe the match between you and your group members on the following characteristics?							
(1) personality							
(2) work style							
(3) lifestyle							
(4) Just for control purposes of attention please answer this item with the "4"							
Person-Supervisor Fit Scale (PSFS) (1=not match to 7=exact match)							
How would you describe the match between the things you value in life and the things your supervisor values?							
How would you describe the match between your personality and your supervisor's personality?							
How would you describe the match between your work style and your supervisor's work style?							
How would you describe the match between your lifestyle and your supervisor's lifestyle?							
How would you describe the match between your supervisor's leadership style and the leadership style you desire?							
VIII. Maslach Burnout Inventory-General Survey (MBI-GS)							
Based on your own feelings and experiences, please judge the frequency of the following events in your unit or to you and tick "√" in the appropriate box.							
How often do the following events occur?	Never	Rarely (a few times a year or less)	Occasionally (once a month or less)	Often (a few times a month)	Frequently (a few times a week)	Very frequently (several times a week)	Every day
Exhaustion							
Work makes me feel physically and mentally exhausted							
I feel exhausted at the end of the day							
I feel tired when I wake up in the morning and have to face the day's work							
Working all day is really stressful for me							
Work makes me feel like I'm going to collapse							
Cynicism							
Since I started this job, I am less and less interested in my work							
I am not as enthusiastic about my job as I used to be							
I doubt the meaning of the work I do							
I care less and less about whether I am contributing to the work I am doing							

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Professional Efficacy							
I can effectively solve problems that arise in my work							
I feel that I am making a useful contribution to the unit							
in my opinion, I am good at what I do							
I feel very happy when I accomplish something on the job							
I get a lot of valuable work done							
I am confident that I can do all my work effectively							
IX、 National Aeronautics and Space Administration Task Load Index (NASA-TLX)							
Note: "Performance" is good to poor from left to right, and the remaining five items are increasing load from left to right.							
Item	Endpoint	Description					
Mental demand	0-20 Low / High	How much mental and perceptual activity was required (e.g., thinking deciding, calculating, remembering, looking, searching, etc.)? Was the task easy or demanding, simple or complex, exacting or forgiving?					
Physical demand	0-20 Low / High	How much physical activity was required (e.g., pushing, pulling, turning, controlling, activating, etc.)? Was the task easy or demanding slow or brisk, slack or strenuous, restful or laborious?					
Temporal demand	0-20 Low / High	How much time pressure did you feel due to the rate or pace at which the tasks occurred? Was the pace slow and leisurely or rapid and frantic?					
Performance	0-20 Poor/ Good	How successful do you think you were in accomplishing the goals of the task set by the experimenter (or yourself)? How satisfied were you with your performance in accomplishing these goals?					
Effort	0-20 Low / High	How hard did you have to work (mentally and physically) to accomplish your level of performance?					
Frustration level	0-20 Low / High	How insecure, discouraged, irritated, stressed and annoyed versus secure, gratified, content, relaxed and complacent did you feel during the task?					