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Medical Staff's Sense of Security, Work Engagement and Turnover Intention: A Cross Sectional Study in Guangdong, China

HUANG Huigen

Doctor of Management

Supervisor:
PhD Luís Dias Martins, Associate Professor,
ISCTE University Institute of Lisbon

December, 2022

BUSINESS
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Abstract

Objective: To understand the current situation of medical staff's sense of security, work engagement, and turnover intention in Guangdong Province and to analyze their influencing factors to explore the relationship between sense of security, work engagement and turnover intention. The thesis also aims to improve medical staff's sense of security, reduce willingness to leave, ensure the sustainable development of medical staff's health, and provide an essential basis for health administration departments to formulate health management policies.

Methods: This study adopted the proportional stratified sampling method to select medical staff in Guangdong Province as the research object. The general information questionnaire, medical staff sense of security scale, work engagement scale and turnover intention scale were selected for investigation. Data analysis was carried out using SPSS 24.0 and AMOS 23.0. The influencing factors were analyzed by one-way analysis of variance and multiple linear regression. Using structural equation modelling, we explored the mediating effect of job engagement on the relationship between security and turnover intention.

Results: The survey results show that the turnover intention of medical staff was at the upper-middle level, and 62.4% are highly willing to leave. Sense of security has a negative effect on turnover intention, which can also be influenced by work engagement.

Conclusion: The study concludes that work engagement mediates between the sense of security and turnover intention and significantly negatively impacts turnover intention. Therefore, hospital administrators should realize the importance of work engagement and take measures to reduce turnover intention.

Keywords: sense of security; turnover intention; work engagement; medical staff
JEL: M50; M54

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Resumo

Objectivo: Este estudo pretende caracterizar a perceção de segurança e da intenção de saída/rotatividade (turnover) dos profissionais de saúde da Província de Guangdong e analisar a relação entre a perceção de segurança, comprometimento com o trabalho e intenção de rotatividade (turnover). Esta tese pretende também fornecer contributos para aumentar a perceção de segurança do pessoal de saúde, reduzir a intenção de saída da instituição, assegurar um desenvolvimento sustentável da saúde destes profissionais e providenciar bases essenciais para a elaboração de políticas de gestão da saúde, pelos departamentos respetivos.

Métodos: A amostra foi estratificada por amostragem proporcional dos profissionais de saúde da província de Guangdong, Os instrumentos selecionados foram a escala da perceção de segurança dos profissionais de saúde, a escala de comprometimento no trabalho e a escala de intenção de rotatividade(turnover). Para tratamento dos dados foi utilizado o SPSS 24.0 e o AMOS 23.0. Recorreu-se à análise de variância univariada e regressão linear múltipla, sendo também utilizados o modelo de equações estruturais para investigar o efeito do comprometimento, na relação entre a sensação de segurança e a intenção de rotatividade.

Resultados: os resultados da pesquisa indicaram que a intenção de rotatividade dos profissionais de saúde é elevada, sendo que 62, 4% dos profissionais apresentam uma muito elevada intenção de saída. A perceção de segurança tem uma influência negativa na intenção de saída.

Conclusão: O estudo conclui que o comprometimento com o trabalho atua como mediador entre a perceção da segurança e a propensão a rotatividade, tendo um efeito negativo significativo sobre a propensão para rotatividade. Consequentemente as administrações hospitalares devem considerar o comprometimento do trabalho no trabalho como um fator determinante para a redução da intenção de saída dos profissionais (turnover).

Palavras-chave: perceção de segurança; intenção de saída/rotatividade (turnover); comprometimento com o trabalho; pessoal médico

JEL: M50; M54

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摘 要

目的：了解广东省医务人员安全感、工作投入和离职意愿的现状及分析其影响因素,探索安全感、工作投入和离职意愿之间的关系，旨在提高医务人员安全感，降低离职意愿，保障医务人员健康可持续发展，并为卫生行政部门制定健康管理政策提供重要依据。

研究方法：采用按比例分层抽样的方法，抽取广东省医务人员作为研究对象，选取一般资料调查表、医务人员安全感量表、工作投入量表和离职意愿量表进行调查。数据分析采用SPSS 24.0和AMOS 23.0，利用单因素方差分析和多元线性回归分析影响因素，采用结构方程模型，探究工作投入在安全感和离职意愿之间的中介效应。

研究结果：调查结果显示医务人员的离职意愿处于中等偏上水平，其中62.4%的医务人员离职意愿较高。安全感对离职意愿有负向影响，也可通过工作投入来影响离职意愿。

研究结论：工作投入在安全感与离职倾向之间起中介作用，对离职倾向有显著的负向影响。因此，医院管理者应认识到工作投入的重要性，并采取措施降低离职意愿。

关键词：安全感；离职意愿；工作投入；医务人员

JEL: M50; M54

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Acknowledgements

Spring has gone and autumn has come for three times. It seems that I just stepped into the gate of Southern Medical University the day before, but I am already busy with the last part of the doctoral dissertation journey. Looking back on the bitterness, it was full of sourness and sweetness. I thought that there would be all kinds of amorous feelings sprinkled on my fingertips, but when I picked up the pen, I was speechless. The only thing I remembered was endless and deep thanks.

First of all, I would like to thank my supervisor, Professor Luis Martins. My first impression of Professor Luis is that he is academically rigorous and friendly. He helped me a lot during the whole process of project implementation. I remember very clearly that my supervisor was very worried about my proposal. He answered my doubts, and led me to search for foreign literature. He always sent me helpful and inspiring literature on my subject and guides me in the direction. During the progress report period, the supervisor helped me to constantly adjust my thinking and gave me many suggestions and opinions for revision. No matter how busy he was, he always actively replied to me, even if there is a 7-hour time difference between us. During the writing process of the dissertation, my supervisor encouraged me constantly. He told me that everything was going well and that I should keep working hard. Here I sincerely thank my mentor for helping me through many difficulties.

It is said in the Book of Learning that if one learns alone without a friend, one is alone and uneducated. I would also like to thank the teachers at the School of Health Management, Southern Medical University, for their help in my studies. Thanks to Prof. Nelson Antonio, Prof. Virginia Trigo, Prof. Sun Ping and Prof. Xu Dong for their valuable opinions on the proposal and mid-term defence, which made the project progress in a good direction. Thanks to the experts who took time out of their busy schedules to review my thesis and the experts on the thesis defence committee. Thank you for your valuable comments! Thanks to the leaders and colleagues of Guangdong Provincial People's Hospital for their help and support, so that I can complete my studies! Thanks to my classmates for their support and help! Thank you to every medical staff who participated in the project. I hope that everything I ask for and what I hope for can be expected! Finally, I would like to thank my family for their support in my life and studies! I hope you are always healthy and healthy!

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致 谢

春去秋来，寒暑三载，须臾间仿佛前一日才步入南方医科大学的校门，今日却已经在忙碌整个博士论文的最后一部分。回想苦辣酸甜，本以为会有千般风情洒落指尖，然而提笔时竟无语凝噎，唯一记下的恐怕只有道不尽的、深深的感谢。

首先，我想感谢我的导师——Luis Martins教授。Luis教授给我的第一印象是学术严谨、待人亲和，在课题实施的整个过程中帮助我很多。记得很清楚导师为我的开题操碎了心，给我解答疑惑，引领我查找国外文献，总是把对我课题很有帮助和启发意义的文献发给我，指引我方向。在中期考核时，导师更是帮我不断调整思路，给我提出很多修改建议和意见。在与导师的沟通中，不管多忙，导师都会积极给予我回复，哪怕我们隔了7个小时的时差。在最后论文撰写过程中，导师不断鼓励我，并告诉我一切都在往好的方向进展，让我继续努力。在这里我真心感谢我的导师帮助我度过重重难关。

学记有云：独学而无友，则孤陋而寡闻。我还要感谢感谢南方医科大学卫生管理学院的各位老师对我学业上的帮助，感谢Nelson Antonio教授、Virginia Trigo教授、孙平教授和徐东教授在开题和中期答辩中提出的宝贵意见，从而使得课题往好的方向进展。感谢百忙之中抽出时间审阅我论文的专家以及论文答辩委员会的各位专家，感谢你们提出的宝贵意见！感谢广东省人民医院各位领导和同事对我的帮助和支持，让我能安心完成学业！感谢同班同学对我的支持和帮助！感谢参与课题的每一位医务人员，愿所求皆所愿，所盼皆可期！最后，感谢我的家人对我生活和学业的支持！希望你们身体一直健健康康！

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List of abbreviations

ABBREVIATION	FULL NAME
ATS	Anticipated Turnover Scale
COR	Conversation of resource
COVID-19	Corona virus 2019
CPC	Communist Party of China
EFA	exploratory factor analysis
GDP	gross domestic product
GFI	the goodness-of-fit index
GP	General Practitioners
ICU	intensive care units
IQS	Intention of Quitting Scale
KMO	Kaiser-Meyer-Olkin
MBI	Maslach-Burnout Inventory
NDRC	National Development and Reform Commission
NHC	National Health Commission
RN	registered nurses
SEM	structural equation modeling
TCM	Chinese traditional medicine
US	United States
UWES	Utrecht Work Engagement Scale
WHO	World Health Organization

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Chapter 1: Introduction

1.1 Research background and motivation

1.1.1 The current state of medical staff human resources at home and abroad

The medical workforce shortage is a worldwide problem. On 9 April 2020, the World Health Organization (WHO, 2020) declared a nursing workforce shortage of 5.9 million globally. Human: Solving the Global Workforce Crisis in Healthcare (Britnell, 2019), a new book published by Oxford University Press and written by the Chairman of KPMG Global Healthcare, mentioned that the gross global demand for medical staff will reach 80 million people by 2030, while the total number of dical staff will be only 62 million, which will leave a gap of 18 million between supply and demand. At that time, there will be around one-fifth of the demand for healthcare unmet. As a study published in The Lancet in 2022 (GBD 2019 Human Resources for Health Collaborators, 2022), 6.4 million physicians, 30 million nurses and midwives, and 2.9 million pharmacists will be needed globally by 2019 if comprehensive health coverage is to be at least 80% accessible. Of these, India has a shortfall of around 4 million medical staff currently. Japan has a projected shortfall of approximately 380 thousand nursing staff by 2025, and the United States (US) has a projected shortfall of 105 thousand physicians by 2030.

As one of the most populous countries in the world, China’s population size brings a demand for healthcare that cannot be underestimated. According to data from the National Health Commission (NHC, 2022a), the total number of health personnel in China was 13.983 million by the end of 2021, of which 11.242 million were health technicians (including practising physicians, practising assistant physicians, registered nurses, pharmacists and assistant pharmacists, lab technicians and assistant technicians, imaging technicians, health supervisors and trainee physicians in pharmaceutical, nursing, and technical sectors. This figure does not include 4.287 million health technicians engaged in management, such as department director, vice director, party secretary, and 4.287 practising or assistant physicians. Practising assistant physicians refer to those whose level of the Medical Practitioner’s Certificate is practising assistant physician and who are engaged in medical and preventive healthcare work, excluding those who are engaged in management. The categories of

practising assistant physicians are divided into four categories: clinical, Chinese traditional medicine (TCM), dentistry and public health. There were 5.018 million registered nurses (RN), 521 thousand pharmacists and assistant pharmacists, and 692 thousand technicians and assistant technicians. RN refers to those who have registered nursing certificates and are engaged in nursing work, excluding nurses who are involved in management.

The shortage of medical personnel, especially those working at the front line of the clinic, has been a factor hindering the development of healthcare in China. China has 76 health technicians per 1,000 population, 3.04 physicians per 1,000 population, and 3.56 nurses per 1,000 population, with a doctor-patient ratio of 1:1.15. The proportions of the top four countries in the world, Japan, Iceland, Norway, and Switzerland, are 1:5.1, 1:4.1, 1:5.7, and 1:3.9, respectively. There is still a large gap compared to these four developed countries. According to the 14th Five-Year Plan (NHC, 2022b), by 2025, the total number of nurses in China should reach 5.5 million, the number of registered nurses per 1,000 population should reach 3.8, the number of practising (assistant) physicians per 1,000 population should reach 0.54, and the ratio of physicians to nurses should reach 1:1.2.

However, China still has a long way to go in terms of human resources for healthcare for the time being. In 2020, WHO reported that there is a global shortage of 5.9 million nurses, and the shortage is even more severe in low- and middle-income countries such as Africa, Southeast Asia and Latin America (Turale et al., 2020). In 2021, WHO (2022) stated that 15 million additional health workers are needed to respond to global emergencies in order to achieve universal health coverage in low- and lower-middle-income countries by 2030.

In China, the control and prevention of the corona virus 2019 (COVID-19) is still being implemented strictly to avoid a regional outbreak and international input of cases at the same time. The subsequently increased workload and the work intensity of medical personnel pose a serious challenge to China’s healthcare system. By the end of 2020, the total number of healthcare labour in China will be 13.475 million, with only 3.13 registered nurses per 1,000 population (WHO, 2022a). This is lower than the ratio recommended by WHO (2022b) (4.45 per 1,000 population). The Outline of the Health China 2030 Plan (Political Bureau of the CPC Central Committee, 2016) argued that China needs to have 4.7 RNs per 1,000 population by 2030, which means there is still a shortage of at least 2 million nurses.

Guangdong Province is one of the most economically developed provinces in China. According to the results of the 7th National Population Census (The National Development and Reform Commission of the PRC, 2021), Guangdong is one of the only two provinces in China where a gross population was exceeding 100 million. By the end of 2021, the

province's resident population was 126.84 million, an increase of 827.5 thousand people compared to the data published in the Communique of the 7th National Population Census of Guangdong Province in 2020. However, in terms of healthcare resources in Guangdong Province, the number of beds in health institutions per capita is the lowest in China. From 2017 to 2021, although the number of beds in healthcare institutions in Guangdong Province has been increasing year on year, the number of beds per capita is on a downward trend, with only 46.74 beds per 10 thousand people in 2021, ranking the last among all the 31 provinces and municipalities in China.

Guangdong's 21 prefecture-level cities are classified into four regions according to their level of economic development: eastern Guangdong, western Guangdong, northern Guangdong, and the Pearl River Delta region. The eastern region of Guangdong includes four cities, Shantou, Chaozhou, Shanwei, and Jieyang; the western region of Guangdong includes three cities, Zhanjiang, Maoming, and Yangjiang; the northern region of Guangdong includes five cities, Shaoguan, Heyuan, Qingyuan and Yunfu; and the Pearl River Delta includes nine cities, Guangzhou, Shenzhen, Zhuhai, Foshan, Huizhou, Dongguan, Jiangmen, Zhongshan, and Zhaoqing. By the end of 2020, the total number of health professions in Guangdong Province was 829.4 thousand, with 306 thousand physicians, 374.5 thousand nurses, 44.5 thousand pharmacists (assistant pharmacists) and 39 thousand technicians (assistant technicians). Nurses accounted for the highest proportion of health professions at 45.15%. practising (assistant) physicians and RN per 1,000 population in Guangdong Province gradually increased from 4.29, 1.616 and 1.569 in 2009 to 6.902, 2.536 and 3.097 in 2019. The ratio of physicians to nurses increased from 1:0.97 to 1:1.22. The growing multi-level and diversified medical and healthcare needs of the people were gradually being met. However, compared to the national level, the number of human resources in all three categories of healthcare per 1,000 population in the same period in Guangdong Province was slightly lower, which was not in line with the economic development status and development positioning of Guangdong Province in China. According to the spirit of the Decision of the Communist Party of China (CPC) Guangdong Provincial Committee and Guangdong Provincial People's Government on Building a Strong Health Province (The People's Government of Guangdong Province, 2015), the number of practising (assistant) physicians and RN per 1,000 resident population in Guangdong Province should reach 2.8 and 3.5 respectively by 2025, which is still a gap compared to the current number.

This phenomenon will have a direct impact on the implementation of the Healthy China strategy. On 25 October 2016, the Central Committee of the CPC and the State Council

released the Healthy China 2030 Outline (Political Bureau of the CPC Central Committee, 2016). The ultimate focus of the Healthy China strategy is on people, more specifically, healthy people. Therefore, the need to meet the medical needs of patients is a top priority. Similarly, since the 18th CPC National Congress (2012), the socialist ideology of the new era, with Xi Jinping's thoughts as the main idea, has emphasized that talent is the first resource. In April 2009, the official release of the Opinions of the State Council of the Central Committee of the CPC on Deepening the Reform of the Medical and Health System (National People's Congress, 2009) kicked off a new round of medical reform, which clearly pointed out that to establish a sustainable mechanism for scientific and technological innovation in medicine and health and a mechanism for safeguarding talents, and to strengthen the construction of a medical and health talent team.

In May 2015, the Guidance Opinions of the General Office of the State Council on the Pilot Comprehensive Reform of Urban Hospitals (Central people's government of the People's Republic of China, 2015) also emphasised the need to strengthen the construction of a health workforce and to establish a remuneration system that is in line with the characteristics of the healthcare industry. As China's public hospital reform continues to deepen, health human resource reform is receiving increasing attention and importance from all sectors of society. Healthy human resources are a key element and core component of healthcareer development. The allocation of healthy human resources is related to the overall situation of the whole healthcare reform, and a reasonable allocation of healthy human resources is conducive to promoting the sound development of healthcare industry and the overall progress of the economy and society.

The medical workforce gap poses a huge challenge in the global fight against COVID-19. However, even without COVID-19, the nursing shortage around the world still exists, but the outbreak of COVID-19 has made the lack of nurses a more acute issue.

COVID-19 pandemic has created new challenges for medical staff worldwide. The need for additional human resources to carry out routine prevention tasks such as nucleic acid tests has created a situation of shortage of medical staff, and most countries are experiencing varying degrees of human resource crisis. In the case of nurses, the integrity of the nurse workforce is an integral part of improving health coverage for all. It is noted that in hospitals with low nurse-to-patient ratios, patient mortality rates are higher (X. Zhang et al., 2018). A shortage of nurses may cause patients to wait longer for diagnosis and treatment, longer hospital stays, and more frequent readmissions. At the same time, nurse burnout due to staff shortages can threaten patient health.

1.1.2 The current state of medical staff's turnover intention

The term magnetic hospital, first proposed by American academic McClure (1983), refers to a hospital that attracts highly qualified professional nurses like a magnet despite a severe shortage of nurses. Such hospitals have a low turnover rate of nurses and are able to have a stable, high-quality nursing workforce, thus providing quality care. Magnet hospitals have been developed in the US for over 20 years, primarily by improving the working environment and increasing the voice of nurses to create an ongoing 'magnet' that has successfully retained nurses and reduced their turnover rate.

According to the China Healthcare Development Report 2015 (Fang, 2016), the turnover rate of nurses in China was 10.2 to 11.2%, with 56.94% of nurses having a turnover intention. According to the report, 33.5% of young nurses in tertiary hospitals nationwide had the intention to leave, of which 3.8% had a very strong will to leave. These figures indicated a high level of turnover intention among young nurses in tertiary hospitals.

The medical graduate population has continued to expand, with the number of medical graduates in China increasing from 493.9 thousand to 790.7 thousand from 2011 to 2018, an average net increase of 42.4 thousand annually. China's prestigious medical colleges, such as Peking Union Medical College Hospital, West China Hospital of Sichuan University, and the School of Medicine of Sun Yat-sen University, have thousands of medical graduates each year and have sent many medical talents to hospitals across China. Almost every province has a medical university or a medical department within a university, showing that China pays great attention to the training of medical students.

As announced on the official website, Southern Medical University has already cultivated more than 100 thousand medical talents for China (China Education News Network, 2021), and Zhejiang University has cultivated more than 50 thousand medical students for China. Zhang Hongbing, a professor at Peking Union Medical College, illustrated that although China trains nearly a million medical students every year, only 100 thousand of them work in medical positions, and most of them work in other industries (China Comment, 2018).

One study showed (Chinese Medical Doctor Association, 2018) that 45% of physicians do not want their children to practise medicine due to the deteriorating practice environment in Chinese hospitals. It is not difficult to explain the reluctance of medical student graduates to the clinic and their desire to leave the hospital and medical practise. Physicians switching careers is not rare. Previously, there were stories of physicians switching careers to sell steamed buns and catering, medical students giving up their doctoral exams to make bread, or

operation of an online shop. These stories used to be the focal points of public opinion.

Bai Jun, a young man from Hunan, who had been admitted to China Medical University with 608 points in the College Entrance Examination, turned into a takeaway delivery man after graduation. This was a famous household story in China. In the past three years, Bai Jun and his young team have served more than a thousand businesses cumulatively and have also received professional certificates. During COVID-19 control period, they provided takeaway delivery services to small and medium-sized businesses that needed to avoid the impacts of the suspension of dine-in food as much as possible. They not only solved the business problems of the restaurants but also facilitated the people's need to eat, fully reflecting the value of the takeaway delivery man. There are many different trades and professions. As a doctor switching careers, Bai Jun is not the first nor the last.

How many physicians have had the desire to change professions since they started practising? As many as 84% of physicians have the desire to change careers. According to the China Medical Talent Development Report 2021 released by Dingxiang Talent (2021), 65.2% of medical practitioners have the idea of trying a bywork, of which 11.7% said they would not choose medicine as their bywork. According to statistics, more than 80% of physicians have had the idea of changing careers after practising and have taken action.

Human resources are one of the core competencies of hospitals and a decisive resource for the sustainable and stable development of healthcare. Inspection of public hospitals also has requirements on the turnover rate of medical staff, indicating that the turnover of medical staff has always been an issue of national concern. The turnover of medical staff is a double-edged sword. On the one hand, a mild turnover rate can bring new people and introduce new ideas to the health institution. On the other hand, a high turnover rate can seriously affect hospital performance, increase recruitment work and other labour costs, and even directly affect the future development of the hospital.

As a result, the problem of medical staff turnover is increasingly troubling hospital administrators. With the ongoing reform of the healthcare system and increasingly fierce competition in hospitals, the issue of medical staff turnover has become an important issue in the strategic management of hospital human resources. In this context, hospital administrators need to pay attention to the issue of how to retain medical staff and reduce the turnover rate of the medical staff since it can provide theoretical and practical significance for the stability of the health personnel team and for the high-quality development of hospitals.

1.1.3 Dilemmas and motivations in the field of research

The global shortage of medical staff has been exacerbated by the outbreak of COVID-19. During the epidemic, many countries suffered from severe shortages of medical staff and overwhelmed health systems. In low- and middle-income countries such as Africa, South-East Asia and Latin America, the shortage of medical staff is even more acute, with a rising number of deaths due to a lack of access to medical resources and lack of timely access to healthcare. It is reported an increase in infection rates, patient mortality and medical errors in areas with sever lack of nurses (X. Zhang et al., 2018).

COVID-19 prevention and control are still strict in China to avoid regional outbreaks in China and cases input from other countries, which has increased the workload and labour intensity of medical staff, posing a serious manpower challenge to China's healthcare system. In addition, a study (Wang & Chen, 2021) found that more than 80% of medical staff experienced psychological problems such as anxiety and depression during COVID-19, with nurses intention to leave the position at 71.4%. It is clear that the shortage of medical staff and the high turnover intention have seriously affected the quality and safety of healthcare and the stability of the health workforce. These are issues that need to be addressed urgently in China and globally.

However, the factors associated with medical staff's resignation intention are still unclear. There is a lack of general and feasible intervention strategies for medical staff's resignation intention in Chinese and international studies. Based on the serious psychological impact of COVID-19 on the medical staff, the existing interventions do not sufficiently take into account mental health factors and are not well grounded in theory.

This study is based on the previous findings that nurses' sense of security is highly negatively related to their turnover intention. This study adopted an innovative approach to explore the underlying causes of medical staff turnover and propose effective management measures by introducing the factor of medical staff's sense of security. This study will provide new ideas and methods to improve the sense of security of medical staff and reduce their turnover intention. This will have far-reaching implications for stabilising China's healthcare workforce and ensuring the healthy and sustainable development of the medical staff.

1.2 Research problem, questions, and thesis structure

1.2.1 Research problem and questions

In the current situation of shortage of healthy human resources in the world, the turnover problem has exacerbated the shortage of medical personnel, and the prediction of turnover is particularly important. Predicting the resignation intention of medical staff before the actual resignation behavior and analyzing the reasons will help hospital managers take targeted measures on the factors that affect resignation and reduce the occurrence of actual resignation. Therefore, the key of this study is to analyze the influencing factors of turnover intention, stabilize the medical personnel team, and promote the sustainable development of medical personnel.

Although it has been reported in the literature that the sense of security is negatively correlated with turnover intention, the evaluation tools are mostly aimed at company employees. Due to the special working characteristics and working environment of medical staff, previous studies cannot represent the impact of medical staff's sense of security on turnover intention.

The research questions are:

- What is the impact of sense of security on turnover intention?
- What is the impact of sense of security on work engagement ?
- How does sense of security and work engagement affect turnover intention?

1.2.2 Research content and structure

This study examined the role and influencing factors of security and work engagement to explore the issue of medical staff turnover intention in Guangdong Province, China, and suggest preventive management measures. Specifically, this study explored:

Firstly, the impact of sense of security and work engagement on the medical staff’s turnover intention.

Secondly, studying which dimensions of sense of security and work engagement play a key role in the impacts on medical staff’s turnover intention.

Thirdly, exploring which leadership management style leads to a greater sense of security and engagement in the workplace, in turn reducing medical staff’s turnover intention.

The study is structured as follows:

Chapter One: Introduction. The main focus is on the importance of human resources and

turnover of medical staff in hospitals at home and abroad, and the analysis of the research background and motivation to study the impacts of sense of security and work engagement on turnover intentions. Research problem and questions, objectives and content, and structure of this study are also described in this chapter.

Chapter Two: Literature Review, including literature, theoretical basis, and research hypotheses. Firstly, the theories of sense of security, work engagement and turnover intention are described. Then this chapter illustrates the concept of sense of security and work engagement, their current research situation, their measurement tools, and research progress. Secondly, the relationship between sense of security, work engagement and turnover intention is described. Last, a comparison of domestic and international studies on medical staff's turnover intention is presented, based on the limitations of the relevant studies and the hypotheses of this study.

Chapter Three: Research Methods. This chapter contains the design of an empirical study on sense of security, work engagement and turnover intentions for medical staff at all levels in hospitals in Guangdong Province, China, specifying the study objects, definition of basic concepts, data collection and processing methods, scale development, and the administration of the survey to obtain empirical results for validation.

Chapter Four: Research Findings. The results of the survey are presented, mainly to show the current situations and factors influencing medical staff's sense of security, work engagement, and medical staff's turnover intention, respectively. A structural equation modeling (SEM) containing the relationship between sense of security, work engagement and turnover intention is constructed.

Chapter Five: Research Conclusions, mainly with the correlation analysis and discussion of research findings.

Chapter Six: Research Prospects. This chapter focuses on a summary of the findings and related conclusions of the previous theoretical and empirical studies, and points out the limitations of this study and prospects for the future studies.

1.3 Chapter summary

This chapter is mainly from the perspective of the importance of medical staff in medical organizations and high turnover intention, and analyses the research background and motivation of this topic, especially the difficulties faced by the field and the inadequacies of empirical research raise the research questions. It expounds on the research questions,

objectives, content and structure, summarizes the main innovations and contributions of this research, and puts forward the importance of this study.

Chapter 2: Literature Review and Research Hypotheses

2.1 Sense of security, work engagement, and turnover intention

2.1.1 Identification, studies, and measurement of sense of security

2.1.1.1 The identification of sense of security

Security is a concept opposed to danger. As interpreted in the Chinese Dictionary, safety means the absence of danger, the absence of threat, and the absence of accidents. Scholars in the psychological and psychiatric research community define security as a sense of foreboding about possible dangers or risks to the body or psyche, a sense of power or powerlessness that the individual has in coping with the disposition, mainly in the form of a sense of certainty and control.

According to Maslow (1945), a humanistic psychologist, a sense of security is a state of mental activity, a feeling of confidence, safety and freedom detached from fear, anxiety, and depression. Maslow's hierarchy of needs argues that if a person's basic physiological needs are met, the next most important thing that a person needs to meet psychologically is a sense of security. According to this theory, he proposed that the first rule of mental health is to have an adequate sense of security. Reasoning from the perspective of dominance and responsibility, there is a sense of control behind a sense of security.

Lin (2003) argued that a sense of security is a positive emotional experience when an individual is relieved of danger or protected in the face of danger. Gui (2013) proposed the concept of medical staff's sense of security. For medical staff, their sense of job security is the feeling of confidence, safety, and freedom they have about the surrounding environment and people in hospitals and other workplaces.

2.1.1.2 Studies about sense of security

Most Chinese studies on security have focused on student and teacher groups and employees in firms, concentrating on describing their psychological and life security. Some studies have found that high job insecurity of corporate employees lowers their perception of the quality of their work life and imposes impacts on individual security behaviour.

Using the Chinese version of the Maslach Burnout Inventory on 127 operating room

nurses, Huang et al. (2016) found that Interpersonal security and control security are negatively associated with depersonalization in burnout, and interpersonal security is positively associated with personal fulfillment (Hu & Xv, 2014).

By comparing job burnout scores and job security among 224 medical staff, Gui et al.'s (2013) research results showed that job security had the effect of reducing job burnout among medical staff. J. H. Zhang et al. (2017) used a questionnaire to study 349 nurses in a tertiary care hospital and found that job insecurity could have both a direct impact on nurses' psychological health and an indirect impact on nurses' psychological health through the three dimensions of job burnout, indicating that when nurses in tertiary care hospitals feel job insecurity, their level of psychological health decreases or they experience somatization symptoms.

J. Y. Zheng et al.'s (2008) study showed that insecurity in nurses' work is positively correlated with physical discomfort. It can be seen that hospital administrators should grasp the influencing factors of medical staff's sense of security in order to take measures to improve medical staff's sense of job security, reduce medical staff's job burnout and physical discomfort, and thus promote the development of medical staff's mental health.

Most of the empirical studies on perceptions of safety abroad have focused on the field of business and corporate management, and very little has been reported on the occupational safety of medical staff groups. Kruzich et al. (2014) found from a study of 1040 public child welfare workers that team psychological safety positively influenced the intention to stay on the job, and the higher team psychological safety cemented the intention to stay on the job.

However, Jean et al. (2014) pointed out that the idea of utilitarianism can lead individuals to use the security in their environment to make choices that are more beneficial to them, even if the choice is unethical and may even have a negative impact on the interpersonal relationships of their colleagues. Occupational security can therefore lead to unethical behaviour, especially in high-level teams but utilitarian ones.

Isenhardt and Hostettler (2016) surveyed 2045 prison correctional officers and showed that being abused and witnessing violence between inmates had a negative impact on feelings of personal safety and increased burnout among correctional officers.

A questionnaire survey of 338 administrative workers by De Sio et al. (2018) showed that employees' job insecurity might influence perceptions of psychosocial risk and increase employees' vulnerability to job stress and gender differences.

By analyzing the potential growth curve of the 2010-2014 data of the German Social Economic Council and the 5-year life satisfaction trajectory of Germans aged 27-30, Helbling

and Kanji (2017) found the subjective worry of job insecurity has a negative and lasting impact on the life satisfaction trajectory.

Japanese scholar Inoue et al. conducted a questionnaire survey in 2018 to analyse the relationship between job insecurity, role ambiguity and psychological distress among 2,184 women and 805 men, showing that the stronger the role ambiguity, the stronger the relationship between job insecurity and psychological distress (Helbling & Kanji, 2017). Thus, hospital administrators should clarify their employees' job responsibilities, clearly position them, and monitor their work behaviour.

In surveys of medical staff, much was reported about perceptions of occupational safety. Some hospitals have installed radiation dose alert systems in their CT rooms, significantly increasing awareness of healthcare protection, reducing occupational exposure to radiation, and increasing the perception of safety among medical staff.

During COVID-19 outbreak, During COVID-19 pandemic, American otolaryngologists strengthened their personal protective equipment and received adequate training on safety protective equipment. Most of the survey respondents reported a high sense of security (K. Yu et al., 2020). Due to an increase in reports of patient attacks on General Practitioners (GP) in Belgium, surveys of GPs showed low perceptions of security among physicians vulnerable to patient attacks (Demeur et al., 2018).

Studies in Germany have also reported that although most female physicians feel safe in surgery, threatened by workplace violence, only a third of physicians feel safe during off-duty hours, and 66% of women and 34% of male physicians say they feel insecure during their shifts (Vorderwulbecke et al., 2015).

The social environment also has a direct impact on health workers' feelings of security. In a country with social unrest, such as Afghanistan, 46.4% of midwives working in Afghanistan feel insecure. In contrast, security is higher in organizations that provide adequate support and stability. For example, 83.5% of Australian nursing staff feel secure in their work (Mansoor et al., 2013).

In different departments, due to the different work content, intensity, and pressure, the sense of security of medical staff is also different. A British study showed that in high-intensity and high-load departments such as emergency departments, physicians and nurses showed a high sense of insecurity (Ilic et al., 2017). A survey of 278 nurses in Turkey showed that nurses did not feel generally safe. "Violence" and "working department" (such as internal medicine, surgery, and intensive care) are the main factors affecting the sense of safety (Samur & Intepeler, 2017).

2.1.1.3 Advances in the measurement of sense of security

Maslow (1943) developed the Sense of Security-Insecurity Questionnaire, which contains 75 items on three factors of belonging, security, and need for respect, using a 3-point scoring. Higher scores indicate a lower sense of security.

Persson et al. (2011) separately interviewed parents in the early postnatal period to examine their state of security and designed an instrument to measure parents' postnatal sense of security. The scale was divided into two subscales from the father's and mother's perspectives. The scale to measure a mother's security has 18 items and four dimensions: empowering behaviour, general personal well-being, family bonding and breastfeeding. The scale to measure a father's security has 13 items and five dimensions.

Igarashi's (2012) scale for measuring people's safety in relation to cancer treatment has five items on a 7-point scale and can be used to measure the safety of the general population or cancer patients and their families. Australian academics (O'Neill & Sevastos, 2013) have developed the Job Insecurity Scale, which summarises four aspects of job insecurity in terms of job change insecurity, job loss insecurity, marginalisation insecurity, and organizational production insecurity.

Krevers (2014) used literature studies and qualitative interviews with patients to develop the Sense of Security in Care-Patients' Evaluation scale. The scale is related to varying degrees of the quality of the care process, perceived health, quality of life, stress, and a general sense of safety. Brazilian scholars (Araújo-Dos-Santos et al., 2018) used interviews to create a scale of job insecurity among nurses, nursing technicians, and nursing staff in tertiary public hospitals. However, studies on reliability and validity are lacking.

The Security Questionnaire is a 16-item scale for measuring the perception of security in normal and neurotypical people, using a 5-point scale for neurotypical people and university students. It is used to measure the perception of safety in both normal and neurotic individuals (Cong & An, 2004).

Hong et al. (2012) used a five-point scale to produce the Sense of Security Scale for Children Aged Three to Six, which contains six dimensions, including a sense of competence, a sense of independence, a sense of parent-child security, a sense of security of teachers and friends, sense of public security, and sense of timidity, with 28 items. A high score means a low sense of security, and the overall Cronbach's α coefficient of the scale is 0.90. Liao et al. (2015) developed a 26-item scale for children left behind, which includes five dimensions: interpersonal confidence, comfort perception, stress mastery, self-acceptance, and fearlessness

of strangers.

Cao et al. (2010) revised Maslow's Security-Insecurity Questionnaire with junior high school students as the target group and included 44 items in three dimensions: emotional security, interpersonal security, and self-security. Based on the group characteristics of college students, Diao et al. (2003) and Sun et al. (2009), and Chen et al. (2006) developed a questionnaire and scale for college students' sense of security to explore the main factors affecting college students' sense of security. Wang (2010) and Xia (2011) constructed the Chinese Residents' Sense of Security Scale and the Urban Residents' Sense of Security Scale, respectively, taking into account the characteristics of Chinese culture and looking for the most significant sources of threats affecting the residents' sense of security from their daily lives. Cui (2013) combined the characteristics of the new generation of migrant workers to produce the Questionnaire on the Sense of Security of the New Generation of Migrant Workers to investigate seven dimensions: health security, economic security, occupational security, public security, family security, security of rights and interests, and identity security questionnaire.

A scale for assessing the security needs of Chinese psychiatric inpatients was developed by scholars in Hong Kong with the aim of determining the security needs of Chinese psychiatric inpatients, which was derived from Davis' Security Needs Assessment Profile and translated into Chinese. The external validity, content validity, construct validity, and internal consistency reliability was evaluated by surveying the safety needs of 98 Chinese forensic psychiatric inpatients (Siu et al., 2017).

As research on security continues to expand, insecurity as a branch is also gradually receiving research attention. Hu (2017) developed a job insecurity scale for Chinese employees. This scale includes five dimensions: job loss insecurity, job execution insecurity, salary promotion insecurity, excessive competition insecurity, and interpersonal relationship insecurity. The scale with a total of 30 items is in line with the current economic and social environment, and Cronbach's α coefficient of the scale was 0.922.

By selecting healthcare workers in a tertiary hospital in a city as the research subjects, Bao (2015) developed her questionnaire on the job insecurity of healthcare workers. The Cronbach's α was 0.934 but did not analyze the indicators of split-half reliability, retest reliability, content validity, structural validity, and discriminant validity. The reliability and validity of the questionnaire are still debatable. At the same time, pharmacy technicians, as an essential part of the hospital staff, should be included in the medical staff's sense of security. There is still room for further exploration of the questionnaire design.

According to the phenomenological research method, He et al. (2021) conducted semi-structured interviews with the medical staff based on the Sense of Safety Scale for Medical Staff they produced in advance. Then, they adopted the Colaizzi analysis procedure to analyse, summarise, refine, and extract themes from the interview transcripts. A total of 56 items were selected into the item pool that can reflect the safety feelings and experiences of medical staff. Clinicians, nursing specialists, pharmacy-related physicians, physicians from clinical support departments, and psychiatrists were selected for expert consultation. After three rounds of expert consultation, the authority coefficients of the three rounds were 0.874, 0.890, and 0.883, respectively, all of which were greater than 0.7. This indicated that the experts were more active in participating in this study. The degree of coordination of experts' opinions in the three rounds was expressed by the Kendall coefficients, which were 0.274, 0.350, and 0.327, respectively. The Kendall coefficient was higher than 0.300 in the second and third rounds, indicating that there was a growing convergence of expert opinions. The three rounds of expert opinion revision were collated to form a pre-test scale for the medical staff's perception of safety. The questionnaire contained six dimensions and 24 items, which were distributed through a large sample survey online.

Based on the statistical analysis of the data collected from the questionnaire, the critical ratio of all 24 items was higher than 3.000 and the P value was lower than 0.05. The correlation coefficients among the items were greater than 0.400. The commonality was greater than 0.200, and the factor loadings were greater than 0.450. for the exploratory factor analysis, the Kaiser-Meyer-Olkin (KMO) value was 0.938, and Bartlett's spherical test approximate chi-square value was 5618 ($p<0.001$). A total of 5 factors were extracted, explaining 72.807% of the variance cumulatively. Item 10 and 13 with factor loadings less than 0.450 were removed, thus forming a 22-item, 5-dimensional scale to measure the perceived security.

The reliability analysis of this scale included the internal consistency reliability coefficient and split-half reliability coefficient. The validity analysis included structural validity and calibration validity. The internal consistency reliability Cronbach's α of the Medical Staff Safety Scale was 0.939, and Cronbach's α coefficients of each dimension were 0.823, 0.918, 0.776, 0.884, and 0.876, respectively. The overall split-half reliability coefficient was 0.967, and the split-half reliability coefficients of each dimension were 0.835, 0.923, 0.778, 0.921, and 0.921, respectively, all of which are greater than 0.7, indicating that the scale has good internal consistency. Using the Job Insecurity Questionnaire as a calibration standard, the correlation coefficients between the dimensions of the Medical Staff Security

Scale and the total score of the Job Insecurity Questionnaire ranged from -0.397 to -0.655 ($p<0.05$). The correlation coefficients between the dimensions of the Job Insecurity Questionnaire and the total score of this scale ranged from -0.500 to -0.644 ($p<0.05$). It indicated that the Medical Staff Security Scale and the Job Insecurity Questionnaire were moderately negatively correlated with a good correlation validity of the calibration scale. The results of the confirmatory factor analysis (CFA) of this study showed that the factor model constructed in the exploratory factor analysis stage had a stable structure, and each adaptation index reached or approached the expected standard, which indicated that the structural validity of the scale was good. Moreover, each factor of this scale is highly correlated with the total scale, and the correlation coefficient is between 0.711-0.876. There was a moderate correlation between each factor, and the correlation coefficient was between 0.453-0.665. It showed that the structural effect of the scale is better (Ba et al., 2021).

2.1.1.4 Progress in studies on factors influencing the sense of security

(1) Laws and regulations

In October 2018, the Basic Medical and Health Promotion Law of the People's Republic of China (Second Draft) reviewed by the Standing Committee of the National People's Congress pointed out that the personal safety and personal dignity of medical and health personnel are inviolable, and their legitimate rights and interests are protected by law. In the same month, 28 ministries, including the National Development and Reform Commission (NDRC) and the National Health Commission (NHC), jointly issued the Memorandum on Joint Punishment and Cooperation of Persons Responsible for Untrustworthy Behaviors That Seriously Harm Normal Medical Order. The document listed 193 people as untrustworthy actors who endanger the normal medical order based on relevant information provided by the Ministry of Public Security.

China's medical staff occupational exposure law has so far lacked clear ways and means of redress. The imperfection of laws and regulations has contributed to the lack of job security for medical personnel. In December 2019, China enacted the first law to protect the personal safety of medical personnel: the Law of the People's Republic of China on Basic Medical Sanitation and Health Promotion. It clearly stipulated that any organization, or individual, is prohibited from threatening or endangering the personal safety of medical and health personnel or violating their human dignity in Article 57.

(2) Uneven distribution of medical resources

As the reform of the honwide reached 986,649, with a total of 8.18 billion visits to

healealthcare system continues to progress, the demand for healthcare services is increasing. The Statistical Bulletin on the Development of Healthcare in 2021 (NHC, 2022a) argued that the total number of healthcare institutions natithcare institutions nationwide and an average of 5.9 visits by residents to healthcare institutions. There were 7.94 million beds in healthcare institutions and 244.36 million admissions, while the total cost of healthcare resources accounted for 6.2% of the gross domestic product (GDP). There were 6.219 million physicians, implementing an average of 7.1 consultations per day.

The WHO Global Health Observatory database predicts that 40 million healthcare workers will still be needed globally by 2030 to meet society's demand for human resources for health (Liu et al., 2017). Between 2018 and 2019, the demand for hospital outpatient services in China increased by 410 million, and the number of hospital admissions increased by 11.67 million (National Bureau of Statistics of the People's Republic of China, 2020).

The NHC revealed that the number of physicians per thousand population in Guangdong Province in 2019 was 2.53, and the number of physicians per thousand population in China was 2.77 (WHO, 2022a). This is significantly lower than many other developed countries. Italy is 8.01, France 6.53, Chile 5.18, Norway 4.89, Switzerland 4.33, Australia 3.76, and South Korea 3.68. The number of nurses per thousand population in China is also lower than in other countries. The WHO (2022a) Health Observatory database shows that China has 2.66 nurses per 1,000 population. For example, Norway has 18.35, Switzerland 17.89, the United States 15.60, Germany 13.40, Chile 13.33, Australia 13.24, and Japan 12.60.

Inadequate and unbalanced allocation of total medical resources will exacerbate the conflict between supply and demand between physicians and patients. Coupled with overworked medical staff and poor communication with patients, it will result in a poor patient experience, with patients easily venting their frustrations on the medical staff, posing physical and psychological safety risks to medical staff.

(3) Social media

The media is an important vehicle for society at large to understand the healthcare industry. The 2018 White Paper stated that 53.75% of physicians in 2011 believed that negative media coverage deteriorated the conflict between physicians and patients. 84.71% of physicians in 2014 believed that negative media coverage contributed to the cause of violence within healthcare settings. The negative impact of the media's tendentious reports on the medical industry has caused a lack of security for medical and health personnel (Chinese Medical Doctor Association, 2018).

(4) Hospital environment

a). Occupational exposure

Due to the nature of the profession, medical personnel is exposed to occupational exposure for long periods of time in a work environment, reducing the need for physiological safety of medical personnel. Most medical personnel will show psychological problems such as worry, sadness, anxiety, fear, and even low psychological security, such as being overly nervous and sensitive (Wang & Zhang, 2018). A survey of radiation safety awareness among medical staff showed that, except for medical staff in the radiology department and the emergency department who had close contact with the radiology department, medical staff in other departments obviously lacked protection awareness. After occupational exposure, these groups of people are more prone to various psychological problems, which affect their physical and psychological safety needs (Szurowska, 2015).

b). Organizational support

Research has shown that in psychologically safe organizations, high-level teams are more trusting, respectful and caring of each other and perform more significantly than low-level team members. In contrast, team psychological safety climate scores for healthcare groups are much lower than the psychological safety levels of teams in several industries in China in recent years. Medical staff is affected by the safety of the organizational environment, rules and regulations, organizational management support, and the occurrence of medical disputes, which reduces the sense of job security of medical staff.

c). Workplace violence

Healthcare workplace violence is an underestimated, widespread, and persistent problem that has been tolerated and ignored. Workplace violence not only reduces medical staff’s sense of job security but also takes a toll on them both physically and psychologically. Medical staff takes the highest number of leaves of absence due to violence, and the most common victims are nurses and nursing assistants. Teams of nurses who had not experienced workplace violence scored higher on the climate of psychological safety, and this group maintained better interpersonal relationships and organizational trust with team members, received more psychological support, and a sense of job security was better.

d). Hours and nature of work

The White Paper illustrated that physicians in Chinese tertiary hospitals worked an average of 51.05 hours per week, and physicians in secondary hospitals worked an average of 51.13 hours per week. Both exceeded the national standard of 40 hours per week. Physical fatigue can increase burnout and reduce job security. The National Health Interview Survey in 2010 (Farnacio et al., 2017) by National Institute for Occupational Safety and Health

pinpointed that long working hours, heavy workloads, job instability and poor career advancement opportunities increase the risk of illness and injury and are detrimental to the development of one's mental health. Studies have also shown that medical professionals are more likely to experience mental health problems such as depression, obsessions, anxiety, and sensitivity when they are under prolonged work pressure (Ji et al., 2015).

e). Psychological safety

Some studies have shown that different personality traits of operating room nurses are associated with levels of psychological distress and sleep quality (Ji et al., 2015). Neuroticism personality was positively associated with psychological distress and sleep quality scores, and extraversion personality was associated with psychological distress and sleep quality scores. Some studies have shown that education, length of service, and job position have different effects on the psychological security of nurses (Newman et al., 2011).

The psychological safety of nurses with less than a bachelor's degree, less than ten years of service, and less than an intermediate title was lower. It may be related to their lack of systematic theoretical knowledge, clinical skills development, and weaker psychological adjustment ability when dealing with emergencies. The safety of nurses in the operating room was significantly higher than that of nurses in the emergency department, which may be related to the fact that the operating room is a separate confined space and nurses have limited communication with patients and their families (Qin & Shi, 2016). Studies have shown that higher levels of psychological safety among nurses of higher age are mainly due to their better operational quality and awareness of safety precautions, and ability to anticipate or respond to possible hazards and risks in the environment.

2.1.1.5 Theoretical foundations of a sense of security

(1) Social exchange theory

Based on Pavlov's theory of conditioned reflexes and Skinner's theory of operational reflexes, the American sociologist Homan developed a theory of social exchange in the mid-20th century. He argued that social exchange is a limited activity, a voluntary behaviour that occurs when others respond in return and stops when others no longer respond in return and is based on mutual trust.

Maslow proposed that human security needs include both physiological and psychological security; physiological security refers to the individual's need for a state of physical safety from existing or potential physical harm. Psychological security refers to the individual's desire to be in a safe, orderly, predictable, and organized environment, with

occupational stability, security of life, and avoidance of negative emotions such as fear and anxiety (Emerson, 1976).

People interact with each other because they obtain social rewards, including intrinsic and extrinsic rewards, through the social exchange in the process of interaction. From the perspective of social exchange theory, a doctor-patient relationship is also a form of social exchange. In the process of medical treatment, patients seek help from medical personnel due to physical and mental illnesses, paying financial resources and time in order to recover their health. Medical personnel uses their medical knowledge in the process to help patients recover their health in order to gain respect, understanding, and appreciation from patients. In this way, the two parties can realise the value of their labour and personal value, and receive the corresponding remuneration for their work, thus realising social exchange.

However, when the exchange is unequal, it undermines the relationship between them and creates conflicts. In the doctor-patient relationship, such conflicts often manifest themselves as doctor-patient conflicts or even medical disputes, adding to the professional stress of medical staff and affecting their physical and mental health.

(2) Psychological contract theory

The psychological contract was introduced as a term by the renowned organizational psychologist Professor Argyris (Dixon-Fowler et al., 2019) and has been refined as the economy and society have developed. The psychological contract emphasises the existence of a common interest between the individual and the organization, i.e., the organization constantly creates various conditions for the development of the individual, and the individual constantly brings his or her own value to the development of the organization. Although there is no tangible contract, the relationship between the two is regulated as if it were a contract.

In the organizational field to which medical personnel belongs, such as a department, the department provides them with clinical experience and learning opportunities to continuously improve their personal capabilities. The medical personnel themselves continue to create value and bring benefits to the department. When the psychological contract is violated, the relationship between medical staff and the corresponding organization will inevitably change, so the job security and personal career development of medical staff will be negatively affected.

2.1.2 Identification, studies, and measurement of work engagement

2.1.2.1 Identification of work engagement

Work engagement is a concept often mentioned in management. With the rise of positive psychology and positive organizational behavior research, work engagement has become a new research hotspot in the field of organizational behavior and human resource management. In the past 30 years, scholars have defined work engagement from different perspectives. Define work engagement in terms of role performance.

Kahn (1990), who first defined the concept of work engagement, argued that personal engagement refers to an individual's role performance at work, both in terms of job performance (the extent to which the individual completes the job task and the process) and personal expression (the way in which the individual completes the job task and the characteristics that the individual expresses about him/herself in the process). When the individual is well engaged in the work role, i.e., when the individual develops a sense of psychological meaning, security, and dominance at work, the individual not only successfully completes the task but also presents a complete and authentic self, thus establishing authentic and good relationships with the work and colleagues.

Kahn (1990) conducted two qualitative, theory-generating studies with summer camp counsellors and members of construction companies. He proposed that work engagement is a phenomenon in which employees bring themselves into their work roles by managing their egos, and members of organizations integrate their egos in order to engage them with their work roles. Work engagement is classified as physical, cognitive, and emotional. Work engagement is highly influenced by the three psychological conditions of "meaningful," "secure," and "effective," and his theory also laid the theoretical foundation for later work engagement research. The theoretical foundation for subsequent work engagement research.

Before the concept of work engagement was clarified, Lodahl and Kejner (1965) introduced the concept of job involvement. Job involvement refers to the importance of a person's identification with his work or work in his self-image and further points out that work engagement is the degree to which job performance affects an individual's self-esteem. Job involvement is slightly different from work engagement. Although the concepts of job involvement and work engagement are similar, job involvement lacks the focus on both employee energy and efficacy. Work engagement, therefore, provides a more complex and thorough perspective on the individual's relationship with work.

Maslach et al. (2003) also defined work engagement in terms of burnout, linking burnout

to work engagement, which is seen as the opposite of "burnout." In the psychological discussion of work states, the early studies were based on negative psychological states, with burnout as the more widely discussed subject (Diener et al., 1999). Burnout is the loss of work engagement, causing employees to feel that their work has gone from initially important, meaningful and challenging to unpleasant, unfulfilling and meaningless; that a state of positive energy has become exhaustion; that total engagement has become cynicism and that a sense of effectiveness has become a sense of ineffectiveness.

As the first to study job burnout, Maslach et al. (2001) identified three characteristics of job burnout: emotional exhaustion, cynicism, and reduced professional efficacy. Job burnout and work engagement are the two extremes of a continuum. The three dimensions of work engagement are the exact opposite of the three dimensions of job burnout. As the exact opposite concept and complement to burnout, job engagement is characterised by energy, involvement, and efficacy, the direct opposites of the three burnout dimensions.

Work engagement is defined in terms of job resources and satisfaction, represented mainly by business hospital administrators. Employee engagement refers to the extent to which individuals are involved, satisfied, and enthusiastic about their work. Employee involvement is a mixture of traditional job attitudes (job satisfaction, job involvement, organizational commitment) and job behaviours (in-role behaviours, extra-role behaviours, organizational citizenship behaviours). Gallup et al.'s study argued that work involvement refers to an individual's involvement and satisfaction with work and enthusiasm for work, which can lead to emotional connection and cognitive alertness with others at work (Maslach et al., 2001).

Saks (2006) defined work engagement from a multidimensional perspective, arguing that employee engagement includes the emotional, cognitive, and behavioural dimensions associated with role performance. Although both Saks' (2006) and Kahn's (1990) definitions emphasise relevance to role performance, Saks' innovation is to introduce the concept of organizational engagement, which emphasises the individual's role in the organization as an employee of the organization in their work role.

Schaufeli et al. (2002) considered work engagement to be an independent variable. They defined work engagement as a positive, fulfilling, work-related state of mind. Work engagement is not a momentary specific state but a more persistent and general emotional-cognitive state characterised by "vigor," "dedication," and "absorption." Vigor is characterised by high energy when working, mental resilience, and a willingness to put energy into work and persevere even in the face of difficulty. Dedication is characterised by intense

devotion to one's work, experiencing a sense of meaning, enthusiasm, inspiration, pride, and challenge. Absorption is characterised by complete concentration and cheerfulness, in which time passes quickly, and it is difficult to disengage from work.

Schaufeli et al.'s (2002) definition of work engagement is now generally accepted nationally and internationally. Therefore, this study also follows this definition. In understanding the definition of work engagement, we also need to pay attention to the following points. First, work engagement describes the psychological connection between individuals and work. It does not emphasize the relationship between individuals and organizations, so it differs from organizational commitment, organizational engagement, and employee engagement. Second, work engagement is an inner experience of happiness, not referring to work attitudes and behaviors. Third, although work resources can promote work engagement, the two should not be confused with each other. Fourth, emotional competitiveness, resilient personality, responsible personality, and extraversion are antecedent variables of work engagement, but not their components.

2.1.2.2 Current status of work input

A survey conducted in 2017 of physicians in Liaoning Province, China, revealed low levels of work engagement among Chinese physicians. Perceived organizational support can indirectly increase vigor, dedication, and absorption (Yang et al., 2020). Since the outbreak of COVID-19 in late 2019, all sectors have been affected in China to some extent, despite the strict control measures taken by the Chinese health system to contain the epidemic. As medical personnel is the backbone of epidemic prevention, their workload has been dramatically increased (Central response to the new coronavirus infection pneumonia outbreak leading group, 2020). This cross-sectional survey of physicians in tertiary hospitals in Liaoning Province revealed that Chinese physicians are under high occupational stress and their work engagement levels are at a low level.

In contrast, a study of the work engagement of nurses found that the work engagement of nurses was generally at a moderate level before and after COVID-19 outbreak. A survey conducted by Liu (2022) 18 tertiary hospitals in southwest China after COVID-19 outbreak showed that 451 haemodialysis nurses had a medium level of work engagement. Compared to Han and Wang's (2017) and Liang's (2009) studies on workload before COVID-19 outbreak, the workload of nurses before and after COVID-19 was consistent, slightly higher than the results of Huang et al.'s (2012) results. The reason for this is that specialist nurses remain engaged in their work because they are able to handle complex specialist scenarios and are

often needed by patients.

Zhang et al. (2022) conducted a questionnaire survey of paediatric nurses in 12 secondary and tertiary hospitals. Findings also showed that the work engagement of nurses was moderately low, with a high dedication dimension and low vigor dimension. This also reflects that it is difficult for nurses to perform nursing operations at work. In order to avoid nursing accidents, they need to devote themselves wholeheartedly. However, they are under high pressure at work for a long time, resulting in physical and mental fatigue, lack of enthusiasm for work, and decreased vigor.

Through a review of multiple articles from 2015-2020, moderate levels of work engagement and low levels of burnout were observed in groups of health professionals in multiple countries (Garcia-Iglesias et al., 2021). A 2017 survey in the United States showed that 13.2% of the population of dentists experienced burnout, and 16.2% were in a highly engaged state (Calvo et al., 2021).

As a stressful event, COVID-19 poses an unprecedented challenge to medical professionals worldwide. In a study in Middle East Palestine, Abu et al. (2022) conducted a cross-sectional survey of 235 community health service providers in the Gaza and found that work engagement was at a moderate level.

In Ecuador, Cuartero-Castaner et al. (2021) surveyed 117 healthcare workers during COVID-19 outbreak, and work engagement was at a high level. In a study in Germany, the work input of 1027 nurses during the second wave of COVID-19 was investigated. Although the overall impact of COVID-19 was still high, the work input during the second wave of COVID-19 was higher than that of the first wave. Although the workload is higher than before COVID-19, the disruption to work and life is less obvious. The resource structure of nurses was not changed fundamentally because of COVID-19, but interpersonal relationships and autonomy were more positively evaluated (Durr et al., 2022).

COVID-19 also had a psychological impact on the medical staff. A study in Spain during the coronavirus pandemic showed that 80.6% of medical staff reported having psychological problems (Gomez-Salgado et al., 2021). The overall level of work engagement was high, but the work engagement of medical staff with anxiety and depression was significantly lower. In addition, when the results were assessed according to occupational type, nurses were found to have higher levels of psychological distress and scored significantly lower on the vigor dimension than other occupational types (Allande-Cusso et al., 2021). This also suggests the need to establish a psychological support programme for medical staff during the COVID-19 pandemic, especially for nurses who belong to the occupational group with the longest patient

contact time and the highest exposure risk.

2.1.2.3 Factors influencing work engagement

(1) Family factors

According to spillover theory, conflict at home can have a negative impact on the work experience across domains. Conversely, when employees are away from work and at home, a relaxed and comfortable environment is conducive to the recovery of employees' resources (Wayne et al., 2022).

The support of family members is thus essential. Zheng et al. (2022) conducted a questionnaire survey of 124 bank employees and their spouses. Findings revealed that spouses with high emotional intelligence were able to sense each other's emotions, express concern, and understanding, and have the ability to manage emotions. They can also reduce further resource consumption at work when the employee returns home, generate good social interactions with them, enhance well-being, and promote positive resource generation, promote the production of active resources, thereby increasing work engagement (Bru-Luna et al., 2021).

The results of a cross-sectional survey of 2,255 nurses in Japan also showed that nurses with family roles had relatively lower levels of burnout (Kida et al., 2022). Liu et al.'s (2020) study further empirically analysed the association between types of work-family conflict and work engagement. Results demonstrated that time-based and tension-based conflict were not significantly associated with work engagement but that behaviour-based and family-based conflict had significant negative associations.

(2) Personal factors

a). Motivation or need

Self-determination theory (Taris et al., 2020) suggests that motivation influences self-determined behaviour. Self-determination theory refers to motivation, including intrinsic motivation and extrinsic motivation. Intrinsic motivation refers to engaging in an activity because it is experienced as intrinsically enjoyable, interesting, and challenging. These activities are self-determined, i.e., they are performed with complete autonomy and choice. Extrinsic motivation refers to performing a move because of its instrumental value, i.e., an individual driven by the extrinsic motivation to engage in an activity in order to obtain the desired outcome.

Surveys on secondary school students showed that holding a clear achievement goal orientation predicts engagement levels (Tu & Yang, 2021). Song and Shen (2022) conducted a

survey of medical staff in 23 public hospitals of different levels in Nanjing. Results indicated that both internal and external work motivation had a positive effect on work engagement, which confirmed that the motivational needs are met, and the self will act accordingly, i.e., increasing work engagement (Lohmann et al., 2017).

The internal motivation of medical staff is that they like and love the job, put patient care at the forefront of their work, have a high level of dedication, and work hard to achieve self-worth. They are also externally motivated to work hard by a sense of team pride, patient evaluation and recognition, and praise from their leaders.

b). Psychological capital.

Luthans (2002) proposed the concept of psychological capital, which refers to a state of positive psychological development characterised by: (i) the confidence (self-efficacy) to undertake and put in the effort necessary to succeed in challenging tasks; (ii) positive attributions (optimism) about the present and future success; (iii) persistence in working towards goals and, when necessary, redirecting the path to them in order to succeed (hope); and (iv) persistence and rebounding when troubled by problems and adversity, even beyond (resilience) to achieve success.

Through a study of a group of nurses, Bonner (2016) argued that psychological capital is a prerequisite for work engagement. When health professionals are faced with adverse events, such as workplace violence and workplace bullying, psychological capital serves as a positive resource that can help individuals regulate stress and increase their ability to tolerate the environment, and improve work engagement.

c). Demographic information

Wan et al. (2018) conducted a questionnaire survey of nurses, and the results showed that age was associated with work engagement. The work engagement of nurses younger than 25 years old is lower than that of nurses older than 44 years old. Although in another study, Aboshaiqah et al. (2016) came to the opposite conclusion that age was found to be a negative predictor of work engagement.

Huang et al. (2012) measured nurses of different ages and found that there were also statistical differences in work engagement by gender and length of service. The work engagement of nurses was closely related to their marital status, i.e., unmarried nurses had higher levels of work engagement than married nurses. This is because they had to undertake the role transition of marriage and family. The instability and disadvantages arising from marriage would inevitably affect their work engagement.

Simpson (2009) argued that the majority of nurses who were in stable marriages or whose

marriages tend to become more stable with age and length of service had a correspondingly higher level of work engagement.

(3) Environmental factors

As a result of the impact of COVID-19, the social environment has become more complex and volatile, so individual career development and choices have been affected (Akkermans et al., 2020). In the current situation, individuals have to change their career aspirations and make compromises in order to make more realistic career choices in a range of acceptable options (Ryu & Jeong, 2021).

Among frontline worker groups, the impact of COVID-19 has also created dilemmas. They are caught in this moral dilemma when faced with the choice between family and professional duties, leading them to compromise on their choices (Miner et al., 2022).

Liu and Liu's (2022) survey of 906 new-generation migrant workers argued that under the influence of COVID-19, the occupational compromise had a positive impact on work engagement. The reason may be that the pressure of life causes the individual's instinct to seek advantages and avoid disadvantages and increase work engagement in order to keep their jobs or complete their career plans. This compromise also further affects individuals' views and pursuits of careers, making them form an exceptional concept of the workplace, thereby guiding this increased work engagement behavior.

The workplace environment is closely related to employees' work status. It has been noted that in a bullying workplace, employees' own basic needs and autonomy are not respected and met, which hinders their motivation to work in a satisfying manner and indirectly disengages them from their work, thus reducing their engagement in their work (Goodboy et al., 2020).

(4) Organizational factors

a). Work and life domain

The organizational environment also has an impact on individual work engagement. Leiter and Maslach (2008) explored the psychological relationship between individuals and work. Burnout and work engagement are seen as having a process continuum and being interchangeable. They proposed a comprehensive model of job burnout that assesses the degree to which an individual is compatible with their job, which assumes that the key is the individual's assessment of the degree to which they are compatible with the job. This model explained the impact of work engagement in the work and life domain. The model developed measures of perceived fit in six key aspects of the workplace environment (Leiter & Maslach, 1999).

Subsequent studies have supported the hypothesised relationship between these six dimensions in terms of burnout or work engagement. Exploring the degree of perceived congruence between individuals and key aspects of the organizational environment, the model proposed that with greater perceived incongruence or mismatch between individuals and work, the likelihood of burnout will be higher. Conversely, greater perceived congruence brings a higher likelihood of work engagement. This dissonance may be temporary rather than fixed and may change over time (for example, due to a change in job responsibilities or one's expectations of a new colleague). The degree of burnout and work engagement can be predicted by rating the following six aspects of work life: workload, control, compensation, team, fairness, and values. A survey of healthcare workers in a Swiss hospital showed that organizational predictors of work engagement, and energy were mainly influenced by workload, engagement by values and efficiency by compensation (Setti & Argentero, 2011).

(i) Workload and burnout are consistently correlated, especially in the dimension of exhaustion (Leiter & Maslach, 1999). Qualitative or quantitative workload overload can cause burnout by depleting people's ability to meet job demands. Burnout occurs when people fail to recover from the demands of work, such as severe exhaustion caused by particularly demanding events at work (meeting deadlines or requiring the resolution of major crises). Burnout does not result if people have the opportunity to recover during quiet periods at work or at home (Shinn et al., 1984). When this overload is a chronic work situation rather than an occasional emergency, it can lead to imbalances without rest. In contrast, a sustainable workload makes employees more productive.

(ii) The demand-control theory of job stress clarifies the importance of personal control in the workplace. A major control issue arises when people experience role conflict (Kjormo & Halvari, 2002). Previous studies of burnout have found a strong correlation between role conflict and fatigue (Piko, 2006). Active participation in organizational decision-making was associated with high levels of performance and low levels of exhaustion (Kjormo & Halvari, 2002). The ability to control crises that are generated in the workplace increases the vigor and well-being of employees at work.

(iii) Inadequate pay increases vulnerability to burnout, whereas alignment of work and pay rewards implies opportunities for material rewards and intrinsic satisfaction and pride (Jachens et al., 2019; Penz et al., 2019).

(iv) Groups refer to the quality of social interactions at work, including conflict issues, mutual support, intimacy, and the ability to work in teams. Burnout is mainly due to relationships with superiors, colleagues, and family members (Jachens et al., 2019). Abu et al.

(2022) conducted a cross-sectional survey of 235 community health service providers in Gaza, and the finding revealed that organizational communication satisfaction was a positive predictor of work engagement. Organizational communication is a very dynamic and complex concept. It broadly refers to the process that occurs in an organization to align people through the transmission of information or symbols to achieve organizational and individual goals. In the case of organizational communication for medical staff, which involves coordination between multiple departments, efficient and satisfactory organizational communication facilitates the work experience and promotes work engagement.

(v) Fairness refers to the extent to which job decisions are perceived as fair and just, and people are more interested in the fairness of the process than the favorability of the outcome (Anderson & Patterson, 2008). In a survey of Chinese nurses, Wan et al. (2018) proposed that organizational fairness was a positive predictor of employees' work engagement. Equity is central to equity theory, which assumes that perceptions of fairness or unfairness are based on people determining the balance between their inputs (i.e., time, effort, and expertise) and outputs (i.e., rewards and recognition). This core concept of unfairness is also reflected in the effort-reward imbalance model (Notelaers et al., 2019). Social interaction processes that lack reciprocity or inequity are predictors of burnout (McFadden et al., 2018).

(vi) Values refer to the cognitive-emotional power of work goals and expectations. Values are the ideals and motivations that initially draw people to work, and they are the motivational link between the worker and the workplace that goes beyond the utilitarian link of time in exchange for money or promotion (Gascon et al., 2021). When there is a conflict of values at work that creates a gap between personal values and organizational values, employees find themselves making trade-offs between the work they want to do and the work they must do.

b). Organizational structure empowerment

A total of 250,000 millennial nurses in Saudi Arabia completed an online questionnaire. The results illustrated that structure empowerment and professional ethics influence the work engagement of Saudi millennial clinical nurses (Balay-Odao et al., 2022). According to Kanter (1987), it is highlighted that employees need more access to opportunities, information, resources, support, formal power, and informal power in order to be empowered. Creating a culture of empowerment in an organization is essential for a positive work environment for employees.

c). Organizational support

According to social exchange theory, the ideas which have been applied to explain organizational behaviour, many organizational theories assume that employment relationships

are established when employees exchange their personal hard work and loyalty for available benefits and social rewards. When employees feel adequately supported by the organization, they are more enthusiastic about their work and more committed to it (Al-Omar et al., 2019; Piotrowski et al., 2021).

(5) Manager factors

In several studies, the leadership style of hospital administrators has a significant impact on the work attitudes of subordinates (Huang, 2022; Manning, 2016; MK et al., 2018). The interaction between leaders and subordinates is influenced by the personal charisma and competence of the leader. Caring and efficient interactions between leaders and subordinates increase subordinates' identification with the organization (Giessner et al., 2013), an organizational climate conducive to teamwork, a harmonious organizational climate and reliable relationships motivate employees' behaviour, reduce burnout and facilitate work engagement.

2.1.2.4 Ending variables of work inputs and their mechanisms of action

(1) The impact of work engagement on individual medical staff

a). Physiologically, dedicated medical staff are full of energy and can recover quickly, even in adversity. However, burnout is associated with staff sore limbs, infection, diabetes, and cardiovascular disease. Findings from a one-year longitudinal study of working professionals aged 45 to 64 years showed that higher work engagement had a degree of buffering against work-related factors and was beneficial for physical and mental health (Leijten et al., 2015).

b). Psychologically, work-engaged health workers have positive affective and cognitive states, experience pleasure and immersion in their work, and are able to develop a sense of pride and inspiration in their work. However, job burnout is associated with employees' anxiety, depression, alcohol dependence, mood disorders, life dissatisfaction, sleep disturbances, and memory disorders (Kubota et al., 2010).

c). Behaviorally, work-engaged health professionals have breadth and depth, and they are more creative and proactive in their work (Caillier & J, 2016). In several studies with groups of nurses, work engagement mediated between leadership behaviours (authentic leadership, inclusive leadership, humble leadership) and innovative behaviours (Lv et al., 2022; Y. X. Wang et al., 2019; K. Yang et al., 2019).

d). They have more extra-role behaviours in the eyes of the leader, which not only contributes to better relationships among colleagues but also allows them to receive more

resources for their work (Hakanen & Riku Perhoniemi, 2008). A study of nurses in Portugal showed that extra-role behaviours contributed to the achievement of the hospital mission, promoted positive experiences, encouraged relationships between nurses and between nurses and patients, and engaged them in hospital activities that promoted a healthy work environment. These behaviours are not part of the formal job requirements of nurses but contribute to the smooth functioning of the hospital as a social system. As a result, hospitals will attempt to attract and retain nurses who are likely to engage in such behaviours (Salanova et al., 2011).

e). Career development with a circular expansion effect. According to resource conservation theory, the underlying assumption is that people are always active in maintaining and acquiring resources that they perceive as valuable, and the potential or actual loss of these resources is a threat to them (Hobfoll, 1989). Work engagement is a positive resource. For example, medical staff with high work engagement have a physical, psychological, and cognitive advantage to adopt proactive behaviours in order to preserve and acquire more resources. After acquiring resources, work engagement is higher, thus creating an extended cycle in which medical staff themselves gain professional development.

(2) The impact of work input on the organization

a). Job performance

In a 1-year longitudinal study in Japan of 1632 manufacturing workers, higher levels of work engagement may have a beneficial effect on job performance. The effect of work engagement on job performance may be greater among women than men (Eguchi et al., 2020).

In the medical staff population, work engagement is also a significant positive predictor of job performance (Bernales-Turpo et al., 2022). In addition, studies have found a strong correlation between work engagement and performance among physicians but a weaker relationship between administrators and nurses. Occupational factors play an important role in driving work engagement and performance (Bakertzis & Myloni, 2021).

b). Patient outcomes

The work engagement of healthcare professionals affects the quality of care for patients. Burnout was associated with poorer patient-perceived quality of care, while work engagement was associated with better patient-self-perceived care. High work engagement was associated with fewer medical errors and higher patient safety (Scheepers, 2017). Health professionals who only have dedication but lack vigor and dedication may be less attentive to patients than to other aspects of their immediate tasks, such as interactions with patients or complaints (Loerbroks et al., 2017).

c). Employee satisfaction

Job engagement has a significant predictive effect on job satisfaction. Job engagement is a positive emotional experience. The pleasure that employees feel from their work and their enthusiasm to perform their job tasks positively affects their attitude towards handling their work. This, in turn, increases job satisfaction (Laschinger, 2012; Van Bogaert et al., 2013).

d). Employees' propensity to stay in their jobs

A nationwide survey study in Japan revealed that work engagement was a significant predictor of long-term care nurses' intention to stay in their jobs (Eltaybani et al., 2018).

Work engagement, the opposite concept of job burnout, is a positive resource that is highly negatively related to burnout (Schaufeli et al., 2010). Whereas burnout is a significant predictor of turnover, work engagement acts as a protective factor that reduces the occurrence of turnover and promotes the retention of employees in their current workplace.

2.1.2.5 Measurement tools of work engagement

The earliest work engagement served as an antithesis and complement to burnout. Maslach measured work engagement using a reverse score of the Maslach-Burnout Inventory (MBI) scale that was originally used to measure burnout (Hobfoll, 1989). He used the three dimensions of exhaustion, cynicism, and low professional self-efficacy to reverse the vigor, involvement, and self-efficacy of work engagement. These two concepts are considered to be opposites on a continuum, so a single instrument, the MBI, was used to measure them. Scores were rated using a 7-point Likert scale (0 to 6 indicating never to every day). The scores for each dimension are calculated reversely to produce a work engagement score. For example, lower scores on the two dimensions of emotional exhaustion and detachment and higher scores on the self-efficacy dimension represent higher work engagement.

Based on previous research, Xu and Zhu (2007) developed the Work Engagement Questionnaire for Employees in Chinese Firms. The questionnaire used the Likert scale, which divides work engagement into four dimensions: interest orientation, psychological identification, work enthusiasm, and active participation. The questionnaire had a total of eight items (two items for each dimension) and was rated on a 7-point Likert scale (1 to 5 indicating strongly agree to strongly disagree). Interest orientation refers to whether the individual feels enjoyment in work. Psychological identity assesses how much the individual identifies with the current job. The enthusiasm dimension assesses the individual's dedication to the work, and active participation assesses the individual's commitment or participation in the work (Xv & Zhu, 2003). The scale has also been used by some Chinese scholars in their

research and has a certain degree of generalisability.

Although Schaufeli et al. (2002) agreed that work engagement is the opposite of burnout, they argued that the dimensions of work engagement are different from the structure of burnout by using three dimensions to measure work engagement: vigor, dedication and absorption. After deleting and revising the items, a work engagement scale with 17 items in three dimensions was obtained. The vigor dimension has six items, which respectively measure high-level energy, high-level tenacity, willingness to put in the effort at work, and perseverance even in the face of difficulties under the vigor dimension. The dedication dimension used five items to measure the sense of meaning, pride and passion, and sense of challenge in work. The focus dimension uses 6 items to evaluate whether the individual is happily engaged in the work, fully focused and deeply involved in the work. In this situation, it feels like time flies, and it is difficult for people to break away from work. After the empirical test, the scale has good reliability and validity.

They also found that vigor and absorption were highly correlated, implying that full immersion in a situation is associated with high levels of energetic vigor. In 2006, Schaufeli et al. (2006) reduced and revised the scale to simplify it by using the 9-item Utrecht Work Engagement Scale (UWES). UWES has three dimensions, including vigor (3 items), dedication (3 items) and absorption (3 items). They are described as the three defining attributes of work engagement. All items were scored using a 7-point Likert scale (0 to 6 indicating never to every day) and the mean score for each dimension was calculated. The higher score means higher level of work engagement. The Chinese version of UWES has been used in Chinese-speaking occupational groups and has good reliability and validity. The Cronbach's α coefficients for the vigor, dedication and absorption subscales are 0.78, 0.84 and 0.8, respectively (Zhang & Gan, 2005).

The questionnaire is also currently being used extensively in China to measure work engagement. As this study uses Schaufeli et al.'s (2006) definition of work engagement, the Chinese version of the Work Engagement Scale, UWES, is used as the research instrument in this study.

2.1.3 Identification, studies, and measurement of turnover intention

2.1.3.1 Identification of turnover intention

Turnover is the process by which an employee voluntarily leaves the position on balance and terminates the position and the benefits it brings after a period of employment in a position

(Schaufeli et al., 2002). The tendency to leave, also known as turnover intention, refers to the possibility of individuals changing their jobs within a certain period of time, and is an important precursor variable for turnover behavior. Scholars generally believe that turnover intention is the most predictive of employee turnover behavior.

Foreign scholars began to study turnover intention in the early 20th century, March et al. (1958) argued that turnover intention is the psychological state of an individual who is likely to change jobs within a certain period of time, depending on the level of satisfaction with the current job and the opportunity to find a new job. Porter and Steers (1973) defined turnover intention as an employee's next withdrawal behavior after experiencing dissatisfaction at work.

Mobley (1977) proposed that turnover intention is a psychological process that occurs after an individual becomes dissatisfied with his or her job and tries to find a new job and assess the opportunities to do so before the act of leaving. Therefore, Mobley further suggests that the intention to leave is the last step before the actual act of leaving. Turnover intention is after job dissatisfaction, the thought of leaving, the intention to find another job, and the possibility of finding another job. It is the intensity of the employee's intention to leave the current job and find a new one. Carsten and Spector (1987) explained the propensity to leave as a cognitive mediator between an individual's dissatisfaction with his or her job and the act of leaving.

M. Zhang and Zhang (2007) believed that the propensity to leave developed over time. This is because the turnover intention is caused by individual dissatisfaction with the organization, and the development of dissatisfaction is a gradual process.

In summary, the turnover intention is a state of mind that arises before the act of leaving a job occurs, after accumulating dissatisfaction with the current position and assessing the external market to consider finding a new job opportunity.

2.1.3.2 Current status of medical staff's turnover intention

The turnover intention of medical staff in China has always been high. In 2019, a survey on the turnover intention of medical and nursing staff in 144 large tertiary hospitals in China showed that the turnover intention of physicians who wanted to leave within one year was as high as 65.66% and nurses as high as 70.80% (Wu et al., 2022).

A study of GPs' turnover intention in China showed that more than 70.0% of GPs had a moderate or high propensity to leave. Factors that affected the turnover intention included low job title and income level, high education level, having temporary work contracts, night shifts,

and limited career development opportunities (Y. Gan et al., 2020).

A meta-analysis of primary health workers' intention to leave their jobs in China revealed that 30.4% of primary health workers had the intention to leave their jobs, with the highest rates in community-based primary care and eastern provinces (He et al., 2020). The high turnover rate in emergency department is a huge challenge in China. A survey pointed out that 55.18% of emergency department physicians had the intention to leave (Feng et al., 2022), while emergency department nurses also had a high level of intention to leave (Jiang et al., 2022). RNs in general hospitals in China also had a fairly high intention to leave (Cao et al., 2021). In China, 20.2 to 56.1% of nurses had the intention to leave the profession (Z. Li et al., 2020).

A study in Jiangsu Province showed that the turnover rate of nurses in 2016 ranged from 0.64% to 12.71%, while the mean turnover intention score was 15.50 ± 3.44, at a high level (Chen et al., 2018). Recently, policies have allowed Chinese families to have two or three children. In this context, Yang and Chen (2020) surveyed 6673 paediatric nurses in mainland China. 663 (9.93%) nurses had a high intention to leave their jobs. In contrast, during the novel coronavirus pneumonia epidemic at the end of 2019, Chinese healthcare workers' turnover intention was 10.1% (Hou et al., 2021).

The shortage of medical staff is a major concern worldwide, which not only has a negative financial impact, but also reduces the quality of care and patient safety (Reed et al., 2021). There is a certain degree of shortage of personnel in every occupation type, and the high turnover rate is one of the reasons for this phenomenon.

Between 2014 and 2017, 33% of health professionals in the U. S. left their organizations, including retirements and voluntary turnover. Up to a third of U.S. public health workers are expected to leave their jobs in the next few years (Leider et al., 2021). In addition, In addition, during the COVID-19 pandemic, medical staff were under tremendous pressure, and many began to worry about their jobs and thus considered planning to leave (S. X. Zhang et al., 2022).

In 2019 the American Academy of Certified Public Accountants sent an email survey to all credentialed physician assistants nationwide about their questions related to leaving the profession. A total of 13,088 physician assistants responded to the questionnaire, with 9.6% of them reporting turnover within one year. The most common reasons included better work and life balance, better management or leadership or environment (reasons related to toxic or abusive environments), and better pay or benefits (Reed et al., 2021).

Oh and Kim (2019) investigated the turnover intention of practising physicians in Korea

in 2016. Approximately 30.5% of respondents wanted to leave within two years. In Croatia, 14% of clinicians in the palliative care discipline still had the intention to leave despite high job satisfaction (Macuka & Tucak, 2021).

There are many studies on nurses' turnover intention, which varies across countries, but overall reporting of turnover intention was at a high level. A global meta-analysis of intensive care nurses showed that more than 27% of critical care nurses worldwide had the intention to leave (Xu et al., 2021).

Studies in developed countries showed that about 9% of European nurses overall have the intention to leave their jobs, with rates ranging from 5% to 17% among European countries. A survey of nurses in Italy showed that 35.5% of nurses had thoughts of leaving their jobs, with 33.1% of them intending to leave the nursing profession (Sasso et al., 2019). In the U. S., the turnover rate for nurses in anaesthesia was 13%. 37.6% had turnover intention but had not yet left (Dexter et al., 2021).

A study by the U. S. Army Hospital revealed that 49% of nurses said they intended to leave. 44% of the turnover reasons were preventable, with dissatisfaction with management and the nursing work environment being the most preventable causes for turnover (Taylor-Clark et al., 2022) .

In Australia, nearly half (42.8%) of midwives had considered leaving their job in the last 6 months (Harvie et al., 2019). 34.7% of midwives in Western Canada had seriously considered leaving their jobs (Stoll & Gallagher, 2019). In less developed countries, 22.1% of nurses in a survey of large multi-centre hospitals in Brazil expressed a turnover intention. A survey of nurses in Jordan showed that 68% of respondents intended to leave, and many would leave for better opportunities abroad (Suliman et al., 2020).

In Africa, the aggregated percentage of nurses' turnover intention in sub-Saharan Africa was 50.74%. East Africa had the highest proportion of nurses' turnover intention at 58.03%. The lowest proportion of nurses' turnover intention was 33.04% in South Africa (Ayalew et al., 2021).

Saudi Arabia has a unique nursing profile, as the majority of the nursing workforce is expatriate. A survey argued that the high turnover of expatriate nurses was a persistent problem in the Saudi healthcare system, and they cited discrimination as a significant factor in their turnover intention (Alshareef et al., 2020).

The COVID-19 pandemic outbreak has increased the demand and workload of nurses. In addition, the number of critical cases, the uncertainty of the disease, and the incidence of death from the disease put psychological pressure on healthcare workers on the frontline.

Considering the worrying issues of stress, burnout, and staff turnover, the COVID-19 pandemic may amplify these problems.

Several studies have shown a significant increase in nurses' turnover intention following the outbreak of the COVID-19 pandemic (Falatah, 2021; Nashwan et al., 2021; Raso et al., 2021). Therefore, it is important for hospital administrators to consider how to reduce the incidence of nurse turnover and maintain the stability of the nursing team.

Based on an evaluation system of pharmacist turnover, including studies published in multiple countries up to 2020, the extent of pharmacist turnover and their turnover intention were assessed. The results showed that pharmacist turnover rates appeared to be increasing over time. Based on a combination of several publications, the turnover rate of pharmacists ranged from 8.6% to 17%. The rate for those choosing to leave the pharmacy profession ranged from 6% to 9%. Pharmacists' turnover intentions ranged from 13% to 61.2%, and the turnover intentions of the pharmacy industry ranged from 6.5% to 18.8%. The turnover intention of hospital pharmacists was significantly higher for than that of community pharmacists (Thin et al., 2022).

An Ethiopian study showed that nearly half (47.8%) of anaesthetists planned to leave their jobs in the coming year. Those who have 2 to 5 years of experience had the peak turnover intention (Kols et al., 2018).

A Malaysian survey of dental technicians in public organizations reported that although the majority of subjects had high job satisfaction and motivation, 8.3% intended to leave the public sector to work in a different organization (Zakaria et al., 2022).

2.1.3.3 Factors influencing turnover intention and conceptual models

Medical staff exit factors can be summarised into three categories: organizational, personal, and social factors. Organizational factors mainly include management style, organizational culture, organizational commitment, interpersonal alignments and remuneration systems. Organizational factors that affect turnover can include high workload, poor working environment, unreasonable salary distribution, lack of career development, lack of opportunities for further study, lack of development of weak disciplines, incompatibility with leadership style, conflicts among colleagues, inability to perform the job.

Firstly, most hospital leaders are characterised by a dual role. Hospital leaders who do not have a professional background in hospital management may not be able to play the role of hospital administrators well in terms of leadership style and ability. They pay more attention to medical quality and discipline development, ignoring the relationship and psychological

development of employees.

Secondly, there are many patients in tertiary hospitals. The turnover of medical workers is frequent. Studying medicine was unpopular. All of these lead to a heavy workload for the employees on the job. In addition, physicians have to take care of scientific research tasks.

Thirdly, the income of medical staff is still at a low to medium level, and most hospitals decide on titles on the basis of seniority. There are irrationalities in the performance pay distribution, and the industry still lacks a set of scientific and reasonable performance distribution systems.

Finally, young workers do not receive satisfactory remuneration, and they do not see career development, especially in disadvantaged disciplines. Because of the complex issues of quota for hospital promotion, coupled with the current series of new regulations such as extended retirement, and the failure of hospitals to establish career planning guidance and adequate opportunities for further study, the factors that influence the departure of young workers by the organization are more serious.

Personal factors mainly refer to the tendency of medical staff to leave due to their own reasons, which mainly include basic conditions such as age, gender, education level, and family. These factors also include individuals' perceptions of the job, such as personal values and expectations of the job. Some employees resign due to personal factors such as physical conditions, long journeys to work due to relocation, being admitted to graduate school or civil servants, or going abroad or changing their names. Family reasons include relocation due to the separation of the husband and wife, returning home to work because of taking care of the family, accompanying the husband and children abroad, and resigning due to pregnancy and childbirth. Some of them left because they felt that the work was monotonous and mechanical, inconsistent with their own expectations, and unable to gain a sense of accomplishment.

Social factors include increasing market competition, strained doctor-patient relations, and some social prejudices. As private and international hospitals are encouraged to enter the market, they naturally target senior talent from public hospitals through their financial advantages and flexible management systems. The loss of a senior talent often leads to a collective loss of the young cadres under them.

Besides, the escalating conflict between physicians and patients and the frequent occurrence of vicious incidents in hospitals in recent years have undoubtedly brought enormous psychological pressure to medical staff. The training cost of medical personnel is high, so they could not accept such a high-risk and high-pressure job.

Finally, there is a small amount of social prejudice, especially when it comes to marriage.

Societal prejudice believes that medical staff has little care for the family. Prejudice against men in the nursing profession. These have led to the resignation of some medical staff.1) Separation decision model

(1) Turnover decision-making model

When March and Simon (1958) defined turnover intentions, they developed a model that attempted to integrate labour market factors with individual behavioural factors. It is proposed that turnover is the result of employees' decision-making behavior, and two direct factors that affect turnover intention are considered: the ease of turnover and the desire to resign. Considering market factors, employees evaluate whether they can find alternative jobs, that is, the ease of leaving. At the same time, it is also affected by the individual's job satisfaction, that is, the desire to leave the job.

Thus, the model consists of a two-part molecular model. One is to evaluate the subjective desire that employees can feel about leaving the organization and its influencing factors. The other one is to measure the perceived ease with which employees can leave the organization and its influencing factors.

Among the rational factors for employees to feel that they are outflowing the organization, they mainly care about the employee's job satisfaction and the possibility of internal mobility in the organization. Among the factors of the ease with which employees feel to flow out of the organization, the main concern is the perceived number of organizations to choose from in the market. This model provides a theoretical basis for the subsequent research on turnover intention or turnover behavior. The perceived ease of turnover develops into perceived job opportunity choice, and the perceived subjective turnover intention evolves into job satisfaction (Zhang & Zhang, 2007).

(2) Model of the exit decision process

Later, Mobley (1977) developed a model of a turnover decision based on the original model, suggesting that the turnover decision was caused by the outcome of the evaluation of satisfaction with the existing job. Generally, the evaluation brought two different results, i.e., job satisfaction or dissatisfaction. Employees who are satisfied with their jobs will improve the efficiency of their work and the quality of their service.

Employees dissatisfied with their jobs develop withdrawal behaviors such as burnout, absenteeism, and thoughts of leaving. Afterward, the employee who thinks about quitting will start to evaluate whether the cost of quitting to them is acceptable, that is, the loss or benefit of quitting. If the cost of quitting is too high or the expected income brought by the new job is lower than the current job, employees may reduce their turnover intention or turn it into

withdrawal behavior. If the cost of quitting is acceptable, employees will have the desire to find a new job.

In addition, some external factors unrelated to work may affect employee turnovers, such as physical health problems or family factors. These factors may contribute to employees' willingness to seek a new job. After generating this intention, they will start the behavior of looking for a new job. If they cannot find a job, they will reassess their existing job and expected situation, which may reduce their turnover intention or produce withdrawal behavior.

If an employee is offered a new job, they will evaluate the current job against the possible new job and will either stay in the hospital or leave, and will eventually do so. In this theory, an employee's turnover intention a job changes in response to practical considerations and is not a decision to be made at any one time but is a dynamic process. However, Mobley also points out that it is possible for employees to leave on impulse.

If employees have the opportunity to get a new job, they will evaluate the existing job and possible new jobs to generate an intention to stay or leave, and finally act to stay or leave. In this theory, employee turnover intentions vary with practical considerations. The turnover intention is not a decision at a certain moment but a process of dynamic change. However, employees may be impulsive and cause resignation.

(3) Model of employee withdrawal decision process

Mobley et al. (1978) further built on their previous theory to derive a model of the employee withdrawal decision process. In this model, they introduced two influencing factors: age and seniority. Results showed a positive correlation between seniority, age, and job satisfaction. Higher seniority and age were associated with higher job satisfaction.

In addition, the researchers proposed that turnover intentions follow employees' dissatisfaction with their current job, the possibility of trying a new job, and evaluating and comparing other job opportunities. It is the last step before actual resignation behavior, which means that turnover intention is a mediator between the variables and resignation behavior (dependent variable).

The study conducted a comparative survey of nurses under 40 years old and above 40 years old. Emotional demands, physical demands, and family-work conflict appeared to increase levels of perceived stress among nurses under the age of 40. Increased perceived stress leads to higher burnout levels. Finally, higher levels of burnout appear to lead to a higher propensity to leave the profession. Although those 40 and older reported higher levels of burnout, tenure was higher in the 40 and older age group (Van der Heijden et al., 2019).

(4) Price's turnover model

Price (1977) introduced his model of turnover. The model identified job satisfaction as an important direct factor contributing to employees' turnover intention. Five factors, including pay, integration, feedback, formal communication, and centralization, were antecedent variables of job satisfaction.

Centralisation was negatively related to job satisfaction and the remaining four variables were positively related to job satisfaction. These five antecedent variables, which allow individuals to receive different levels of job satisfaction, resulted in turnover intention coupled with a moderation of the external availability to find a new job.

(5) Price-Mueller turnover model

Price and Mueller (1981) further investigated the model by adding new variables. The model's exogenous variables were structured: job involvement, positive or negative affect, job autonomy, distributional fairness, job stress, pay, promotion opportunities, and social support. These eight factors synergistically influence job satisfaction. Job satisfaction, together with family responsibilities, general training opportunities and specialisation, influence the turnover intention.

(6) The unfolding model

Lee and Mitchell (1994) found that there are many real-life turnovers that were not captured by traditional models. For example, some employees who are satisfied with their jobs will leave; some people will leave before finding a replacement job, and some departures may be the result of individual "impulses." The traditional models assumed that employees could rationally judge the expectation of turnover, which they might not be able to do. "Matching" was a better description of the turnover decision process.

For these reasons, the unfolding model introduced "shock" and "script." The combination of these two concepts constitutes four paths for employee turnover. Some of these paths are consistent with traditional models, while others are unconventional. Some departures reflect pre-planned thoughts, and some leave for reasons that have nothing to do with individual job satisfaction. The main contribution of this model is that, for the first time, it is proposed that the turnover process of employees may start from factors other than emotion, not necessarily from job dissatisfaction.

Based on this, Mitchell (2001) further developed the job embeddedness theory. This model has received increasing attention because it breaks away from the traditional attitudinal model and suggests that some turnover decisions are independent of job satisfaction levels and can be caused by "system shock."

2.1.3.4 Tools for measuring turnover intention

Single-item turnover intention scales are frequently used in research, often appearing as simple question options. In a study of employees' turnover intention, researchers often choose single-item questions to assess nurses' desire to leave in order to quickly and easily understand their level of turnover intention. For example, employees were asked "Do you plan to leave your current position next year?", "Do you plan to change jobs?", "Do you plan to leave this position?" Participants often simply respond "yes" or "no."

Michael and Specter (1982) constructed the Intention of Quitting Scale (IQS). They believed that turnover intention is the result of the combined effect of the possibility of employees quitting their current job, the motivation to find other jobs, and the possibility of obtaining an outside job. The scale had into six items. Items one and six constituted Intention of Quitting I, items two and 3 constituted Intention of Quitting II, and items four and five constituted Intention of Quitting III. For example, "I am now considering changing jobs" was used to measure the likelihood of an employee quitting his or her current job; "I intend to change my job" was used to measure the motivation to find another job; and "I am willing to give up my current job" was used to measure the possibility of obtaining another job. The scale was based on a 7-point Likert scale ranging from "never" (1) to "consider it every day" (7). The higher score indicated a stronger intention to quit. This scale is widely used and has been translated into several languages, but because the scale is so detailed, there is not much variability. However, as the scoring is too detailed, there is not much variability, so the translated scale has been simplified from the previous version.

In order to make the Korean version of the IQS more truly reflect the degree of turnover intention and reduce the deviation of the survey results, Lee et al. (2012) combined the Visual Analog Scale method and changed the IQS scoring level to three items. Each item is scored from 0 (never consider) to 10 (always consider). The total score ranged from 0 to 30 points. The changed scale has better sensitivity, with Cronbach's α coefficient at 0.94.

The Nurses Early Exit Study was developed by a research team to investigate the turnover intention scale of a group of nurses to assess the frequency of leaving in the past year (Hasselhorn et al., 2004), and the scale was part of the Basic Questionnaire-12 scale. The evaluation of turnover intention includes two aspects: the idea of leaving the current position and the turnover intention the nursing profession. The items to measure turnover intention were "In the past year, did you often have the idea of leaving your current job?" and "In the past year, did you often have the idea of giving up the nursing profession?". The answers were

divided into 4 options: “never”, “several times a year”, “several times a month”, and “every day”. Responses of “several times a month” and “every day” indicated a strong turnover intention. The other two items were to measure the main reasons for quitting their current job and the nursing profession, and are multiple options: promotion, poor working conditions, health reasons, low pay, lack of career prospects, need to take care of family members, other personal reasons, and other professional reasons. This scale is widely used and to some extent reflects the level of nurses’ turnover intention. However, the scope of respondents is limited so it has not been used in other groups.

Hinshaw et al. (1985) developed the Anticipated Turnover Scale (ATS) in a group of nurses to investigate perceptions and views of voluntary work positions with 12 items. In order to reduce the bias of the survey results, the number of positive items and negative items of turnover intention is equal, such as “I am very sure that I will quit my current job in the near future” and “I am sure that I will stick to this job for a period of time”. The scale was based on a Likert scale of 7, ranging from strongly agree (7) to strongly disagree (1), with a total score of 7 to 84. The higher score implied the stronger intention to quit the job. They used the scale to survey 1597 nursing staff in 1985. The reliability of ATS was initially tested with Cronbach’s α coefficient at 0.84. The exploratory factor analysis and principal component analysis were used for construct validity, and the explanation rate of the total variance of the two factors was 54.9%.

Fitzpatrick et al. (2014) conducted a cross-sectional survey of 2633 nursing staff, and Cronbach’s α coefficient was 0.89. This further validated the good reliability of the scale. Nam et al. (2021) surveyed Korean interns and retested the reliability after two weeks. The intraclass correlation coefficient of the two-week test-retest reliability is 0.81, which has good internal consistency (Cronbach’s α is 0.85, and McDonald’s ω coefficient reliability is 0.92). It can provide a reliable and effective tool for measuring the expected turnover intention of Korean nurses.

Barlow and Zangaro (2010) conducted a meta-analysis of the reliability of the ATS scale used in a study of RNs in the United States. The study found that the ATS scale can accurately evaluate the degree of turnover intention of nurses before nurses leave, so it provides a basis for nursing hospital administrators to make decisions about nursing human resources management.

According to the loss of Japanese information technology service personnel and the characteristics of work and organization, Tei and Yamazaki (2005) developed a six-item turnover intention scale. Tei-Tominaga et al. (2009) modified the scale. Items included: “I

hate my current job at the hospital and am seriously concerned about other jobs"; "I would not hesitate to quit my job at the hospital"; "I hate my current job and can't stand it anymore"; "I would quit my current job immediately if I found a job that suited my needs"; "I hate my current job so much that I am late, leave early and miss work"; "I have seriously talked to my family and friends about quitting my job". Responses were self-assessed based on their own feelings about the scale by a four-point scale. The higher score meant higher risk of quitting the job. The scale not only reflects the respondents' current level of turnover intention, but also assesses behaviours related to the respondents' turnover intention. Therefore, it has been used more widely in Japan.

Simon et al. (2010) further refined the Intention to Leave scale by dividing the ITL scale into two: intention to leave the profession and intention to leave the organization. Items included "In the past year, have you had thoughts of leaving the nursing profession?"; "I used to assess the extent to which the nurse intends to leave the nursing profession"; "In the past year, would you like to change your current job to .....? (Options include another hospital, home care, nursing home, practice and self-employment)". These items were used to assess the nurses' intention to leave their position and were categorised according to how often the intention to leave had occurred in the past year. The options were: "Never", "A few times a year", "several times a month", "several times a week", "every day". Options of "several times a month", "several times a week", and "every day" indicated potential leavers, and the degree of turnover is gradually increasing as the frequency increases. The study found that the intention to leave the profession model was superior to the intention to leave the organization model.

2.1.4 Theoretical foundations

2.1.4.1 Conversation of resource

The Conversation of resource (COR) theory can well explain the impact of resources on work engagement and turnover intention. COR is a model about stress and motivation, which mainly explores the process of stress generation from the perspective of individual resource input-output imbalance. Stress and insecurity arise when individuals are threatened with loss of resources or when resources are invested and not rewarded accordingly. The individual tends to think that the individual has no psychological motivation to preserve, acquire, and utilize resources. Different motivations for dealing with resources will have different effects on attitudes, psychology, and behavior.

The underlying assumption is that people are always active in maintaining and acquiring resources that they perceive as valuable, and the potential or actual loss of these resources is a threat to them. The core idea is that individuals with more resources are less affected by the loss of resources and have a greater ability to acquire other resources, and vice versa.

This leads to two spiral effects of resources: the loss spiral and resource gain. The loss spiral refers to the fact that individuals with a lack of resources are more likely to experience stress when faced with a loss of resources, which in turn causes them to lose a large amount of resources, thus causing them to be trapped in a circle of constant loss of resources. The resource gain refers to the fact that individuals with more resources are less likely to be stressed when faced with resource loss and will try to acquire other resources to prevent the loss of their own resources, thus generating greater resource growth.

COR theory is based on the principle that people have a deep-seated motivation to acquire, retain and protect what they value (Hobfoll, 1989). COR theory has three principles. Firstly, the feeling of losing resources is much more pronounced than the feeling of gaining them. Secondly, people will tend to invest in resources in order to gain more resources or to avoid losing the resources they already have, in which case those with more resource preservation will lose fewer resources and gain more. Conversely, those with fewer resources will tend to lose them and gain fewer as well. Thirdly COR theory elaborates two feedback loops (positive and negative loop).

Thus, when people with less resource conservation lose their resources, they may face the threat of losing the only resources they have. The innovation of COR theory is that it describes not only what individuals will do when faced with stress, but also how they will behave when there is no threat. Specifically, when faced with stress, the COR model predicts that individuals will try to minimise the net loss of resources. Conversely, when not facing a threat, people will try to develop resource replenishment to offset potential future losses. COR theory describes burnout as a state of extreme resource depletion, and work engagement can be seen as a resource overload. When people generate an excess of resource accumulation, they may experience positive well-being and health.

2.1.4.2 The job demands-resources model

The job demands-resources (J-DR) model was to explain the mechanisms underlying job burnout or engagement (Schaufeli et al., 2002). The model emphasized two types of characteristics of work: job demands and job resources. Job demands refer to physical, social, or organizational aspects of work that require continuous physical or mental effort. Therefore,

job demands are associated with certain physical and psychological states (such as exhaustion). Resources are health-protective factors, and job resources refer to resources from the physical, social and organizational aspects of work, i.e., external resources (such as organizational and social) and internal resources (such as cognitive characteristics and action patterns).

These resources play a role in achieving work goals, alleviating and depleting the physical and mental demands of work, or stimulating personal growth, learning and development. Emotional exhaustion is highly associated with job demands such as workload and time pressure. Feelings of alienation or disengagement from work intentions are more associated with poor job resources such as lack of feedback, poor job control, lack of social support and lack of involvement in decision-making.

The J-DR model develops three further core assumptions: the dual pathway assumption, the buffering assumption, and the coping assumption.

In terms of the dual pathway assumption, there are two pathways through which work affects employees: attrition and gain. On the one hand, the loss pathway. The health attrition process is the burnout caused by excessive job demands and lack of job resources, which leads to negative organizational outcomes such as sick leave, low performance, and low organizational commitment. Essentially, when work demands (negative factors) are consistently high and not compensated by work resources (positive factors), employees' energy is continuously depleted in the work process, which may eventually lead to energy depletion (burnout). In turn, it has a negative impact on the individual employee (such as health problems) and on the organization (such as performance).

On the other hand, the gain path. The motivation process is triggered by an abundance of work resources. Increasing the work engagement of employees, this, in turn, has positive effects such as high organizational commitment, high intention to stay and high job performance. It is important to emphasise that both high job demands and low job resources generate burnout, only high job resources (and not low job demands) increase work engagement. In fact, job resources have a natural motivational quality that motivates employees, and increases work engagement, therefore imposing a positive impact.

Thus, increasing job resources (such as social support, job autonomy and feedback) can kill two birds with one stone. It discourages burnout and increases work engagement. Conversely, reducing work demands (such as work overload, role conflict and job insecurity) only has an effect on burnout and does not increase work engagement. The dual pathway assumption has been tested in a number of empirical studies.

The buffering assumption proposes that work resources buffer the attrition of high work demands on employees. Work resources mitigate the negative impact of work demands on employees. Work overload, work-family conflict, emotional demands, and physical demands do not lead to high levels of burnout when employees have autonomy, timely feedback, social support and quality supervisory relationships at work. Job resources moderate the effect of job demands on burnout. The negative effect of job demands on burnout is reduced with high job resources and increased with low job resources.

The coping assumption argues that employees are better able to translate high work resources into high levels of performance under challenging circumstances (high work demands). Under high work demands, employees are more fully engaged in their work, drawing on a large amount of resources they already have to achieve their work goals, thereby acquiring more new resources. For example, being forced to complete a project in a very limited amount of time can boost performance. In other words, in a high-demand environment, employees make the best use of their work resources to better engage in their work and achieve their goals. The positive effects of outcome variables, such as employee performance, are stronger when employees are in a high-demand environment.

2.2 Studies on the relationship between security, work engagement, and turnover intention

2.2.1 Studies on the correlation between sense of security and work engagement

Kahn (1990), one of the first scholars to give a systematic description of the concept of work engagement, identified safety, meaningfulness, and effectiveness as the three key drivers of work engagement. Scholars who have studied the factors that influence work engagement have mostly argued that work engagement is matched to work resources.

Hobfoll (1989)argued that there are four types of work resources that influence work engagement: Physical resources, conditional resources, individual characteristics, and energy resources. Physical resources (such as houses and cars) are valued by their physical attributes. Conditional resources (such as position and seniority) have positive meaning for an individual’s work life. Individual characteristics (such as self-efficacy and optimism) are characteristics or abilities that the individual carries with him or her that can withstand external pressures. Energy resources (such as money and knowledge) are valuable because they help the individual to access other resources that he or she needs. There is emerging

evidence that security is a resource that organizations can bring to the table to combat burnout (Moriano et al., 2021).

According to the definition, the sense of security of medical staff comes from a number of dimensions, including the workplace environment, the relationship with patients, organizational support, one's own competence, and the social environment. As a basic need, it is a necessary and positive resource for health professionals in the workplace and is characterised by a variety of individual, conditioned and energetic characteristics.

According to the COR theory, employees' experiences of insecurity can be perceived as significant and result in negative outcomes. insecurity is correlated to low work engagement. The lack of job security means that employees feel threatened by uncertainty. When job insecurity is present, employees may experience hopelessness and burnout (Sverke et al., 2002). This can be a powerful stressor. The constant depletion of self-regulatory resources is the result of this negative emotion. This will also increase the psychological distress of employees and cause mental health problems for employees (Mutambudzi et al., 2017). This can even lead to somatic symptoms such as low back pain and coronary heart disease (Urquhart et al., 2013; Virtanen et al., 2013). The workplace thus becomes an environmental stressor for employees, exacerbating the burnout response and leading to lower work engagement (Azam et al., 2017).

To protect their positive resources from depletion or to reduce depletion, individuals will tend to preserve positive resources, and a sense of security and work engagement are both positive resources that facilitate employee recovery. When organizations grant protection from security threats and safeguards in the workplace, it facilitates employees to have an adequate sense of security.

For medical staff, a more reassuring and free environment improves the quality of professional life (Copeland & Henry, 2018), increased dependence on the organization, which facilitates full engagement, increased work engagement, and produces positive feedback process (D. Xu et al., 2022).

In addition, medical staff needs to work in teams, so they are influenced by cooperative communication between colleagues. Work engagement increases when perceptions are consistent, and work engagement is higher when there is consistent perceptual communication between colleagues (Roczniewska & Richter, 2022).

2.2.2 The impacts of sense of security on turnover intention

Richter et al. (2020) conducted a follow-up study of 699 Belgian employees. Results indicated

that job insecurity was associated with actual turnover over time. Based on COR theory (Hobfoll, 1989; Hobfoll, 2001), when employees experience job insecurity, one of their most important resources, such as the position they are employed in, is threatened. It may further deplete the employee's resources. Employees may try to protect their remaining resources by withdrawing from the stressful situation. One way to get out of a job insecurity situation is to change jobs (Filipkowski & Johnson, 2008).

Data from Indian clinicians showed that perceived security in the workplace is a significant positive predictor of physician job satisfaction. The perceived security brought by that an organization is able to deal with workplace violence can impose more significant impacts on job satisfaction and turnover intention than the effect of actual violence (Ahamed et al., 2021).

In addition, job insecurity may lead to job quitting due to involuntary unemployment. According to COR theory, prior resource loss can make individuals more vulnerable to future resource loss. Medical staff work in high-intensity, high-stress environments where insecurity can lead to job depletion resources can translate into negative emotions, negative attitudes, and job stress.

Through the experience of job insecurity, employees' job performance may be affected (Cheng & Chan, 2008), as employees who feel job insecure invest energy in dealing with the threat of possible job loss and experience stress complaints. Over time, job insecurity may lead to employees unconsciously losing their jobs because they are no longer able to meet the company's expectations.

2.2.3 The impacts of work engagement on the turnover intention

Kahn's (1990) work engagement theory stated that, based on the idea that the self is integrated into the job role, when work engagement is low, the individual withdraws the self from the job role. It results in a reduction in the performance created by that job role, which in turn leads to a turnover intention. Furthermore, based on the motivational process of the JD-R model of job requirements, previous research has confirmed a negative relationship between job engagement and turnover intentions, with higher job engagement leading to lower turnover intentions.

This suggests that work engagement creates resources among employees. Work engagement is associated with beneficial outcomes for the organization, such as higher levels of performance and lower turnover intention (Halbesleben, 2010), and for employees, such as better self-perceived health (Schaufeli & Bakker, 2004). Due to the nature of their profession,

medical staff has higher levels of job skill specialisation and those with higher levels of work engagement show higher levels of satisfaction and performance at work. In addition, they also tend to accumulate positive experiences and create dependency ties with the organization, and therefore a lower turnover intention (Rodwell et al., 2017).

According to COR theory, they would consider staying in their current job position in order to preserve their current resources. Quitting is likely to result in the loss of existing beneficial experience and restarting learning and familiarization with the work environment (De Lange et al., 2008). Conversely, the high intensity and stress levels of medical staff deplete resources, reduce work engagement, and increase burnout and the turnover intention.

Caesens et al.'s (2016) study further revealed that the relationship between the two may be non-linear, but rather in a curve U shape. Too many beneficial antecedents may instead lead to undesirable outcomes. Usually, after beneficial antecedents reach an inflection point, their relationship with the desired outcome is no longer linear and positive, but rather a transition curve pattern is created. Employees who are actively engaged and put a lot of effort into their work may expect that their organization should reward them for their input at the same level. If highly work-engaged employees do not feel the same return on their investment, they may start looking for job opportunities in other organizations.

Therefore, additional increases in work engagement do not produce additional desirable effects. These results suggest that although moderate levels of work engagement are associated with lower levels of turnover intentions, excessive work engagement is not beneficial. Excessive work engagement tends to translate into job stress and cause the employee to search for less demanding jobs. Based on the current state of work engagement, most studies show that medical staff has moderate or even low levels of work engagement. High levels of work stress and burnout are often reported in medical staff workplaces. Appropriate job resource enhancement for employees to increase work engagement and reduce turnover intentions is a practical solution.

2.2.4 Studies on the impacts of sense of security and work engagement on the turnover intention

The JD-R model states that when an organization provides valuable resources to its employees, it facilitates a motivational process (i.e., through increased work engagement) that is conducive to positive outcomes (i.e., employees are less inclined to leave the organization) (Schaufeli & Bakker, 2004). Work engagement acts as an important bridge in this process, linking work resources to outcomes.

Research shows that work engagement buffers the impact of insecurity on employee well -being (Stiglbauer et al., 2012). As a resource, security is also an influential factor driving work engagement. Higher sense of security often brings higher level of work engagement (Zhang et al., 2021).

Conversely, burnout levels increase when insecurity is high (Cheng et al., 2011). Employees are full of vigor and maintain a positive attitude at work, which can also inspire employees to create more performance, and employees will have higher satisfaction and recognition for their work (W. Zhang et al., 2018). This positive emotional state creates value for both the individual and the organization. For the employees themselves, a sense of security is a basic requirement to ensure that they can work with peace of mind in the organization. It is also the fundamental guarantee that employees are driven to be creative and innovative in their work.

Therefore, in order to preserve that positive status and resources, employees tend to stay in the organization more. According to the resource gain assumption, an employee who invests in the position can receive resources. In other words, as employees spend more emotion, energy and competency in their jobs, they will also gain more performance and happiness, a better understanding of their jobs, a higher level of competence in their jobs, and a sense of control and competence in the workplace, thus increasing their sense of security (Vieira et al., 2021). This leads to a greater sense of control and competence in the workplace and a greater sense of security.

2.3 Research gaps and research hypotheses

Turnover intention, also known as the propensity to leave, is a tendency to quit a job. Medical personnel’s turnover intention is affected by personal factors and organizational factors. Personal factors include age, gender, education, years of experience (Labrague & de Los, 2021), while organizational factors include organizational fit, organizational support, professional identity, job satisfaction, and job burnout (Sasso et al., 2019). The sense of security is the premonition of possible physical or psychological dangers or risks and the individual’s sense of strength or powerlessness in coping with them (Ba et al., 2021).

Studies have shown that somatic discomfort among nurses is positively related to their insecurity at work (Virtanen et al., 2013). It was also found that when nurses felt insecure at work, their mental health decreased or they experienced somatization symptoms such as palpitations, dizziness, and poor concentration. These symptoms affect nurses’ productivity

and focus, which could affect patient safety (Ruokolainen et al., 2014).

Feeling secure has a positive effect on the intention to stay on the job (Kruzich et al., 2014) Job security can also reduce burnout (Barr, 2020), which is the antithesis of job engagement and can have a negative impact on medical staff and contribute to the turnover intention. (X. Zhang et al., 2020). The term "job engagement" is used to refer to an individual's commitment to their work. Job engagement refers to the performance of an individual's role at work, including job performance and personal expression.

Studies have shown that work engagement is negatively related to turnover intentions. For example, higher levels of work engagement are associated with lower turnover intentions (Steffens et al., 2018). However, the current lack of security in the medical profession has been shown to increase work engagement (Yi & Xiong, 2021).

However, there is a lack of clarity about the factors associated with poor security and turnover intention among medical staff and a lack of targeted interventions (Eweida et al., 2021). The factors associated with a poor sense of security and the turnover intention of medical staff are not well understood, and there is a lack of targeted interventions.

In a previous study, Ba et al. (2021) developed the Medical Staff Security Scale to address a specific group of medical staff. The study found through pre-tests that among those with higher levels of nurse security, their turnover intention was lower. Nurse security was negatively related to turnover intention (r=-0.969), work engagement was negatively related to turnover intention (r=-0.939), and nurse security was, in turn, positively related to work engagement (r=0.983).

In summary, we hypothesise that there is a close relationship between medical staff's sense of security, work engagement, and medical staff's turnover intention. Therefore, this study aims to investigate the mechanisms that influence the relationship between medical staff's sense of security, work engagement and turnover intention, in order to establish effective intervention strategies. Based on work requirements-resource models, medical staff's sense of security is an important positive resource, and the turnover intention is its result. This model believes that work investment is used as an important bridge in this process, linking work resources and results. Therefore, we set a sense of security as an independent variable, the work investment as the mediator, and the turnover intention as the dependent variable.

Based on the above, we make the following hypotheses:

H1: Security has a negative impact on turnover intention.

H2: Sense of security has a positive effect on work engagement.

H3: Work engagement has a negative impact on turnover intention.

H4: Work engagement mediates the impact of sense of security on turnover intention.

2.4 Chapter summary

This chapter first provides a comprehensive overview of the theories and the current state of studies relating to sense of security, work engagement, and turnover intention, and analyses the dimensions and influencing factors of all three variables. Secondly, a discussion is given on the relationship between and among both sense of security, work engagement and turnover intentions. On this basis, the limitations of the relevant studies are presented, and the research hypotheses of this study are proposed, inferring that work engagement plays a mediating role between sense of security and turnover intention.

Chapter 3: An Empirical Study: The Case of General Hospitals in Guangdong Province

This study has the following objectives: a). to understand the current situation and statistics of security, work engagement and turnover intention among medical staff in Guangdong Province; b). to find out whether demographic variables have any significant effect on security, work engagement and turnover intention; and c). to investigate the relationship between sense of security, work engagement, and turnover intention.

The design of the empirical research methodology in this chapter focuses on the design of variables based on the research hypothesis in Chapter 2, where variables that are difficult to measure in terms of medical staff's sense of security, work engagement and turnover intention are converted into actionable variables, on the basis of which a questionnaire is obtained. The questionnaire was then used to obtain relevant data, conduct data analysis and make validation of the proposed hypotheses based on the results of the data analysis.

3.1 Research methods and technical roadmap

3.1.1 Research methods

This study was conducted as a cross-sectional survey from September 2020 to May 2021. A two-stage sampling method was used to select medical personnel in Guangdong Province, which is located in the southernmost part of mainland China and adjacent to Hong Kong and Macau.

The proportional stratified sampling method was adopted. According to Guangdong Provincial Bureau of Statistics (2019), we determined the ratios of tertiary, secondary and primary general hospitals that should be included in this study based on the number of tertiary, secondary and primary general hospitals in Guangdong Province and the ratios of different level hospitals in the four regions of Guangdong Province. The study determined that the ratio of tertiary hospital to secondary hospital to primary hospital as 2:1:1.

According to the Guangdong Health Statistics released by the Guangdong Provincial Health Commission (2020), there were 292,128 licensed physicians, 356,784 registered nurses, 43,374 pharmacists, and 37,175 technicians in Guangdong Province. According to

theses numbers, we decided that the ratio of physicians to nurses to pharmacists and technicians as 4:8:1:1.

Firstly, in the first stage, the administrative regions of Guangdong Province are divided into four major regions: the Pearl River Delta, East Guangdong, West Guangdong, and North Guangdong. In the second stage, hospitals are selected according to the proportion of hospitals at different levels in each region. In the third stage, each hospital is sampled according to the sampling ratio of medical staff. Then, if medical staff in each hospital meets the following criteria: a). medical staff with professional qualifications and completed registration; b). aged 18 years or above; and c). with at least one year of work experience, they were invited to respond to the survey. If the medical staff meets the following criteria: a). medical staff who were unable to participate in this study due to sick leave, maternity leave, vacation, or physical or mental illness; and b). Medical staff who refused to participate in this study are not invited to respond the survey.

3.1.2 Technical roadmap

The technical roadmap of this study is shown in Figure 3.1. Based on the research background, the research questions were proposed to investigate the correlation between sense of security, work engagement, and turnover intention. Then, four hypotheses were proposed, and the study explored how to test the four hypotheses via two methods: multiple linear regression and structural equation modeling (SEM). Last, research implications and prospects are discussed.

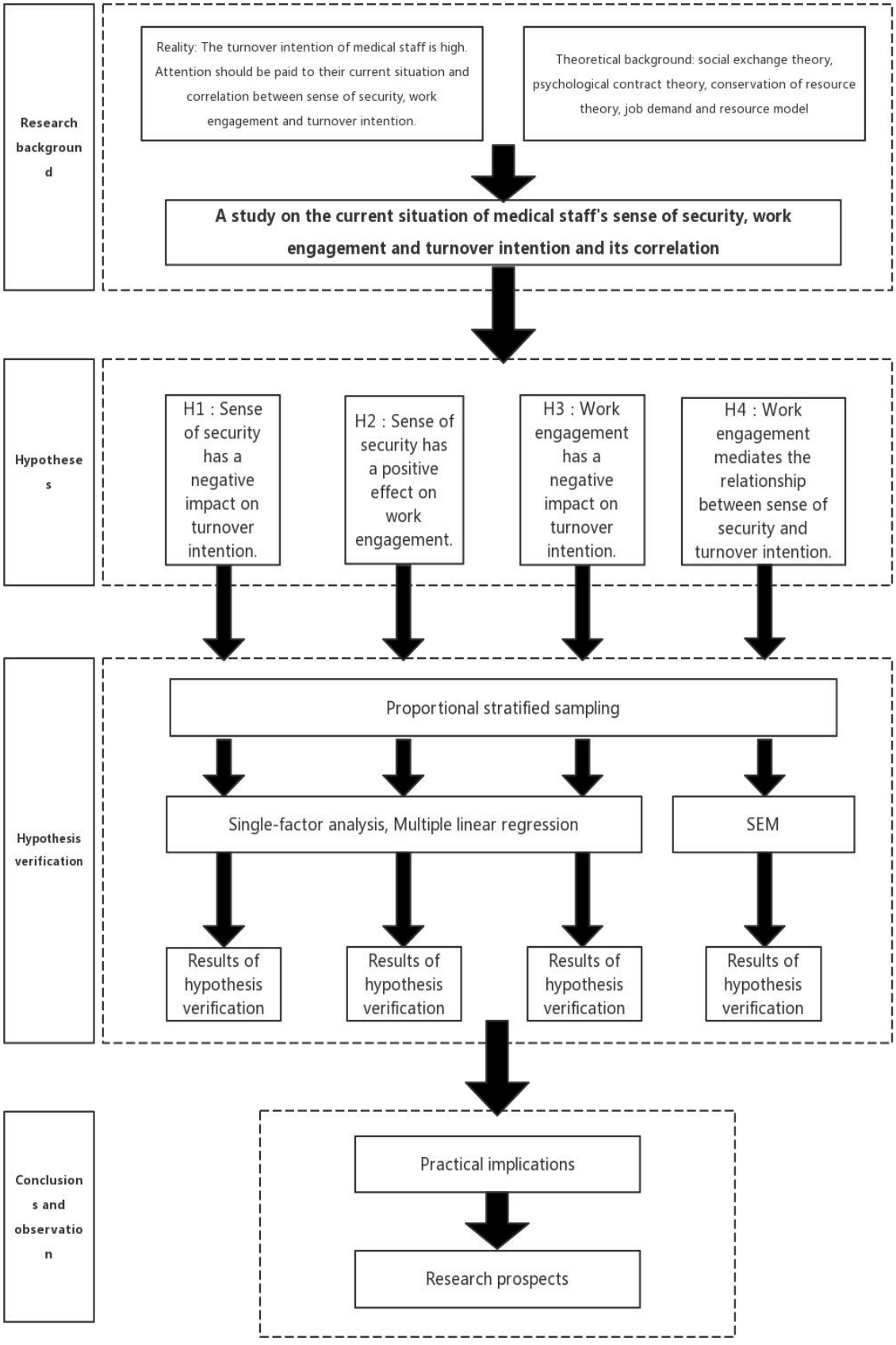

Figure 3.1 Technology roadmap

3.2 Data collection and processing

3.2.1 Data collection

3.2.1.1 Sample size

The range of sample size is directly related to the variables and the sample size should be 5 to 10 times the number of variables. The study contained three scale to measure the three variables in the conceptual model. There are 22 items on the Medical Staff Security Scale, 16 items on the Work Engagement Scale and six items in the Turnover Intention Scale. Therefore, the required sample size was 220 to 440. Taking into account 10% to 20% loss rate, the total sample size was 275 to 550.

3.2.1.2 Research tools

(1) Medical staff security scale

The scale was developed by the study group. Questions such as "The physical environment and occupational exposures in the hospital worry me" and "Frequent rescues and complex events at work worry me" were used to assess perceptions of security. The nature of the data was verified by Kaiser-Meyer-Olken (KMO) coefficients and Bartlett's test for exploratory factor analysis (EFA).

The KMO value was 0.938 and the Bartlett test was statistically significant:x^2=5618.123, $p<0.01$. It contained 22 items and five dimensions. The variance contribution of the five factors was 72.807% and the eigenvalue was 4.916. Each item consisted of 5 scores (1 to 5 indicating strongly agree to strongly disagree), with higher scores indicating a higher sense of security. The scale score is the sum of the reverse coding of the relevant items. The internal consistency coefficient (Cronbach's α) was 0.939, the retest reliability was 0.808 and the split-half reliability coefficient was 0.967, which is good. In this study, Cronbach's α of the Medical Staff Security Scale was 0.961.

(2) Work engagement scale

The scale was designed and developed by Schaufei et al. (2006). It is currently the most widely used work engagement scale in China and abroad. The Chinese version of the Work Engagement Scale was revised by J. B. Li et al. (2006). There are 16 items in total, including three dimensions of vigor, dedication, and absorption. For example, there are items such as "I feel energised in my work" and "I find the work I do to be full of meaning and purpose". There are seven options, with 0 being never and six being every day. Higher scores indicate a

higher level of commitment to the work. In this study, Cronbach's α of the Work Engagement Scale was 0.963.

(3) Turnover intention scale

The scale was developed by Michaels and Spector (1982) and revised by Lee and Lee (2000) in Taiwan, China. The questionnaire includes questions such as "Have you ever considered quitting your current job" and "Do you want to find another similar job?" The scale consists of six items and three dimensions (Turnover Intention I, Turnover Intention II, and Turnover Intention III), with two items in each dimension.

Turnover Intention I indicates the likelihood of the employee quitting the job. Turnover Intention II showcases the employee's motivation to find another job. Turnover Intention III demonstrates the likelihood of the employee being exposed to external work. Each item is scored on a Likert four-point scale, from one point (strongly disagree) to four points (strongly agree). The higher score means stronger intention to quit. The Cronbach's α of the total scale was 0.893. For the study, Cronbach's α for the scale was 0.760.

3.2.1.3 Ethics

The study was approved by the Ethics Committee of Guangdong Provincial People's Hospital (GDREC 2018052 h). Data were collected through an Internet-based survey. To obtain written informed consent from participants, an electronic survey pathway was placed on the homepage. Those who agreed to participate could submit their written informed consent by clicking on the consent button and the questionnaire was then launched.

The researcher informed participants of the purpose and methods of the study and explained that participation was completely voluntary and that they could withdraw at any time if they wished. Participants were asked to complete the questionnaire during their break time, which would not interfere with their work. The cooperation of the research participants was obtained and the researcher promised them that the data collected in this study would be used for scientific research only and would be kept strictly confidential.

3.2.1.4 Quality control

In order to ensure the quality of the data, strict quality control was carried out at every stage of the study.

(1) Research design phase

The researchers reviewed a large amount of domestic and international literature to understand the medical professional's turnover intention in Guangdong Province and conducted a pre-test on the scale prior to the formal survey, with any problems identified

being addressed in a timely manner to ensure the reliability and validity of the scale.

(2) Data collection phase

The selection of study participants was strictly based on inclusion and exclusion criteria. To ensure the quality of the questionnaire, the researcher sent a link to the questionnaire to the members of the Guangdong Nursing Association and forwarded it to the chief nursing officers of each hospital, who invited their staff, including physicians, nurses, pharmacists and technicians, to respond to the questionnaire.

In the phase of questionnaire processing. Firstly, the design of the questionnaire adopted a logical proofreading method, providing instructions for filling out the questionnaire and frequently asked questions. Secondly, the order of items or options was randomly adjusted as needed to screen out those that did not meet the conditions. Thirdly, anti-repeat submission. The same username can only be used to fill out the questionnaire only once. Those that are screened as invalid answers cannot proceed with their answers. Fourthly, automatic data cleaning. Too long answering time and random selection of options are filtered out as invalid responses. Fifthly, automatic determination of invalidity when the response time is less than 2 minutes or when all options are the same. Sixthly, analysis of data in stages to correct deviations in a timely manner. Seventhly, during the research process, researchers collect data in the background and make timely assessments to pinpoint and deal with abnormalities in a timely manner. In this way, the authenticity of the data can be ensured.

(3) Data collation stage

The accuracy of the data is ensured by repeated validation and check of the answer’s logic.

3.2.2 Data processing methods

Analyses were performed using IBM SPSS statistical software 23.0 and AMOS 24.0. Continuous variables were described by means and standard deviations. Categorical data were described as frequencies and percentages. Independent samples t-tests and ANOVAs were used to test for differences in means between factors based on socio-demographic characteristics. Pearson correlation analysis was used to analyse the interaction between sense of security, work engagement and turnover intention. Hierarchical regression analysis was adopted to analyse the effects of demographic data, sense of security, work engagement and propensity to quit on employee turnover.

SEM was used to test the mediating effect of work engagement on the impact of sense of security and turnover intentions through a covariance matrix. The ratio of questionnaire to model parameters for SEM is suggested to be greater than 10:1 (Wu, 2009). In this study,

3367 questionnaires were available to test the conceptual model with 27 parameters, which is an acceptable ratio of 124:1.

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Chapter 4: Research Results

4.1 Descriptive statistical analysis of sample characteristics

From September 2020 to May 2021, a total of 4457 questionnaires were distributed through the online questionnaire and 4340 questionnaires were validly returned, the valid return rate of the questionnaires was 97.37%. The descriptive analysis of the sample is shown in Table 4.1

Table 4.1 Descriptive statistical characteristics of the sample (*n*=4340)

	Classification	Frequency	Percentage %	Effective percentage %	Cumulative percentage %
Gender	Male	784	18.10	18.10	18.10
	Female	3556	81.90	81.90	100.00
Age	≤30	2138	49.30	49.30	49.30
	31~	904	20.80	20.80	70.10
	36~	561	12.90	12.90	83.00
	≥41	737	17.00	17.00	100.00
Length of service	≤5	1292	29.80	29.80	29.80
	6~	1411	32.50	32.50	62.30
	11~	1052	24.20	24.20	86.50
	≥21	585	13.50	13.50	100.00
Occupation	Doctor	1240	28.60	28.60	28.60
	Nurse	2480	57.10	57.10	85.70
	Pharmacists	310	7.10	7.10	92.90
	Technician	310	7.10	7.10	100.00
Title	Junior	2586	59.60	59.60	59.60
	Intermediate	1316	30.30	30.30	89.90
	Advanced	438	10.10	10.10	100.00
Marital status	Married	2922	67.30	67.30	67.30
	Unmarried	1327	30.60	30.60	97.90
	Divorced or widowed	91	2.10	2.10	100.00
Education level	Secondary school and below	62	1.40	1.40	1.40
	Tertiary	1883	43.40	43.40	44.80
	Undergraduate	1496	34.50	34.50	79.30
	Masters	795	18.30	18.30	97.60
	PhD	104	2.40	2.40	100.00
Monthly income	≤5000	1261	29.10	29.10	29.10
	5001~10000	2002	46.10	46.10	75.20
	10001~15000	594	13.70	13.70	88.90
	15001~20,000	285	6.60	6.60	95.40
	20001~25000	143	3.30	3.30	98.70
	≥25001	55	1.30	1.30	100.00

	Classification	Frequency	Percentage %	Effective percentage %	Cumulative percentage %
Job satisfaction	Yes	1566	36.10	36.10	36.10
	No	2774	63.90	63.90	100.00
Type of employment	Contract	2647	61.00	61.00	61.00
	Staffing	1615	37.20	37.20	98.20
	Agents	78	1.80	1.80	100.00
Hours of overtime per week	≤5h	2112	48.70	48.70	48.70
	5h<T≤10h	1488	34.30	34.30	82.90
	10h<T≤15h	406	9.40	9.40	100.00
	T > 15h	334	7.70	7.70	90.60
Frequency of workplace violence	0 times	2218	51.10	51.10	100.00
	1-3 times	1581	36.40	36.40	48.90
	4-6 times	281	6.50	6.50	12.50
	≥7 times	260	6.00	6.00	6.00
Working specialty	ICU	289	6.70	6.70	6.70
	Internal Medicine	1091	25.10	25.10	31.80
	Surgery	880	20.30	20.30	52.10
	Obstetrics and Gynaecology	481	11.10	11.10	63.20
	Paediatrics	307	7.10	7.10	70.20
	Emergency	448	10.30	10.30	80.60
	Outpatient				
	Medical and Technical Departments	484	11.20	11.20	91.70
	Other Sections	360	8.30	8.30	100.00
Length of sleep	≤6h	1117	25.70	25.70	100.00
	6H<T≤7H	2313	53.30	53.30	53.30
	7H<T≤8H	780	18.00	18.00	71.30
	＞8h	130	3.00	3.00	74.30
Region	Pearl River Delta	2886	66.50	66.50	66.50
	Guangdong East	442	10.20	10.20	76.70
	Western Guangdong	687	15.80	15.80	92.50
	Northern Guangdong	325	7.50	7.50	100.00
Hospital level	Primary Hospital	349	8.00	8.00	8.00
	Secondary Hospital	1487	34.30	34.30	42.30
	Tertiary hospitals	2504	57.70	57.70	100.00

The sample characteristics were analysed as follows.

(1) In terms of gender, 18.1% of the sample was male and 81.9% were female. The high proportion of females reflects the general phenomenon of the current predominance of

females in the healthcare industry.

(2) In terms of age group analysis, 49.3% of the sample were under 30 years old, 20.8% were 31 to 35 years old, 12.9% were 36 to 40 years old and 17% were higher than 41 years old. 30 years old and below accounted for almost half of the total sample, which is in line with the youthfulness feature of the healthcare industry.

(3) Analysed by age group, the number of samples with less than five years of service accounted for 29.8%, those with six to ten years accounted for 32.5%, those with 11 to 20 years accounted for 24.2% and those with more than 21 years accounted for 13.5%. The number of samples with less than ten years of service was 62.3%, which may be because of the high mobile nature of the healthcare industry.

(4) In terms of occupational analysis, the sample size of physicians accounted for 28.6%, nurses for 57.1%, technicians for 7.1% and pharmacists for 7.1%. The nurse group accounts for a larger proportion, which may be due to the fact that in China, after physicians complete medical tasks, patient care and observation of conditions are more often done by nurses.

(5) Analysing from the titles, the sample size of junior titles accounted for 59.6%, the sample size of intermediate titles accounted for 30.3% and the sample size of senior titles accounted for 10.1%, which is in line with the rule of career development that the people at higher position face difficulty in being promoted. The number of people with higher title accounts for a smaller share.

(6) In terms of marital status, 67.3% of the sample were married, 30.6% were unmarried, and 2.1% were divorced or widowed.

(7) In terms of education analysis, 1.4% of the sample's education background was below junior secondary college, and 43.4% was tertiary junior college. 34.5% of the sample had a bachelor's degree, 18.3% had a master's degree and 2.4% had a doctoral degree. The sample size of the junior college degree in the sample is 1883 medical personnel, and among them there are 1532 nurses with the junior college degree. This shows that only 81.6% of the junior college samples come from the nurse group. 57.1% of this sample comes from the nurse group, which shows that the personnel in the medical and health industry in China mainly have college and bachelor degrees. Nurses are the largest group in the healthcare system. According to statistics in 2020, nurses accounted for 44.6% of the total medical staff, and the education background of nurses affects the proportion of all medical staff.

(8) In terms of monthly income, the number of samples with income less than RMB 5000 accounted for 29.1%; RMB 5 to 10 thousand accounted for 46.1%; RMB 10 to 15 thousand accounted for 13.7%; RMB 15 to 20 thousand accounted for 6.6%; RMB 20 to 25 thousand

accounted for 3.3%; and above RMB 25 thousand accounted for 1.3%. The larger proportion of the sample had an income higher than RMB 5 thousand mainly due to the fact that the subjects of this study are all from Guangdong Province, which is an economically developed region in China.

(9) In terms of job satisfaction, 36.1% of the sample were satisfied with their jobs and 63.9% were dissatisfied with their jobs.

(10) Analysis of the type of employment shows that 61% of the sample was contractual, 37.2% was staffing and 1.8% was staffing agency, which is in line with the current ways of employment in China.

(11) From the analysis of weekly overtime hours, samples with less than 5-hour overtime accounted for 48.7%; 5- to 10-hour overtime accounted for 34.3%; 10- to 15-hour overtime accounted for 9.4%; and overtime above 15 hours per week accounted for 7.7%. The proportion of overtime hours above five hours per week accounted for about half of the total sample, indicating that people in China's healthcare industry were under a high workload.

(12) Analysis of the annual frequency of workplace violence showed that 51.1% of the sample did not experience workplace violence; 36.4% of the sample experienced one three three times, 6.5% of the sample experienced four to six times; and 6% of the sample experienced workplace violence for over seven times. The number of samples that had experienced workplace violence accounted for approximately half of the total sample, indicating that people in China's healthcare industry face a more serious workplace environment.

(13) Analysed by working departments, the sample size from intensive care units (ICU) department was 6.7%, internal medicine department was 25.1%, surgery department was 20.3%, obstetrics and gynaecology department was 11.1%, paediatrics department was 7.1%, outpatient and emergency department was 10.3%, medical technology department was 11.2% and other departments were 8.3%.

(14) From the analysis of the daily sleep hours, samples with sleep of less than 6 hours accounted for 25.7%; sleep hour between six to seven hours accounted for 53.3%; sleep hour between seven to eight hours accounted for 18%; and sleep hours above eight hours accounted for 3%. Most of samples had less than seven hours of sleep per day, which indicated that people in China's healthcare industry might be in a sleep-deprived state.

(15) Analysed by the region in which the hospitals were located, 66.5% of the sample came from hospitals located in the Pearl River Delta region; 10.2% of the respondents came from eastern Guangdong Province; 15.8% from western Guangdong Province; and 7.5% from

northern Guangdong Province.

(16) Analysed by hospital level, 8% of the respondents were from primary hospitals; 34.3% from secondary hospitals; and 57.7% from tertiary hospitals. Combined with the analysis of the region in which the hospitals are located, the Pearl River Delta region is more developed in terms of economic development, with more resources for supporting healthcare services and more high-level hospitals.

4.2 Descriptive statistical analysis of variable characteristics

The descriptive statistical analysis for the variables in this study illustrated their distribution in terms of the number of items, minima, maxima, means and standard deviations of each variable, as shown in Table 4.2.

Table 4.2 Descriptive statistical characteristics of the study variables (*n*=4340)

	Number of items	Minimum value	Maximum value	Average	Standard deviation
Feelings of security	22	22	110	78.649	19.942
Environment	4	4	20	14.076	4.014
Patients	4	4	20	13.979	4.076
Self	3	3	15	10.791	2.866
Organizational management	7	7	35	25.353	6.811
Social support	4	4	20	14.450	4.194
Work engagement	16	0	96	65.536	19.943
Vigor	6	0	36	22.793	7.960
Dedication	5	0	30	21.198	7.013
Absorption	5	0	30	21.545	6.544
Turnover intention	6	6	24	13.889	4.157
The possibility of quitting your current job	2	2	8	3.996	1.746
Possibility of obtaining an external work	2	2	8	5.127	1.655
Motivation to find other work	2	2	8	4.766	1.684

(1) Sense of security variable

The mean value of medical staff’s sense of security was 78.649, indicating that medical staff’s sense of security was at a high level. The environmental dimension, the patient dimension and the social support dimension all consisted of four items. The social support dimension has the highest mean, and the patient dimension has the lowest mean, indicating that the patient factor had a greater influence on the medical staff’s sense of security.

(2) Work engagement variable

The mean value of medical staff’s work engagement was 65.536, indicating that their work engagement intensity is high. The means and standard deviations of the three

dimensions are similar, implying that the three dimensions (vigor, dedication, and absorption) did not vary greatly among medical staff.

(3) Turnover intention variable

The mean value of the turnover intention variable was 13.889, indicating a medium to high level of turnover intention. The mean value of "likelihood of getting an external job" was 5.127, while the mean value of "likelihood of quitting current job" was lower, but with a larger standard deviation, indicating that some medical staff has a strong turnover intention their jobs. The mean value of "likelihood of quitting current job" was low, but the standard deviation was high, indicating that some medical staff has a stronger likelihood of quitting their current job which dispersed the overall low level of likelihood of quitting their current job.

4.3 Difference analysis of demographic characteristics on the variables

This study used independent samples t-tests or one-way ANOVAs to explore whether there is significant relationship between demographic variables (gender, age, length of service, occupation, job title, marital status, education, monthly income, job satisfaction, type of employment, number of overtime hours per week, frequency of workplace violence per year, department of work, number of hours of sleep per day, region of hospital, hospital level) and sense of security, work engagement, turnover intention among medical staff. Gender and job satisfaction were split into two variables, and independent samples t-tests were used to test their correlation with sense of security, work engagement and turnover intention. One-way variance was adopted to test the other variables.

4.3.1 Difference analysis of gender on other variables

As shown in Table 4.3, after a t-test, the results showed that there was a significant difference in the level of security among medical staff by gender (P<0.05). Males' sense of security was slightly higher than that of women, which was reflected in the dimensions of environment, patient, self, organization and management, and social support (P<0.05). There were no significant differences between the genders at the level of work engagement and its dimension. There was a significant difference between men and women in the level of turnover intention (P<0.05). As for the item of the possibility of quitting the current job, there was also a significant difference between men and women (P<0.05).

Table 4.3 Statistical analysis of differences in gender on variables (*n*=4340)

	Gender	Number of people	Average	Standard deviation	*T*	*P*
Environment	Male	784	14.467	3.793	3.010	0.003
	Female	3556	13.990	4.057		
Patients	Male	784	14.374	3.895	2.996	0.003
	Female	3556	13.892	4.111		
Self	Male	784	11.005	2.745	2.314	0.021
	Female	3556	10.744	2.891		
Organizational management	Male	784	25.805	6.438	2.053	0.04
	Female	3556	25.253	6.888		
Social support	Male	784	14.781	4.112	2.440	0.015
	Female	3556	14.377	4.208		
Total score of sense of security	Male	784	80.431	18.919	2.766	0.006
	Female	3556	78.256	20.142		
Possibility of quitting your current job	Male	784	3.880	1.667	-2.055	0.04
	Female	3556	4.022	1.763		
Possibility of obtaining external work	Male	784	5.029	1.653	-1.821	0.069
	Female	3556	5.148	1.655		
Motivation to find another job	Male	784	4.682	1.675	-1.543	0.123
	Female	3556	4.785	1.685		
Turnover intention	Male	784	13.592	4.020	-2.214	0.027
	Female	3556	13.955	4.184		
Vigor	Male	784	22.878	7.947	0.33	0.741
	Female	3556	22.774	7.964		
Dedication	Male	784	21.404	6.950	0.908	0.364
	Female	3556	21.153	7.027		
Absorption	Male	784	21.730	6.581	0.875	0.382
	Female	3556	21.504	6.537		
Work engagement	Male	784	66.011	19.891	0.738	0.460
	Female	3556	65.431	19.956		

4.3.2 Difference analysis of age on other variables

After one-way analysis of variance, as shown in Table 4.4, there was no significant difference in the level of security for medical staff of different ages. However, there are significant differences in work engagement and turnover intention ($P<0.05$). As for the variable of work engagement, age has significant differences in the three dimensions of vigor, dedication, and concentration ($P<0.05$). The level of work engagement tends to increase with age. As for the variable of turnover intention, age significantly differed in the two dimensions of the possibility of quitting the current job and obtaining an external job ($P<0.05$).

Table 4.4 Statistical analysis of differences in age on variables (*n*=4340)

	Age	Number of cases	Average	Standard deviation	Minimum value	Maximum value	F	Significance
Environment	18 to 30	2138	14.167	3.957	4	20	10.551	0.199
	31 to 35	904	14.117	4.031	4	20		
	36 to 40	561	13.775	4.119	4	20		
	≥41	737	13.992	4.073	4	20		
Patients	18 to 30	2138	13.973	3.979	4	20	00.503	0.680
	31 to 35	904	14.086	4.090	4	20		
	36 to 40	561	13.818	4.310	4	20		
	≥41	737	13.989	4.159	4	20		
Self	18 to 30	2138	10.767	2.810	3	15	10.996	0.112
	31 to 35	904	10.748	2.900	3	15		
	36 to 40	561	10.660	3.015	3	15		
	≥41	737	11.014	2.867	3	15		
Organizational management	18 to 30	2138	25.507	6.730	7	35	10.405	0.239
	31 to 35	904	25.248	6.832	7	35		
	36 to 40	561	24.866	7.195	7	35		
	≥41	737	25.407	6.714	7	35		
Social support	18 to 30	2138	14.558	4.082	4	20	10.548	0.200
	31 to 35	904	14.467	4.179	4	20		
	36 to 40	561	14.159	4.394	4	20		
	≥41	737	14.339	4.366	4	20		
Total score for sense of security	18 to 30	2138	78.970	19.570	22	110	10.074	0.359
	31 to 35	904	78.666	20.046	22	110		
	36 to 40	561	77.278	21.065	22	110		
	≥41	737	78.741	20.004	22	110		
The possibility of quitting your current job	18 to 30	2138	4.117	1.760	2	8	10.198	<0.001
	31 to 35	904	3.904	1.706	2	8		
	36 to 40	561	4.034	1.762	2	8		
	≥41	737	3.729	1.709	2	8		

	Age	Number of cases	Average	Standard deviation	Minimum value	Maximum value	F	Significance
Possibility of obtaining external work	18 to 30	2138	5.243	1.622	2	8	11.650	<0.001
	31 to 35	904	5.166	1.626	2	8		
	36 to 40	561	4.963	1.685	2	8		
	≥41	737	4.867	1.722	2	8		
Motivation to find other work	18 to 30	2138	4.771	1.662	2	8	10.098	0.348
	31 to 35	904	4.688	1.637	2	8		
	36 to 40	561	4.843	1.762	2	8		
	≥41	737	4.791	1.741	2	8		
Turnover intention	18 to 30	2138	14.131	4.156	6	24	60.352	0.000
	31 to 35	904	13.758	4.062	6	24		
	36 to 40	561	13.840	4.166	6	24		
	≥41	737	13.387	4.223	6	24		
Vigor	18 to 30	2138	21.874	8.109	0	36	21.456	0.000
	31 to 35	904	23.415	8.082	0	36		
	36 to 40	561	23.276	7.266	0	36		
	≥41	737	24.327	7.539	0	36		
Dedication	18 to 30	2138	20.735	7.022	0	30	80.063	0.000
	31 to 35	904	21.634	7.004	0	30		
	36 to 40	561	21.128	7.032	0	30		
	≥41	737	22.062	6.880	0	30		
Absorption	18 to 30	2138	20.837	6.686	0	30	20.189	0.000
	31 to 35	904	21.926	6.631	0	30		
	36 to 40	561	21.888	6.219	0	30		
	≥41	737	22.868	5.988	0	30		
Work engagement	18 to 30	2138	63.445	20.298	0	96	18.445	0.000
	31 to 35	904	66.975	19.972	0	96		
	36 to 40	561	66.292	18.955	0	96		
	≥41	737	69.258	18.870	0	96		

4.3.3 Difference analysis of length of service on other variables

After one-way analysis of variance, as shown in Table 4.5, the medical staff of different length of service had significant differences in their sense of security, work engagement, and turnover intention (P<0.05). Among the variables of sense of security, length of service had significant differences in the dimensions of environment, self, organization and management, and social support (P<0.05). However, there was no significant difference in the dimensions of patients. There were statistical differences in work engagement and its various dimensions, and the level of work engagement of those with 1- to 5-year length of service was significantly higher than that of other age groups (P<0.05). As for the variable of turnover intention, length of service had a significant difference in the possibility of quitting the current job and the possibility of obtaining an external job (P<0.05), but there was no significant difference in the motivation to look for other jobs.

Table 4.5 Statistical analysis of the differences in length of service on the study variables (n=4340)

	Length of service	Number of cases	Average	Standard deviation	F	Significance
Environment	1 to 5	1292	14.161	3.984	3.357	0.018
	6 to 10	1411	14.201	3.972		
	11 to 20	1052	13.736	4.080		
	≥21	585	14.198	4.041		
Patients	1 to 5	1292	13.978	4.044	0.867	0.457
	6 to 10	1411	14.045	3.973		
	11 to 20	1052	13.819	4.211		
	≥21	585	14.111	4.147		
Self	1 to 5	1292	10.793	2.830	2.740	0.042
	6 to 10	1411	10.799	2.811		
	11 to 20	1052	10.630	2.958		
	≥21	585	11.053	2.898		
Organizational Management	1 to 5	1292	25.673	6.667	4.210	0.006
	6 to 10	1411	25.393	6.743		
	11 to 20	1052	24.739	7.049		
	≥21	585	25.653	6.801		
Social support	1 to 5	1292	14.623	4.126	2.990	0.030
	6 to 10	1411	14.501	4.067		
	11 to 20	1052	14.125	4.363		
	≥21	585	14.530	4.307		
Total score for sense of security	1 to 5	1292	79.228	19.585	3.121	0.025
	6 to 10	1411	78.941	19.638		
	11 to 20	1052	77.049	20.554		
	≥21	585	79.545	20.226		
The possibility of quitting your current job	1 to 5	1292	4.125	1.740	6.832	<0.001

	Length of service	Number of cases	Average	Standard deviation	*F*	Significance
	6 to 10	1411	3.979	1.730		
	11 to 20	1052	4.007	1.777		
	≥21	585	3.733	1.716		
Possibility of obtaining external work	1 to 5	1292	5.216	1.603	6.321	<0.001
	6 to 10	1411	5.207	1.641		
	11 to 20	1052	5.000	1.700		
	≥21	585	4.964	1.694		
Motivation to find other work	1 to 5	1292	4.795	1.627	0.404	0.750
	6 to 10	1411	4.737	1.651		
	11 to 20	1052	4.789	1.758		
	≥21	585	4.733	1.752		
Turnover intention	1 to 5	1292	14.135	4.017	4.102	0.006
	6 to 10	1411	13.924	4.126		
	11 to 20	1052	13.796	4.261		
	≥21	585	13.431	4.309		
Vigor	1 to 5	1292	21.604	8.113	23.775	<0.001
	6 to 10	1411	22.705	8.129		
	11 to 20	1052	23.244	7.514		
	≥21	585	24.817	7.515		
Dedication	1 to 5	1292	20.488	7.025	9.274	<0.001
	6 to 10	1411	21.337	6.972		
	11 to 20	1052	21.289	6.983		
	≥21	585	22.270	6.989		
Absorption	1 to 5	1292	20.464	6.760	24.942	<0.001
	6 to 10	1411	21.651	6.566		
	11 to 20	1052	21.823	6.263		
	≥21	585	23.171	6.092		
Work engagement	1 to 5	1292	62.556	20.467	21.473	<0.001
	6 to 10	1411	65.694	19.957		
	11 to 20	1052	66.357	19.133		
	≥21	585	70.258	19.113		

4.3.4 Difference analysis of occupation on other variables

After one-way analysis of variance, as shown in Table 4.6, medical staff had different occupations, and there were significant differences in their sense of security and turnover intention (P<0.05), but there was no significant difference in work engagement. As for the variable of sense of security, there were significant differences between occupation and environment, patient, self, organization and management, and social support (P<0.05), and nurses had a higher level of sense of security. As for the variable of turnover intention, the occupation had a significant difference in the possibility of quitting the current job and the possibility of obtaining an external job (P<0.05). Technicians had the lowest turnover

intention, while physicians, nurses, pharmacists, and technicians had no significant difference in the motivation dimension of looking for other jobs.

Table 4.6 Statistical analysis of variance of occupation on study variables (n=4340)

	Occupation	Number of cases	Average	Standard deviation	F	Significance
Environment	Doctor	1240	13.745	4.081	8.457	<0.001
	Nurse	2480	14.332	3.933		
	Pharmacists	310	13.507	4.176		
	Technician	310	13.919	4.082		
Patients	Doctor	1240	13.690	4.194	6.700	<0.001
	Nurse	2480	14.205	3.952		
	Pharmacists	310	13.410	4.343		
	Technician	310	13.903	4.187		
Self	Doctor	1240	10.673	2.942	3.060	0.027
	Nurse	2480	10.894	2.814		
	Pharmacists	310	10.471	2.957		
	Technician	310	10.758	2.855		
Organizational management	Doctor	1240	25.004	6.945	3.185	0.023
	Nurse	2480	25.594	6.724		
	Pharmacists	310	24.677	6.967		
	Technician	310	25.500	6.736		
Social support	Doctor	1240	14.214	4.367	3.014	0.029
	Nurse	2480	14.599	4.095		
	Pharmacists	310	14.126	4.389		
	Technician	310	14.526	4.023		
Total score for sense of security	Doctor	1240	77.326	20.412	5.381	0.001
	Nurse	2480	79.623	19.609		
	Pharmacists	310	76.190	20.642		
	Technician	310	78.607	19.544		
The possibility of quitting your current job	Doctor	1240	3.843	1.657	5.682	0.001
	Nurse	2480	4.054	1.804		
	Pharmacists	310	4.203	1.716		
	Technician	310	3.939	1.605		
Possibility of obtaining external work	Doctor	1240	4.789	1.734	28.738	<0.001
	Nurse	2480	5.314	1.608		
	Pharmacists	310	5.048	1.591		
	Technician	310	5.061	1.537		
Motivation to find other work	Doctor	1240	4.767	1.694	0.043	0.988
	Nurse	2480	4.764	1.685		
	Pharmacists	310	4.752	1.635		
	Technician	310	4.797	1.690		
Turnover intention	Doctor	1240	13.398	4.015	8.755	<0.001
	Nurse	2480	14.132	4.277		
	Pharmacists	310	14.003	3.943		
	Technician	310	13.797	3.774		

	Occupation	Number of cases	Average	Standard deviation	*F*	Significance
Vigor	Doctor	1240	22.803	7.912	1.397	0.242
	Nurse	2480	22.902	8.129		
	Pharmacists	310	22.742	7.365		
	Technician	310	21.923	7.315		
Dedication	Doctor	1240	21.243	7.094	0.771	0.510
	Nurse	2480	21.275	7.066		
	Pharmacists	310	20.797	6.656		
	Technician	310	20.810	6.604		
Absorption	Doctor	1240	21.634	6.510	0.931	0.425
	Nurse	2480	21.580	6.617		
	Pharmacists	310	21.484	6.181		
	Technician	310	20.961	6.454		
Work engagement	Doctor	1240	65.680	19.995	1.074	0.359
	Nurse	2480	65.758	20.235		
	Pharmacists	310	65.023	18.471		
	Technician	310	63.694	18.744		

4.3.5 Difference analysis of titles on other variables

After one-way analysis of variance, as shown in Table 4.7, different professional titles had significant differences (P<0.05) in the sense of security, work engagement and turnover intention of medical staff. As for the variable of sense of security, in addition to the self-dimension, professional titles had significant differences in the dimensions of environment, patient, organization and management, and social support (P<0.05), and medical staff with junior professional titles had the lowest sense of security. As for the variable of work engagement, in addition to the dimension of dedication, professional titles had significant differences in the dimensions of vigor and concentration (P<0.05), and medical staff with junior professional titles had the highest work engagement. As for the variable of turnover intention, except for the motivation dimension of looking for other jobs, the job title had a significant difference in the possibility of quitting the current job and the possibility of obtaining an external job (P<0.05).

Table 4.7 Statistical analysis of variance of study variables by job title (n=4340)

	Professional title	Number of cases	Average	Standard deviation	*F*	Significance
Environment	Junior	2586	14.316	3.868	11.704	<0.001
	Intermediate	1316	13.759	4.201		
	Advanced	438	13.612	4.189		
Patients	Junior	2586	14.173	3.931	8.457	<0.001
	Intermediate	1316	13.780	4.244		
	Advanced	438	13.434	4.326		
Self	Junior	2586	10.859	2.750	1.872	0.154
	Intermediate	1316	10.707	3.027		
	Advanced	438	10.642	3.033		
Organizational	Junior	2586	25.692	6.489	8.034	<0.001

	Professional title	Number of cases	Average	Standard deviation	*F*	Significance
management						
	Intermediate	1316	24.889	7.246		
	Advanced	438	24.744	7.206		
Social support	Junior	2586	14.681	3.955	10.467	<0.001
	Intermediate	1316	14.179	4.456		
	Advanced	438	13.902	4.635		
Total score for sense of security	Junior	2586	79.721	18.906	9.676	<0.001
	Intermediate	1316	77.314	21.284		
	Advanced	438	76.333	21.300		
The possibility of quitting your current job	Junior	2586	3.999	1.740	3.991	0.019
	Intermediate	1316	4.059	1.767		
	Advanced	438	3.788	1.703		
Possibility of obtaining external work	Junior	2586	5.188	1.608	14.882	<0.001
	Intermediate	1316	5.141	1.663		
	Advanced	438	4.724	1.841		
Motivation to find other work	Junior	2586	4.724	1.625	2.090	0.124
	Intermediate	1316	4.825	1.707		
	Advanced	438	4.843	1.931		
Turnover intention	Junior	2586	13.910	4.065	4.383	0.013
	Intermediate	1316	14.026	4.227		
	Advanced	438	13.354	4.442		
Vigor	Junior	2586	22.419	8.045	7.854	<0.001
	Intermediate	1316	23.207	7.785		
	Advanced	438	23.753	7.854		
Dedication	Junior	2586	21.066	7.090	1.609	0.200
	Intermediate	1316	21.301	6.868		
	Advanced	438	21.674	6.972		
Absorption	Junior	2586	21.387	6.600	3.264	0.038
	Intermediate	1316	21.626	6.449		
	Advanced	438	22.231	6.464		
Work engagement	Junior	2586	64.871	20.104	4.515	0.011
	Intermediate	1316	66.135	19.584		
	Advanced	438	67.658	19.896		

4.3.6 Difference analysis of marital status on each variable

After one-way analysis of variance, as shown in Table 4.8, the marital status of medical staff had a significant difference (P<0.05) in their sense of security and work engagement but had no significant difference in their turnover intention. In the sense of security variable, marital status had significant differences in the environmental dimension, patient dimension, organizational management, and social support dimension (P<0.05). As for the variable of work engagement, in addition to the dimension of dedication, marital status had significant differences on the dimensions of vigor and concentration (P<0.05), and unmarried medical

staff had the highest work engagement.

Table 4.8 Statistical analysis of differences in marital status on study variables (*n*=4340)

	Marital status	Number of cases	Average	Standard deviation	*F*	Significance
Environment	Married	2922	13.931	4.090	8.840	<0.001
	Unmarried	1327	14.443	3.808		
	Divorced or widowed	91	13.385	4.152		
Patients	Married	2922	13.905	4.157	6.948	0.001
	Unmarried	1327	14.226	3.856		
	Divorced or widowed	91	12.769	4.310		
Self	Married	2922	10.750	2.922	3.632	0.027
	Unmarried	1327	10.922	2.728		
	Divorced or widowed	91	10.198	2.941		
Organizational management	Married	2922	25.152	6.981	6.457	0.002
	Unmarried	1327	25.874	6.383		
	Divorced or widowed	91	24.209	6.956		
Social support	Married	2922	14.354	4.274	4.213	0.015
	Unmarried	1327	14.704	3.950		
	Divorced or widowed	91	13.824	4.832		
Total score for sense of security	Married	2922	78.092	20.448	7.095	0.001
	Unmarried	1327	80.169	18.576		
	Divorced or widowed	91	74.385	21.356		
The possibility of quitting your current job	Married	2922	3.999	1.749	0.343	0.710
	Unmarried	1327	4.000	1.729		
	Divorced or widowed	91	3.846	1.914		
Possibility of obtaining external work	Married	2922	5.103	1.677	2.979	0.051
	Unmarried	1327	5.199	1.581		
	Divorced or widowed	91	4.835	1.922		
Motivation to find other work	Married	2922	4.782	1.714	0.493	0.611
	Unmarried	1327	4.729	1.611		
	Divorced or widowed	91	4.813	1.731		
Turnover intention	Married	2922	13.884	4.203	0.469	0.626
	Unmarried	1327	13.928	4.020		
	Divorced or widowed	91	13.495	4.625		
Vigor	Married	2922	23.001	7.875	5.119	0.006
	Unmarried	1327	22.252	8.124		
	Divorced or widowed	91	24.000	7.901		
Dedication	Married	2922	21.285	6.947	2.332	0.097
	Unmarried	1327	20.931	7.167		
	Divorced or widowed	91	22.308	6.744		
Absorption	Married	2922	21.625	6.481	3.079	0.046
	Unmarried	1327	21.280	6.690		
	Divorced or widowed	91	22.835	6.265		

	Marital status	Number of cases	Average	Standard deviation	*F*	Significance
Work engagement	Married	2922	65.911	19.769	3.934	0.020
	Unmarried	1327	64.462	20.331		
	Divorced or widowed	91	69.143	19.124		

4.3.7 Difference analysis of educational background on other variables

After one-way analysis of variance, as shown in Table 4.9, medical staff's educational background has a significant difference (P<0.05) in their sense of security and turnover intention the job, but has no significant difference in work engagement. Among the variables of sense of security, education had significant differences in the dimensions of environment, patients, organization and management, and social support (P<0.05). Among the variables of turnover intention, education has significant differences in all dimensions (P<0.05). Among the variables of work engagement, the work engagement of medical staff with a technical secondary school degree or below is the lowest.

Table 4.9 Statistical analysis of differences in academic qualifications on study variables (n=4340)

	Academic qualification	Number of cases	Average	Standard deviation	*F*	Significance
Environment	Technical secondary school and below	62	13.113	4.301	20.772	<0.001
	Technical school	1883	14.614	3.735		
	Undergraduate	1496	13.608	4.235		
	Masters	795	14.006	3.969		
	PhD	104	12.164	4.295		
Patients	Technical secondary school and below	62	13.210	4.535	13.331	<0.001
	Technical school	1883	14.438	3.914		
	Undergraduate	1496	13.547	4.163		
	Masters	795	13.931	4.047		
	PhD	104	12.731	4.647		
Self	Technical secondary school and below	62	10.532	3.077	6.929	<0.001
	Technical school	1883	11.020	2.741		
	Undergraduate	1496	10.512	2.955		
	Masters	795	10.824	2.892		
	PhD	104	10.548	3.131		
Organizational management	Technical secondary school and below	62	24.677	7.121	12.295	<0.001
	Technical school	1883	26.083	6.414		
	Undergraduate	1496	24.566	7.136		
	Masters	795	25.380	6.839		
	PhD	104	23.654	7.145		
Social support	Technical secondary school and below	62	14.081	4.771	12.340	<0.001
	Technical school	1883	14.882	3.923		
	Undergraduate	1496	14.000	4.384		
	Masters	795	14.483	4.174		

	Academic qualification	Number of cases	Average	Standard deviation	*F*	Significance
	PhD	104	13.077	4.948		
Total score for sense of security	Technical secondary school and below	62	75.613	21.105	15.543	<0.001
	Technical school	1883	81.037	18.769		
	Undergraduate	1496	76.233	20.876		
	Masters	795	78.624	19.804		
	PhD	104	72.173	21.599		
The possibility of quitting your current job	Technical secondary school and below	62	4.694	1.843	14.138	<0.001
	Technical school	1883	3.923	1.692		
	Undergraduate	1496	4.213	1.861		
	Masters	795	3.730	1.584		
	PhD	104	3.827	1.675		
Possibility of obtaining external work	Technical secondary school and below	62	5.323	1.545	24.303	<0.001
	Technical school	1883	5.186	1.552		
	Undergraduate	1496	5.305	1.689		
	Masters	795	4.762	1.718		
	PhD	104	4.154	1.794		
Motivation to find other work	Technical secondary school and below	62	4.919	1.740	11.651	<0.001
	Technical school	1883	4.617	1.606		
	Undergraduate	1496	4.979	1.762		
	Masters	795	4.664	1.637		
	PhD	104	5.096	1.867		
Turnover intention	Technical secondary school and below	62	14.936	4.420	17.141	<0.001
	Technical school	1883	13.726	3.954		
	Undergraduate	1496	14.497	4.454		
	Masters	795	13.156	3.873		
	PhD	104	13.077	3.970		
Vigor	Technical secondary school and below	62	21.355	7.138	0.599	0.663
	Technical school	1883	22.739	8.130		
	Undergraduate	1496	22.858	7.923		
	Masters	795	22.915	7.718		
	PhD	104	22.760	7.705		
Dedication	Technical secondary school and below	62	20.419	6.208	0.472	0.757
	Technical school	1883	21.140	7.111		
	Undergraduate	1496	21.166	6.916		
	Masters	795	21.421	7.005		
	PhD	104	21.471	7.173		
Absorption	Technical secondary school and below	62	20.516	5.717	0.616	0.651
	Technical school	1883	21.455	6.705		
	Undergraduate	1496	21.619	6.413		

	Academic qualification	Number of cases	Average	Standard deviation	*F*	Significance
	Masters	795	21.676	6.513		
	PhD	104	21.712	6.214		
Work engagement	Technical secondary school and below	62	62.290	16.847	0.593	0.667
	Technical school	1883	65.334	20.422		
	Undergraduate	1496	65.643	19.581		
	Masters	795	66.011	19.740		
	PhD	104	65.942	19.703		

4.3.8 Difference analysis of monthly income on other variables

After one-way analysis of variance, as shown in Table 4.10, the monthly income of medical staff had a significant difference (P<0.05) in their sense of security and turnover intention but had no significant difference in work engagement. As for the variable of sense of security, apart from the self dimension, the monthly income had significant differences in the environmental dimension, patient dimension, organizational management, and social support dimensions (P<0.05). The medical staff with a monthly income of 20,001 to 25,000 had the lowest sense of security. As for the variable of work engagement, the work engagement of medical personnel with a monthly income higher than 25001 was the highest. As for the variable of turnover intention, monthly income had significant differences in all dimensions (P<0.05).

Table 4.10 Statistical analysis of the variance of monthly income on the study variables (n=4340)

	Monthly income	Number of cases	Average	Standard deviation	*F*	Significance
Environment	≤5,000	1261	14.073	4.034	8.968	<0.001
	5,001~10,000	2002	14.285	3.873		
	10,001~15,000	594	14.242	4.095		
	15,001~20,000	285	13.291	4.371		
	20,001~25,000	143	12.462	4.026		
	≥25,001	55	13.000	4.363		
Patients	≤5,000	1261	13.944	4.100	3.509	0.004
	5,001~10,000	2002	14.072	3.967		
	10,001~15,000	594	14.242	4.053		
	15,001~20,000	285	13.537	4.457		
	20,001~25,000	143	12.888	4.294		
	≥25,001	55	13.691	4.574		
Self	≤5,000	1261	10.710	2.865	0.818	0.537
	5,001~10,000	2002	10.825	2.810		
	10,001~15,000	594	10.924	2.925		
	15,001~20,000	285	10.653	3.114		
	20,001~25,000	143	10.643	3.087		
	≥25,001	55	11.055	2.321		
Organizational management	≤5,000	1261	25.078	6.851	4.802	<0.001

	Monthly income	Number of cases	Average	Standard deviation	*F*	Significance
	5,001~10,000	2002	25.550	6.673		
	10,001~15,000	594	26.002	6.911		
	15,001~20,000	285	24.997	7.077		
	20,001~25,000	143	23.252	7.303		
	≥25,001	55	24.782	5.830		
Social support	≤5,000	1261	14.365	4.186	4.421	0.001
	5,001~10,000	2002	14.589	4.114		
	10,001~15,000	594	14.697	4.144		
	15,001~20,000	285	14.095	4.449		
	20,001~25,000	143	13.112	4.574		
	≥25,001	55	14.000	4.730		
Total score for sense of security	≤5,000	1261	78.169	20.191	4.850	<0.001
	5,001~10,000	2002	79.322	19.364		
	10,001~15,000	594	80.108	20.239		
	15,001~20,000	285	76.572	21.261		
	20,001~25,000	143	72.357	20.555		
	≥25,001	55	76.527	19.595		
The possibility of quitting your current job	≤5,000	1261	4.058	1.791	2.285	0.044
	5,001~10,000	2002	4.032	1.752		
	10,001~15,000	594	3.870	1.687		
	15,001~20,000	285	3.747	1.653		
	20,001~25,000	143	4.007	1.655		
	≥25,001	55	3.909	1.713		
Possibility of obtaining external work	≤5,000	1261	5.246	1.595	15.205	<0.001
	5,001~10,000	2002	5.209	1.626		
	10,001~15,000	594	5.081	1.680		
	15,001~20,000	285	4.530	1.775		
	20,001~25,000	143	4.539	1.771		
	≥25,001	55	4.509	1.741		
Motivation to find other work	≤5,000	1261	4.803	1.618	4.720	<0.001
	5,001~10,000	2002	4.745	1.687		
	10,001~15,000	594	4.564	1.697		
	15,001~20,000	285	4.881	1.829		
	20,001~25,000	143	5.210	1.707		
	≥25,001	55	5.146	1.768		
Turnover intention	≤5,000	1261	14.106	4.125	3.740	0.002
	5,001~10,000	2002	13.986	4.179		
	10,001~15,000	594	13.515	4.241		
	15,001~20,000	285	13.158	4.121		
	20,001~25,000	143	13.755	3.725		
	≥25,001	55	13.564	3.853		
Vigor	≤5,000	1261	23.119	8.726	1.317	0.254
	5,001~10,000	2002	22.630	7.766		
	10,001~15,000	594	22.571	7.315		
	15,001~20,000	285	22.923	7.474		
	20,001~25,000	143	22.217	6.799		

	Monthly income	Number of cases	Average	Standard deviation	*F*	Significance
	≥25,001	55	24.436	8.335		
Dedication	≤5,000	1261	21.267	7.394	0.636	0.673
	5,001~10,000	2002	21.026	7.000		
	10,001~15,000	594	21.315	6.497		
	15,001~20,000	285	21.505	6.711		
	20,001~25,000	143	21.643	6.107		
	≥25,001	55	21.909	7.670		
Absorption	≤5,000	1261	21.305	7.116	1.103	0.356
	5,001~10,000	2002	21.501	6.371		
	10,001~15,000	594	21.941	6.018		
	15,001~20,000	285	21.926	6.363		
	20,001~25,000	143	21.594	5.756		
	≥25,001	55	22.218	7.335		
Work engagement	≤5,000	1261	65.691	21.899	0.534	0.750
	5,001~10,000	2002	65.157	19.503		
	10,001~15,000	594	65.827	18.036		
	15,001~20,000	285	66.354	18.733		
	20,001~25,000	143	65.455	17.124		
	≥25,001	55	68.564	21.534		

4.3.9 Difference analysis of job satisfaction on each variable

After T test, as shown in Table 4.11, job satisfaction had a significant difference (P<0.05) to the sense of security, work engagement, and turnover intention. Among the variables of sense of security, job satisfaction had significant differences in all dimensions (P<0.05), and medical staff with high job satisfaction also had higher scores of sense of security. Among the variables of work engagement, job satisfaction had significant differences in the dimensions of vigor, dedication, and absorption (P<0.05). Medical staff with higher job satisfaction also had higher scores of dedication. Among the variables of turnover intention, job satisfaction had significant differences in all dimensions (P<0.05).

Table 4.11 Statistical analysis of differences in job satisfaction on study variables (n=4340)

	Satisfaction	Number of people	Average	Standard deviation	*T*	*P*
Environment	Yes	1566	15.064	3.679	12.392	<0.001
	No	2774	13.518	4.089		
Patients	Yes	1566	15.013	3.743	12.791	<0.001
	No	2774	13.396	4.141		
Self	Yes	1566	11.544	2.639	13.268	<0.001
	No	2774	10.366	2.902		
Organizational management	Yes	1566	27.487	5.930	15.951	<0.001
	No	2774	24.149	6.981		
Social support	Yes	1566	15.672	3.693	14.778	<0.001
	No	2774	13.760	4.301		
Total score for sense of security	Yes	1566	84.780	17.555	15.638	<0.001

	Satisfaction	Number of people	Average	Standard deviation	*T*	*P*
The possibility of quitting your current job	No	2774	75.188	20.375		
	Yes	1566	3.456	1.498	-15.741	<0.001
Possibility of obtaining external work	No	2774	4.301	1.802		
	Yes	1566	4.710	1.656	-12.691	<0.001
Motivation to find other work	No	2774	5.362	1.607		
	Yes	1566	4.374	1.674	-11.728	<0.001
Turnover intention	No	2774	4.988	1.649		
	Yes	1566	12.540	3.864	-16.569	<0.001
Vigor	No	2774	14.651	4.123		
	Yes	1566	25.821	7.468	19.651	<0.001
Dedication	No	2774	21.083	7.718		
	Yes	1566	23.735	6.261	18.602	<0.001
Absorption	No	2774	19.766	7.010		
	Yes	1566	23.885	5.734	18.377	<0.001
Work engagement	No	2774	20.223	6.605		
	Yes	1566	73.441	18.027	20.553	<0.001
	No	2774	61.073	19.588		

4.3.10 Difference analysis of the type of employment on other variables

After a one-way ANOVA, as shown in Table 4.12, there was a significant difference ($P < 0.05$) between the types of employment of the medical staff on the intention to leave, and no significant difference in the feeling of security and job commitment.

Table 4.12 Statistical analysis of variance of employment type on study variables (n=4340)

	Employment type	Number of cases	Average	Standard deviation	*F*	Significance
Environment	Contract system	2647	13.982	4.043	2.501	0.082
	Preparation	1615	14.248	3.955		
	Personnel Agents	78	13.731	4.186		
Patients	Contract system	2647	13.892	4.111	4.974	0.007
	Preparation	1615	14.172	3.992		
	Personnel Agents	78	12.936	4.400		
Self	Contract system	2647	10.705	2.887	5.421	0.004
	Preparation	1615	10.958	2.820		
	Personnel Agents	78	10.231	2.954		
Organizational Management	Contract system	2647	25.225	6.927	1.525	0.218
	Preparation	1615	25.583	6.627		
	Personnel Agents	78	24.949	6.574		
Social support	Contract system	2647	14.392	4.235	0.917	0.400
	Preparation	1615	14.557	4.120		
	Personnel Agents	78	14.205	4.298		
Total score for sense of security	Contract system	2647	78.196	20.210	2.880	0.056

	Employment type	Number of cases	Average	Standard deviation	*F*	Significance
	Preparation	1615	79.518	19.484		
	Personnel Agents	78	76.051	19.692		
The possibility of quitting your current job	Contract system	2647	4.068	1.767	5.727	0.003
	Preparation	1615	3.886	1.699		
	Personnel Agents	78	3.846	1.894		
Possibility of obtaining external work	Contract system	2647	5.198	1.616	6.304	0.002
	Preparation	1615	5.015	1.703		
	Personnel Agents	78	5.026	1.823		
Motivation to find other work	Contract system	2647	4.792	1.664	1.636	0.195
	Preparation	1615	4.715	1.716		
	Personnel Agents	78	4.974	1.675		
Turnover intention	Contract system	2647	14.057	4.146	5.660	0.004
	Preparation	1615	13.616	4.163		
	Personnel Agents	78	13.846	4.144		
Vigor	Contract system	2647	22.712	8.117	1.964	0.140
	Preparation	1615	22.843	7.647		
	Personnel Agents	78	24.500	8.817		
Dedication	Contract system	2647	21.227	7.036	2.089	0.124
	Preparation	1615	21.079	6.959		
	Personnel Agents	78	22.718	7.236		
Absorption	Contract system	2647	21.375	6.718	3.178	0.042
	Preparation	1615	21.762	6.216		
	Personnel Agents	78	22.782	7.000		
Work engagement	Contract system	2647	65.314	20.347	2.164	0.115
	Preparation	1615	65.684	19.163		
	Personnel Agents	78	70.000	21.585		

As for the variable of sense of security, there was a significant difference ($P < 0.05$) between employment type on the patient dimension and the self dimension, but no significant difference was found for the environmental dimension, organizational management and the social support dimension, and medical staff with employment type of personnel agency had the lowest security.

As for the variable of work engagement, the type of employment differed significantly ($P < 0.05$) only for the concentration dimension, while the highest work engagement was found among medical staff whose employment type was staffing agency.

As for the variable of turnover intention, the type of employment was significantly different for the other two dimensions ($P < 0.05$), except for the motivation to find another job, and the intention to quit was highest for medical staff on contract.

4.3.11 Difference analysis of weekly overtime hours on other variables

After one-way analysis of variance, as shown in Table 4.13, the weekly overtime hours of medical staff have significant differences (P<0.05) in their sense of security, work engagement, and turnover intention.

Table 4.13 Statistical analysis of the variance of overtime hours on the study variables (n=4340)

	Overtime hours	Number of cases	Average	Standard deviation	F	Significance
Environment	≤5h	2112	14.361	3.916	13.179	<0.001
	5h<T≤10h	1488	14.063	3.991		
	10h<T≤15h	406	13.293	4.240		
	T > 15h	334	13.281	4.225		
Patients	≤5h	2112	14.154	4.050	7.505	<0.001
	5h<T≤10h	1488	14.013	4.038		
	10h<T≤15h	406	13.687	4.138		
	T > 15h	334	13.078	4.211		
Self	≤5h	2112	10.986	2.798	9.051	<0.001
	5h<T≤10h	1488	10.717	2.892		
	10h<T≤15h	406	10.480	2.925		
	T > 15h	334	10.261	3.000		
Organizational management	≤5h	2112	25.819	6.606	10.515	<0.001
	5h<T≤10h	1488	25.220	6.901		
	10h<T≤15h	406	24.677	7.063		
	T > 15h	334	23.820	7.087		
Social support	≤5h	2112	14.729	4.104	10.652	<0.001
	5h<T≤10h	1488	14.382	4.207		
	T > 15h	334	13.464	4.377		
Total score for sense of security	≤5h	2112	80.050	19.416	11.993	<0.001
	5h<T≤10h	1488	78.395	20.125		
	T > 15h	334	73.904	20.708		
The possibility of quitting your current job	≤5h	2112	3.921	1.704	7.578	<0.001
	5h<T≤10h	1488	3.982	1.730		
	T > 15h	334	4.383	1.924		
Possibility of obtaining external work	≤5h	2112	5.079	1.632	3.240	0.021
	5h<T≤10h	1488	5.155	1.652		
	10h<T≤15h	406	5.074	1.790		
	T > 15h	334	5.368	1.616		
Motivation to find other work	≤5h	2112	4.699	1.670	4.034	0.007
	5h<T≤10h	1488	4.789	1.669		
	10h<T≤15h	406	4.820	1.776		
	T > 15h	334	5.027	1.693		
Turnover intention	≤5h	2112	13.698	4.121	6.771	<0.001
	5h<T≤10h	1488	13.925	4.083		
	10h<T≤15h	406	14.017	4.467		
	T > 15h	334	14.778	4.208		

	Overtime hours	Number of cases	Average	Standard deviation	*F*	Significance
Vigor	≤5h	2112	23.524	7.931	15.894	<0.001
	5h<T≤10h	1488	22.444	7.567		
	10h<T≤15h	406	21.938	8.215		
	T > 15h	334	20.758	8.948		
Dedication	≤5h	2112	21.642	6.937	8.946	<0.001
	5h<T≤10h	1488	21.069	6.744		
	10h<T≤15h	406	20.567	7.450		
	T > 15h	334	19.740	7.825		
Absorption	≤5h	2112	21.781	6.481	2.774	0.040
	5h<T≤10h	1488	21.465	6.314		
	10h<T≤15h	406	21.214	7.064		
	T > 15h	334	20.802	7.211		
Work engagement	≤5h	2112	66.947	19.926	10.122	<0.001
	5h<T≤10h	1488	64.979	18.925		
	10h<T≤15h	406	63.719	21.018		
	T > 15h	334	61.299	22.194		

As for the variable of sense of security, overtime hours had significant differences in the dimensions of environment, patient, self, organization and management, and social support (P<0.05), and medical staff who worked overtime for less than five hours a week had the highest sense of security.

As for the variable of work engagement, the weekly overtime hours had significant differences in the vitality, dedication, and concentration dimensions (P<0.05), and the medical staff with weekly overtime hours of less than 5 hours had the highest work engagement.

As for the variables of turnover intention, the weekly overtime hours had significant differences in all dimensions (P<0.05), and the medical staff with weekly overtime hours of more than 15h had the strongest turnover intention.

4.3.12 Difference analysis of the annual frequency of exposure to workplace violence on other variables

After one-way analysis of variance, as shown in Table 4.14, the frequency of workplace violence suffered by medical staff each year had a significant difference (P<0.05) in their sense of security, work engagement, and turnover intention.

Table 4.14 Statistical analysis of variance of WPV on study variables (n=4340)

	WPV	Number of cases	Average	Standard deviation	*F*	Significance
Environment	0 times	2218	14.551	3.875	28.600	<0.001
	1~3 times	1581	13.796	4.019		
	4~6 times	281	13.228	4.006		
	≥7 times	260	12.646	4.510		
Patients	0 times	2218	14.477	3.936	31.832	<0.001
	1~3 times	1581	13.691	4.045		
	4~6 times	281	13.192	4.171		

	WPV	Number of cases	Average	Standard deviation	*F*	Significance
	≥7 times	260	12.339	4.602		
Self	0 times	2218	11.097	2.759	22.610	<0.001
	1~3 times	1581	10.590	2.922		
	4~6 times	281	10.377	2.779		
	≥7 times	260	9.850	3.150		
Organizational management	0 times	2218	26.139	6.499	27.578	<0.001
	1~3 times	1581	24.904	6.871		
	4~6 times	281	23.861	6.949		
	≥7 times	260	22.989	7.809		
Social support	0 times	2218	14.974	3.995	31.748	<0.001
	1~3 times	1581	14.126	4.218		
	4~6 times	281	13.623	4.362		
	≥7 times	260	12.842	4.752		
Total score for sense of security	0 times	2218	81.237	18.939	34.779	<0.001
	1~3 times	1581	77.108	20.100		
	4~6 times	281	74.281	20.237		
	≥7 times	260	70.665	22.979		
The possibility of quitting your current job	0 times	2218	3.816	1.681	20.473	<0.001
	1~3 times	1581	4.109	1.764		
	4~6 times	281	4.349	1.893		
	≥7 times	260	4.465	1.823		
Possibility of obtaining external work	0 times	2218	4.980	1.662	13.519	<0.001
	1~3 times	1581	5.242	1.605		
	4~6 times	281	5.470	1.630		
	≥7 times	260	5.308	1.792		
Motivation to find other work	0 times	2218	4.658	1.702	7.394	<0.001
	1~3 times	1581	4.843	1.664		
	4~6 times	281	4.950	1.571		
	≥7 times	260	5.027	1.703		
Turnover intention	0 times	2218	13.454	4.145	19.559	<0.001
	1~3 times	1581	14.194	4.080		
	4~6 times	281	14.769	4.181		
	≥7 times	260	14.800	4.256		
Vigor	0 times	2218	24.138	7.823	48.667	<0.001
	1~3 times	1581	21.727	7.774		
	4~6 times	281	20.637	8.056		
	≥7 times	260	20.131	8.014		
Dedication	0 times	2218	22.202	6.794	36.437	<0.001
	1~3 times	1581	20.480	6.914		
	4~6 times	281	19.199	7.468		
	≥7 times	260	19.165	7.525		
Absorption	0 times	2218	22.247	6.440	21.209	<0.001

	WPV	Number of cases	Average	Standard deviation	*F*	Significance
	1~3 times	1581	21.080	6.352		
	4~6 times	281	20.082	7.072		
	≥7 times	260	19.962	7.205		
Work engagement	0 times	2218	68.586	19.643	41.131	<0.001
	1~3 times	1581	63.287	19.315		
	4~6 times	281	59.918	20.747		
	≥7 times	260	59.258	20.850		

As for the variable of sense of security, the annual frequency of workplace violence had significant differences in the dimensions of environment, patient, self, organization and management, and social support (P<0.05). Medical staff who had not experienced workplace violence had the highest sense of security.

As for the variable of work engagement, the annual frequency of workplace violence had significant differences in the dimensions of vitality, dedication, and focus (P<0.05). Likewise, health workers who did not experience workplace violence had the highest job engagement.

As for the variable of resignation intention, the frequency of workplace violence per year had significant differences in all dimensions (P<0.05), and medical staff who suffered from workplace violence over seven times per year had the strongest resignation intention.

4.3.13 Difference analysis of working department on other variables

After one-way analysis of variance, as shown in Table 4.15, there were significant differences (P<0.05) in the sense of security and resignation intention of medical staff in the working departments, but no significant difference in work engagement.

Table 4.15 Statistical analysis of the variance of work sections on the study variables (n=4340)

	Work section	Number of cases	Average	Standard deviation	*F*	Significance
Environment	ICU	289	14.114	4.351	12.390	<0.001
	Internal Medicine	1091	14.588	3.823		
	Surgery	880	14.184	4.047		
	Obstetrics and Gynaecology	481	13.730	3.966		
	Paediatrics	307	13.671	4.173		
	Emergency Outpatient	448	13.513	4.130		
	Medical and Technical Departments	484	14.777	3.700		
	Other Sections	360	12.797	3.968		
Patients	ICU	289	14.145	4.213	11.593	<0.001
	Internal Medicine	1091	14.406	3.950		
	Surgery	880	14.198	3.973		
	Obstetrics and Gynaecology	481	13.728	4.147		

	Work section	Number of cases	Average	Standard deviation	*F*	Significance
	Paediatrics	307	13.437	4.268		
	Emergency Outpatient	448	13.315	4.380		
	Medical and Technical Departments	484	14.645	3.625		
	Other Sections	360	12.750	4.097		
Self	ICU	289	10.848	3.009	7.220	<0.001
	Internal Medicine	1091	10.995	2.726		
	Surgery	880	10.898	2.895		
	Obstetrics and Gynaecology	481	10.651	2.860		
	Paediatrics	307	10.316	2.949		
	Emergency Outpatient	448	10.625	2.983		
	Medical and Technical Departments	484	11.217	2.710		
	Other Sections	360	10.092	2.917		
Organizational management	ICU	289	25.436	7.193	12.344	<0.001
	Internal Medicine	1091	26.167	6.515		
	Surgery	880	25.933	6.690		
	Obstetrics and Gynaecology	481	24.825	6.804		
	Paediatrics	307	24.893	6.923		
	Emergency Outpatient	448	24.152	7.160		
	Medical and Technical Departments	484	26.029	6.324		
Social support	ICU	289	14.488	4.414	10.313	<0.001
	Internal Medicine	1091	14.937	3.919		
	Surgery	880	14.640	4.179		
	Obstetrics and Gynaecology	481	14.254	4.128		
	Paediatrics	307	13.987	4.581		
	Emergency Outpatient	448	13.710	4.434		
	Medical and Technical Departments	484	15.015	3.849		
	Other Sections	360	13.300	4.355		
Total score for sense of security	ICU	289	79.031	21.574	13.101	<0.001
	Internal Medicine	1091	81.092	19.069		
	Surgery	880	79.852	19.699		
	Obstetrics and Gynaecology	481	77.187	19.696		
	Paediatrics	307	76.303	20.833		
	Emergency Outpatient	448	75.315	21.071		
	Medical and Technical Departments	484	81.682	18.056		
	Other Sections	360	72.025	19.981		
The possibility	ICU	289	3.972	1.671	4.519	<0.001

	Work section	Number of cases	Average	Standard deviation	*F*	Significance
of quitting your current job						
	Internal Medicine	1091	3.841	1.682		
	Surgery	880	3.997	1.767		
	Obstetrics and Gynaecology	481	4.198	1.784		
	Paediatrics	307	4.127	1.793		
	Emergency Outpatient	448	4.027	1.805		
	Medical and Technical Departments	484	3.831	1.620		
	Other Sections	360	4.289	1.876		
Possibility of obtaining external work	ICU	289	5.194	1.508	1.395	0.202
	Internal Medicine	1091	5.108	1.641		
	Surgery	880	5.093	1.677		
	Obstetrics and Gynaecology	481	5.285	1.647		
	Paediatrics	307	5.212	1.604		
	Emergency Outpatient	448	5.083	1.716		
	Medical and Technical Departments	484	5.136	1.570		
	Other Sections	360	4.969	1.824		
Motivation to find other work	ICU	289	4.678	1.619	6.358	<0.001
	Internal Medicine	1091	4.596	1.645		
	Surgery	880	4.756	1.653		
	Obstetrics and Gynaecology	481	4.803	1.678		
	Paediatrics	307	4.909	1.773		
	Emergency Outpatient	448	4.859	1.719		
	Medical and Technical Departments	484	4.669	1.613		
	Other Sections	360	5.225	1.814		
Turnover intention	ICU	289	13.844	3.843	3.382	0.001
	Internal Medicine	1091	13.545	4.087		
	Surgery	880	13.846	4.146		
	Obstetrics and Gynaecology	481	14.285	4.185		
	Paediatrics	307	14.248	4.278		
	Emergency Outpatient	448	13.969	4.298		
	Medical and Technical Departments	484	13.636	3.905		
	Other Sections	360	14.483	4.529		
Vigor	ICU	289	22.789	7.415	0.694	0.678
	Internal Medicine	1091	23.025	7.870		
	Surgery	880	22.442	8.449		
	Obstetrics and	481	22.873	7.597		

	Work section	Number of cases	Average	Standard deviation	*F*	Significance
	Gynaecology					
	Paediatrics	307	23.072	8.371		
	Emergency Outpatient	448	22.350	8.192		
	Medical and Technical Departments	484	23.021	7.766		
	Other Sections	360	22.847	7.510		
Dedication	ICU	289	21.177	6.445	1.003	0.427
	Internal Medicine	1091	21.421	7.014		
	Surgery	880	20.933	7.190		
	Obstetrics and Gynaecology	481	21.401	6.865		
	Paediatrics	307	21.707	6.943		
	Emergency Outpatient	448	20.670	7.334		
	Medical and Technical Departments	484	21.238	7.021		
	Other Sections	360	21.092	6.840		
Absorption	ICU	289	21.678	5.827	1.125	0.344
	Internal Medicine	1091	21.763	6.527		
	Surgery	880	21.609	6.600		
	Obstetrics and Gynaecology	481	21.578	6.609		
	Paediatrics	307	22.003	6.607		
	Emergency Outpatient	448	20.973	6.817		
	Medical and Technical Departments	484	21.260	6.735		
	Other Sections	360	21.275	6.244		
Work engagement	ICU	289	65.644	18.273	0.859	0.538
	Internal Medicine	1091	66.208	19.827		
	Surgery	880	64.984	20.583		
	Obstetrics and Gynaecology	481	65.852	19.592		
	Paediatrics	307	66.782	20.271		
	Emergency Outpatient	448	63.993	20.695		
	Medical and Technical Departments	484	65.519	20.071		
	Other Sections	360	65.214	19.051		

As for the variable of sense of security, there were significant differences between the working departments on the environmental dimension, patient dimension, self-dimension, organizational management dimension, and social support dimension ($P<0.05$). Medical staff whose working department was internal medicine had the highest sense of security. As for the variable of work engagement, medical staff who worked in pediatrics had the highest work engagement. As for the variable of turnover intention, except for the possibility of obtaining an external job, the work department had significant differences in the other two dimensions

(P<0.05).

4.3.14 Difference analysis of daily sleep duration on other variables

After one-way analysis of variance, as shown in Table 4.16, there were significant differences (P<0.05) between medical staff's daily sleep duration and their sense of security, work engagement, and turnover intention.

Table 4.16 Statistical analysis of differences in sleep duration on study variables (n=4340)

	Sleep duration	Number of cases	Average	Standard deviation	F	Significance
Environment	≤6h	1117	13.591	4.141	11.301	<0.001
	6H<T≤7H	2313	14.103	4.026		
	7H<T≤8H	780	14.533	3.737		
	＞8h	130	15.015	3.826		
Patients	≤6h	1117	13.607	4.260	10.582	<0.001
	6H<T≤7H	2313	13.933	4.024		
	7H<T≤8H	780	14.444	3.938		
	＞8h	130	15.208	3.733		
Self	≤6h	1117	10.459	2.948	14.085	<0.001
	6H<T≤7H	2313	10.766	2.846		
	7H<T≤8H	780	11.204	2.772		
	＞8h	130	11.608	2.619		
Organizational management	≤6h	1117	24.618	7.055	11.936	<0.001
	6H<T≤7H	2313	25.313	6.779		
	7H<T≤8H	780	26.209	6.478		
	＞8h	130	27.254	6.340		
Social support	≤6h	1117	13.995	4.354	11.109	<0.001
	6H<T≤7H	2313	14.433	4.176		
	7H<T≤8H	780	14.994	3.933		
	＞8h	130	15.408	4.122		
Total score for sense of security	≤6h	1117	76.270	20.669	14.055	<0.001
	6H<T≤7H	2313	78.548	19.880		
	7H<T≤8H	780	81.383	18.789		
	＞8h	130	84.492	18.346		
The possibility of quitting your current job	≤6h	1117	4.149	1.807	7.335	<0.001
	6H<T≤7H	2313	4.004	1.733		
	7H<T≤8H	780	3.806	1.699		
	＞8h	130	3.685	1.600		
Possibility of obtaining external work	≤6h	1117	5.311	1.656	10.146	<0.001
	6H<T≤7H	2313	5.125	1.631		
	7H<T≤8H	780	4.894	1.705		
	＞8h	130	4.985	1.585		
Motivation to	≤6h	1117	4.892	1.626	4.701	0.003

	Sleep duration	Number of cases	Average	Standard deviation	*F*	Significance
find other work						
	6H<T≤7H	2313	4.767	1.699		
	7H<T≤8H	780	4.619	1.720		
	＞8h	130	4.562	1.599		
Turnover intention	≤6h	1117	14.351	4.187	10.642	<0.001
	6H<T≤7H	2313	13.895	4.136		
	7H<T≤8H	780	13.319	4.159		
	＞8h	130	13.231	3.778		
Vigor	≤6h	1117	21.943	8.424	15.708	<0.001
	6H<T≤7H	2313	22.621	7.753		
	7H<T≤8H	780	24.142	7.569		
	＞8h	130	25.046	8.436		
Dedication	≤6h	1117	20.525	7.471	12.477	<0.001
	6H<T≤7H	2313	21.064	6.794		
	7H<T≤8H	780	22.283	6.797		
	＞8h	130	22.862	7.138		
Absorption	≤6h	1117	21.011	6.920	7.105	<0.001
	6H<T≤7H	2313	21.497	6.392		
	7H<T≤8H	780	22.239	6.254		
	＞8h	130	22.815	7.123		
Work engagement	≤6h	1117	63.478	21.128	13.654	<0.001
	6H<T≤7H	2313	65.182	19.367		
	7H<T≤8H	780	68.664	19.210		
	＞8h	130	70.723	20.975		

In the sense of security variable, the daily sleep duration had significant differences in the environment dimension, patient dimension, self dimension, organizational management dimension, and social support dimension (P<0.05). Medical staff who slept more than eight hours a day had the highest sense of security.

As for the variable of work engagement, the daily sleep duration had significant differences (P<0.05) on the dimensions of vigor, dedication, and absorption. Similarly, medical staff who slept more than eight hours a day had the highest work input.

As for the variable of turnover intention, the daily sleep duration had significant differences in all dimensions (P<0.05). Medical staff who slept less than six hours a day had the strongest will to quit.

4.3.15 Difference analysis of hospital geographical location on other variables

After one-way analysis of variance, as shown in Table 4.17, there were significant differences (P<0.05) in the sense of security, work engagement, and turnover intention of medical staff in the region where the hospital was located.

Table 4.17 Statistical analysis of the variance of geography on the study variables (*n*=4340)

	Hospital geographical location	Number of cases	Average	Standard deviation	*F*	Significance
Environment	Pearl River Delta	2886	13.739	4.099	34.408	<0.001
	Guangdong East	442	14.430	3.750		
	Western Guangdong	687	14.360	3.850		
	Northern Guangdong	325	15.988	3.267		
Patients	Pearl River Delta	2886	13.665	4.138	34.194	<0.001
	Guangdong East	442	14.124	3.777		
	Western Guangdong	687	14.255	4.074		
	Northern Guangdong	325	15.994	3.222		
Self	Pearl River Delta	2886	10.579	2.915	30.514	<0.001
	Guangdong East	442	10.984	2.715		
	Western Guangdong	687	10.923	2.772		
	Northern Guangdong	325	12.126	2.407		
Organizational management	Pearl River Delta	2886	24.810	6.980	33.999	<0.001
	Guangdong East	442	25.939	6.458		
	Western Guangdong	687	25.694	6.471		
	Northern Guangdong	325	28.655	5.278		
Social support	Pearl River Delta	2886	14.141	4.301	30.705	<0.001
	Guangdong East	442	14.844	3.956		
	Western Guangdong	687	14.575	4.017		
	Northern Guangdong	325	16.397	3.232		
Total score for sense of security	Pearl River Delta	2886	76.934	20.340	40.074	<0.001
	Guangdong East	442	80.321	18.620		
	Western Guangdong	687	79.806	19.282		
	Northern Guangdong	325	89.160	15.463		
The possibility of quitting your current job	Pearl River Delta	2886	4.075	1.790	13.925	<0.001
	Guangdong East	442	4.016	1.706		
	Western Guangdong	687	3.919	1.704		
	Northern Guangdong	325	3.431	1.340		
Possibility of obtaining external work	Pearl River Delta	2886	5.128	1.671	2.643	0.048
	Guangdong East	442	5.127	1.639		
	Western Guangdong	687	5.224	1.662		
	Northern Guangdong	325	4.911	1.497		
Motivation to find other work	Pearl River Delta	2886	4.854	1.708	12.238	<0.001
Motivation to find other work	Pearl River Delta	2886	4.854	1.708	12.238	<0.001
	Guangdong East	442	4.710	1.686		
	Western Guangdong	687	4.655	1.608		
	Northern Guangdong	325	4.299	1.532		
Turnover intention	Pearl River Delta	2886	14.057	4.240	11.561	<0.001
	Guangdong East	442	13.853	4.086		
	Western Guangdong	687	13.798	4.045		
	Northern Guangdong	325	12.640	3.479		

	Hospital geographical location	Number of cases	Average	Standard deviation	*F*	Significance
Vigor	Pearl River Delta	2886	22.805	7.995	0.757	0.518
	Guangdong East	442	22.344	7.712		
	Western Guangdong	687	22.838	8.154		
	Northern Guangdong	325	23.197	7.564		
Dedication	Pearl River Delta	2886	21.109	7.059	5.611	0.001
	Guangdong East	442	20.993	6.822		
	Western Guangdong	687	20.985	7.288		
	Northern Guangdong	325	22.720	6.044		
Absorption	Pearl River Delta	2886	21.341	6.610	8.902	<0.001
	Guangdong East	442	21.581	6.421		
	Western Guangdong	687	21.539	6.707		
	Northern Guangdong	325	23.314	5.442		
Work engagement	Pearl River Delta	2886	65.255	20.045	4.077	0.007
	Eastern Guangdong	442	64.919	19.302		
	Western Guangdong	687	65.362	20.987		
	Northern Guangdong	325	69.231	17.145		

In the variable of sense of security, there were significant differences (P<0.05) in the dimensions of environment, patient, self, organization and management, and social support. Medical staff in northern Guangdong had the highest sense of security, while those in the Pearl River Delta had the lowest sense of security.

In the variable of work engagement, the regions where the hospitals were located had significant differences in the dimensions of vigor, dedication, and absorption (P<0.05). Similarly, the work engagement of medical staff in northern Guangdong was the highest.

In the variable of turnover intention, the location of the hospital had significant differences in all dimensions (P<0.05). Medical staff in the Pearl River Delta region had the strongest turnover intention, and medical staff in northern Guangdong had the lowest turnover intention.

4.3.16 Difference analysis of hospital level on other variables

After one-way analysis of variance, as shown in Table 4.18, the level of hospital had a significant difference (P<0.05) in the sense of security and turnover intention of medical staff but had no significant difference in work engagement.

Table 4.18 Statistical analysis of variance of Hospital class on study variables (n=4340)

	Hospital grade	Number of cases	Average	Standard deviation	*F*	Significance
Environment	Primary hospital	349	12.808	4.549	54.079	<0.001
	Secondary hospital	1487	13.508	4.049		
	Tertiary hospitals	2504	14.590	3.827		
Patients	Primary hospital	349	12.565	4.679	54.529	<0.001
	Secondary hospital	1487	13.451	4.229		

	Hospital grade	Number of cases	Average	Standard deviation	*F*	Significance
	Tertiary hospitals	2504	14.490	3.800		
Self	Primary hospital	349	10.103	3.168	27.582	<0.001
	Secondary hospital	1487	10.515	2.892		
	Tertiary hospitals	2504	11.051	2.776		
Organizational management	Primary hospital	349	22.868	7.793	61.831	<0.001
	Secondary hospital	1487	24.402	6.932		
	Tertiary hospitals	2504	26.264	6.421		
Social support	Primary hospital	349	12.863	4.803	61.082	<0.001
	Secondary hospital	1487	13.897	4.294		
	Tertiary hospitals	2504	15.000	3.937		
Total score for sense of security	Primary hospital	349	71.206	22.856	65.405	<0.001
	Secondary hospital	1487	75.772	20.253		
	Tertiary hospitals	2504	81.395	18.790		
The possibility of quitting your current job	Primary hospital	349	4.470	2.001	38.624	<0.001
	Secondary hospital	1487	4.203	1.848		
	Tertiary hospitals	2504	3.807	1.615		
Possibility of obtaining external work	Primary hospital	349	5.229	1.763	0.943	0.390
	Secondary hospital	1487	5.096	1.709		
	Tertiary hospitals	2504	5.131	1.606		
Motivation to find other work	Primary hospital	349	5.258	1.741	34.314	<0.001
	Secondary hospital	1487	4.929	1.751		
	Tertiary hospitals	2504	4.601	1.611		
Turnover intention	Primary hospital	349	14.957	4.549	25.580	<0.001
	Secondary hospital	1487	14.227	4.389		
	Tertiary hospitals	2504	13.540	3.910		
Vigor	Primary hospital	349	22.140	7.782	1.338	0.263
	Secondary hospital	1487	22.908	8.225		
	Tertiary hospitals	2504	22.815	7.822		
Dedication	Primary hospital	349	20.742	7.127	1.038	0.354
	Secondary hospital	1487	21.337	7.106		
	Tertiary hospitals	2504	21.180	6.941		
Absorption	Primary hospital	349	20.705	6.558	3.721	0.024
	Secondary hospital	1487	21.471	6.672		
	Tertiary hospitals	2504	21.705	6.458		
Work engagement	Primary hospital	349	63.587	19.683	1.812	0.164
	Secondary hospital	1487	65.716	20.460		
	Tertiary hospitals	2504	65.700	19.659		

As for the variable of sense of security, the level of the hospital had significant differences in the dimensions of environment, patient, self, organization and management, and social support (P<0.05). Medical staff from tertiary hospitals had the highest sense of security. As

for the variable of turnover intention, except for the possibility of obtaining an external job, the hospital grade had significant differences in the other two dimensions (P<0.05). Medical staff from primary hospitals had the strongest turnover intention.

4.4 Correlation analysis

This study used Pearson to analyse whether there was a significant correlation between sense of security and work engagement, between sense of security and turnover intention, and between work engagement and turnover intention.

4.4.1 Correlation analysis between sense of security and work engagement

The results of the correlation analysis in Table 4.19 showed that overall, sense of security in all dimensions was significantly and positively correlated with work engagement ($P < 0.05$).

Table 4.19 Correlation between perceived security and work engagement (n=4340)

	Environment	Patients	Self	Organizational management	Social support	Total score of sense of security
Vigor	0.222**	0.225**	0.242**	0.239**	0.224**	0.254**
Dedication	0.228**	0.222**	0.250**	0.249**	0.233**	0.261**
Absorption	0.206**	0.200**	0.221**	0.221**	0.205**	0.233**
Work engagement	0.236**	0.234**	0.257**	0.256**	0.238**	0.270**

** Significant correlation at 0.01 level (two-tailed).

4.4.2 Correlation analysis between sense of security and turnover intention

The results of the correlation analysis in Table 4.20 showed a significant negative correlation ($P < 0.05$) between the each dimension of sense of security and the turnover intention.

Table 4.20 Correlation between perceived security and turnover intention (n=4340)

	Environment	Patients	Self	Organizational management	Social support	Total score of sense of security
The possibility of quitting your current job	-0.391**	-0.350**	-0.345**	-0.397**	-0.377**	-0.415**
Possibility of obtaining external work	-0.204**	-0.200**	-0.226**	-0.245**	-0.217**	-0.244**
Motivation to find other work	-0.327**	-0.317**	-0.261**	-0.338**	-0.326**	-0.352**
Turnover intention	-0.378**	-0.355**	-0.340**	-0.401**	-0.377**	-0.414**

** Significant correlation at 0.01 level (two-tailed).

4.4.3 Correlation analysis between work engagement and turnover intention

The results of the correlation analysis in Table 4.21 indicated that each dimension of work engagement was significantly and negatively correlated with turnover intention ($P < 0.05$).

Table 4.21 Correlation between work engagement and intention to leave (n=4340)

	Vigor	Dedication	Absorption	Work engagement
The possibility of quitting your current job	-0.494**	-0.523**	-0.502**	-0.546**
Possibility of obtaining external work	-0.395**	-0.407**	-0.387**	-0.428**
Motivation to find other work	-0.347**	-0.359**	-0.360**	-0.383**
Turnover intention	-0.505**	-0.527**	-0.511**	-0.555**

** Significant correlation at 0.01 level (two-tailed).

4.4.4 A multifactorial analysis of medical staff's sense of security

Taking sense of security as the dependent variable, age, working years, professional title, marital status, job satisfaction, overtime hours, exposure to violence at workplace, sleep duration, region, and hospital grade as independent variables were meaningful for univariate analysis. Among them, dummy variables were set for unordered categorical variables, and the assignment of independent variables were shown in Table 4.22.

Table 4.22 Table of independent variable assignments

Independent variable	Assignment method
Gender	Male=1, Female=2
Length of service (years)	≤5=1, 6 to 10=2, 11 to 20=3, ≥21=4
Academic qualifications	College and below = 1, Bachelor's degree = 2, Master's degree = 3, Doctorate = 4
Occupation	Nurse (Z_1 =0, Z_2 =0, Z_3 =0), Doctor (Z_1 =1, Z_2 =0, Z_3 =0), Pharmacist (Z_1 =0, Z_2 =1, Z_3 =0), Technician (Z_1 =0, Z_2 =0, Z_3 =1)
Specialty/Department	Outpatient and emergency (Z_1 =0, Z_2 =0, Z_3 =0, Z_4 =0, Z_5 =0, Z_6 =0, Z_7 =0), ICU(Z_1 =1, Z_2 =0, Z_3 =0, Z_4 =0, Z_5 =0, Z_6 =0, Z_7 =0), Internal medicine (Z_1 =0, Z_2 =1, Z_3 =0, Z_4 =0, Z_5 =0, Z_6 =0, Z_7 =0), Surgery (Z_1 =0, Z_2 =0, Z_3 =1, Z_4 =0, Z_5 =0, Z_6 =0, Z_7 =0), Obstetrics and Gynecology (Z_1 =0, Z_2 =0, Z_3 =0, Z_4 =1, Z_5 =0, Z_6 =0, Z_7 =0), Pediatrics (Z_1 =0, Z_2 =0, Z_3 =0, Z_4 =0, Z_5 =1, Z_6 =0, Z_7 =0), labs (Z_1 =0, Z_2 =0, Z_3 =0, Z_4 =0, Z_5 =0, Z_6 =1, Z_7 =0), others (Z_1 =0, Z_2 =0, Z_3 =0, Z_4 =0, Z_5 =0,Z_6 =0,Z_7 = 1)
Satisfaction with your job	Yes=1, No=2
Marital status	Unmarried (Z_1 =0, Z_2 =0), married (Z_1 =1, Z_2 =0), divorced or widowed (Z_1 =0, Z_2 =1)
Subject to violence at workplace frequency	None = 1, ≤ 3 times = 2, 3 times < F ≤ 6 times = 3, > 6 times = 4
Number of hours of sleep per day	≤6h=1, 6h<T≤7h=2, 7h<T≤8h=3, >8h=4
Hours of overtime per week	≤5h=1, 5h<T≤10h=2, 10h<T≤15h=3, T>15h=4

Independent variable	Assignment method
Average monthly income (RMB)	≤5000=1, 5001 to 10000=2, 10001 to 20000=3, ≥20001=4
Region	Pearl River Delta (Z_1 =0, Z_2 =0, Z_3 =0), Eastern Guangdong (Z_1 =1, Z_2 =0, Z_3 =0), Western Guangdong (Z_1 =0, Z_2 =1, Z_3 =0), Northern Guangdong (Z_1 =0, Z_2 =0, Z_3 =1)
Hospital level	Primary hospital = 1, Secondary hospital = 2, Tertiary hospital = 3

As shown in Table 4.23, gender, professional title, education, job satisfaction, violence at workplace, daily sleep duration, weekly overtime hours, hospital grade, department, and region were independent risk factors affecting medical staff's sense of security.

Table 4.23 Multiple linear regression analysis of factors influencing perceptions of safety Among Medical Staff (*n*=4340)

Independent variable	Regression coefficient	Standard error	Standardisation Regression coefficient	*t*	*P*
(Constant)	89.625	2.932	-	30.570	<0.001
Gender	-1.960	0.770	-0.038	-2.545	0.011
Title	-1.019	0.500	-0.034	-2.037	0.042
Academic qualifications	-1.819	0.481	-0.076	-3.780	<0.001
Satisfaction with your job	-7.893	0.617	-0.190	-12.783	<0.001
Subject to violence at workplace frequency	-2.989	0.349	-0.126	-8.576	<0.001
Number of hours of sleep per day	0.508	0.227	0.032	2.244	0.025
Hours of overtime per week	-1.250	0.305	-0.059	-4.094	<0.001
Hospital level	1.090	0.119	0.141	9.160	<0.001
Specialty/Department	-	-	-	-	-
Emergency Outpatient	-	-	-	-	-
ICU	0.046	1.436	0.001	0.032	0.974
Internal Medicine	2.499	1.077	0.054	2.320	0.020
Surgery	1.179	1.116	0.024	1.056	0.291
Obstetrics and Gynaecology	0.007	1.244	0.000	0.006	0.995
Paediatrics	-2.552	1.397	-0.033	-1.827	0.068
Medical and Technical Departments	4.599	1.241	0.073	3.706	<0.001
Other specialties	-3.543	1.335	-0.049	-2.655	0.008
Region	-	-	-	-	-
Pearl River Delta	-	-	-	-	-
Eastern Guangdong	4.108	0.976	0.062	4.209	<0.001
Western Guangdong	1.625	0.815	0.030	1.995	0.046
Northern Guangdong	8.345	1.146	0.110	7.284	<0.001

Note: R^2 = 0.137, adjusted R^2 = 0.132, F = 27.422, p < 0.001

4.4.5 Multi-factor analysis of medical staff's work engagement

Taking work engagement as the dependent variable, age, working years, professional title, marital status, job satisfaction, overtime hours, exposure to violence at workplace, sleep

duration, region, and hospital grade as independent variables were meaningful for univariate analysis. Dummy variables were set for unordered categorical variables and see Table 4.22 for the assignment of independent variables. As shown in Table 4.24, length of service, job satisfaction, exposure to violence at workplace, weekly overtime hours, and monthly income were independent risk factors affecting medical staff's work engagement.

Table 4.24 Multiple linear regression analysis of factors influencing medical staff work Engagement (n=4340)

Independent variable	Regression coefficient	Standard error	Standardisation Regression coefficient	t	P
(Constant)	74.960	2.840	-	26.398	<0.001
Years of work	1.895	0.551	0.097	3.436	0.001
Satisfaction with your job	-11.674	0.619	-0.281	-18.845	<0.001
Subject to WPV frequency	-2.976	0.344	-0.126	-8.651	<0.001
Hours of overtime per week	-0.997	0.305	-0.047	-3.268	0.001
Monthly income	1.880	0.419	0.077	4.489	<0.001

Note: R^2 = 0.124, adjusted R^2 = 0.120, F = 38.140, P < 0.001

4.4.6 Multi-factor analysis of medical staff's turnover intention

Taking turnover intention as the dependent variable, age, working years, professional title, marital status, job satisfaction, overtime hours, exposure to violence at workplace, sleep duration, region, and hospital grade as independent variables were meaningful for univariate analysis. Dummy variables were for unordered categorical variables and see Table 4.22 for the assignment of independent variables. As shown in Table 4.25, job satisfaction, exposure to violence at workplace, weekly overtime hours, hospital grade, occupation, department, and region were independent risk factors affecting medical staff's turnover intention.

Table 4.25 Multiple linear regression analysis of factors influencing medical staff's turnover Intention (n=4340)

Independent variable	Regression coefficient	Standard error	Standardisation Regression coefficient	t	P
(Constant)	11.955	0.650	-	18.403	<0.001
Satisfaction with your job	1.851	0.132	0.214	13.980	<0.001
Subject to WPV frequency	-0.486	0.075	-0.098	-6.509	<0.001
Hours of overtime per week	0.147	0.066	0.033	2.236	0.025
Hospital grade	-0.132	0.026	-0.082	-5.181	<0.001
Occupation	-	-	-	-	-
Nurses	-	-	-	-	-
Pysicians	-1.038	0.201	-0.113	-5.166	<0.001
Pharmacists	-0.292	0.245	-0.018	-1.192	0.233
Technician	-0.410	0.242	-0.025	-1.691	0.091
Specialty	-	-	-	-	-
Emergency Outpatient	-	-	-	-	-
ICU	0.374	0.308	0.022	1.216	0.224
Internal Medicine	0.047	0.231	0.005	0.205	0.838
Surgery	0.340	0.239	0.033	1.422	0.155

Independent variable	Regression coefficient	Standard error	Standardisation Regression coefficient	*t*	*P*
Obstetrics and Gynaecology	0.528	0.266	0.040	1.984	0.047
Paediatrics	0.803	0.299	0.050	2.682	0.007
Medical and Technical Departments	-0.014	0.266	-0.001	-0.054	0.957
Others	0.776	0.286	0.051	2.716	0.007
Region	-	-	-	-	-
Pearl River Delta	-	-	-	-	-
Eastern Guangdong	-0.379	0.209	-0.028	-1.811	0.070
Western Guangdong	-0.123	0.179	-0.011	-0.684	0.494
Northern Guangdong	-0.648	0.246	-0.041	-2.632	0.009

Note: $R^2 = 0.092$, adjusted $R^2 = 0.086$, $F = 15.512$, $p < 0.001$

4.4.7 Reliability of the medical staff sense of security scale

In order to test the reliability of the Medical Staff Sense of Security Scale, a validation factor analysis was conducted on the Medical Staff Safety Scale, and an SEM was established based on the dimensions and items of the Medical Staff Sense of Security Scale (Figure 4.1). The results showed that the goodness-of-fit index (GFI) and adjusted GFI were slightly lower than the ideal standard, and with reference to the fit criteria of each index of the model, the structure of the medical staff safety scale basically meets the ideal standard and fits the data.

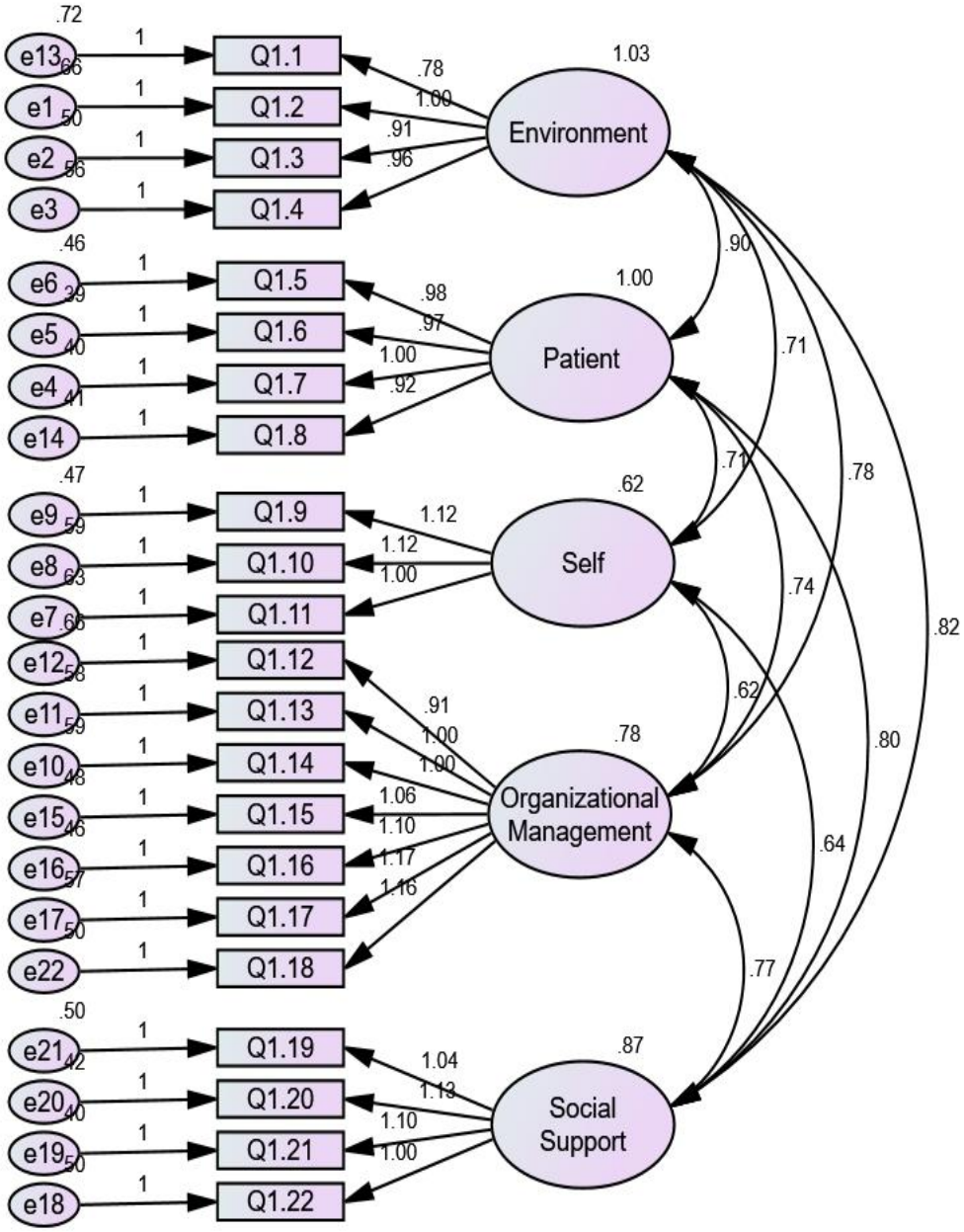

Figure 4.1 Non-standardized regression plots for the medical staff sense of security scale

4.4.8 Reliability of the work engagement scale

In order to test the reliability of the Work Engagement Scale, a validation factor analysis was conducted on the Work Engagement Scale, and an SEM was established according to the dimensions and items of the Work Engagement Scale (Figure 4.2). Its standardised path diagram was obtained through the analysis, and with reference to the fit criteria of each index of the model, the fit indices of the Work Engagement Scale basically reached the ideal criteria and fitted the data.

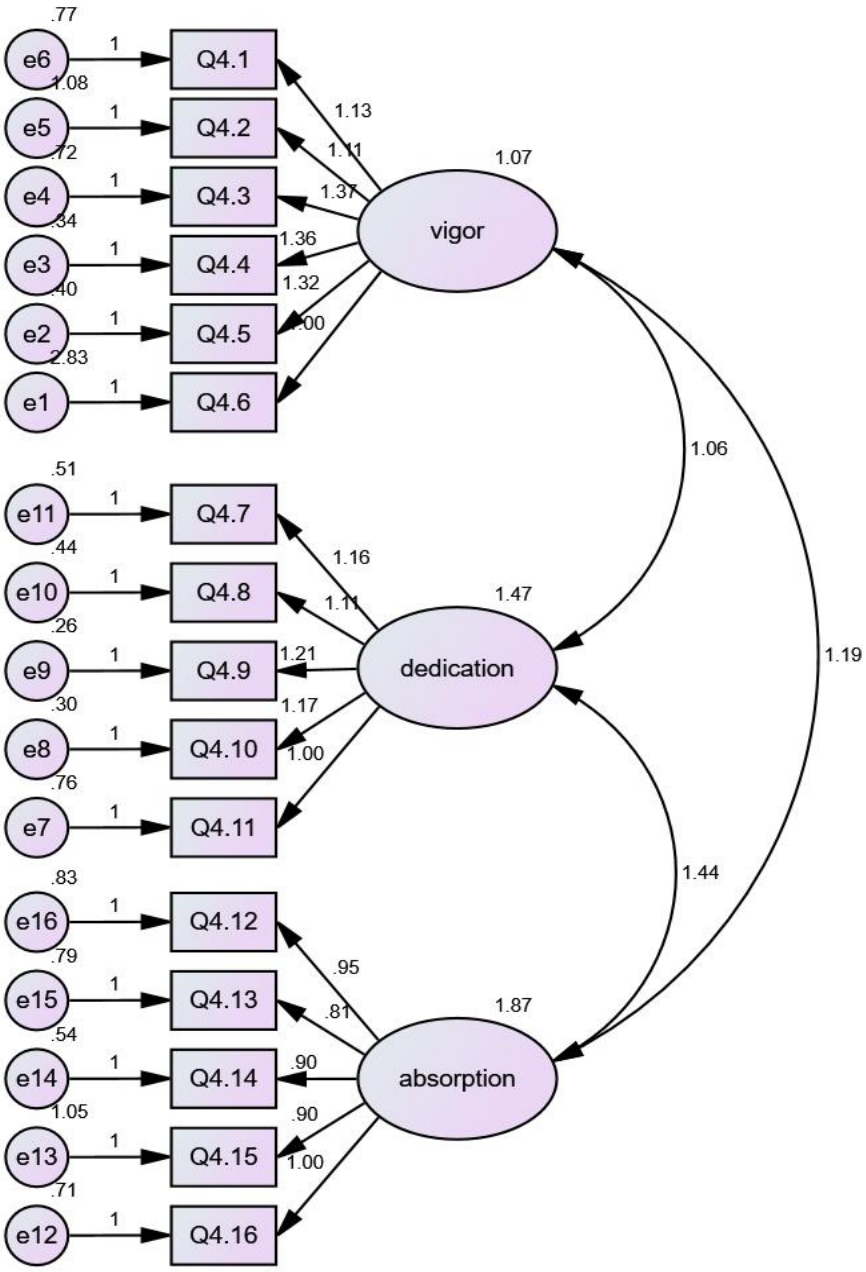

Figure 4.2 Unstandardized regression plot for the work engagement scale

4.4.9 Reliability of the turnover intention scale

In order to test the reliability of the Turnover Intention Scale, a validation factor analysis was conducted on the Work Engagement Scale. Based on the dimensions and items design of the Turnover Intention Scale, an SEM was established (Figure 4.3). Its standardised path diagram was obtained through analysis. With reference to the fit criteria of each index of the model, the fit indices of the Turnover Intention Scale basically aligned with the ideal criteria and

fitted the data.

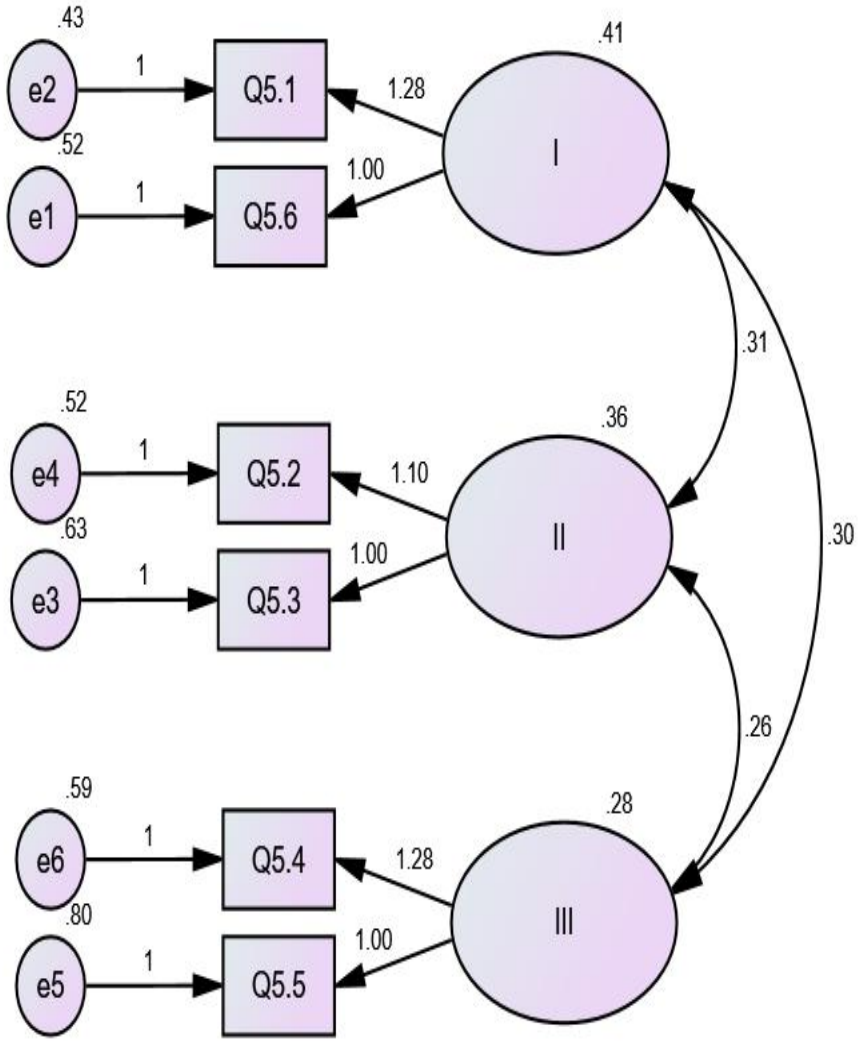

Figure 4.3 Unstandardized regression weighting chart for the turnover intention scale

4.4.10 Mediating effects test of the conceptual model

The conceptual model constructed in this study had a mediating effect, and the bias-corrected percentile Bootstrap technique in AMOS was used to test the mediating effect of the model and to examine if work engagement mediates the impacts of sense of security on turnover intention. The Bootstrap function was adopted to repeat the sampling 5000 times for the mediation effect analysis. If the 95% confidence interval of the mediation effect does not include 0, it means that the mediation effect is significant. However, if the 95% confidence interval of the mediation effect includes 0, it means that there is no mediation effect. The results showed that the direct effect, indirect effect and 95% confidence interval of the

mediating effect of the sense of security to turnover intention did not include 0, and the absolute value of Z value was higher than 1.96 (P<0.05), indicating that work engagement partially mediated the impacts of sense of security on turnover intention (Figure 4.4).

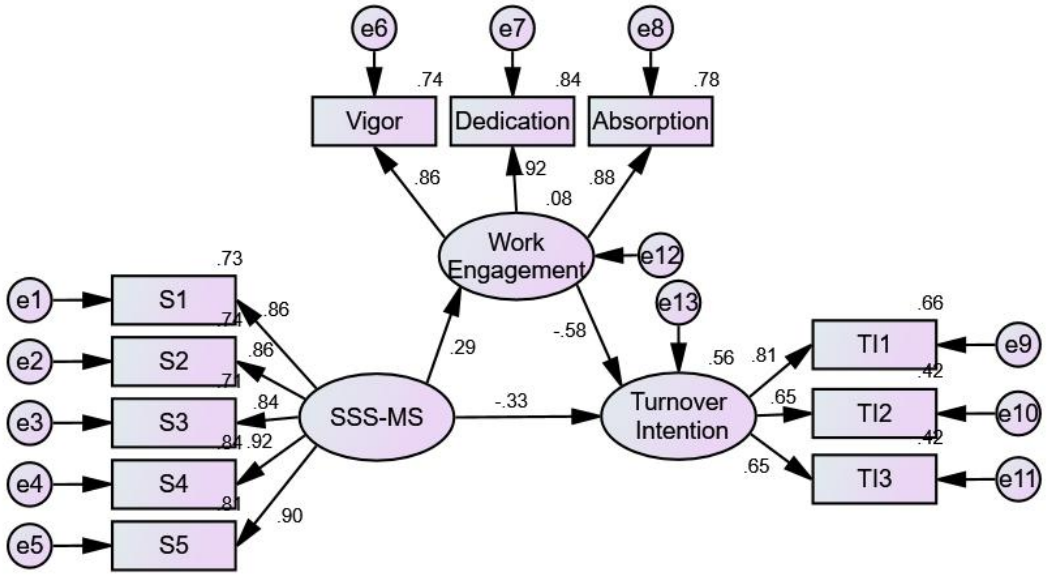

Figure 4.4 SEM (non-standardized) of medical staff's sense of security, work engagement, and turnover intention

S1 = Environment t; S2 = Patient; S3 = Self; S4 = Organizational management; S5 = Social support; TI 1 = Turnover intention I; TI 2 = Turnover intention II; TI 3 = Turnover intention III.

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Chapter 5: Discussion

5.1 Discussion of the current situation and factors influencing the sense of security of medical staff

5.1.1 The current state of sense of security of medical staff

In this study, the total score of the medical staff's sense of security was 78.65±19.92; self dimension was 10.79±2.87; organizational management dimension was 25.35±6.81; patient dimension was 13.98±4.08; social support dimension was 14.45±4.19); and environment dimension was 14.08±4.01. The mean scores of the five dimensions from high to low were sequenced as organizational management, social support, self, environment, and patient.

In order to further assess the perceived safety scores of the medical staff, the mean scores of the questions in this study were statistically significant in relation to the 3-point ratio. The ten lowest scoring items were (in descending order): "The patient's lack of tolerance makes me feel worried"; "The patient's unstable personality traits make me feel uneasy"; "The patient's lack of cognitive understanding makes me feel worried"; "I am physically and mentally exhausted by the demands of teaching and research after work"; "Insufficient comprehensive ability leads to conflicts and the inability to deal with emergencies makes me worry"; "I feel scared at work because of the mistrustful behaviour of the patients"; "I am physically and mentally exhausted by night shifts, overtime work and work overload"; "I often face rescue and complicated incidents at work, which makes me feel worried"; "I am worried by the unreasonable remuneration and the lack of a good personal career path"; and "The physical environment of hospital and occupational exposure make me feel worried".

The ten items with the highest scoring were (in descending order): "Lack of ethics and professionalism among colleagues worries me"; "Lack of cohesion and sense of collective honour in the department worries me"; "Lack of clinical competence worries me about being replaced or losing my job"; "I feel isolated due to the lack of care and support from my superiors"; "I feel depressed due to the lack of social recognition and family support"; " The tense atmosphere created by the media for medical treatment makes me feel uneasy"; "Inadequate and uneven distribution of medical resources makes me feel worried"; "Inability to control my emotions due to work problems makes me feel worried"; "I am disturbed by the

inadequate management system of the hospital"; and "I am disturbed by the management's lack of attention to the development of the hospital and its failure to safeguard the interests of the staff".

In this study, the mean score of medical staff's sense of security was 3.58±0.91, which was moderate and slightly higher than the sense of security of medical staff at the frontline of the prevention and control of COVID-19 (Jiang et al., 2021). The main reason is that COVID-19 is characterised by rapid spread, extensive infection, difficulty in prevention and control, as well as in-hospital transmission and infection of medical staff. In the normal state, medical staff has been able to engage in medical operations steadily where they are more likely to face the usual medical work stress, so the level of security reflects a higher level.

Meng et al.'s (2021) investigated the sense of security of elderly patients, and found that older people had a moderately low level of security, indicating that they have a poor sense of anticipation of the dangers of their illness, a greater sense of powerlessness to cope with changes in their condition, a lack of control over the progression of their disease (Fagerström et al., 2011), and a poor psychological state.

The findings of this study are similar to Yi and Xiong's (2021) findings. Possible reasons may be the high work pressure, the increasing physical and psychological violence endured by medical staff, and the need to improve their ability to cope with work emergencies, which leads to a lack of certainty and control over their work.

The two dimensions with relatively high mean scores across the five questions are organizational management and social support. The sense of social support includes the individual's perceived support from family and organization and is the sum of the individual's perception of all support that one has access to.

The results of related studies showed that a good sense of organizational support is the basis for medical staff to enhance their self-confidence, improve their self-efficacy, enhance their sense of innovation, and stabilize their departmental team (Zeng et al., 2021). Social exchange theory suggests that when employees, individuals, can perceive support from the organization, they accordingly develop a sense of obligation and belonging to the organization and choose organizational citizenship behaviours in return, such as consciously and actively performing their job duties, helping colleagues and providing creative suggestions.

Jeong and Kang (2021) conducted a qualitative study to explore nurses' experiences of safety and found that the basic structure of nurses' safety consisted of three categories: nurses' personal protection systems, safety support systems and risk factors. The results indicated that nurses place a high value on support systems. This study is in line with the above-mentioned

view that in medical practice, medical staff, as individuals, need to be integrated into the overall healthcare environment, and that there is a need for coordination and integration between medical staff and hospital administrators, and between medical and technical positions, as well as a need for mutual understanding and support (Chatzittofis et al., 2021).

Samur and Intepeler (2017) investigated Turkish nurses' perceptions of occupational safety and work environment and found that the level of occupational security among nurses is not high, especially as the relationship between colleagues and different work departments affect the level of safety. Support from hospital administrators motivates medical staff and support from medical and technical support positions consciously improves the quality of work and makes them feel warm and transmits emotions (Slåtten et al., 2020).

Most hospitals nowadays adopt the magnetic hospital management concept, which adheres to the principle of being people-oriented, making rational use of human resources by improving the environment and staffing, improving the remuneration system, and making reasonable use of human resources, thus retaining staff like a magnet (Evrenol & Terzioğlu, 2022).

In terms of organizational behaviour, a leader is a person who has a strong influence on others, and a good leader should be able to construct a set of shared values and beliefs that employees share (Alharbi et al., 2021). Numerous studies have also confirmed that the relationship between employees and their direct leaders in an organization directly affects employees' organizational commitment (Seren et al., 2019).

Imagine a person who takes the pursuit of money, fame, and fortune as his goal and "people are economic people" as his theory of human nature. He will not put the hospital's values on "saving lives and practising revolutionary humanitarianism", nor will he take people-oriented as his management model, but profit maximisation as his goal, and the leadership style will be centralised and oppressive.

Therefore, when selecting and training leaders, hospitals should focus on selecting people who share the hospital's values, perceptions, and goals. It suggests that hospital administrators who have strong management ability and good leadership styles that can improve the sense of security of medical staff. It also suggests that hospital administrators should focus on improving their own abilities, using the power of example to win the trust of their subordinates, adopting appropriate leadership styles, and giving more encouragement and recognition to their subordinates, thus increasing the sense of security of the medical staff.

The two dimensions that scored relatively low were environment and patients. At present, as people pay increasing attention to health, the requirements for medical treatment are

getting increasingly higher. However, they do not understand the routine work of the medical industry, and there is also a large degree of misunderstanding and distrust of medical workers, resulting in frequent conflicts between physicians and patients (Gong & Guo, 2022). China's medical laws are still not mature. The cost-effectiveness of being a medical personnel is not high, and their social status has declined. Under the regulations of the government's medical insurance bureau, physicians also need to consider assessment pressures such as the medical insurance quota should not exceed the standard, and meeting the daily work indicators. These factors further lead to occupational insecurity among medical workers (Mirzaei et al., 2022).

The existing healthcare environment, where medical staff is faced with multiple role demands and expectations (Yang et al., 2021) In order to reduce these psychological pressures, medical staff must seek additional resources to meet these demands or to avoid the potential loss of resources in the future, and when the overall healthcare environment is poor, the healthcare system is flawed and hospital management is flawed, medical staff have too few support resources available to them and have to invest their own resources to meet the demands, such as increasing their emotional labour (Saeki & Shimato, 2021) The medical staff is required to make a certain amount of mental effort. The psychological effort required of medical staff, which is reflected in facial expressions, language and behaviour, will inevitably affect their sense of security and will greatly increase the likelihood of them leaving an organization that does not provide sufficient resources but instead makes high demands on their role.

In recent years, there have been frequent conflicts between physicians and patients in China, and there have been numerous negative reports about medical disturbances and violence against physicians. The tension between physicians and patients can put more pressure on the medical staff who are in a high-intensity and high-stress working environment (Tian & Du L, 2017).

In the existing medical environment, medical staff is faced with multiple role requirements and expectations (Yang et al., 2021), which has brought huge psychological pressure on themselves. In order to reduce these psychological pressures, medical personnel must seek more resources to meet these needs or avoid resources that may be lost in the future. When the overall medical environment is not good, the medical system has disadvantages, and the hospital management has deficiencies, medical staff can get too few support resources. They can only rely on investing their own resources to meet the requirements, such as increasing their emotional labor (Saeki & Shimato, 2021).

Medical staff is required to pay a certain amount of psychological effort and reflected in

their facial expressions, language, and behavior. In this situation, the sense of security of medical staff is bound to be affected. This will greatly increase the possibility of medical staff leaving this organization where sufficient resources cannot be provided, but high role commitment is required.

5.1.2 Analysis of factors influencing the sense of security of medical staff

5.1.2.1 Gender

In this study, 18.10% of the medical staff were male, of which 49.5% were physicians, 31.9% were nurses, 8.8% were pharmacists and 9.8% were technicians. Among the female medical staff, 24.0% were physicians, 62.7% were nurses, 6.8% were pharmacists and 6.6% were technicians. This is roughly the same proportion of medical staff within the health system, Nurses are predominantly female in the market, and pharmacists and technicians are relatively evenly distributed by gender. In terms of gender, men scored significantly higher than women, which is consistent with the findings of other scholars. There may still be a quantitative mismatch between men and women at workplace, with men having an advantage in career progression due to their physiological advantages and generally being more resistant to stress than women (Mache et al., 2012). This makes men more likely to be entrusted with important responsibilities.

Women have changing hormone levels, rich inner experiences, stronger feelings, more delicate personalities and emotions, strive for perfection in their work and are more sensitive to external information (Gamsakhurdashvili et al., 2021). In addition to the work environment in the workplace, women are also responsible for most of the household chores and children's education. Therefore, they have to balance the roles of "family" and "social" people. When they have to balance the relationship between "family" and "society", they often need to devote more time and energy and consider more factors (Rung et al., 2021), so it may be easier for the female to feel job insecure.

It suggests that more attention should be paid to the psychological condition of female medical staff. Timely psychological intervention should be provided when they are in the face of adverse events and setbacks. Good psychological assistance mechanisms should also be established on a daily basis, such as the family of labour union, hospital president's hotlines, leadership mailboxes, and psychological catharsis rooms. Stable remuneration, reward and punishment mechanisms should be set up to enhance staff's sense of belonging and security in the hospital. Hospital administrators should develop business training programmes to enhance

the medical staff's own sense of direction in their development, especially to strengthen the mental healthcare of female medical staff and increase their opportunities for promotion and further education.

5.1.2.2 Title

The study found that medical staff security showed statistical significance in terms of job titles, with higher job titles associated with lower levels of security. This is consistent with Xu et al.'s (2020) findings. Due to the fact that most of the employees with low titles are new medical staff. They have a higher desire to adapt and integrate into the environment as soon as possible and have a title quickly, so they are easy to be motivated.

At the same time, there is a limited number of clinical position title slots, and some medical staff with higher titles may have a mismatch between their abilities and titles, so the respect and self-fulfilment aspirations of some medical staff without titles are not met in a timely manner (Teare et al., 2017).

Moreover, a higher title means higher work pressure, as medical staff with high titles are often required to do research, clinical teaching and other activities in addition to their regular work. As a result, medical staff with high titles have higher workloads, leading to high levels of work pressure (Matsushita & Yamamura, 2021), and a lower sense of security.

In addition, due to the pyramidal management model of hospitals, there are fewer managerial positions in hospitals. It is not easy for senior medical staff to find a management position with a title. Therefore, they tend to feel like their self-value is not reflected, and their sense of achievement is low (Sonmez & Gul, 2021), causing a lack of security at work.

It suggests that flexible scheduling can be implemented for senior medical staff. Appropriate work positions can be adjusted for senior titles to minimise work-family conflict for medical staff (Wu et al., 2021). These measures can be used to increase staff motivation and fulfilment.

Firstly, it is recommended that hospital administrators should encourage senior title staff to continuously strengthen their own abilities, to further expand the development space for senior title staff, alleviate clinical pressure, and mobilise work motivation and creativity.

Secondly, the hospital administration level can appropriately increase the work flexibility and autonomy of senior title staff (Chichra et al., 2019). This can, on the one hand, bring into play the abilities and experience of senior title staff and motivate them to work more actively and creatively so that they are given adequate attention; on the other hand, the achievements of senior title medical staff should be given timely recognition to satisfy the need for a sense

of achievement and respect, and give full play to the role of senior title medical staff in clinical, teaching, management and scientific research.

5.1.2.3 Education background

The results of the study showed that there was a statistically significant difference in the sense of security of medical staff with a technical secondary college degree compared to that of medical staff with a technical college degree. The sense of security of medical staff with a technical college degree was higher than that of a technical secondary college degree. The difference between the sense of security of medical staff with a technical college degree compared to those with a bachelor's, master's and doctoral degree was statistically significant. There was a statistically significant difference in the sense of security of medical staff with a bachelor's degree compared to those with a master's or doctoral degree. There was a statistically significant difference in the sense of security for medical staff with a master's degree compared to those with a doctoral degree.

In summary, medical staff with a college degree have the highest sense of security, with a master's degree second, a bachelor's degree third, a technical college degree fourth. Medical staff with a doctoral degree has the lowest sense of security. In recent years, physicians are generally introduced as key talents and are often given benefits, so there is a significant gap in the benefits enjoyed by medical staff with different degrees while performing the same work (Kheirabadi et al., 2021). This disparity may cause those with different academic qualifications to experience different feelings of security.

The education level of medical personnel is generally high. The study showed that 55.2% of the respondents have a bachelor's degree or above, indicating that the medical profession is higher professional and technical knowledge, and medical staff has formal professional training and education. With the development of society and the advancement of technology, the demand for highly educated medical personnel has greatly increased. Nurses in the clinical departments of tertiary first-class hospitals in provincial units in Guangdong Province basically have a bachelor's degree as the entry requirement, and physicians should have a doctor's degree as the entry requirement. This also shows that the medical industry has a high degree of specialization and generally requires a high level of education (Dahlberg et al., 2021).

Higher academic qualifications mean better the opportunities for development. At the same time, higher education level means that the individual has higher recognition of self-worth and a deeper understanding of his or her work (X. Liu et al., 2020). Hospitals generally

give more work support and help to highly educated talents. The higher the individual's education level, the stronger the business ability and scientific research ability. The mastery of new knowledge and technology will be faster and more sensitive. Excellent performance at work will earn you respect and a sense of security. It is recommended that hospitals recruit highly educated personnel and introduce highly educated personnel, which can improve the theoretical and innovative levels of the entire team. It is recommended that the hospital establish a good evaluation and employment mechanism, and provide relevant guidance on issues that affect the promotion of professional titles, such as research design, data collection, and paper writing, to help those who are weak in research to develop themselves.

5.1.2.4 Job satisfaction

According to Herzberg et al's (1959) "two-factor theory", the satisfaction factor is a source of satisfaction and motivation, while the dissatisfaction factor is a source of opinion and negative behaviour. Negative emotions or behaviours in the workplace may increase the negative feelings of medical staff towards their work.

Medical staff who are satisfied with their work determine, to some extent, how motivated they are and how proactive they are in learning professional knowledge. Medical staff who are satisfied with their current job status are more concerned with their career planning and development, are proactive in improving their professional knowledge and skills, and are proactive in learning the latest developments in their profession. To some extent, medical staff's job satisfaction determines the degree of enthusiasm of medical staff for work and the degree of active learning of professional knowledge. Medical staff who are satisfied with their current working conditions pay more attention to their career planning and development. They will actively improve their professional knowledge and professional skills, and take the initiative to absorb the latest developments in professional frontiers.

Scholars studied the effect of nurses' sense of job security on job satisfaction and found that nurses' sense of job security was positively related to job satisfaction. Job satisfaction was high when the sense of job security was high (Bektas et al., 2022). As satisfaction is an emotional feeling, it is an attitudinal evaluation of medical staff comparing the gap between their perceptions and expectations of the job itself and related aspects, mainly related to the feelings of the medical staff at work. At this stage, most of the medical staff in public hospitals are in a state of overload.

In addition, medical staff in public hospitals are under research pressure, making them physically and mentally exhausted (Anand et al., 2022). However, the low level of

remuneration in public hospitals has led to an imbalance in the pay-reward ratio and job dissatisfaction among medical staff.

It is suggested that hospitals should focus on humanistic care and people-oriented management, and actively carry out various forms of cultural activities for staff to enrich the business activities of medical staff, such as mountain climbing, ball games, swimming, interest groups and excursions. Groups should be formed for each sport and a team leader is elected to organize the activities. While doing physical exercise, medical staff also enhance their interpersonal communication skills, stimulate the mental health potential of employees, and play a role in relieving their own pressure.

5.1.2.5 Exposure to violence at workplace in the past year

The study found that exposure to violence at workplace in Guangdong Province had a significant negative predictive effect on perceptions of safety. As exposure to workplace violence increased, perceptions of safety decreased. Hospital violence was defined as the physical and psychological violence faced by medical staff while performing their tasks, and a study by Marquez et al. (2020) indicated that exposure to workplace violence was associated with the perceived good or bad doctor-patient relationship and could predict medical staff's sense of security. Tensions in the doctor-patient relationship have been shown to contribute to a lack of security among medical staff in both national and international studies (Liu et al., 2019).

Violence is a social problem that affects the health of citizens and the development of medical and healthcare, and its global incidence is increasing year by year. Chinese medical staff also face the risk of violent injury, and some have suffered it. The Law of the People's Republic of China on Basic Medical Care and Health Promotion emphasises the change in the concept of medical care and health from "focusing on the treatment of diseases" to "focusing on people's health". This change in philosophy is in line with the main contradiction in Chinese society, which is reflected in the medical field: the contradiction between the people's growing need for healthcare and the relatively unbalanced and insufficient development of medical and health services.

The disparity in the distribution of medical resources, the inducement of public opinion by individual media and the silent attitude of the public are all social factors that can intensify the conflict between physicians and patients in the same direction. The frequent occurrence of violence, coupled with the lack of a comprehensive early warning and prevention mechanism for such incidents in medical institutions, has resulted in the problem never being

fundamentally resolved.

Frequent violent incidents worsen the relationship between physicians and patients, exacerbate the crisis of trust between physicians and patients, and then reduce the sense of security of medical staff. Medical staff believes that perpetrators disrespect their own professional skills and professional dedication, which reduces the work efficiency, work quality and personal fulfillment of medical staff, and weakens the relationship with patients, administrators, and colleagues.

Fazel et al. (2015) found that people who experience sexual harassment are prone to depressive symptoms, possibly due to the fact that victims of sexual harassment tend to adopt a silent and tolerant attitude, and are reluctant to talk about their experiences. However, it was difficult for them to get out of the situation through their efforts, and they were prone to feelings of hopelessness and worthlessness, leading to depression.

A national case study conducted by WHO reported that more than half of medical staff had experienced at least one violent incident in the year prior to the study, and it is also prevalent in UK inpatient department (Ramacciati & Giusti, 2020). Shafran-Tikva et al. (2017) conducted a statistical study of violence exposure among medical staff in Israeli hospitals, which revealed that 87% of medical staff reported experiencing violence from patients or other visitors in the past year.

Violence against medical professionals in the United States is also extremely common and significantly higher than in other professions. In developing countries, over 50% of medical staff face patient-led verbal and physical violence (Groenewold et al., 2018). Globally, there is a high incidence of violence against healthcare professionals, with a relatively low incidence in Asian countries compared to other countries but a significant upward trend (P. Y. Wang et al., 2019).

Medical institutions should adopt a “zero tolerance” approach to hospital violence to reduce the physical and psychological harm caused by hospital violence to medical staff. Medical staff should take the necessary steps to prevent hospital violence by receiving staff safety training and encouraging effective communication between patients and physicians. Hospital administrators should provide timely psychological comfort and counselling to medical staff who have been subjected to hospital violence to avoid depression and other psychological problems.

To improve the psychological adjustment ability of medical staff, firstly, regular mental health lectures and training should be organized, including self-awareness training, conflict and dispute resolution skills, improvement of doctor-patient relationship and interpersonal

skills. In this way, medical staff can master basic self-adjustment skills and enhance their ability to resist adverse external environment. It also enhances the communication skills of medical staff so that they can properly manage their relationships with colleagues, patients, and family members. Secondly, diversified mental health activities, such as mental health knowledge competitions. Thirdly, the establishment of an in-hospital psychological counselling station to provide psychological guidance, counselling, and stress reduction training to hospital staff at regular times each week.

5.1.2.6 Length of sleep per day

Sleep is one of the basic needs of human beings, and with the fast-paced and stressful life in modern society, an increasing number of people are experiencing sleep problems (Nikfar et al., 2018). This has led to an increasing number of physical and mental health problems. Sleep deprivation experiments have shown that, while trying to stay awake, most subjects experience dizziness, difficulty concentrating, memory loss, emotional irritability, temper tantrums, dull and confused expressions, and even frustration and depression (Sayre et al., 2021).

Sleep has become an increasingly serious problem for today's workforce. According to a survey conducted by Ma et al. (2019) on the sleep status of medical professionals in seven cities in China. The average daily sleep duration of medical professionals was 6.78 hours, and 30.4% of medical professionals reported a lack of sleep. The proportion of individuals experiencing sleep deprivation gradually increases with age. Health can be improved by maintaining an appropriate sleep schedule.

Previous research with medical professionals has shown that improving sleep quality is beneficial in improving anxiety and depression, both from an individual perspective and in terms of family emotional relationships. Sleep quality is essential for the physical and mental health of individuals (Coles et al., 2015). It is also important for family bonding. The main reasons for this are the high risks taken by frontline medical staff in the treatment of illnesses and the relatively tense doctor-patient relationship in the wider social environment. The internal and external risks often result in psychological stress for medical and nursing staff, which ultimately manifests itself in the length and quality of their sleep.

In addition, studies have shown that medical staff with night shifts had significantly higher rates of sleep disturbance than those without night shifts (Kim et al., 2015). Due to the unique nature of their profession and the changing conditions of their patients, medical staff are often required to work night shifts for 24 hours and may be woken up at any time during

the night shift, which interrupts the homeostasis of the medical staff's sleep-wake cycle. Moreover, on-call medical staff is mostly on independent night shifts, with increased worry and tension compared to the daytime, making it difficult to fall asleep again. The poor daytime sleep environment after night shifts increases the incidence of acute and chronic sleep disorders such as drowsiness and insomnia and shortens overall sleep duration.

In the long run, the human cerebral cortex becomes dysfunctional. This can lead to disruption of the circadian rhythm of the body's biological clock and disruption of the internal environment, which can lead to fatigue, lethargy, daytime sleepiness and other daytime dysfunctions (Ramadan & Al-Saleh, 2014), thus seriously affecting the quality of sleep and work of medical staff.

5.1.2.7 Hours of overtime work per week

A study of job insecurity among nursing staff in Brazilian public hospitals found that work intensity in the organization of the work process explained the composition of job insecurity. It suggested that work intensity is the component that most influences sense of security (Araújo-Dos-Santos et al., 2018). Today's surge in demand for healthcare services and the lack of supply of medical staff, as well as the use of shift rotations in most hospital working hours, have made overtime work for medical staff common (Wu et al., 2018).

The medical profession is unique in its nature, with emergency rescues and in-hospital consultations requiring physicians to work unconditionally even during off-hours, which overloads them for long periods of time and seriously strains their health. The medical profession is not a machine, and working under high pressure for long periods of time will affect not only their physical health but also their mind.

In China, almost all physicians have worked 24 hours continuously and even 50 hours without rest (Gong et al., 2014). In Canada, the maximum continuous working time for physicians is around 15 hours (Brown, 1995). In Canada, the maximum continuous working hours for physicians are around 15 hours. For example, young residents are required to arrive an hour early to go the rounds of the wards, work overtime in the evenings, work a night shift every four to seven days, and work rotating shifts on weekends or holidays. If there are too many patients, physicians who are on leave can be called back to the hospital at any time to help.

The problem of overtime in large general hospitals is already a common situation. Since ancient times in China, physicians have been portrayed as "healing the sick and saving the lives of others" and "returning the blessings of life". People do not realise that physicians also

need protection and rest.

As the old saying goes, “If you are not a good prime minister, you should be a good doctor” to highlight the responsibilities of physicians. The image and status of the doctor is always deified to varying degrees, and the “god” does not need to rest. In the minds of the majority of laymen, a doctor should be like a Bain Que or Hua Tuo (legendary surgeons in Chinese history), waiting for the call, ready to appear at any time to solve a problem, to cure the disease at once without any complications.

The public lacks basic medical knowledge and has high expectations for physicians to treat diseases. When the treatment fails to meet expectations, the treatment effect is not obvious, or complications occur, when the doctor-patient situation is tense and the media exaggerates, patients more generally believe that the doctor is not doing his best to treat the disease. This leads to medical disputes, and the sense of security of medical staff is reduced.

At the organizational level, we need to provide professional workplaces for medical staff, with rest areas in the workplace for those working long shifts; Rationalising work schedules to guarantee adequate rest and sleep.

In the working environment, arranging shifts reasonably, establishing a scientific employment mechanism, simplifying the work process, and strengthening the auxiliary functions of software support to relieve the physical and mental fatigue of medical staff. Refining the responsibilities of medical staff. Administrative work should be separated from academic work. Clarifying the scope of work and leisure time of medical staff to avoid high-pressure situations such as continuous overtime work caused by mixed functions.

Moreover, carrying out team building for medical personnel, cultivating the tacit understanding among internal personnel, enhancing team centripetal force and cohesion, and relieving stress through good teamwork, thereby improving the quality of medical services and job satisfaction.

At a social level, professional mental health support and counselling should be provided, including active listening, acceptance, understanding, empathy, clarification, cooperation, feedback and resource-oriented psychological support to help them tap into internal and external resources, real and psychological resources. Support should be given to the medical staff’s family members, including understanding the personal situation of the medical staff’s family members and providing assistance if necessary.

At the individual level, medical personnel need to self-evaluate their psychological state after long-term high-intensity work nu mastering basic psychological support techniques. In case of discomfort and other situations, the mental state can be automatically restored by

resting, leaving the scene, and being fully informed.

5.1.2.8 Hospital level

In terms of perceptions of safety, there were significant differences between medical staff working at different levels of hospital. Higher levels of hospital were associated with higher levels of security among medical staff. This is in line with the findings of other studies (Gashmard et al., 2015).

Medical resources in lower-level hospitals are scarce and unevenly distributed. Most of the professional staff and advanced medical equipment are in tertiary hospitals. Compared with tertiary hospitals, secondary hospitals do not have enough advanced medical equipment with fewer senior professional and technical personnel. Practising physicians have lower education levels, fewer opportunities to learn, and less work experience and experience than physicians in tertiary hospitals, leading to a lower sense of security among staff in secondary hospitals in general. Tertiary hospitals have strong strength and scale. They are more likely to place greater emphasis and regulation on the training and management of talent, and can provide a variety of learning opportunities for the career development of medical staff.

It is suggested to increase training opportunities, so that medical staff in low-level hospitals have the opportunity to get in touch with the latest technology and ideas, so as to meet their knowledge update needs. It is also suggested to improve the professional knowledge and management knowledge structure of department managers, enhance the sense of organizational support, and improve the overall quality of the department team.

5.1.2.9 Working department

Related studies have shown that there are differences in the level of security of medical staff working in different departments. This study showed that the security scores of different departments were ranked in descending order: medical labs, internal medicine, surgery, ICU, obstetrics and gynaecology, paediatrics, outpatient, emergency departments, other departments. This is because, as the front line of saving patients' lives in hospitals, emergency medicine is the department with the highest concentration of acute, critical and severe patients and the heaviest rescue and management tasks (Smith-Miller et al., 2014).

Due to the specific nature of the work in the department, frontline medical staff in the emergency department are not only burdened with a heavy workload (Pujo et al., 2021), but also have to endure extraordinary occupational pressure, heavy work responsibilities, high labor intensity, complex working environment, long night shifts, and biological clock disorders, which make medical staff prone to irritability (Afshari et al., 2020). There are also

many sudden events and a high incidence of accidental death, coupled with the stress of patients' families in emergency care, misunderstanding by patients and their families, lack of social support and understanding, and the risk of personal injury and infection (Ellis & Esson, 2021).

Outpatient clinics are the first stop of call in hospitals such as fever clinics. Due to the sudden global public health incident, fever clinics in hospitals at all levels are an important checkpoint and the forefront of the prevention and control of new coronary pneumonia. The medical staff for pre-examination and triage have been in the outpatient hall or the door of the consultation room for a long time. The flow of people there is high and complex. All kinds of voices, crowd activities, and electronic calls are mixed together, making the environment here noisy (Amoatey et al., 2022).

One study showed that the noise level in all areas of the outpatient clinic was the highest at the pre-screening triage desk at 74.46 ± 3.46 dB(A) (Voitl et al., 2019), which far exceeds the ambient noise standards set in China for hospitals. Therefore, the subjective experience of medical staff working in a noisy environment is not good. Outpatient medical staff had the highest incidence rate of perceived hearing loss, tinnitus, and irritability. Therefore, it is suggested that the relevant departments of the hospital should strengthen the hearing health protection of medical staff, and detect potential diseases of the auditory system of employees early, so as to take active and effective preventive measures.

5.1.2.10 Regions

Being located in different regions of Guangdong Province is an influential factor in the sense of security of medical staff. A two-by-two comparison suggested that the difference is not statistically significant when comparing Eastern Guangdong with Western Guangdong, with Northern Guangdong having the highest sense of security and the Pearl River Delta having the lowest sense of security. A study (Deng & Zhan, 2021) implied that the level of health human resource allocation in Eastern, Western and Northern Guangdong is lower than the provincial average, and there is a significant gap with the Pearl River Delta region. The Pearl River Delta is the region with the highest level of healthy human resources allocation in Guangdong Province, but there are large internal differences in healthy human resources allocation.

Guangzhou and Shenzhen have the highest level of healthy human resources allocation, which is 4 to 5 times the provincial average. Huizhou and Zhaoqing had the lowest health human resource allocation levels, even lower than the provincial average. The allocation of

healthy human resources in the Pearl River Delta region is polarized. The polarization of the economy leads to the polarization of the allocation of healthy human resources, which shows that the allocation of healthy human resources between regions is not a radiation effect, but more of a siphon effect. Areas, where healthy human resources are concentrated, consume healthy human resources in surrounding areas.

Therefore, the government should take the following measures: increase financial transfer payments, narrow the difference in the allocation of healthy human resources within the region, introduce high-quality health personnel, improve the environment for patients to seek medical care, give full play to the leverage of medical insurance payments, appropriately increase the essential public health service funding standard per capita in rural areas and communities, expand the scope of public health service items and medical insurance. The government and medical institutions should actively explore the multi-region practice system of physicians, nurses, and pharmacists to promote the flow of health personnel within the region, alleviate the shortage of healthy human resources, and narrow the differences between regions.

5.2 Current status and influencing factors of medical staff work engagement

5.2.1 Current status of medical staff work engagement

The results of this study showed that the total work engagement score of medical staff in Guangdong Province was 65.54 ± 19.94, with an overall mean score of 4.10 ± 1.25, which was at an intermediate level. It is similar to the results of the 6th National Health and Services Survey in China (Ge et al., 2021), but slightly higher than the results of a survey on nurses' work engagement in a tertiary hospital in Beijing (Du et al., 2016) and slightly lower than the results of a survey on healthcare workers' work engagement in a specialist hospital in Hubei Province (Wu et al., 2017)

Comparing with figures in other countries, the results were slightly lower than the findings of Swedish intensive care unit healthcare workers (Holmberg et al., 2020). There were still some gaps between northern Spain (González Gancedo et al., 2019), Central Spain (García-Iglesias et al., 2021), Saudi Arabia (Aboshaiqah et al., 2016) and Malaysia (Abu et al., 2022).

The reasons for the differences between China and other countries may be due to

differences in the training models and costs of healthcare workers. The training of foreign physicians emphasizes “elitism”. Before becoming a medical student, you must go through scientific and rigorous comprehensive assessment and selection. Only those with good grades will be admitted to medical school. Cultivating medical students not only pays attention to students' independent thinking and decision-making ability, adopts project-based-learning mode, but also pays attention to the cultivation of students' humanistic qualities. The curriculum includes a large number of psychology, medical ethics, medical philosophy, medical society, medical behavioral science, and communication skills. The most important thing is to encourage students to study clinical practice and scientific research training and participate in various medical training programs. Finally, those with excellent comprehensive abilities are screened out through a segmented assessment and elimination mechanism (Lin et al., 2015; H. Wang et al., 2021).

As a result, only the truly elite can become physicians. Moreover, governments abroad play an important role in maintaining the stability of the healthcare workforce, with state funding and social security benefits for patients giving healthcare workers a more lucrative income and higher social status than those in other professions.

However, the training model of medical and healthcare personnel in China is not yet perfect. Due to the shortage of clinical education resources, it is difficult to ensure the quality of medical student training due to the expansion of enrollment. Factors such as the current complex doctor-patient relationship, high-intensity work nature, and low work income all have an important impact on the work engagement of medical staff.

In this study, the vigor dimension of work engagement had an average score of 3.80±1.33 points. The mean score of the dedication dimension was 4.24±1.40 points. The mean score of the absorption dimension was 4.31±1.31 points. The order of the three dimensions from high to low is absorption, dedication, and vigor. This is consistent with the findings of the Brazilian (Da Silva et al., 2020) study, but inconsistent with findings in Malaysia (Othman & Nasurdin, 2011) and Saudi Arabia (Aboshaiqah et al., 2016).

Vigor refers to a high level of energy and mental toughness at work, as evidenced by a willingness to put effort into work and persistence in the face of difficulties, not easily fatigued or compromised. Dedication refers to a high level of involvement in work and experiencing feelings of meaning, passion, motivation, pride and challenge, a strong sense of identification with the work, and a sense of pride and excitement about the work. Absorption refers to being completely focused and happily engaged in the work, forgetting time and finding it difficult to separate from the work, showing a strong sense of involvement and

focus. Although the result of this survey had the highest score in the absorption dimension, which is slightly inconsistent with other survey results, the results of the dedication dimension and the vigor dimension are similar to other studies, which may be related to organizational culture (Chu, 2014).

However, there is also literature that suggests that the type of service may influence the three dimensions of work engagement (Borges et al., 2017). Also, the lowest mean score for the vigor dimension in this study is consistent with the findings of a UK cross-sectional survey conducted in the National Health Service (Jeve et al., 2015). The reasons may be heavy clinical workloads, overload, and complex patient-physician relationships, which make it difficult for clinical staff to maintain vigor in the face of intense physical and mental challenges.

5.2.2 The influence of demographic and sociological factors on the work engagement of medical staff

5.2.2.1 Length of service

Employees' work engagement increases with working hours, which is consistent with previous research findings (Qiu & Wang, 2020; Sliwinski et al., 2014). An online survey of 3,876 dentists officially registered in the Valencia Tri-State region showed that dentists with more years of experience reported a better perception of well-being at work, and that well-being buffered burnout and increased patient focus and commitment to work (Molina-Hernandez et al., 2021). This may be due to the fact that with more years on the job, employees are imbued with the organizational culture and the degree of personal and organizational values fit gradually increases, combined with the experience gained and the ability to deal with problems at work becomes stronger (Sygit, 2009).

The increase in remuneration is accompanied by some realisation of the medical staff's self-worth. An increased sense of self-identification with their work is demonstrated by increased commitment to their work, increased responsibility and higher levels of work engagement. As work experience increases, employees' perception of stress decreases and other aspects of the work environment improve.

Much of the literature identifies length of service as an important factor associated with well-being, and some studies on self-perceived mental health found a positive correlation between length of service and mental health (Lee et al., 2019; Puriene et al., 2008). With good psychological well-being, positive work status is maintained and work engagement levels are

increased.

But there are also studies that contradict our results, Stanetić and Kosana (2013) conducted a survey of 239 family physicians in seven primary care centres in the Republika Srpska. The results showed that the older physician and the longer the working years brings about higher stress level and higher risk of burnout syndrome. This may be related to the different survey subjects and sample sizes. The subjects of this study are medical staff in general hospitals, whose occupational environment is relatively fixed. The sample size of the study is large and the deviation is small. However, the sample of their study is 239 physicians, so there may be large variations in the results.

5.2.2.2 Job satisfaction

The results of this survey revealed that job satisfaction is a positive predictor of work engagement. According to self-determination theory (Schreurs et al., 2014; Trépanier et al., 2015; Van den Broeck A et al., 2019), the indirect relationship between workplace violence and work engagement (i.e., vigor, dedication, absorption) is moderated by a continuum of basic psychological needs and intrinsic work motivation (Stanetic & Tesanovic, 2013). Self-determination theory explains why individuals engage in intrinsically motivated behaviour, or in other words, do something for their own good out of interest and enjoyment.

Intrinsic motivation is developed by satisfying or fulfilling three basic psychological needs: the need for autonomy (i.e., the belief that one is the original source of one's volitional behaviour), competence (i.e., the opportunity to perform required tasks effectively and to experience the demonstration of competence), and relationships (i.e., the establishment of personal connections with others in a social context).

When these three basic psychological needs are met (i.e., need satisfaction or fulfillment), individuals are motivated to perform the behavior intrinsically, or in other words, because they enjoy the behavior and find it to be a personal ally to fulfillment (Ryan & Deci, 2017). Self-determination theory and its predictions have been successfully applied in organizational research (Baard, 2002; Deci & Ryan, 2014) to explain why employees become intrinsically motivated and fully engaged in their work. Thus, it is when intrinsic needs are met and job satisfaction is achieved that employees become intrinsically motivated and transformed into motivation to become more engaged in their work.

5.2.2.3 Workplace violence

The frequency of workplace violence is a negative predictor of work engagement. Studies

pointed out that workplace violence is significantly associated with job burnout (J. Yu et al., 2020). A longitudinal study with a 12-month follow-up showed that exposure to workplace violence increased burnout levels over a 12-month period, further confirming the causal relationship between workplace violence and burnout (Pihl-Thingvad et al., 2019).

Workplace violence has a positive impact on burnout, secondary trauma, and empathic fatigue (Yi et al., 2020). The occurrence of violence significantly increases the probability of severe emotional exhaustion, depersonalization, and low occupational achievement in burnout syndrome patients (Tsukamoto et al., 2022). Exposure to workplace violence is a drain on the positive resources of health professionals because of the negative emotional impact of the unsafe environment and the occurrence of workplace violence. When positive resources are not adequately replenished, such as untimely and inadequate organizational support, staff may feel disrespected and perceive their work as too costly, leading to burnout and a decline in engagement.

5.2.2.4 Hours of overtime per week

Longer overtime hours per week causes lower work engagement of medical staff, in line with Fang et al.'s (2017) findings. Most studies reported that overtime is detrimental to employees' well-being and health (Bae & Fabry, 2014; Ng & Feldman, 2008; Sparks et al., 2018; Van der Hulst, 2003).

It is worth noting that this study contradicts Schleupner and Kuhnel (2021) who found a positive relationship between overtime hours and work engagement because, according to job demand-resources (JD-R) theory, overtime can be used as a job requirement and higher job demands motivate employees to devote more resources and increase their work engagement.

Two job demands, time pressure and high workload, commonly lead employees to work overtime. These two kinds of work requirements may belong to the challenging work requirements of medical staff for the subjects of this study, rather than hindering work requirements. Challenging requirements can have similar effects as resources and have similar positive effects on work engagement (Crawford et al., 2010). This means their research shows that overtime is a positive factor. Other similar studies have also shown that overtime work can improve work motivation (Beckers et al., 2007; Beckers & Linden, 2004) and work centrality (Ng & Feldman, 2008).

This also suggests that we can distinguish whether overtime brings positive or negative effects, and that the quality of work done overtime may be a key factor (Watanabe & Yamauchi, 2018).

A Japanese study classified overtime employees into various categories based on the quality of overtime work. “Highly involuntary overtime employees” worked overtime for involuntary reasons, experiencing the most intense fatigue, the most mental distress and the lowest work engagement. Although the “intrinsically motivated overtime employees” work the longest hours, their mental health level is no different from the norm. Their work engagement was better than that of “highly involuntary overtime employees”, and even significantly better than that of any other type of overtime employees (Watanabe & Yamauchi, 2019).

Therefore, one of the findings is that overtime hours are negatively related to work engagement, possibly because of the nature of the work of medical staff. They must complete the content of their class before they can hand it over and leave. However, the huge workload and the time pressure of the “work must be completed during their work time” force them to work overtime to complete the work. Therefore, working overtime is an obstructive requirement for medical staff. Intrinsic motivation may originate from the organization or the patient, making them more engaged and positive. But the overtime work of medical staff is obviously not voluntary. Therefore, medical staff is “highly involuntary overtime employees”, and overtime work has caused a decline in work engagement (Watanabe & Yamauchi, 2018).

5.3 Current status and factors influencing medical staff’s turnover intention

5.3.1 The current state of medical staff’s turnover intention

The results of this study demonstrated that the total score of medical staff’s turnover intention was 13.889±4.157, at an upper-middle level. The average score of the total items was 2.315±0.693, at a relatively high level. Among them, 3.5% of medical staff had a very low turnover intention. 34.1% of medical staff had a low turnover intention. 47.7% of medical staff had a high turnover intention. 14.7% of medical staff had a very high turnover intention. The current level of turnover intention showed that most of the medical staff had a tendency to consider leaving the organization, and they were more likely to resign.

Our findings were lower than the turnover intention score of medical staff in Heilongjiang province (at 15.27 ± 3.49) (Xu & Yan, 2019). It may be because of the fact that only 104 medical personnel in Heilongjiang were surveyed. Although the research objects are mainly senior professional titles and middle-level cadres, the monthly income of RMB 4,000 to 6,000

accounted for nearly half of the respondents. In this research, most of the subjects were clinical medical personnel, but the number of samples with income of RMB 5001 to 10000 accounted for 46.1%, and the salary is significantly higher than respondents in Heilongjiang. This may be the reason why the turnover intention of medical staff in Guangdong Province is lower than that in Heilongjiang.

In addition, our results are also lower than the results of a cross-sectional study of turnover intentions of grassroots medical staff in Anhui Province (14.15±4.35) (Chen et al., 2021). This shows that compared with grassroots medical staff in lower-level institutions, due to the objective reality of the environment and platform, the career development space of medical staff is also limited (X. Xu et al., 2022). This may be the reason why their turnover intention is slightly higher than that of the research subjects in this survey.

The results of this survey are higher than the turnover intention scores of 2,700 medical staff in 9 public hospitals in Zhejiang, Hunan, and Sichuan in 2019 (13.02±3.63) (Wu & Dou et al., 2021). This may be because their survey was before COVID-19 outbreak, while ours was after the outbreak. The epidemic has brought about tremendous changes in the daily work of medical staff. Even during the period of normalization of the epidemic in our study, medical staff is under a certain degree of steady-state load pressure (Peng et al., 2021).

In this survey, the scores of the turnover intention of each occupation type are as follows: the score of physician's turnover intention was (13.400±4.015), and the average score of the items was (2.233±0.669); The score of nurses' turnover intention was (14.130±4.277), and the average score of the items was (2.355±0.713); The score of pharmacists' turnover intention was (14.000±3.943), and the average score of the items was (2.333±0.657); The technician's turnover intention score was (13.800±3.774), and the average score of the items was (2.300±0.629).

In this study, the turnover intention of each occupation type is nurse, pharmacist, technician, and physician in descending order. This may be due to the heavy clinical workload of nurses, lower professional recognition, and more night shifts than other occupations. Studies have also shown that nurses have a high turnover intention their jobs and are more willing to leave the nursing industry than physicians (Wu et al., 2022).

The turnover intention score of physicians in this study was slightly lower than that of a 2018 survey of 1,456 primary healthcare physicians in 26 provinces and four municipalities in mainland China (13.48±3.24) (W. Li et al., 2020). The research objects of this study are physicians in general hospitals at all levels. Compared with primary care physicians, the research objects of this study may have better job security and working environment (Wang et

al., 2020), so they have a lower turnover intention.

The turnover intention of nurses is slightly lower than the average score of turnover intention items in a survey of 56 emergency nurses in Chongqing, China (2.38±0.57) (Ma et al., 2022). This may be because the results were obtained from nurses at all levels in a general hospital. The workload of the emergency department is heavy and the work is busy. General hospital nurses have a more even distribution of turnover intention scores than emergency department nurses and were therefore slightly lower than emergency department nurses.

The result of this study is higher than the survey score (13.97±3.63) of 12,291 nurses in 23 hospitals nationwide (Cao et al., 2021). The reason may be that our study samples were from various hospitals in Guangdong Province. Guangdong Province is an economically developed coastal area in the east of China. It has many development opportunities and correspondingly great work pressure. Nurses also have higher turnover intentions than those in the Midwest (L. Gan et al., 2020).

In addition, this survey was conducted during the prevention and control period of COVID-19. Compared with the investigation before the epidemic, nurses took on more tasks and roles. The medical system has increased the demand and workload for clinical nurses. Not only work pressure, but psychological problems also follow. As a result, turnover intentions increase (Falatah, 2021; Nashwan et al., 2021; Tabur et al., 2022).

In addition, a 2016 survey of 1,798 nurses in 48 hospitals in Jiangsu Province, which is also a relatively economically developed province, showed that our result was lower than that of nurses in Jiangsu Province (15.50±3.44) (Chen et al., 2018). This may be related to the fact that in recent years, the medical and health system has paid more and more attention to nurses, and has taken many positive measures to increase nurses' job security, guarantee nurses' welfare benefits, and gradually improve nurses' satisfaction.

The questions on the Turnover Intention Scale are, in descending order,

"If you knew of a job opening at another organization that would suit you, how likely would you be to get the job?"; "Would you like to find another job of a different nature?"; "Would you like to find another job of the same nature?"; "What are the chances of finding a suitable position in another organization given your current conditions and situation?"; "Would you quit your current job?"; "Would you consider quitting your current job?"; "Have you ever considered quitting your current job?".

The three dimensions of turnover intention, from high to low, are "likelihood of getting an outside job", "motivation to find another job" and "likelihood of quitting your current job". The mean scores for each dimension are as follows: "Likelihood of quitting current job" was

(1.998±0.873), which is at a low level. “Likelihood of getting an outside job” was (2.564±0.828), which is at a high level. “Motivation to find another job” was (2.383±0.842).

From this, we can conclude that the medical personnel in Guangdong Province, the subject of this survey, have the idea of leaving their jobs and believe that they are more likely to get another job or even leave their field of work and not do the same type of work.

In summary, the results show that although medical staff is less likely to consider resigning from their current positions, they have greater motivation to seek other jobs. If the outside world can provide jobs with better conditions, they will also choose to leave the clinic or choose to leave their current positions in order to obtain better job opportunities. This problem is very detrimental to the stability of the hospital’s medical personnel.

The highest mean score is the question of “likelihood of getting an outside job”, which is consistent with other studies (Wei et al., 2016). This may be due to the strong professional characteristics of medical staff and targeted work skills. They are easily qualified for the same type of work in other institutions. Moreover, the current shortage of medical personnel is serious, and the demand for such professionals is greater than the supply. Medical personnel have unique advantages in the labor market and are irreplaceable (Lu et al., 2017)

The second reason may be that the reform of China’s medical system has brought more employment opportunities. Medical staff can choose other medical institutions. Since 2009, the Chinese government has promulgated a series of policies and regulations to encourage the development of private hospitals, aiming to optimize the medical system, meet diverse needs, and improve medical services. These initiatives have increased the chances of medical staff obtaining new jobs, as well as their turnover intention (Jin et al., 2014).

The “motivation to find another job” item was also at a high level in this study. The externalization of work motivation of most medical staff is often expressed as the intention to quit (Yu et al., 2021). Due to their own pursuit of the target and the fact that the current working state is not up to expectations, medical staff will increase their turnover intention and look for other better or more suitable jobs.

Job motivation and satisfaction have also been identified as key factors in turnover intentions (Bonenberger et al., 2014). The WHO (2010) mentioned that monetary and non-monetary incentives are key factors influencing retention and motivation to work. Whether salary income matches expectations, and whether the organization and society can recognize one’s efforts are all factors that motivate work motivation and keep one’s job. On the contrary, if medical staff cannot obtain the expected returns for their work, they will be dissatisfied with their work and produce the idea of quitting.

Our survey showed that medical professionals scored even higher on the question “Would you like to find another job of a different nature?” than the question “Would you like to find another job of the same nature?” This suggests that medical staff have low job satisfaction and have the idea of leaving the job. They are even more likely to want to leave their industry than to just change providers. There is a serious shortage of medical personnel. The more medical personnel leave the industry, the more serious the shortage of medical personnel will be, which is not conducive to the quality of medical care and increases the cost of the medical system (Huang et al., 2021). Therefore, this phenomenon should be taken seriously by improving the satisfaction of medical staff, motivating medical staff, reducing the turnover intention, and stabilizing the talent team to promote sustainable development.

The “likelihood of quitting current job” was at a low level, the lowest of the three items, which is similar to other studies. However, the score level was significantly lower than that of operating room nurses in Qingdao (Xiao et al., 2020) and that of operating room nurses in Anhui Province (Zhu et al., 2022).

This dimension indicates the degree of dissatisfaction of medical staff with their current jobs and the possibility of actually implementing resignation. The reason for the low score in this item may be that medical personnel in Guangdong Province are highly embedded in the organization, and they still need some stimulation to consider leaving their current positions. Or the medical personnel in Guangdong Province have not been able to obtain better job opportunities to replace their current jobs. Therefore, the medical personnel team in Guangdong Province, the research object of the study, was relatively stable in the current period.

5.3.2 Influence of demographic and sociological factors on turnover intention

5.3.2.1 Job satisfaction

In multiple regression analysis, multiple variables were included to analyze the impact on turnover intention. In the final model, we found that job satisfaction was the most influential factor on the medical staff’s turnover intention. Our research confirms many previous studies (Chao et al., 2015; Leider et al., 2016; Li et al., 2016), and verifies theories such as Mobley (1977) and Price-Mueller’s turnover model (Siefert et al., 1991; Vinokur-Kaplan, 1991). At the same time, the study also verified that job satisfaction is a key factor affecting turnover intention, and job dissatisfaction will increase turnover intention.

In our current survey, the number of people who are generally satisfied accounts for

36.1% of the total number. The profession with the highest satisfaction is pharmacist, and the number of satisfied people accounts for 38.1% of the total number. Followed by the number of satisfied physicians accounted for 36.1% of the total number. The third is nurses, and the number of satisfied people accounts for 35.8% of the total number. The lowest level of satisfaction is technicians, and the number of satisfied people accounts for 35.2% of the total number.

Some studies have shown that nurses have higher job satisfaction than physicians (Chan et al., 2015; Jonsson, 2012; Sehlen et al., 2009). Most of these studies were conducted in developed countries, such as Germany and Switzerland. However, there is also a study pointing out that a survey of ICU wards in Norway showed that compared with physicians, nurses' satisfaction was lower than that of physicians, although there was a statistical difference in measuring work stress (Myhren et al., 2013).

Studies have also pointed out that occupations with higher turnover intentions are often accompanied by high tendency of turnover (Kim & Kao, 2014). The occupation type with the highest turnover intention in our study was nurses, which differed from technicians with the lowest satisfaction. This may be due to the fact that nurses and physicians accounted for the majority of our sample size. There were only more than 300 technicians and pharmacists as respondents to this study. There is a certain difference in the turnover intention of physicians and nurses, whose turnover intention may have a large variation.

Therefore, we only compare the effect of job satisfaction on the turnover intention for physicians and nurses. The number of nurses who are satisfied with their jobs is less than that of physicians, and their turnover intention is also higher than that of physicians. This is consistent with the many studies' results (Iliopoulos & Priporas, 2011; Seo et al., 2016). This may be due to the complicated work content of nurses, heavy workload and low autonomy (Papathanassoglou et al., 2012). Therefore, they are more prone to burnout, which makes satisfaction drop, further leading to an increase in turnover intention (Hoff et al., 2019).

There are many organizational factors that influence job satisfaction, such as factors related to pay, benefits, motivation and relationships with superiors (Arian et al., 2018; Dilig-Ruiz et al., 2018; Specchia et al., 2021). From the perspective of hospital administrators, this suggests that we need to pay more attention to the satisfaction of medical staff when developing hospital management strategies and be able to support different policies depending on the type of occupation. In addition, improving welfare benefits and more appropriate equipment, as well as improving the space platform for education and career development and setting up a reasonable promotion system can also contribute to increasing job satisfaction

(Zhang et al., 2016) This will in turn improve the retention rate of medical staff.

5.3.2.2 Workplace violence

Our results found that workplace violence was an influential factor on the turnover intention and that the exposure to workplace violence caused turnover intention, which is consistent with previous studies (Cakal et al., 2021; Heponiemi et al., 2014; Li et al., 2019). In this study, the results reflected that nearly half of medical staff experienced workplace violence in the workplace, with 48.9% experiencing workplace violence. Physicians experienced the most workplace violence, accounting for 51.7%. This is also consistent with previous national survey data that most Chinese physicians have experienced workplace violence (Sun et al., 2017).

This may be related to the fact that perpetrators of workplace violence mainly originate from patients and their families (Talas et al., 2011) and physicians and nurses are professions that spends more time in contact with patients. The current high incidence of workplace violence, which can be physically and psychologically traumatic for healthcare workers, has a significant impact on their health and well-being (Konttila et al., 2021). It can have an impact on the health and well-being of healthcare professionals (Havaei & MacPhee, 2021). These incidents can also be demotivating and frustrating, leading to feelings of burnout and an increased turnover intention the profession (Chen et al., 2016). Choi and Lee (2017) also pointed out that workplace violence has an impact on the quality of the professional life of health professionals. Sun et al. (2021) noted that workplace violence increases stress at work.

It is also worth noting that following an incident of workplace violence, even though some healthcare workers do not suffer direct harm, the impact of the incident also affects the safe climate and environment (Chang et al., 2018). It also contributes to low morale and perceived fear and insecurity within the organization (Mikkola et al., 2017; Noga et al., 2021).

The exposure of medical staff to workplace violence, which affects the work status of medical staff can also cause many problems such as medical errors, inefficient care, conflict and stress among health professionals (Noga et al., 2021). American Nurses Association (American Nurses Association, 2015, 2016, 2020) recommended a zero-tolerance policy, encouraged staff to report incidents, and implemented a comprehensive violence prevention program.

The US National Institute for Occupational Safety and Health Guideline (2013) recommended physical barriers for protection, silent alarm systems, panic buttons, mirrors and raised platforms, bright and effective lighting, video surveillance equipment, controlled or

restricted access facilities, and locks on doors leading to employee-only areas. This also gives Chinese hospital administrators inspiration to learn from their experience and to upgrade the work protection environment, increase investment in security and upgrade equipment (Chang et al., 2019). Chinese hospital administrators can also keep up with the times by introducing smart devices such as access control points with face recognition for employees and central control devices for the security office.

In terms of employee training, the Occupational Safety and Health Administration (1997) published a Guide to Preventing Workplace Violence for Healthcare and Social Service Workers. The guide was subsequently updated in 2016 as well (Occupational Safety and Health Administrations, 2020). The guide mentioned that training medical staff in emergency response is an integral part of the process.

Although there are a number of training programs aimed at workplace violence prevention for medical staff, studies have noted that existing training has many unsatisfactory outcomes, still falls short of guideline expectations, and lacks a focus on facility-specific risk assessments and policies (Arbury et al., 2017).

Therefore, in drawing on the workplace violence prevention training of others for medical staff, it is also important to strengthen the treatment of this issue, and hospital administrators can reinforce the following points in their training.

A policy on the prevention of workplace violence; identification of risk factors that cause or contribute to aggression; clear policies and procedures for recording changes in the behaviour of patients and their families or peers; knowledge of the location, operation and coverage of safety equipment (such as alarm systems) and the maintenance schedules and procedures required; early judgement of escalating behaviour of patients and their families or peers, or of warning signs or situations that may lead to aggression. How to recognise, prevent or eliminate unstable situations or aggressive behaviour; self-regulation and learning to control anger; the appropriate use of medication; techniques for communicating with patients and peers (such as relatives and visitors); the correct use of safe houses (i.e. places where staff can take refuge from violent incidents); standard response action plans for violent situations, including the feasibility of assistance, response to alarm systems and communication procedures; appropriate How to initiate self-defence procedures at the right time; progressive approaches to control and when and how to apply protective restraint appropriately and safely when needed; ways to protect oneself and colleagues, including the use of the buddy system; policies and procedures for reporting and record keeping of incidents; access to medical treatment, trauma-informed care, workers' compensation or legal assistance following a

violent incident or injury policies and procedures for accessing medical treatment, trauma-informed care, counselling, workers' compensation or legal assistance following a violent incident or injury. The key point is that hospital administrators should implement the training content and simulate the exercises, which are essential for the management of the incident.

It is crucial to manage and prevent workplace violence (Solorzano & De Oliveira, 2021; Taylor, 2018). Protecting medical staff and providing them with a safe environment will increase medical staff's trust in the organization and job satisfaction in addition to reducing talent loss. In turn, it will reduce their turnover intention, thus preserving the hospital workforce (Chang et al., 2019; Ma et al., 2022).

5.3.2.3 Overtime hours

The longer overtime hours mean an intention to leave. The results of the survey are consistent with previous studies (Sharififard et al., 2019; Steinmetz et al., 2014). Overtime has become a regular phenomenon among Chinese medical staff (Tsai et al., 2016; Wu et al., 2018). The main reasons for this are the lack of human resources and the high workload, which requires them to take care of more patients (Bae, 2012a). A 2004 survey showed that more than half of nurses worked 40 hours of overtime per week (Bae & Brewer, 2010).

There are several states in the United States that require nurses to work overtime, but nurses working in states that do not mandate overtime have equal or higher overtime hours than nurses working in states that do require mandatory overtime (Bae, 2012b). This also suggests that overtime hours need to be stipulated by the government. China's Labour Law also stipulates that overtime should be subsidised to protect the basic rights of employees (Zhao, 2020).

Overtime work also has a negative impact on the physical health of medical staff (Bae, 2012a), and is associated with occupational injuries (Shin et al., 2020). Overtime can cause stress in staff, raise their cortisol levels, and threaten their balance between work and non-work periods (Albertsen et al., 2008; Hsu et al., 2019; Lundberg & Hellström, 2002). Prolonged and extensive overtime work may also contribute to cardiovascular diseases such as coronary heart disease and hypertension (Brisbois & Chalupka, 2010; Cheng et al., 2021; McInnes, 2010). Excessive overtime may also lead to shorter life expectancy (Jackson, 2011).

In addition, overtime has been reported as an important work stressor (Leng et al., 2020) and may also have an impact on the mental health of medical staff (Houdmont et al., 2011; Ohta et al., 2015). Studies found that overtime may have an increased risk of anxiety and depression (Kato et al., 2014; Lee et al., 2015; Liu et al., 2021). The impact of overtime is

also reported as a significant source of work stress and may have an impact on the mental health of medical staff, increasing the likelihood of anxiety and depression. At the same time, overtime also affects family work conflicts, because employees will bring their dissatisfaction at work to family life (Yu & Leka, 2022).

For organizations, overtime is not an effective way to improve patient outcomes and quality of care, despite its ability to complete work content in the short term. Studies pointed out that overtime may affect the quality of patient care (Luther et al., 2017; Stimpfel et al., 2012). This is particularly true when overtime work by medical staff leads to a state of exhaustion (Bae, 2013; Lobo et al., 2018). It may affect the perceived acuity of medical staff (D'Sa et al., 2018), making it difficult to identify potential hazards that threaten patient safety, or even increasing the incidence of medical errors and compromise patient safety (Beltempo et al., 2022; Griffiths et al., 2014; Mmamma et al., 2015).

Medical staff devote a lot of time and energy, but often fail to get a matching return (Coulshed et al., 2022). As a result, they experience burnout (Wilson, 2016), job dissatisfaction, and increased turnover intention (Rivard et al., 2020). Long-term excessive overtime is not conducive to the long-term sustainable development of the organization.

Some studies indicated that it is hard to manage the workload of overtime work (Picton, 2009). This suggests that hospital administrators can set reasonable measures, use hospital information systems to record overtime workload. Monitoring, control and analysis of these performance indicators should be strengthened (Almorsy & Khalifa, 2016). By 2010, 16 states in the US had introduced regulations restricting overtime for nurses, and nurses working in states with mandatory overtime regulations reported working fewer total hours per week (Bae et al., 2012). This also demonstrates the ability of government strategies to safeguard the well-being of medical staff.

5.3.2.4 Hospital level

The study found that the medicals staff in higher-level hospital had lower intention to quit, which is consistent with some studies (Chen et al., 2017; Tao et al., 2015). There was a statistically significant difference between the “likelihood of quitting current job” and “motivation to find another job” items in this survey, with the turnover intention being higher in lower-level hospitals. This implies that the workforce at lower-level hospital may be in an instable state. They may leave the organization as soon as job opportunities become available at higher levels.

In order to strengthen the quality of medical care and improve the scientific management

of hospitals, and to promote the sustainable development and modernisation of the healthcare system, hospitals in China have been graded, and a grading system of "three levels and ten grades" has been established. Hospitals are graded according to the number of beds, the number of departments, the size of the hospital, the amount of funding, and the availability of equipment. Hospitals with higher grade and level possess more comprehensive the strength and greater the scope of radiation.

Research explained that regardless of rank, promotion within public hospitals still requires a lot of time and effort on research tasks. However, medical staff working in lower-ranked hospitals have little chance of successfully applying for academic research compared to physicians working in higher-ranked medical institutions. In China, it is more difficult for primary care physicians to be promoted and they are at a disadvantage in terms of career development (He et al., 2020). It is difficult for them to get the expected results even if they put in a lot of effort, and there is no balance between investment and return. Higher ranked hospitals have higher platforms and talent pools, so they can offer better opportunities to apply for research projects and teamwork. If primary care staff keep stumbling over their future career development, they will choose to leave primary care.

An empirical study also confirmed that public hospital physicians' satisfaction with income is not a determinant of intention to leave. Physicians in Chinese urban public hospitals value their professional environment and career development rather than payment in their job decisions (F. Zhang et al., 2017). Large hospitals tend to have access to more government funding and more medical and educational resources, and so can give them a broader platform and room for development, which is conducive to future career development.

According to the powerful siphon effect, large tertiary hospitals attract less well-resourced talent from the surrounding area due to their concentration of resources and continue to recruit more experienced medical staff from lower-rated hospitals (Lv & Zhao, 2018). The hospital environment reflects the overall quality of the staff and the effectiveness of the hospital management. Higher-level hospitals enjoy better environment and higher job satisfaction of the medical staff (McCaughey et al., 2015).

5.3.2.5 Occupation

The findings found a statistically significant difference in turnover intention scores for nurses compared to physicians. Nurses have a higher turnover intention than physicians, which may be related to the perceived lower status of nurses in society and the healthcare system in China (Wu & Chen et al., 2021), as well as the long-standing phenomenon of less attention

paid to nurses (Jiang & Shang, 2021).

Nurses themselves make horizontal and vertical comparisons. In addition to comparing their own professional differences with those of physicians, they are also concerned about how their profession is perceived by others and how it compares with their peers in other professions (Wang & Yang, 2015).

Therefore, nurses feel that they have low social status, so they will be more disappointed and have negative emotions at work. Compared with peers or physicians of the same seniority, nurses have a lower professional identity than physicians (Wlodarczyk & Tobolska, 2011). Under the long-term continuous comparison, negative emotions will be generated, and then the dissatisfaction with the work will accumulate, and the turnover intention the job will increase.

In addition, there is tension between physicians and nurses, which may stem from the fact that nurses feel more bound by the rules of hospital operations than physicians. Most nurses without prescriptive authority need to follow physicians' orders to carry out their medical work, while physicians have more freedom in this regard (Selmanoff, 1968). There are even cases of physicians bullying junior nurses (Andrews, 1993).

Moreover, hospitals have two lines of authority: administrative and medical. In hospitals where the majority of management are clinicians, nurses also tend not to have the same upper limit of promotion in administration as physicians (Abu et al., 2021). In addition, nurses have the longest contact time with patients compared to physicians and do not gain as much respect from patients as physicians (Donahue, 2020). As a result, nurses have a low self-perceived status (Liu et al., 2012). This results in a lower sense of professional identity for nurses.

Differences in the working styles of physicians and nurses also contribute to differences in the willingness of nurses and physicians to leave the profession. Nurses often have to work more frequent shifts and more night shifts than physicians. Some studies even pointed out that the workload of nurses was greater than that of physicians during COVID-19 prevention and control (Zhong et al., 2022). This led to both physical and psychological impacts on nurses (Tong et al., 2018).

regardless of their profession, medical staff is vital to the development of hospitals. Therefore, hospital administrators need to focus on the needs of nurses and can tailor interventions to the position (Chen et al., 2022). Hospital administrators need to be more proactive in trying to develop institutional models that are satisfactory to both nurses and physicians and that meet the needs of the hospital as a whole. Establishing a reasonable performance mechanism to improve the treatment of nurses and achieving fair management

(Mohamed, 2014). In addition, standardising job management so that nurses have the same opportunities as clinicians for promotion, merit assessment and further study, and improving the sense of belonging of nurses.

5.3.2.6 Working department

Medical staff turnover intention scores were higher in obstetrics and gynaecology and paediatrics compared to outpatient and emergency departments. This result is similar to the findings of the turnover intention survey of nurses in 18 tertiary hospitals in Wuhan, Hubei Province (T. T. Yang et al., 2019). Some studies mentioned that higher levels of physician burnout in obstetrics and gynaecology (Bourne et al., 2019). Physicians in obstetrics and gynaecology also face traumatic events, most common adverse events such as maternal and infant injury or death. It was reported that 5% of midwives suffer from work-related post-traumatic stress disorder (Sheen et al., 2015), and their levels of emotional exhaustion and tendency to depersonalise the care recipient increased.

Other consequences include an increase in sick leave and employee departures (Slade et al., 2020), which can affect organizational costs. The reasons for this may be related to the fact that patients in obstetrics and gynaecology are mainly maternal and sick women. Obstetrics and gynaecology require emotional labour from the medical staff, especially as obstetrics and gynaecology is about welcoming newborns as the expected outcome. Medical staff is not only responsible for the health of the patient, but also for a family. However, the complex and changing conditions of pregnancy can cause maternal anxiety and fear, and prolonged emotional exertion may cause empathic fatigue and burnout among medical staff (Fernando & Consedine, 2014; Ledoux, 2015).

Paediatrics is also emotionally demanding, as children often have difficulty expressing their feelings and are uncooperative and difficult to communicate with. Parents are often required to attend with their children. They also need to be soothed when managing their children’s conditions, so they are more likely to lose control of their emotions when confronted with a crying child (Ramirez et al., 2018). This can be a challenge for paediatric staff (Weiss et al., 2021).

Paediatrics is also a department with a severe shortage of medical staff in China, with staff shortages leading to high workloads, only four paediatricians per 10,000 children, and a 12.6% turnover rate of paediatricians. One study mentioned that 40% of paediatricians suffer from job burnout (Olson et al., 2015). Obstetrics and gynecology and pediatrics are departments with complicated work. Because the amount of medication and examination in

obstetrics and pediatrics is less than that of other departments, the economic benefit is not high. Therefore, obstetrics, gynecology and pediatrics are less profitable, resulting in low income for medical staff (J. M. Wang et al., 2021).

There is even a saying in China that “gold ophthalmology, silver surgery, exhausting work in obstetrics and gynaecology, worthless in paediatrics”, which reflects the dilemma of medical staff in obstetrics and gynaecology and paediatrics. The Research Report on the Current Work Situation of Paediatricians in China (Yimi Research, 2016) also argued that nearly 90% of paediatricians consider their income to be lower than the average income of physicians in the same hospital. The pressure of work is high, but the rewards are not sufficient, increasing job dissatisfaction among medical staff and the turnover intention.

5.3.2.7 Regions

The study shows that the turnover intention of medical staff in the Pearl River Delta region and northern Guangdong is statistically significant. The turnover intention is higher in the Pearl River Delta region than in northern Guangdong. Scores on the items of “likelihood of quitting current job”, “likelihood of getting an outside job” and “motivation to find another job” were statistically significant across regions.

As the political, cultural and economic centre of Guangdong Province, the Pearl River Delta region is the most developed region, with a tight labour market and a number of large tertiary hospitals in the region (Deng & Zhan, 2021; Fabre & Rodwin, 2011).

In addition, non-public hospitals in the Pearl River Delta region take up most of the market share of private hospitals and attract experienced medical staff, offering a wider choice of labour market employment (Xiao-ran et al., 2014). This has also increased the propensity of medical staff in the Pearl River Delta region to leave the profession. In contrast, medical staff in general hospitals in northern Guangdong are less likely to choose to quit due to their relatively fewer resources and the lack of competitiveness of medical staff in northern Guangdong compared to those in the Pearl River Delta region (Jin & Zhou, 2017).

Moreover, the best medical resources are concentrated in the Pearl River Delta region, which leads to a higher number of patients from other regions being referred to the Pearl River Delta region for treatment of difficult and complicated diseases. Due to the “celebrity doctor effect”, many general patients from other regions also choose large hospitals in the Pearl River Delta region for treatment. This has led to a greater workload for medical staff in the region and an increased turnover intention the profession (L. Gan et al., 2020).

In terms of the cost of living, a large proportion of the medical workforce in the Pearl

River Delta region are non-locals, who need a high cost of living to support themselves in a large city, where housing prices are high. In the Chinese cultural context, not owning a home by marriageable age is tantamount to lacking a sense of belonging in the city (C. Y. Zhang et al., 2020). They may consider returning to their hometown or a city with a lower cost of living.

However, medical staff in northern Guangdong are more local in composition than in the Pearl River Delta region. Their cost of living is relatively lower, but they also lose many job options. As a result, medical staff in northern Guangdong are less willing to quit their jobs than those in the Pearl River Delta region.

5.4 Correlation between medical staff's sense of security, work engagement, and turnover intention

5.4.1 Correlation between sense security and work engagement of medical staff

According to Maslow's Hierarchy of Needs, once a person's basic physiological needs have been met, the first priority is to satisfy the individual's sense of adequate security. In addition, a sense of security is the basis of an individual's psychological health. The acquisition of a sense of security can promote the establishment and increase of self-confidence and self-esteem, facilitate the establishment of trusting interpersonal relationships with others, and enable them to consciously generate positive work motivation and attitudes from within, so that they are brave enough to express themselves and improve their work efficiency.

When medical staff is in a demanding and stressful work environment, the sense of imbalance between the individual and the organization may reduce their psychological security and even lead to a serious decrease in productivity or low work engagement (Zhang et al., 2021). In the course of providing healthcare services, medical staff is faced with heavy clinical workloads, performance appraisals and promotions, which can be psychologically stressful. This can lead to increased stress, psychological imbalance, uncertainty about their development and insecurity, which in turn can lead to lower work engagement (Hsieh & Kao, 2022).

Therefore, hospital administrators should pay attention to the mental health of medical staff, adjust the workload when they are dysfunctional, and provide humanistic care, as well as develop a scientific and effective schedule based on the patient's condition, workload and the medical staff's own work capacity. In addition, the necessary organizational activities not only help to form good interpersonal relationships within the medical team organization, but

also reduce the work pressure of the medical staff, improve their level of psychological security, and increase their commitment to their work.

According to the job resource-needs model, a sense of security as a work resource is an emotional need of medical staff in the organization (Zhang et al., 2021). It also enables medical staff to better adjust to the demands of the job, reduces the impact of negative emotions on work, and delays low levels of personal achievement to increase work engagement.

According to social exchange theory, the behaviour of individuals is governed by the activities that come from exchanges that bring rewards and rewards. Through their hard work, medical professionals are expected to gain value recognition and respect through their interactions with patients and performance in the organization, in addition to basic pay rewards (Basit, 2017). In the event of a poor doctor-patient relationship, when medical staff are unable to cope with the demands of their work (the stress of the doctor-patient relationship), they may feel that their efforts are not respected and recognised and that they do not receive the expected rewards for their efforts. When the principles of fairness and reciprocity are violated, this affects the motivation and quality of work. This is where a sense of security is essential for medical staff. Any security that the organization brings to the table will compensate for this lack of fairness and reciprocity, thereby increasing their commitment to their work and reducing their turnover intention.

5.4.2 Correlation between sense of security and turnover intention of medical staff

The results of this study dementated a negative correlation between medical staff’s sense of security and their turnover intention, in line with resource conservation theory. The theory clarifies that it is a model of stress and motivation, which focuses on the process of stress generation from the perspective of individual resource input-output imbalance. Stress and insecurity arise when individuals are threatened by the loss of resources or when they do not receive a corresponding return on their investment in resources, and individuals are thought to be psychologically motivated to conserve, acquire and utilise resources. Different motivations to deal with resources can have different effects on attitudes, psychology and behaviour.

When feelings of insecurity arise, the turnover intention or even the act of quitting can occur. Medical staff are always willing to work to gain resources they perceive as valuable, including psychological resources such as earning the respect of patients, trust and professional identity. These resources can motivate healthcare workers to deal with and cope with the stresses and problems of their jobs (Ângelo & Chambel, 2015). When medical staff

have gained sufficient security in the organization, a strong sense of responsibility will lead medical staff to reward the organization with proactive behaviour. This is in line with Lotfi et al.'s (2022) study. During COVID-19 control period, nurses are under a lot of pressure and will decide their inclination to leave based on their sense of security climate.

5.4.3 Work engagement medicates the impacts of sense of security and turnover intention

The results of this study show that a sense of security can significantly increase medical staff's work engagement, and a sense of security and work engagement can significantly reduce medical staff's turnover intention. Work engagement partially mediates the relationship between security and turnover intentions.

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Chapter 6: Research Conclusions and Prospects

6.1 Research conclusions

As security and work engagement are important predictor variables for understanding the intention to leave medical staff, this study explores the correlation between medical staff's security, work engagement, and intention to quit based on comprehensive hospitals in Guangdong Province, China. The hypotheses proposed in the thesis were tested through theoretical and empirical studies, following an analysis of the influence of potential variables in the model. The results show that the model has a good fit by constructing a structural equation model of medical staff's sense of security, work engagement, and turnover intentions. The fit of the conceptual model is good.

6.2 Innovations and contributions of this study

Firstly, based on an extensive review of domestic and international literature, this study applies security, work engagement and turnover intentions to the management of hospital medical staff. It concentrates on the current situation of security, work engagement and turnover intentions of hospital medical staff and the factors influencing turnover intentions. The study explores the significant differences in general demographic data on medical staff's sense of security, work engagement and turnover intention, analyses the important factors influencing medical staff's turnover intention, and extends the theoretical model of turnover intention.

Secondly, the four hypotheses of medical staff's sense of security, work engagement, and turnover intention were tested and an SEM of medical staff's turnover intention was developed. The analysis of the main factors influencing the reduction of medical staff turnover intentions has important theoretical and practical implications for the stabilisation of the health workforce for Chinese medical staff.

6.3 Practical suggestions

6.3.1 Suggestions at the national level

Unlike developed countries such as Europe and the United States, public hospitals are the main body that provide medical services in China, while private hospitals play a less essential role. According to 2021 healthcare statistics, 70.2% of the available beds in China are in public hospitals, while private hospital beds accounted for only 29.8%. Therefore, the China's strategic deployment of the medical and health system and the support of medical staff have greatly affected the motivation and stability of medical staff. Combined with our research results, the following suggestions are made at the national level.

(1) Promoting legislation and implementation of laws and regulations to ensure the safety of medical personnel

Compared with the sound legal protection system in developed countries, China's laws and regulations on hospital safety are still in the exploratory stage. For example, the United States has a relatively complete system for dealing with medical malpractice, and has a complete medical insurance system, which can better protect the rights and interests of patients. Therefore, once a medical dispute occurs, the first choice is often to resort to litigation. However, in China, medical incidents threaten the personal safety of medical staff. This urgently requires China to issue relevant laws and regulations to list such behaviors as illegal and criminal to ensure the normal order of medical treatment. In 2021, China issued the Guiding Opinions on Promoting the Management of Hospital Safety and Order, which emphasized the need to attach importance to the work of hospital safety and security, and establish and improve the management system of hospital safety and order. The release of this opinion reflects the China's emphasis on and determination to ensure the safety of medical personnel. This opinion puts forward opinions and solutions, but only the opinions and solutions have no effect of legal enforcement. In order to create a safe and stable environment and ensure that the rights and interests of medical personnel are effectively protected, it is urgent to implement various opinions. It is also necessary to issue a series of laws and regulations related to the legislation of the guidance on the safety of the medical system in a timely manner, so as to exert the superimposed effect of policies. By promoting it to various places and ensuring effective implementation the personal safety of medical staff can be protected by law, and the sense of achievement, happiness, and security of medical staff can be continuously enhanced. Only by working in a safe and secure environment can medical

staff put their minds to work without worrying about their personal safety. Only by stabilizing people's hearts can we retain talents.

Nurses are the largest group in the medical and health system, but the current regulations to protect nurses are only the Nurses Regulations implemented in 2008. Regulations are administrative regulations, rather than laws, so they are less mandatory and restrictive. It has been 15 years since the ordinance was issued. In 2011, China has separated nursing from the second-level discipline group of clinical medicine and became a first-level discipline, keeping pace with clinical medicine. The development of nursing specialty means that more practicing rights need legislative protection. Compared with legislative laws, the binding effect of regulations may be reduced, because the binding force of regulations depends on its execution. The actual implementation may be affected by external factors, such as political and economic factors, which may lead to a decline in the binding effect of regulations. The stability of the nurse team greatly affects the sustainable development of the medical system, but the protection of some nurses' rights and interests has not been implemented. It is urgent to promote the process of legislative improvement and upgrade the Nurse Regulations into the Nurse Law to effectively regulate the behavior of hospitals and protect the rights of nurses. This is also beneficial to the progress of healthcare.

Medical personnel have a high occupational exposure risk due to their occupational characteristics. At present, in addition to the radiation injury of medical personnel is included in the statutory occupational diseases, the injuries caused by other occupational exposures of medical personnel have not been included in the scope of statutory occupational diseases. In 2022, China's first medical personnel occupational exposure protection law, Xiamen Special Economic Zone Medical and Health Personnel Occupational Exposure Protection Regulations was implemented. Intended to establish a sound prevention and treatment system for occupational exposure, the regulation makes detailed provisions on occupational exposure training, employee physical examination, emergency response. The regulation also clarifies the scope of responsibility of all parties involved in occupational exposure protection. However, this regulation is only implemented in Xiamen, a city of China, and there is still no legal protection in other places. Therefore, we recommend learning from Xiamen's advanced experience, collecting and adopting relevant opinions, and forming guidelines or drafts that can be used nationwide for occupational exposure protection of medical personnel. China should promulgate comprehensive occupational health and safety regulations and laws to protect the health of medical personnel and standardize their occupational activities, and speed up their implementation to ensure the physical and mental health of medical personnel.

(2) Increasing investment in the health system, improve medical facilities and improve the income level of medical staff

According to the report data of WHO, global health expenditure grew faster than other sectors around the world in 2020, accounting for 10.8% of the global GDP. Health expenditures accounted for 9.2% of GDP in high-income countries, 7.1% of GDP in upper-middle-income countries, and 5.2% of GDP in lower-middle-income countries. In developed countries, the ratio of medical and health investment to GDP is generally more than 8%, and some even reach more than 10%. In 2020, China's total medical and health expenditures accounted for 7.1% of GDP, and in 2021, the total medical and health expenditures accounted for 6.5% of GDP. The survey results in this study show that the higher monthly income of medical staff means higher the work commitment and lower turnover intention. Compared with developed countries, there is still a gap in fiscal investment in the medical system between China and developed countries. It is recommended to further increase fiscal investment in the health system. The high-quality development of China's public hospitals has entered the fast lane, and the "three improvements" (improving the quality of medical services, improving the efficiency of medical services, and improving the treatment of medical personnel). To complete the high-quality development of hospitals, it is inseparable from the state's investment in medical and health care. Increasing national health investment will help improve the working environment and working conditions of medical personnel, and promote the development of medical personnel's technical level and quality.

Due to the large gap in resources between urban and rural areas in China, medical staff in primary and secondary hospitals often have lower income and treatment. In terms of capital investment, there is an urgent need for health administrative departments at all levels to continue to increase investment in grassroots health, optimize and adjust the structure of health and health expenditures, and continue to tilt towards urban and rural grassroots. At the same time, strengthen the convergence of the performance salary level of grassroots medical personnel, and reasonably improve the treatment of grassroots medical personnel. Therefore, it is recommended to coordinate and balance the relationship with the performance salary level of local county (district) public hospitals, put forward suggestions for rationally checking the total amount and level of performance salary of grassroots medical and health institutions, and gradually narrow the income gap. In this way, the medical staff at the grassroots level can obtain satisfactory income and treatment. Even at the grassroots level, they can leverage their roles at their positions and gain a sense of value, thus being willing to stay at the grassroots level to provide medical services.

Improving the economic income and treatment of medical staff can help improve the social status of medical staff, improve the work enthusiasm and satisfaction of medical staff, increase their sense of security and work commitment, and can effectively reduce their turnover intention.

6.3.2 Suggestions at the hospital administration level

For hospital administrators, selecting, educating, employing, and retaining personnel are hot issues that hospital administrators need to focus on. Based on the research findings, the following recommendations are made..

(1) Enhancing human resource management, the performance distribution system, and mobilizing the enthusiasm of medical staff

The allocation of hospital human resources should meet the needs of the hospital's functional tasks and quality and safety management. However, many hospitals have not yet met the requirements of national human resource allocation. At the same time, the turnover rate of medical personnel is increasing, so the shortage of human resources is prominent. It is suggested that hospitals should rationally allocate sufficient medical staff in accordance with national requirements, and reduce the overtime hours of medical staff. It is also recommended that hospital should organize work schedule to allow for adequate rest and sleep, refine the job responsibilities of medical staff, separate administrative work from academic work, clarify the scope of work and leisure time of medical staff, and avoid high-pressure situations such as continuous overtime work caused by mixed roles.

Hospitals administration should pay attention to special groups and medical staff in special departments, and female medical staff, nurse groups, medical staff in emergency departments, ICU. In terms of human resource allocation and salary, preferential policies should be given to the above-mentioned groups. At present, the non-official staff in many hospitals accounts for about half of the total medical staff, but the treatment of these non-official medical staff is quite different from that of the staff. This creates a sense of insecurity and unfairness, and non-staff medical staff are more likely to leave their jobs. The establishment of equal pay for equal work between informal staff and formal staff can showcase the principle of fair and just distribution, which can effectively mobilize the work enthusiasm of informal staff and enhance the sense of belonging to the organization.

(2) Paying attention to the physical and mental health of medical staff and enhancing humanistic care for medical staff

A sense of security is an important factor in the willingness of medical staff to leave, and

hospitals need to improve the security of medical staff if they want to stabilise them. Physical and mental health is the foundation of a sense of security. Hospitals can regularly screen and evaluate the physical and mental health of medical staff, and pay attention to the physical and mental conditions of medical staff in a timely manner. In this way, administration can achieve three-level prevention and control of early detection, early prevention, and early treatment to effectively protect the physical and mental health of medical staff. The hospital should provide various channels and places of psychological assistance, such as home of labour union, psychological hotline, and psychological catharsis room. This is conducive to soothing emotions and reducing psychological stress. For medical staff whose physical and mental health is compromised, the hospital should actively provide treatment and care. This is conducive to enhancing the sense of belonging and security of the staff to the hospital. At the same time, it is suggested that hospitals should strengthen humanistic care and human-based management. Various forms of activities should be carried out in a regular basis to strengthen the team building of medical staff. For example, mountain climbing, playing ball, swimming, interest groups, and outings. This is beneficial to strengthen the communication between the teams and enhance the cohesion, so that the medical staff will be more confident and optimistic in the face of various situations.

(3) Improving the working environment to create a safe and harmonious medical environment

Hospitals should provide professional workplaces for medical staff. For example, providing rest areas in the workplace for medical staff working long shifts. Hospitals should provide good medical equipment and consumables, and increase protective measures to reduce the harm to medical staff caused by noise, needle stick injuries, and harmful chemicals. Hospitals should implement the hospital safety guarantee opinions issued by the state. For example, in high-risk departments (emergency and critical care, pediatrics, obstetrics and gynecology) to strengthen security equipment and safety measures. Hospitals should establish and improve information sharing and early warning mechanisms for high-risk patients, strengthen safety education for medical staff, and improve medical staff's safety awareness and prevention capabilities.

Hospitals should actively guide public opinion propaganda. In the era of information explosion, we must pay special attention to Internet self-media reports. The hospital should guide the media to do more objective, rational and positive publicity reports. It is also necessary to continuously improve the medical and health knowledge of the masses, so that the masses have scientific and reasonable expectations for medical results. At the same time,

the comprehensive quality and communication skills of medical staff should be improved to reduce doctor-patient conflicts, promote respect and trust between doctors and patients, and create a safe and harmonious medical environment.

(4) Facilitating the career planning of medical personnel to help personal growth

Due to the influence of social factors, working environment and other factors, medical personnel have many difficulties in career development, and it is difficult to find a career development direction in a relatively short period of time. As a result, the professional value of medical personnel has not been respected and reflected as it should be. Therefore, to a certain extent, it affects the work enthusiasm and work efficiency of medical staff. Hospitals should actively start from many aspects to realize the career planning of medical staff. On the one hand, hospitals should formulate and implement relevant training plans and learning plans internally to strengthen the training and learning of medical staff. Medical staff can also exercise and improve their professional skills and comprehensive quality by participating in relevant competitions and selections. The hospital should formulate a corresponding reward system to encourage medical staff to study on the job to improve their academic qualifications. On the other hand, the hospital establishes strategic alliances with external institutions, such as other advanced hospitals, scientific research institutions, and universities to seek cooperation. Hospitals should regularly organize academic exchanges, professional skills training and other activities to promote exchanges and cooperation among medical staff and enhance mutual understanding. These activities can also promote mutual learning, reference and absorption. In this way, the professional value of medical staff can be reflected and respected, thus effectively improving the work enthusiasm of the medical staff.

(5) Enhancing organizational cohesion in the hospital

In order to enhance the cohesion of the organization in the hospital, it is recommended to start from the following aspects:

Understanding employee needs. Having a certain understanding of the needs of employees, grasping the issues they are most concerned about, and proposing corresponding measures according to different situations.

Building good relationships. Good interpersonal relationship is the basis for cohesiveness of the organization. Every employee is eager to gain the respect and trust of others and the organization. Only in this case can the barriers between each other be eliminated, positive resonance can be generated, and employees can be integrated into the organization.

Establishing a mutual trust mechanism as the foundation of a person’s psychological stability, full of enthusiasm, and high work efficiency. Therefore, establishing a mutual trust

mechanism is of great significance to improving the overall quality of employees and maintaining organizational cohesion.

Improving employee's job skills and job performance. It is suggested to increase training opportunities so that they have the opportunity to get in touch with the latest technology and ideas, meet their knowledge update needs, improve the professional knowledge and management knowledge structure of department managers, enhance their sense of organizational support for subordinate nurses, and improve the quality of the department team overall improvement. The hospital can help medical staff plan their career development path, provide training objectives at all levels, and help the growth and development of each stage of career. In addition, the hospital can strive for more opportunities for employees to learn and communicate, and provide a platform for employees to learn and train. Increasing the budget input to help employees' career development, encouraging employees to improve their academic qualifications on the job, and providing a certain degree of financial support.

Establishing an equal and harmonious relationship. This is the key to enhancing organizational cohesion. Harmony does not mean that there are no contradictions and differences, but that contradictions and differences can be properly handled and properly resolved so that they will not affect the work.

Organizational culture building. If an enterprise wants to achieve good development, it must have a commonly recognized value and establish a corresponding system and culture to maintain it.

6.3.3 Suggestions at the individual level

Whether the personal character and ability of medical personnel match the job position is also a factor that affects the willingness to leave. How to obtain achievement satisfaction at work also requires medical staff to exert their subjective initiative. Hospitals should encourage medical staff to improve themselves and find work goals. Therefore, combined with the conclusions of this study, the following suggestions are put forward at the individual level.

(1) Improving communication skills and stress resistance

Effective communication between healthcare professionals and patients and their families is critical to accurate diagnosis, appropriate treatment, and helping patients understand their health conditions and needs. Nowadays, doctor-patient conflicts occur frequently, mainly due to poor communication, lack of trust from patients, and inability to understand and support each other. Therefore, in addition to professional knowledge and technology, medical staff also need to strengthen the learning and improvement of communication skills. Communicate

with patients and their families should pursue the principle of integrity, mutual respect, empathy, and patience. A good working atmosphere is conducive to promoting the input of medical staff, thereby reducing their willingness to resign.

In the process of communicating with others, it is also important to manage your emotions. Medical staff are often under pressure, and a good ability to resist stress can help them quickly adjust their emotions and avoid negative emotions affecting communication at work. In order to avoid losing control of their emotions and ruining their careers, it is recommended that medical staff learn how to control their emotions. First of all, medical personnel must correctly understand stress, secondly learn to deal with stress correctly, and last learn to regulate stress correctly. Medical staff who have been in a mental state of high-intensity work for a long time should conduct self-assessment and learn basic psychological support techniques, which can be used for self-regulation to relieve psychological problems. They are also encouraged to take part in more physical exercises, maintain good work and rest habits, and participate in more social activities to enhance their ability to resist stress.

(2) Improving professionalism through self-learning

The work of medical personnel is extremely professional. Nowadays, the medical industry is changing rapidly. Medical personnel improve their professional ability and quality through self-learning. Possessing a wealth of knowledge and solid technology is also a source of security for medical staff. Conversely, if the knowledge and ability of medical staff cannot be improved, it will be difficult for them to adapt to increasingly complex diseases and sophisticated science and technology, which will eventually lead to an increase in their turnover intention. Therefore, medical personnel should first change their mindsets. They should not complete their work merely because it is required by their superiors but continue to learn by themselves. Medical personnel should actively participate in continuing education and vocational retraining to develop themselves. By improving their academic qualifications, they can broaden their horizons in higher education institutions, have access to cutting-edge knowledge, and devote themselves to work with full enthusiasm.

6.4 Limitations research prospects

This study has certain limitations and the main reasons for these limitations are:

Firstly, this study conducted a questionnaire survey. As the study was conducted during COVID-19, the questionnaire was completed online so we were unable to verify the identity of the respondents.

Secondly, the relationship among sense of security, job engagement and turnover intention was verified in this study. However, there are many factors that affect the turnover intention of medical staff. The focus of this thesis is to study the impact of security and work engagement on the turnover intention. The next step will be to introduce other variables to enrich the conceptual model.

Third, this study only included medical personnel from Guangdong Province, China so the representativeness is limited. The next step will be considering the sample of medical personnel in China.

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Annex A: Sense of Security Scale for Medical Staff (SSS-MS)

1 mark = very well met, 2 marks = met, 3 marks = fair, 4 marks = not met, 5 marks = very poorly met

Title item		in line with me very much	in line with me	neutral	not in line with me	not in line with me very much
Environment	1. The physical hospital environment, occupational exposure concerns me					
	2. Night shifts, overtime work and work overload make me feel physically and mentally exhausted					
	3. I am often faced with resuscitation and complex events at work that worry me					
	4. The demands of teaching and research outside of work make me feel physically and mentally exhausted					
Patients	5. The distrustful behaviour of the affected party makes me feel scared at work					
	6. The patient's lack of cognitive understanding worries me					
	7. The unstable character traits of the affected party make me uneasy					
	8. The lack of tolerance on the part of the patient concerns me					
Self	9. The lack of comprehensive skills leads to conflicts and the inability to deal with emergencies worries me					
	10. Not being able to control my emotions due to work issues					

	worries me					
	11. Lack of clinical competence makes me worry about being replaced or losing my job					
Organizational management	12. The lack of ethics and professionalism of my colleagues worries me					
	13. Lack of concern and support from my superiors makes me feel isolated					
	14. The lack of cohesion and sense of collective honour in the department worries me					
	15. Poorly coordinated clinical support systems worry me					
	16. The poor management system of the hospital makes me feel uneasy					
	17. Unreasonable pay and the lack of a good personal career path make me worry					
	18. I am disturbed by the lack of attention given by the management to the development of the hospital and the failure to safeguard the interests of the staff					
Social support	19. The tense atmosphere created by the media coverage of my visit to the doctor made me feel uneasy					
	20. The lack of systematic and well-developed national policies and legal protection makes me feel uneasy					
	21. Inadequate and uneven distribution of healthcare resources worries me					
	22. Lack of social acceptance and family support makes me feel depressed					

Annex B: Work Engagement Scale (WES)

All items were scored using the Likert-7 scale, ranging from 0 (never) to 6 (every day).

		0	1	2	3	4	5	6
Energy	1. I feel motivated when I work							
	2. I don’t get discouraged even when things don’t work out							
	3. I am happy to get up in the morning and go to work							
	4. I feel energetic when I work							
	5. I am in a very cheerful mood at work							
	6. I can work long hours without taking a holiday in between							
Giving	7. I am proud of the work I am currently doing							
	8. I find the work I do very rewarding							
	9. I work in a job that inspires me							
	10. I am very passionate about what I do							
	11. The current job is challenging for me							
Dedication	12. When I’m working, all I can think about is my work							
	13. When working, time always passes without me realising it							
	14. When I work, all I think about is work							
	15. It’s hard to get me to drop what I’m doing							
	16. I feel happy when I am fully engaged in my work							

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Annex C: Turnover Intention Questionnaire (TIQ)

Each item is rated on a Likert-4 scale ranging from 1 (strongly disagree) to 4 (strongly agree).

	1	2	3	4
1. Have you considered quitting your current job?				
2. Are you looking for other jobs of the same nature				
3. Are you looking for other jobs of a different nature				
4. What are the chances of finding a suitable position in another institution given your current conditions and status?				
5. If you knew of a job opening at another institution that would suit you right now, how likely do you think it would be to get the job?				
6. Would you quit your current job?				

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Annex D: Academic Achievements during the Study

I. Papers

1. Tang Y, Dias Martins LM, Wang S-b, He Q-x and Huang H-g (2022) The impact of nurses' sense of security on turnover intention during the normalization of COVID-19 epidemic: The mediating role of work engagement. front. public Health 10:1051895. doi: 10.3389 fpubh.2022.1051895 (Corresponding author)

2. He Q, Dias Martins LM, Huang H-g. Job Security Among Healthcare Workers in Guangdong, China, Frontiers in Public Health, 11:1096825. doi:10.3389/fpubh.2023.1096825 (Corresponding author)