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Modeling the Relationship between Organizational Support, Self-Efficacy, and Clinicians' Health Communication Ability: a Case-Based Approach in Chinese Hospitals

CAI Dingbin

Doctor of Management

Supervisors:

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ISCTE University Institute of Lisbon

PhD Wang Dong, Full Professor,
Southern Medical University

November, 2024



BUSINESS
SCHOOL

Marketing, Operations and General Management Department

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Abstract

Against the background of unsatisfactory health communication effects among Chinese clinicians, this study aimed to explore the relationship between organizational support and self-efficacy and clinicians' health communication ability.

This study was divided into two phases. In the first phase, based on Gioia's methodology and the "7W" theory, a clinician health communication ability evaluation scale was developed and validated in 29 hospitals in Guangdong Province. In the second phase, based on the Social Cognitive Career Theory and the Job Demand-Resources model, a hypothetical model was constructed. A cross-sectional survey was conducted on clinicians from 19 tertiary and secondary hospitals in Z City. The relationship between organizational support, self-efficacy, and health communication ability was analyzed using linear regression, a mediating effect model, and a structural equation model.

The research results are as follows: 1) The clinician health communication ability scale developed in this study has good reliability and validity. 2) Organizational support and self-efficacy correlate positively with clinicians' health communication ability, and organizational support positively correlates with self-efficacy. 3) Self-efficacy plays a partial mediating role in the relationship between organizational support and health communication ability.

The contributions of this study are as follows: First, the health communication ability scale for clinicians was developed and validated for the first time in China, providing a reliable measurement tool for research on the health communication ability of Chinese clinicians. Second, it provides empirical evidence from a sample of Chinese clinicians for path studies on the relationship between organizational support, self-efficacy, and health communication ability in the medical industry. It provides specific theoretical and practical guidance for improving clinicians' health communication ability.

Keywords: Clinicians, Health Communication Ability, Organizational Support, Self-efficacy

JEL: M54; M12

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Resumo

Considerando os efeitos insatisfatórios da comunicação em saúde por parte dos médicos chineses, este estudo teve como objetivo investigar a relação entre o contexto organizacional, a autoeficácia e a capacidade de comunicação, pelos médicos.

Este estudo foi dividido em duas fases. Na primeira fase, com base na metodologia de Gioia e na teoria "7W", foi desenvolvida e validada uma escala de avaliação da capacidade de comunicação clínica em saúde em 29 hospitais da província de Guangdong. Na segunda fase, com base na Teoria Social Cognitiva e no modelo "Job Demand-Resources", foi construído um modelo de hipóteses. Foi realizada uma pesquisa transversal a médicos de 19 hospitais terciários e secundários da cidade de Z. A relação entre o suporte organizacional, a autoeficácia e a capacidade de comunicação em saúde foi analisada através de uma regressão linear, com efeito mediador e do modelo de equações estruturais.

Os resultados da investigação são os seguintes: 1) A escala de competências de comunicação clínica em saúde desenvolvida neste estudo apresenta boa fiabilidade e validade. 2) O apoio organizacional e a autoeficácia correlacionam-se positivamente com a capacidade de comunicação em saúde dos médicos. O apoio organizacional correlaciona-se positivamente com a autoeficácia. 3) A autoeficácia desempenha um papel mediador entre o suporte organizacional e a capacidade de comunicação em saúde.

As contribuições deste estudo são as seguintes: Em primeiro lugar, a escala de competências comunicacionais para médicos foi desenvolvida e validada pela primeira vez na China, fornece uma ferramenta de medição fiável para a investigação sobre a capacidade de comunicação dos médicos chineses. Em segundo lugar, fornece evidências empíricas, para estudos posteriores sobre a relação entre o suporte organizacional, a autoeficácia e a capacidade de comunicação nas instituições de saúde. O presente estudo fornece igualmente, orientação teórica e prática para o desenvolvimento das competências de comunicação dos médicos.

Palavras-chave: Clinicians, Health Communication Ability, Organizational Support, Self-efficacy.

Keywords: Clinicians, Health Communication Ability, Organizational Support, Self-efficacy

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摘要

在中国临床医生的健康传播效果不理想背景下,本研究旨在探讨组织支持和自我效能与临床医生健康传播能力之间的关系。

本研究分为两个阶段:第一阶段基于 Gioia 方法学和“7W”理论,开发了临床医生健康传播能力评价量表,并在广东省 29 家医院中进行了验证;第二阶段基于社会认知职业理论模型(SCCT)和工作需求-资源模型(JD-R),构建了假设模型,采用横断面调查法,以湛江市 19 家三级、二级医院的临床医生为对象,通过岭回归、中介效应模型、结构方程模型,分析了组织支持和自我效能与健康传播能力之间的关系。

研究结果如下:1)本研究开发的临床医生健康传播能力量表具有良好的信效度。2)组织支持、自我效能均与临床医生的健康传播能力正相关,组织支持与自我效能正相关。3)自我效能在组织支持和健康传播能力之间起到了部分中介作用。

本研究的贡献在于以下方面:首先,首次在中国开发并验证了临床医生健康传播能力量表,为中国临床医生健康传播能力研究提供了可靠的工具。其次,为医疗行业组织支持和自我效能与健康传播能力之间的路径研究提供来自中国临床医生样本的实证,并为提升医生健康传播能力提供了具体的理论和实践指导。

关键词: 临床医生, 健康传播能力, 组织支持, 自我效能

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List of Abbreviations

HCAS	Health Communication Ability Scale
OS	Organizational Support
EFA	Exploratory Factor Analysis
CFA	Confirmatory Factor analysis
SEM	Structural Equation Modeling
ANOVA	Analysis of Variance
SCCT	Social Cognitive Career Theory
JD-R	Job Demands-Resources
KMO	Kaiser-Meyer-Olkin
ICC	Intraclass Correlation Coefficients
AVE	Average Variance Extracted
CR	Combined Reliability
NHSC	National Health Commission
CNY	Chinese Yuan

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Chapter 1: Introduction

1.1 Background of health communication in China

1.1.1 Healthy China

In 2016, the Central Committee of the Communist Party of China and the State Council issued the 'Healthy China 2030' Outline, proposing a health strategy for China with the theme of 'co-building and sharing, and health for all.' The proposal of the 'Healthy China' strategy reflects the Chinese government's great emphasis on the issue of national health. Since the 21st century, with the acceleration of industrialization and urbanization and the intensification of the trend of an aging population, China's healthcare system has faced unprecedented challenges. The deterioration of the ecological environment, the high incidence of chronic diseases, and the relative lag in public health literacy have made the health problems of the entire society increasingly prominent. Against this background, China has proposed the national strategy of 'Healthy China,' which emphasizes the strategic position of health as a priority for development. This strategy is not only related to the well-being of the people but also an essential engine for promoting sustainable economic and social development (Central Committee of the Communist Party of China & State Council of China, 2016).

An essential goal of the Healthy China strategy is to reduce the incidence of disease and lower medical costs by strengthening health education and improving public health literacy. This will improve people's quality of life and help promote social harmony and stability. Especially in the new crown epidemic, the importance of health communication has been highlighted as never before. Health communication, as an essential part of the 'Healthy China' strategy, is a key means to improve public health (C. Liu, 2023).

In implementing the Healthy China strategy, the government has actively promoted the development of health communication through a series of policy measures. For example, establishing a health education system has popularised health knowledge and disseminated correct health lifestyles. Specifically, health communication content is not limited to disease prevention and treatment but also includes nutrition and health, mental health, environmental health, and many other aspects. In addition, the government also uses various forms of health

communication activities, such as health lectures, health knowledge competitions, and health promotion weeks, to raise public health awareness (L. Wang, 2023).

Despite this, China still faces some pressing problems in promoting the Healthy China strategy. First, the uneven distribution of medical resources between urban and rural areas and between regions remains prominent, especially in remote areas, where a lack of medical resources has led to a lower level of health among residents. Second, the public's health awareness and literacy need to be further improved, and many people still do not pay enough attention to health issues. In addition, the spread of false health information also poses a threat to improving the public's health literacy. These problems show that health communication still has a long way to go in improving the health literacy of the whole population (Xie, 2021).

1.1.2 Health literacy

Health literacy refers to an individual's ability to obtain, understand, and apply health information to make decisions that benefit their health. Health literacy is not only a guarantee of personal health but also an essential part of public health (Schulz & Nakamoto, 2013). Improving public health literacy is one of the critical goals of the Healthy China strategy. According to the 'Healthy China 2030' Outline, by 2030, the Chinese people's health literacy level will reach 30%. This goal requires efforts in many areas, including strengthening health education, promoting healthy lifestyles, and improving the quality of medical services (CPC & SC, 2016). In recent years, with the popularization of health education and the improvement of medical standards, the health literacy level of the Chinese public has improved. However, there is still a significant gap compared to developed countries. In particular, the public's literacy level regarding first aid knowledge and the ability to distinguish health information still needs to be improved (H. Xu, 2021; Zheng & Wang, 2022).

Improving health literacy depends on popularizing health education and is closely related to factors such as an individual's socioeconomic status and cultural background. For example, highly educated people are generally more likely to access and understand complex health information, while less educated people are often restricted in accessing information. In addition, people with better economic conditions can access more health information and enjoy better medical services. All of this shows that improving health literacy requires the joint efforts of the whole society, including collaboration between the government, educational institutions, medical institutions, and other parties (H. Xu, 2021).

Health communication still faces a daunting task in promoting the construction of a 'Healthy China' and improving public health literacy. China needs to carry out health education

actively, emphasize the importance of scientific nutrition and moderate exercise, help the public identify prevention methods for common diseases, and provide reliable health guidance to help people better understand their health status. In addition, it is necessary to pay attention to the health needs of different groups, strengthen health education in communities and schools, carry out in-depth health communication work, and targeted improve public health literacy (L. Wang, 2023).

1.1.3 Health communication

Health communication refers to translating medical research results into public health knowledge, which can reduce disease morbidity and mortality by changing attitudes and behaviors, thereby improving the public's quality of life and health (J. Hu et al., 2022). Health communication is an interdisciplinary subject in communication studies, clinical medicine, and preventive medicine. It involves health promotion, medical journalism, health education, and public health (L. Zhang et al., 2009). Effective health communication is essential for improving public health literacy. Research has shown that if patients cannot understand written or spoken health information, it may hurt their health. Therefore, understanding patients' comprehension limitations is a prerequisite for effective health communication. The effectiveness of health communication can be maximized by the public reading, understanding, and applying health information. At the same time, improving public health literacy relies on scientifically effective health communication techniques (Davis et al., 1998; Walters et al., 2018).

Scientific and effective health communication improves the health literacy of the whole population. It makes it easier for highly literate groups to accept and adopt health information, thus promoting the effectiveness of information dissemination (Malikhao, 2020). The high demands of these groups on information sources and content have also promoted the development of health communication in the direction of personalization and scientification. At the same time, highly educated groups can also become participants and promoters of communication, expanding the reach and influence of communication, forming a long-term mechanism for health communication, and ultimately promoting the continuous improvement of public health (Nutbeam, 2000).

Although health communication has successfully promoted the construction of a 'Healthy China' and improved public health literacy, there are still many problems. For example, the classification and dissemination of health information is not systematic enough to meet the individual needs of groups of different ages, regions, and cultural backgrounds (Cai, 2018; J. Li, 2010). It is also difficult to effectively monitor the scientific nature of the information

sources and the accuracy of the target audience, leading to a proliferation of 'pseudo-health information' that is likely to mislead the public (S. Wu, 2016). In addition, the evaluation mechanism for the effectiveness of health communication is not yet perfect, and it is impossible to measure whether the information has influenced the target group effectively. The lack of scientific evaluation methods will affect the promotion of follow-up work (Macnamara, 2017). At the same time, health communication has not been deeply integrated with entities such as communities and schools, making it difficult to have a sustained and practical influence. Health communication personnel's quality, ability, and professionalism must also be improved (Sharkiya, 2023).

1.1.4 Health communication service beneficiaries and providers

1.1.4.1 Beneficiaries of health communication services

In health communication, beneficiaries cover multiple levels, including individuals, families, communities, and specific groups such as the elderly, children, pregnant women, and people with chronic diseases. These audiences often have difficulty accurately identifying health information due to barriers to medical knowledge and are easily misled by 'pseudo-science' when actively collecting information. They need scientific and accurate health information covering disease prevention, health management, and lifestyle habits to make informed health decisions. In addition, with the popularization of the internet, patients and their families, internet users, and especially residents of remote areas, have become important targets of health communication. In addition, the group of caregivers also has a greater demand for health knowledge, especially regarding safe medication use (X. Xu & Wang, 2022).

Health communication must fully consider the recipients' differences in ethnicity, culture, education, and cognitive levels. Recipients are the receivers of information and the beneficiaries of health communication. Chinese and foreign research shows that the focus of health communication targets is different. In addition to focusing on traditional groups, foreign health communication also focuses on groups such as adolescents, veterans, new immigrants, and people of color, especially vulnerable groups (X. Wang & Zhou, 2020). Among these groups, adolescents have become the focus of health communication due to their strong ability to accept and their role as role models. Health communication targeted at adolescents can help them establish healthy concepts and form healthy behaviors, which will benefit them for life. The beneficiaries of Chinese health communication are mainly concentrated on the elderly, followed

by children, youth, and middle-aged people, which may be due to the more urgent need for health communication in these groups (Xing & Jiang, 2018).

The key to successful communication is effectively providing information that meets the target audience's needs so they do not struggle to find it elsewhere. Developing health communication programs that best suit the characteristics of different beneficiary groups effectively improves personal health behavior (G. Yang, 2022).

The current issues of 'left-behind children' and 'empty-nest elderly' in Chinese society have become blind spots in health communication, especially in the central and western regions and rural areas where medical resources are scarce. These areas are economically underdeveloped, with low literacy levels and limited comprehension. 'Empty-nest elders' resist new ideas and things, and 'left-behind children' do not quickly develop good health habits (Zheng & Wang, 2022). Therefore, health communication targeted at these groups should become an essential direction for improving the efficiency of health communication in China. Research on minority populations provides more possibilities for health education and promotion and provides a basis for formulating targeted health communication strategies (Su & Li 2019).

1.1.4.2 Health communication service providers

Health communication service providers refer to individuals or organizations responsible for providing accurate and practical health information to the public during the health communication process to promote public understanding and management of health. In China, health communication providers mainly include clinicians, nurses, public health experts, health educators, social workers, community leaders, media workers, scientific researchers, and volunteers. These providers need professional knowledge, interdisciplinary abilities, and comprehensive qualities to promote the development of health communication (S. Sun & Chen, 2018).

Health communication service providers play a crucial role in improving public health and achieving the health goal for all. They help the public raise their health awareness by scientifically interpreting complex health information and promoting changes in health behavior through various channels, thereby reducing disease incidence and improving overall health. In the event of a public health emergency, health communication professionals can promptly convey information released by the health administrative department, help the public understand the situation, and take appropriate protective measures, thereby effectively curbing the spread of the epidemic (S. Sun & Chen, 2018; X. Wang & Zhou, 2020; Xing & Jiang, 2018).

In China, doctors and nurses are the leading providers of health communication. As the frontline of medical services, doctors and nurses must provide treatment services and deliver health information to patients and their families. Health information content includes disease prevention, treatment options, and healthy lifestyles. However, due to their busy work schedules and limited professional knowledge, the health communication abilities of many doctors and nurses still need to be improved. For example, many doctors and nurses lack sufficient communication skills when dealing with patients, making health information ineffective (H. Xu, 2021).

In addition, as the importance of health communication has gradually been recognized, more and more public health experts and health educators have also become involved in health communication. They deliver health information to a broader public through health education activities, writing health science articles, and producing health education videos (L. Chen et al., 2018). These health communication providers are essential in improving public health literacy and promoting health behavior change.

However, there are still some deficiencies in the training and team building of health communication providers in China. For example, the quantity and quality of professionals need to be improved urgently, especially in rural and remote areas, where the shortage of health communication talent is severe. In addition, the professional quality and comprehensive ability of health communication providers also need to be improved to better meet the needs of modern society for health communication (Zheng et al., 2022).

1.1.5 Introduction to the clinicians' health communication service

Clinicians are playing an increasingly important role in health communication. As providers of medical services, clinicians not only need to treat patients and disseminate health knowledge to patients and the public through health communication. Through clinicians' health communication, the public can better understand health knowledge and choose healthier behaviors in their daily lives (X. Li, 2014).

In China, the public's primary source of health information is doctors, and the role of clinicians in health communication is vital. Especially in primary care settings, health communication by doctors affects patients' treatment outcomes and the community's overall health (X. Xu et al., 2022). However, due to their busy schedules, many clinicians lack the time to engage in health communication activities. In addition, many clinicians receive insufficient training in communication skills and media use, resulting in poor health communication outcomes (J. Xu, 2022). Research shows that clinicians' communication abilities directly affect

the public's health behavior. For example, if doctors can clearly and accurately convey information when explaining treatment options to patients, patient compliance will significantly improve, and treatment outcomes will also improve accordingly. Therefore, improving clinicians' health communication abilities is critical to improving the whole population's health (X. Xu et al., 2022).

In addition to health communication during the diagnosis and treatment process, clinicians can expand their influence in health communication by participating in community health education and writing health science articles. This helps more people gain access to health knowledge and enhances clinicians' professional image and social status. For example, by publishing health science articles in the media, some doctors widely disseminate health knowledge and enhance public awareness of health issues and their influence (Y. Liu et al., 2022).

1.2 Current state of research

As an interdisciplinary research field, health communication has been developing for decades. Its research covers multiple disciplines, such as public health, social sciences, psychology, and communication, and has become an essential means of improving public health behavior and health literacy. Since the concept of 'medical care communication' was first proposed in the United States in the 1970s, this field has rapidly expanded globally. It has become an essential part of international public health. The practice and research of health communication focus mainly on promoting the adoption of healthy behaviors and improving overall health through effective information dissemination (J. Xu, 2022).

1.2.1 Current status of health communication research

Health communication research covers various topics, from health education and public health policy to individual health behaviors and social health interventions.

Health communication in the United States began in the field of public health, especially in early public health projects such as the Community Prevention of Heart Disease project. With the development of the intersection of communication and medical fields, health communication has gradually become an independent discipline, focusing on improving public awareness and application of health information through information technology (J. Wang, 2011). Globally, health communication has made significant progress. For example, Japan has improved the health literacy of its citizens through the 'Report on Building National Health for

the 21st Century.' The UK's 'Our Health' report has proposed several health communication strategies to improve how information is communicated to promote changes in public health behaviors (Ge & Sun, 2019). These international practices demonstrate the critical role of health communication in improving public health and reflect its global importance.

European and American scholars have demonstrated a high depth of health communication research, especially in applying new technologies and evaluating their effectiveness. For example, research in the United States has made progress in the application of social media and big data to explore how to more effectively reach target audiences and motivate them to take health actions (X. Wang & Zhou, 2020). Some studies have shown that the application of social media has significantly improved the efficiency of health information dissemination and enhanced public attention to health issues (Ge & Sun, 2019). Health communication is about disease prevention and health promotion, doctor-patient communication, and improving health literacy. Health communication has become a core part of public health interventions regarding disease prevention and health promotion. For example, the role of health communication in controlling chronic diseases (such as diabetes and cardiovascular disease) is widely recognized (B. Li & Li, 2014). Through practical information dissemination, the public can better understand disease risk factors and take preventive measures, and doctor-patient communication ability has also become the key to improving patient compliance and treatment outcomes (Y. Wang & Cao, 2020). In addition, the topic of health communication research also involves health inequalities among different groups. Researchers seek to alleviate health disparities between different social groups through health communication, thereby improving public health (Ma, 2020).

The tradition of health communication in China can be traced back to ancient times. For example, the concept of 'treating the disease before it occurs' in Huangdi Neijing reflects the importance attached to the dissemination of health information in the early days (Ye & Lu, 2016). Health promotion became part of public health policy after the founding of the People's Republic of China. The role of health communication became increasingly prominent, primarily driven by significant epidemics, and it became an essential tool for epidemic prevention and control. Health communication research in China has focused more on practical applications, emphasizing public health, infectious disease prevention and control, and improving doctor-patient relationships, including chronic disease management, food safety, and HIV prevention. Public health events such as SARS and the new crown epidemic have accelerated the development of health communication research. The experience of these crises shows that by combining the public and social media, governments and medical institutions can more

efficiently disseminate epidemic information and improve public awareness and behavior in prevention and control (C. Liu, 2023; S. Sun & Chen, 2018). In addition, with the popularisation of the Internet and social media, Internet health communication has also become a research hotspot (Zhao, 2014).

However, there are still deficiencies in integrating theory and practice in health communication research in China. Although, in recent years, academia has gradually focused on interdisciplinary research in health communication, the effectiveness of health communication in specific practices still needs to be improved. In particular, for long-term health issues such as chronic disease prevention and control, promoting public health behavior change through continuous and effective health communication strategies remains a key research direction in the future (Xing et al., 2018).

1.2.2 Current research on health communication ability among clinicians and its influencing factors

Health communication ability refers to the ability of an individual or organization to effectively obtain, integrate, apply, and express health information resources, as well as interact with the audience in the process of disseminating health information. This ability not only involves the acquisition and dissemination of health knowledge but also includes the skills to effectively communicate and promote health in specific situations (L. L. Chen, 2023; J. Hu et al., 2022; H. Wang, 2015). S. Park et al. (2021) attribute health communication ability to three core elements: knowledge, skills, and contextualization, further emphasizing the ability to apply health communication in diverse situations. These elements provide theoretical support for clinicians and require them to respond flexibly to different communication needs in specific situations.

Clinicians' health communication ability is crucial in medical practice. This ability directly affects patients' understanding and compliance with treatment plans, which significantly impacts patients' health outcomes (Kountz, 2009; Osterberg & Blaschke, 2005). Good health communication ability not only improves patient satisfaction but also improves the doctor-patient relationship (Stewart, 1995; J. Wang, 2014). In addition, health communication ability also has a positive effect on improving medical safety. Medical risks can be effectively reduced by reducing errors caused by poor communication (T. C. Chen et al., 2015; Y. Zhang, 2015).

Various external and internal factors affect the formation of health communication ability. First, organizational support plays a crucial role in cultivating the ability of medical staff to communicate healthily. Medical institutions can effectively improve the communication ability of medical staff by providing training opportunities, resource support, and policy guidance (X.

Hu et al., 2022). Second, the social and cultural environment significantly impacts the effectiveness of health communication. Cultural differences may affect the effectiveness of communication strategies, so they need to be adjusted for different sociocultural backgrounds (Kreuter & McClure, 2004; Schiavo, 2013). Third, technological development has brought new tools and channels for health communication. The application of social media, telemedicine, and electronic health records has expanded the scope of health information dissemination and enhanced the communication ability of clinicians (Dedding et al., 2011; Moorhead et al., 2013). Fourth, patient needs are also a key factor affecting communication effectiveness. Meeting patients' needs helps improve patient health outcomes and the effectiveness of doctor-patient communication (Epstein & Street, 2011; S. Jiang, 2019). Fifth, self-efficacy, which refers to an individual's confidence in completing a task, directly impacts health communication ability. Medical staff with high self-efficacy are more confident and effective when communicating complex health information (Bandura & Wessels, 1997; Rosenstock et al., 1988). These factors work together to determine the ability and performance of clinicians in health communication.

Presently, a few assessment tools have been developed by Chinese and foreign scholars to improve the ability of medical personnel to communicate healthily. American scholar Coleman (Coleman et al., 2013) developed a set of health communication knowledge ability evaluation forms for medical students and medical personnel. The form has three dimensions: knowledge, skills, and attitudes, with 62 evaluation sub-items covering communication skills, environmental grasp, language conditions, assessment ability, and professional attitude. European scholar Karuranga (2017) revised and improved it on this basis, using the Delphi expert consultation method to finally form an evaluation system with three dimensions and 56 indicators, which applies to the evaluation of the health communication ability of European medical personnel. Chang et al. (2017) constructed an evaluation system applicable to non-clinicians in China, but there are still insufficient systematic assessment tools for clinicians. It should be noted that most of the existing assessment tools were developed before the COVID-19 pandemic and do not fully reflect the needs of clinicians in terms of communication skills in the new situation. In addition, many of these tools still require scoring by third-party experts and lack reliability and validity testing, resulting in insufficient reliability and validity.

Overall, there are significant deficiencies in research on clinicians' health communication ability in China. Despite the growing importance of clinicians' health communication in improving public health literacy, there is currently a lack of a systematic health communication ability assessment tool suitable for Chinese clinicians, making it challenging to assess clinicians' health communication performance accurately. This limits the effectiveness of health

communication and hinders the improvement of clinicians' communication ability. More importantly, existing research still has deficiencies in exploring the impact mechanisms of organizational support and self-efficacy on clinicians' health communication ability. The role of organizational support and self-efficacy as essential factors influencing clinicians' professional behavior in improving health communication ability needs further study and exploration.

In the modern medical environment, with the shift in the medical model from a biomedical model to a bio-psycho-social model, the ability to communicate health has become a necessary skill for clinicians. Doctors must be able to diagnose and effectively communicate health information to patients so that patients can better understand their condition and follow the treatment plan to improve their health literacy. However, at present, China still lacks a systematic assessment tool that can be used to assess clinicians' health communication abilities. This makes it difficult for hospital administrators to accurately assess doctors' performance in the health communication process and provide targeted training and support. In contrast, several international studies have examined doctors' ability to communicate healthily. For example, American scholars have developed a unique assessment tool to evaluate doctor-patient communication skills. However, due to differences in culture and medical systems, these tools are not entirely suitable for Chinese clinicians. In addition, these tools focus more on doctors' communication skills with patients than on overall health communication ability. Therefore, developing an assessment tool suitable for Chinese clinicians is significant based on China's national conditions.

At the same time, existing research lacks an exploration of the mechanism of action of organizational support and self-efficacy on physicians' health communication ability. Organizational support and self-efficacy are important factors affecting physicians' professional behavior, and their role in improving their communication ability needs further study and discussion. Organizational support refers to the resource support, training, and emotional support provided by hospitals and management to physicians. Self-efficacy refers to the degree of confidence a physician has in completing a task, directly affecting a physician's professional behavior and performance. Therefore, studying how these two factors can improve doctor-patient relationships and medical quality through improving health communication ability is of great theoretical and practical significance.

1.3 Research problem

In hospital management work, we have found that the health communication carried out by many clinicians is ineffective. This dilemma is mainly reflected in patients' poor understanding and compliance with health information, misunderstandings that arise quickly in doctor-patient communication, and barriers to information transmission. For example, when clinicians explain a patient's condition and promote disease prevention and control knowledge, they often use too many technical terms, which makes it difficult for the patient to understand. More importantly, some clinicians lack effective communication when promoting health knowledge to patients, resulting in poor health education. According to the survey by Deng Lili et al. (2011), 53.8% of Chinese general practitioners believed that the lack of communication skills was the main factor affecting doctor-patient communication (Deng et al., 2011). Wang Pei et al. (2021) pointed out that doctors often underestimate patients' demand for individualized health information, resulting in poor health communication outcomes (Wang Pei et al., 2021). Moreover, Du Yingjie et al. (2022) found that 90.1% of anesthesiology staff in 45 Chinese hospitals believe there is a problem with poor doctor-patient communication (Du et al., 2022). Furthermore, Du et al. (2022) discovered that 40% of doctors had never received any communication skills training throughout their careers, making it difficult for them to effectively convey health information in practice (Du et al., 2022). In summary, the effectiveness of clinical doctors' health communication is unsatisfactory, mainly reflected in insufficient health communication abilities, including a lack of effective communication skills, failure to meet patients' individualized needs, and a lack of communication skills training.

This dilemma is particularly prominent in managing some complex diseases and long-term treatments. For example, in managing chronic diseases, clinicians often need to communicate with patients about medication, lifestyle adjustments, and the importance of disease management. However, many doctors do not fully consider patients' knowledge level and comprehension ability when implementing health management plans, which results in patients not fully understanding the information conveyed by clinicians, leading to poor patient compliance and treatment outcomes. In addition, the problem of information asymmetry between clinicians and patients further exacerbates this dilemma. Patients often have doubts or distrust in their clinicians' health advice, which, to some extent, weakens the effect of health communication.

In clinical practice, this communication dilemma affects the treatment effect and causes tension in the doctor-patient relationship. Clinicians feel they have done their best, but patients

do not follow the advice, affecting the treatment results. Patients feel that clinicians do not clearly and effectively communicate important information to patients, making it difficult for them to respond correctly to their condition. This misunderstanding and conflict make the clinician's health communication effectiveness a key pain point in the doctor-patient relationship.

The reasons for answering this question may be: 1) Clinicians' self-efficacy is not strong, which affects their health communication ability. 2) Clinicians receive insufficient organizational support, which affects their health communication ability. 3) Clinicians receive insufficient organizational support, affecting their self-efficacy and low health communication ability. 4) Clinicians have personal reasons (interests or work priorities are misaligned), resulting in poor health communication ability.

1.4 Research questions

1.4.1 Main question

How can clinicians' health communication ability be measured, and how do organizational support and self-efficacy affect clinicians' health communication ability?

1.4.2 Sub-questions

Question 1: What is the current state of clinicians' health communication ability, and how is it measured?

Question 2: Is there an association between clinicians' perceived organizational support and health communication ability? Is there an association between their self-efficacy and health communication ability? Is there an association between their perception of organizational support and self-efficacy?

Question 3: Does clinicians' self-efficacy mediate the relationship between organizational support and health communication ability? If so, to what extent does self-efficacy mediate?

Question 4: Are there significant differences in self-efficacy and health communication ability among clinicians with different demographic and sociological variables?

Question 5: How can clinicians' health communication ability be improved?

1.5 Research innovations

Health communication is a comprehensive ability involving many aspects, such as communication, education, and behavior change. In the actual medical process, in addition to explaining complex medical knowledge to patients in an easy-to-understand manner, doctors must also develop personalized health communication plans based on factors such as the patient's background, culture, and health knowledge reserve. This requires doctors to have a high level of comprehensive quality. Although attention has been paid at home and abroad to doctors' health communication abilities, it has primarily focused on the macroscopic level of patient satisfaction and doctor-patient relationships, lacking an in-depth exploration of individual doctor abilities. In China, in particular, existing research has focused more on doctors' professional skills and lacks research on their health communication abilities. Therefore, this study not only enriches theoretical research in the field of health communication in China but also provides new ideas for improving the practical abilities of clinicians.

Therefore, the innovations of this study are as follows: First, to develop a health communication ability scale applicable to Chinese clinicians, which provides a scientific measurement tool for subsequent research and hospital management. Second, to systematically explore the influence mechanism of organizational support and self-efficacy on clinicians' health communication ability, filling the current research gap. Third, to provide hospital management with specific theoretical and practical guidance for enhancing clinicians' health communication ability through empirical research.

1.6 Purpose and significance

1.6.1 Purpose

This study aims to develop a health communication ability scale for clinicians that applies to the Chinese context and verify its reliability and validity. This scale was developed to fill the current instrument gap in this area and provide a scientific and reliable measurement tool for subsequent related studies. Through the development of this scale, this study hopes to be able to more comprehensively and accurately assess clinicians' performance in health communication, thus providing clear guidelines for clinicians' professional training and ability enhancement.

In addition, this study aims to explore and validate the relationship between health communication ability and organizational support and self-efficacy. Through empirical research, this study will provide an in-depth analysis of how organizational support and self-efficacy influence clinicians' health communication ability. It will clarify the role of organizational support and self-efficacy in enhancing clinicians' health communication ability and provide empirical support and a theoretical basis for developing effective interventions.

1.6.2 Significance

This study has the following important significance:

Firstly, regarding theoretical significance, this study will enrich and deepen research in health communication ability. Most existing studies have focused on patients' receptivity to health communication, and there is a dearth of research on clinicians, the active party in health communication. By developing the Health Communication Ability Scale, this study provides a highly operational assessment tool for future related research. In addition, by exploring the mechanisms by which organizational support and self-efficacy influence health communication ability, this study further promotes the application of the Social Cognitive Career Theory (SCCT) and the Job Demand-Resource Model (JD-R) in the healthcare field.

Second, in practical terms, the results of this study will provide a scientific basis for hospital managers to develop more effective training and support measures. Using the scale, hospital managers can understand the strengths and weaknesses of clinicians in health communication and carry out targeted interventions and improvements. Based on the development of the scale, this study also reveals the mechanism of action of organizational support and self-efficacy in health communication ability, which can provide an essential reference for hospitals to develop employee motivation and support strategies, improve doctor performance, and optimize health communication results.

Finally, this study also has important social significance. Improving clinicians' health communication ability helps improve patients' understanding and acceptance of health information, improving their health knowledge and compliance. This is significant for improving doctor-patient relationships, promoting national health, and reducing the burden on government public health.

1.7 Structure of the thesis

This thesis is divided into six parts (Figure 1.1), systematically exploring issues related to clinicians' health communication ability and putting forward corresponding theoretical and practical suggestions based on the research findings. The structure of the thesis follows the logical order from background introduction to the literature review, and then to research design, scale verification, empirical analysis, results, and discussion, and finally summarize the research findings and puts forward management countermeasures to provide a scientific basis for improving clinicians' health communication ability.

Part 1: Background. Part 1 mainly introduces the research's macro, meso, and micro contexts. At the macro level, it describes the impact of the Healthy China Strategy on clinicians' health communication. At the meso level, it analyzes how factors such as China's hospital management model and resource allocation affect doctors' professional behavior and health communication. The micro level focuses on the specific dilemmas clinicians face in their work, including unsatisfactory health communication results, unclear role positioning in health communication, and patients' insufficient understanding of health information. This part aims to provide a realistic background for the research and point out the necessity and urgency of the research.

Part 2: Literature review. The second part systematically reviews the research results at home and abroad in related fields of health communication ability, organizational support, and self-efficacy. The literature review first reviews the concept of health communication ability and its constituent elements and analyzes the shortcomings of existing assessment tools. Next, the definitions, dimensions, and related theories of organizational support and self-efficacy were explored. Based on this literature, a theoretical framework was constructed, and a hypothetical model was proposed. The hypothetical model combines the social cognitive career theory (SCCT) and the job demand-resource model (JD-R), providing theoretical support for subsequent empirical research.

Part 3: Methodology. Part 3 describes in detail the research design, sample selection, data collection and analysis methods, and implementation steps of this study. The research design clarifies the research content and methods, and appropriate research methods are selected based on the research content. Sample selection focuses on the number and representativeness of the sample. Data collection strictly follows relevant procedures to ensure the reliability and validity of the data. Various statistical analysis methods are used in the data analysis process, including reliability and validity analysis, descriptive statistics, analysis of variance, correlation analysis,

regression analysis, mediating effect analysis, and structural equation modeling, to verify the research hypotheses and reveal the relationships between variables.

Part 4: Results. This part presents the main research results. First, the reliability and validity of the health communication ability scale were demonstrated through the test of its reliability and validity. Second, the results of the empirical study showed the relationship between organizational support, self-efficacy, and clinicians' health communication ability. This part provides data support for subsequent discussion and management policy recommendations.

Part 5: Discussion. The fifth part discusses the results of the two-stage study in depth. First, it discusses the development process of the health communication ability scale, the reliability and validity of the verification results, and analyzes its significance in practical application. Then, it discusses in detail the mechanism of action of organizational support and self-efficacy in improving health communication ability and compares and analyzes the results of this study with relevant Chinese and foreign research. In addition, it discusses the impact of the research results on management and future research and points out a theoretical path for improving clinicians' health communication ability.

Part 6: Conclusion and recommendations. Part 6 summarizes the study's main findings and proposes corresponding management policy recommendations. In addition, the study also points out the limitations of this study. It proposes suggestions for future research directions, emphasizing the need for further research in a broader geographical scope and over a more extended period.

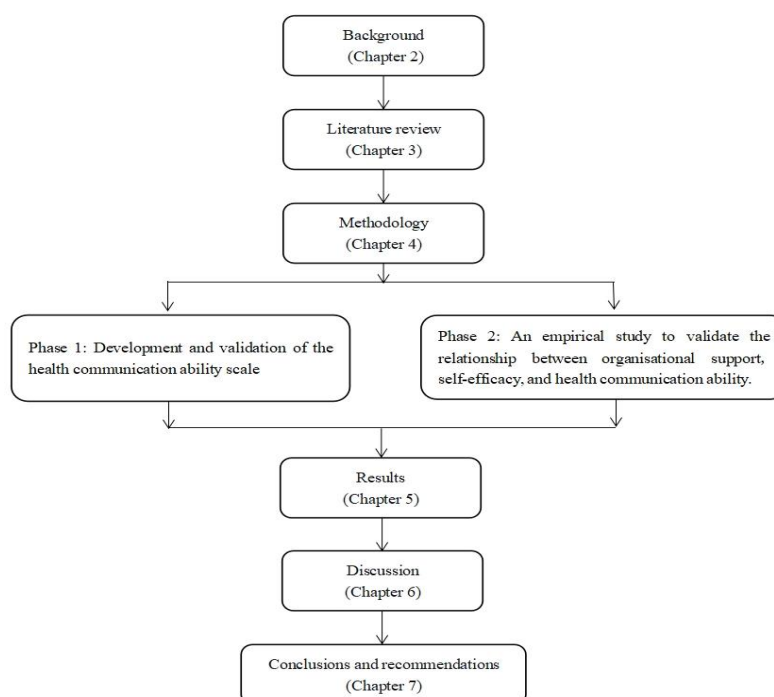


Figure 1.1 Structure of the thesis

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Chapter 2: Literature Review

This chapter provides a detailed review of the relevant literature around the three core concepts of health communication ability, organizational support, and self-efficacy. First, the concepts, dimensions, outcomes, and influencing factors of health communication ability were sorted out, and the related theories were discussed; the shortcomings of the existing assessment tools were pointed out, and the need to develop new assessment tools was emphasized. Second, organizational support's definition, outcomes, and influencing factors were analyzed, and relevant theories and measurement tools were introduced. Again, the concepts, outcomes, and influencing factors of self-efficacy were sorted out, and related theories and measurement methods were introduced. Finally, research hypotheses were formulated to explore the relationship between organizational support, self-efficacy, and health communication ability, and the SCCT and the JD-R model were introduced as theoretical frameworks to construct the hypothesized model of this study. These theoretical and literature reviews provide a solid foundation for subsequent research.

2.1 Health communication ability

2.1.1 Concept of health communication ability

Health communication refers to transforming medical research results into public health knowledge by changing people's attitudes and behaviors to reduce disease and death prevalence to improve people's quality of life and health (J. Hu et al., 2022). At present, there is no uniform definition of health communication ability. J. Hu (2022) suggests that health communication ability refers to the individual psychological qualities that an individual demonstrates when performing health communication activities. According to L. Chen (2023), health communication ability is a fundamental strategy and way of health education and health promotion, which is a systematic and scientific process of transmitting and sharing health information through different communication media based on the theory of disseminating knowledge about health and health education. H. Wang (2015) pointed out that health communication ability is the ability of medical institutions and medical personnel to help the

public improve their health literacy through the use of various channels to disseminate to the public symbolic information in the form of language, text, sound, pictures, images and so on. This paper synthesizes the views of the above literature. It adopts the following definition: Health communication ability refers to the ability of an individual or an organization to understand, integrate, apply, express, and present health information resources, as well as to interact and communicate with the audience while communicating health information. Health communication ability includes both the skills to acquire and disseminate health knowledge as well as the ability to communicate and implement health promotion effectively (L. L. Chen, 2023; J. Hu et al., 2022; H. Wang, 2015).

2.1.2 Dimensions and elements of health communication ability

Three elements of health communication ability. According to S. Park et al. (2021), knowledge, skills, and contextualization ability are the three core elements that measure a professional's level of expertise in health communication. Knowledge refers to an individual's theoretical foundation and professional understanding of health communication, covering cross-cultural communication, health behavior research, social marketing, health care communication, and public health fundamentals. This knowledge gives health communication professionals an in-depth understanding of health issues, enabling them to design and implement effective health communication strategies. Skills refer to an individual's ability to apply knowledge to practice, including mastery of communication essentials, proficiency in media and journalism, and research and writing skills. These skills enable health communication professionals to communicate efficiently with the public, utilize media resources to disseminate information, and support health communication activities through research. Situationalization refers to an individual's ability to apply knowledge and skills in specific situations, covering five competencies: communicating with different audiences, completing health communication programs, public health management, providing health services, and developing market-relevant health products and services. This ability requires experts to flexibly adapt communication strategies and methods to different social environments and audience needs. These three elements are interdependent and form a framework of professional competencies for health communication experts. Knowledge provides the theoretical basis for using skills, skills enable knowledge to be practiced, and situationalization ability is the effective combination of knowledge and skills in specific contexts to achieve optimal health communication outcomes.

Five dimensions of health communication ability. Yin et al. (2018) proposed that the health communication ability of medical personnel consists of five dimensions:

- (1) Basic professional literacy of communicators
- (2) Production capacity of communication content
- (3) Ability to select and utilize communication channels
- (4) Communication ability to communicate with audiences
- (5) Ability to provide feedback on communication effects

Essential professionalism of communicators refers to the basic qualities and abilities that medical personnel should have when conducting health communication, including familiarity with medical theories, disease mechanisms, diagnosis and treatment knowledge, possession of clinical research and academic achievements, knowledge of medical humanities, compliance with hospital rules and regulations, participation in health communication training, as well as sensitivity to health hotspots and willingness to communicate. The ability to produce communication content involves the ability of medical staff to produce and organize communication content in health communication, including collecting and organizing case data, transforming professional knowledge into medical guides or popular science articles, and taking the initiative to declare selected topics to obtain communication opportunities and resources. The ability to select and utilize communication channels refers to the ability to select and utilize different communication channels, including cooperating with mass media to introduce medical knowledge, utilizing self-published media and social media platforms to disseminate information, and participating in health public welfare activities and popularization competitions to demonstrate professional skills. Health communication ability refers to the ability of medical personnel to communicate effectively with patients and other audiences, including face-to-face health education during treatment, one-to-many education through online and offline communication groups, and demonstrating professional strengths in internal and external consultations and academic conferences. Health communication ability refers to the ability of medical staff to evaluate and provide feedback on the effectiveness of health communication, including measuring the effectiveness of communication through media coverage, forwarding of works, increasing the number of outpatient visits, and improvement in peer recognition, and making adjustments and optimizations accordingly. These five dimensions cover professionalism, content production, channel utilization, audience communication, and effect evaluation of health communication ability that medical professionals should have in health communication activities.

Three dimensions of physical education teachers' health communication ability. L. Chen (2023) constructed a structural model of physical education teachers' health communication ability, which contains three dimensions: health knowledge skill base, health communication perception ability, and health communication practice ability. The health knowledge skill base is the root of health communication, covering the mastery of physical education health knowledge, the establishment of health beliefs, and the understanding of health behaviors, providing theoretical support for understanding the basic principles and practices of health promotion. Health communication perceptual ability involves:

- (1) Recognizing health risks and crises, being sensitive,
- (2) To understand the target audience's characteristics,
- (3) Helping professionals assess health problems and respond quickly to audience needs accurately.

On the other hand, health communication practical ability is the ability to translate theoretical knowledge and perceptual ability into concrete actions, covering language expression, information organization, new media tools, and the selection and processing of communication content to ensure the effectiveness of health communication activities. Together, these three dimensions constitute a comprehensive system of health communication ability for physical education teachers, from theory to practice, from perception to action, to achieve effective communication of health information and health promotion of the audience.

2.1.3 Outcomes of health communication ability

Health communication ability is a core skill of healthcare professionals that plays a vital role in medical practice. It not only affects patients' understanding and implementation of treatment plans but also directly impacts patients' clinical outcomes and overall health status. Research shows that the health communication ability of healthcare professionals is closely related to patient adherence, patient satisfaction, patient health outcomes, healthcare safety, improvement of doctor-patient relationships, and health inequalities.

Patient adherence. Health communication ability plays a crucial role in improving patient adherence. Patient adherence refers to the willingness and ability of patients to follow medical advice, which is closely related to the communication skills of healthcare professionals. Studies have shown that patient adherence is significantly improved when healthcare professionals can clearly explain the nature of the disease, the need for treatment, and the potential risks. For example, Kountz (2009) found that patients with low health literacy who received effective communication and education from their physicians had significantly higher adherence,

especially in managing chronic diseases. Similarly, Osterberg and Blaschke (2005) emphasized that effective communication by healthcare professionals is crucial for patient adherence to long-term treatment. In China, related studies have also shown the importance of health communication ability. Zheng (2009) showed that healthcare professionals with strong communication skills can better help patients understand and implement their treatment regimens, thereby improving patient adherence. Especially in chronic disease management, enhancing health communication ability is considered an effective strategy to improve patient adherence.

Patient satisfaction. Patient satisfaction is an essential indicator for evaluating the quality of healthcare services, and healthcare professionals' health communication ability directly impacts patient satisfaction. Stewart (1995) found that healthcare professionals can improve patient satisfaction through effective communication. For example, patient-centered communication can significantly increase patient satisfaction. In China, a study by J. Wang (2014) pointed out that communication skills of medical staff are a vital factor influencing patient satisfaction. By strengthening the training of the medical staff on health communication, the overall satisfaction of patients with healthcare services can be effectively improved. This also suggests that the health communication ability of medical staff not only affects treatment outcomes but also has a significant impact on patients' service experience.

Patient health outcomes. The ability of medical staff to communicate effectively significantly impacts patient health outcomes. Effective health communication can improve health outcomes by increasing patients' understanding of treatment options and enhancing their motivation for treatment (Schillinger et al., 2002). For example, the communication skills of healthcare professionals can help patients better manage chronic diseases such as diabetes and hypertension, thereby improving patient health outcomes (Hall et al., 1995). In China, a study of cancer patients by Tang et al. (2006) found that physicians with high health communication ability were able to significantly improve patients' quality of life and mental health status. This suggests that positive health impacts can be achieved in managing a wide range of diseases by improving the health communication ability of medical staff.

Medical Safety. Medical safety is a crucial aspect of healthcare delivery, and the health communication ability of medical staff plays a crucial role in ensuring medical safety. It has been found that miscommunication is one of the major causes of medical errors and that practical health communication ability can significantly reduce the incidence of such errors. For example, T. C. Chen et al. (2015) pointed out that miscommunication is the leading cause of medical errors, and enhancing the communication competence of medical staff can

significantly reduce medical risks. In China, research by Y. Zhang (2015) emphasized the importance of health communication ability in surgical safety. By strengthening communication training for surgical teams, communication errors during surgery can be significantly reduced, and overall healthcare safety can be improved.

Improvement of doctor-patient relationship. The quality of the doctor-patient relationship directly impacts the patient's treatment experience and health outcomes, and the ability of medical staff to communicate plays a crucial role in this. Good communication enhances patients' trust in medical staff, reduces doctor-patient conflict, and improves the overall doctor-patient relationship (Levinson et al., 2010). Fiscella et al. (2004) found that medical staff can significantly improve the quality of doctor-patient relationships by respecting and understanding patients. In China, a study by D. Liu et al. (2009) showed that by enhancing the health communication ability of medical staff, doctor-patient disputes could be effectively reduced and doctor-patient relationships improved. This suggested that health communication ability enhances the relationship between medical staff and patients and contributes to a more harmonious healthcare environment.

Reduction of health inequalities. The ability of medical staff to communicate also plays a vital role in reducing health inequalities. Especially in a multicultural context, cross-cultural health communication ability can help healthcare professionals better understand and respond to the needs of patients from different racial and cultural backgrounds, thereby reducing health inequalities. In the United States, Betancourt et al. (2003) found that healthcare professionals with intercultural communication skills significantly improved the health outcomes of minority patients. In China, Yu's (2022) study emphasized the importance of improving the health communication ability of medical staff in ethnic minority areas. His study showed that health inequalities in these areas could be significantly reduced by improving the cross-cultural communication skills of healthcare workers.

2.1.4 Factors affecting health communication ability

Health communication ability is influenced by various factors, including external factors such as organizational support, socio-cultural, technological development, and patient needs, as well as content factors such as self-efficacy and individual differences.

Organizational support. The training opportunities, resource support, and policy orientation that healthcare organizations provide to their medical staff largely influence their health communication ability. A supportive organizational culture can motivate healthcare workers to actively participate in health communication and provide them with the necessary

tools and platforms. As a member of the organization, whether medical staff can obtain sufficient resources and channels of support is directly related to their willingness and ability to perform in health communication. For example, West China Hospital in Sichuan has incorporated health communication into its party-building target responsibility system, requiring each department to set up informants and propagandists and encouraging the establishment of a secondary self-media platform. The hospital paid each health communication article to incentivize creativity and linked it to year-end performance (Zheng & Liu, 2022). Similarly, the Third Hospital of Peking University set the assessment mechanism of health communication as a binding indicator. It actively promoted health communication by organizing business training, continuing medical education, and teaching competitions for full-time and part-time health educators (X. Hu et al., 2022).

Social and cultural environment. The social and cultural environment has a significant impact on health communication ability. Social support systems and cultural context play a crucial role in enhancing the effectiveness of health communication. Kreuter and McClure (2004) emphasized that cultural context plays a vital role in health communication and that cultural differences may lead to differences in the effectiveness of communication strategies. Schiavo (2013) stated that social support systems can enhance communication effectiveness by providing the necessary resources and encouragement for healthy communication. Social support can facilitate the effective dissemination of information and help individuals overcome challenges in health communication. Parke et al. (2003) emphasized that the social and cultural environment significantly influences health literacy as an essential policy challenge. Different cultural backgrounds and social structures can affect the understanding and application of health messages and, thus, the effectiveness of health communication. Social networks and social support play a crucial role in health communication. Social networks provide information and influence individuals' health behaviors through emotional support and practical help. These social factors change the effectiveness of health communication by influencing the reception and understanding of information (Kim et al., 2015). Social support and cultural context play an essential role in communicating healthily. Considering these social and cultural factors is crucial when developing health communication strategies to maximize communication effectiveness (Dutta, 2008).

Technological developments. Advances in information technology, in particular, are profoundly changing the ways and means of health communication. Studies have shown that the application of emerging technologies such as social media, telemedicine, and electronic health records have become essential tools for health information dissemination. A systematic

study by Moorhead et al. (2013) demonstrated that social media plays a vital role in health communication by providing health professionals with a new platform to interact with patients and the public. These platforms make it easier to disseminate health information and enable health professionals to share their experiences and knowledge with their peers globally, thus improving their communication ability. Dedding et al. (2011) explored the impact of e-health technologies on physician-patient interactions. They found that the spread of technologies such as telemedicine, which has a healthy communication ability, has a significant impact, requiring healthcare professionals to have new communication skills to cope with the changing interaction environment. In China, Lei et al. (2013) examined the impact of the introduction of electronic health record systems on hospital workflows and the work of medical staff. They found that technological advances have improved the ability of medical staff to communicate while increasing work efficiency. Medical staff must be proficient in these systems to better communicate with patients and manage health information.

Patient needs. Patient needs and expectations for health information profoundly impact health communication ability. S. Jiang's (2019) study noted that a patient-centered approach to communication can significantly improve health outcomes by understanding and responding to individualized patient needs. Epstein and Street (2011) described patient needs as critical to the health communication process, emphasizing the importance of addressing these needs in healthcare interactions. Stewart's (1995) study demonstrated that when healthcare professionals effectively respond to patients' needs, patients' health outcomes are more favorable. Street et al.'s (2005) study revealed that patients' engagement is associated with motivation for medical consultation and improved communication ability, emphasizing the positive effect of responding to patient needs on improving health communication outcomes. By understanding and responding to patients' needs during the patient-physician communication process, healthcare professionals enhance their health communication ability and significantly improve patients' health outcomes.

Self-efficacy. Self-efficacy, an individual's confidence in his or her ability to complete a task, significantly affects health communication ability. Social cognitive theory emphasizes that self-efficacy can directly influence an individual's health behaviors and communication ability (Bandura & Wessels, 1997). Rosenstock et al. (1988) stated that individuals with high self-efficacy are more likely to engage in health behaviors and can communicate health information more effectively. Nutbeam (2000) found that individuals with high self-efficacy performed more positively in health education interventions and could better apply health information. Janz et al. (2004) indicated that self-efficacy can enhance the effectiveness of health

communication by improving an individual's ability to understand and apply health information. Self-efficacy affects health behavior by influencing an individual's behavioral confidence and ability to take action, thus increasing the effectiveness of health communication. Medical professionals with high self-efficacy perform better in health communication. They typically have an advantage in clarity and effectiveness of messaging, are more comfortable communicating complex health issues, and respond positively to challenges. Self-efficacy increases an individual's self-confidence and motivation, enhancing their health communication performance. In addition, healthcare professionals with high self-efficacy tend to invest more time and effort in health education and communication, further enhancing their health communication ability (Champion & Skinner, 2008).

Individual differences. Individual differences in health communication ability are characterized by education level, health knowledge, and cultural background; Rosenstock et al. (1988) noted that an individual's education level and health knowledge significantly affected their health communication ability. Parker et al. (2003) noted that age and gender differences significantly affected health communication ability and that younger and female healthcare workers may perform better in certain areas of health communication. Zangeneh et al. (2021) found that individual differences, such as marital status, work background, department, work shifts, and type of employment, have a significant impact on nurses' health communication ability and that these skills are critical to providing quality patient care.

2.1.5 Theories related to health communication ability

2.1.5.1 The "5W" theory

American scholar Lasswell (1948) put forward the "5W" linear communication process in his paper "The Structure and Function of Communication in Society": Who→Says what→In which channel→To whom→With what effects. Who: This element focuses on the initiator or source of information dissemination. Who: This element focuses on the initiator or source of information dissemination. Understanding the disseminator's identity, background, and conditions helps assess the information's credibility and impact. To whom: refers to the target audience of information dissemination; understanding the characteristics and needs of the audience can help to adjust the communication strategy and improve the effectiveness of the communication; with what effects: focus on the effect of the information dissemination, through the evaluation of the communication effect, we can understand the effectiveness of the message and adjust the strategy.

The "5W" model is one of the earliest and most influential communication models widely used in analyzing the communication process (Shoemaker et al., 2003). More effective communication strategies can be designed to improve the impact of information dissemination through the comprehensive consideration of communicators, content, channels, audiences, and effects. Some scholars have found that in the new media environment, the research of the "5W" model still has excellent prospects for development (Wen, 2015). Cao et al. (2017) used the "5W" communication model to construct a model of the influence of social opinion on the doctor-patient relationship on medical students and to understand the influence of social opinion on the doctor-patient relationship on medical students. Based on the "5W" model, Y. Sun et al. (2020) analyzed the dissemination of TCM in Arab countries under the background of "One Belt, One Road". They explored more suitable local dissemination methods. Ren et al. (2021) analyzed the current situation and problems of China's science popularization industry based on the "5W" model and put forward corresponding suggestions. Liang (2022) used the "5W" model as a framework to analyze Chinese news media's coverage of gender equality and put forward suggestions for journalists. Xue and Li (2022) analyzed the dilemmas of TCM animation communication based on the "5W" model and provided references for communication models.

The "5W" communication theory is widely used in health communication research. Y. Sun et al. (2020) used this model to comprehensively analyze the characteristics of the epidemic's early prevention and control publicity in Huairou District and assess health communication's effect. Yian and Nan (2020), based on this model, analyzed the health communication of children in the Chinese media in the context of the normalization of prevention and control of Novel Coronavirus Pneumonia and found that the effect of communication had improved. Based on the "5W" model, C. Chen et al. (2021) developed a health communication model for infectious disease prevention and control. The model effectively improved the population's health literacy. Lin et al. (2021) utilized the model to construct an online opinion generation model by text-mining COVID-19-related public opinion, and X. Xu et al. (2022) investigated the needs of childcare workers to popularize children's safe use of medication by using the "5W" model and proposed a strategy for improving the model.

The "5W" communication theory has also been widely used in health communication in new media. Using this model as a framework, Shi (2020) analyzed the advantages and disadvantages of health communication on short video platforms and suggested development suggestions. Zhai (2020) used the model to explore the new trend of health communication through short videos. X. Jiang (2022) found that there are many new changes in health

communication under new media, but also faced many dilemmas and put forward suggestions to promote the development of health communication. Wei et al. (2022) extended the "5W" model and constructed an eight-component model for the dissemination of online health rumors, which further enriched the communication research. The above studies found that most of the studies are still based on the unidirectional linear communication model, lack of consideration of the feedback mechanism and two-way communication, and fail to pay sufficient attention to the policy factors and the motivation of the communicators. This is a limitation of the "5W" model, which McQuail (1985) argues is conceptually obsolete due to its linear structure. Especially in the Internet era, scholars have suggested revisiting communication research from a social relations perspective (Hai, 2009). However, some researchers believe the model still has explanatory power and applicability, but there are fewer plans to improve it (Wei et al., 2022).

2.1.5.2 The "7W" theory

Bredock (1958) added two new elements of communication to the "5W" theory: communication motivation (for what purpose) and communication environment (under what circumstance). The introduction of these two elements helps researchers analyze the background and motivation of information dissemination more in-depth, more accurately predict the effects and impacts of information dissemination, and reveal more levels and connotations of information dissemination. Bredock's "7W" communication process theory has thus become more comprehensive and scientific, making up for the inadequacy of the background and motivation of information dissemination and providing more robust support for formulating communication strategies. The seven elements in theory are: Who Says What, In Which Channel, To Whom, With What Effects, What Environment, and What Aim. What Aim) Information dissemination is a complex system, and the "7W" theory emphasizes the interactions among various elements. A systematic way of thinking helps to establish a more scientific research methodology and analytical framework and improves the reliability and persuasiveness of the research. The communicator, content, channel, audience, effect, environment, and motivation are regarded as an organic whole, which helps researchers to deeply understand the complexity and diversity of information dissemination and improve the depth and breadth of research.

Braddock's "7W" theory is widely used in cultural and organizational communication in China. For example, based on Braddock's "7W" theory, some studies have explored the willingness of patients to give informed consent (Woolf et al., 2005), as well as measures to

enhance the willingness of women over 40 years of age to undergo X-ray examination (Nekhlyudov & Braddock III, 2009). Chinese scholar Duan (2018) analyzed the characteristics of communication in the new media environment in combination with "7W" theory and pointed out that the construction of new media for government affairs is facing support and challenges in various aspects, such as policy and technology, and that it is necessary to constantly study the characteristics and laws of communication of the new media, to understand the needs of the audience, and to realize the communication of government affairs in the era of new media transformation and development. Hao and Zhang (2021), based on the "7W" theory, from seven aspects of the traditional classroom, network classroom, flipped classroom, and pair of classroom teaching mode of comparative analysis, aimed at achieving the optimization of teaching and learning, to improve the effectiveness of classroom teaching in colleges and universities. Lv et al. (2020), based on the "7W" theory, explored and established the basic functional modules of China's farmers' education and training mechanism, including the government and farmers' organizations to cooperate in the education and training of the goal-oriented mechanism, the mechanism for the expression of demand, the mechanism of cooperative supply, supervision and management mechanisms, incentives and constraints, diversification and safeguard mechanism, and performance evaluation mechanism. X. Wang and Liang (2021) analyzed the translation and dissemination of Chinese shadow puppets using "7W" communication theory. They constructed a dynamic and open mode of translating Chinese shadow puppets, which provided a new perspective for the foreign dissemination of Chinese culture. Using the "7W" model as a guide, Y. Li (2022) studied the overseas dissemination of the poetry of Du Fu, the "Sage of Poetry," and analyzed the roles and influences of the various elements in the dissemination process on the overseas dissemination of Du Fu's poetry.

This study chooses the "7W" theory as the basis, aiming to comprehensively and systematically assess the comprehensiveness and systematicity of information dissemination. "7W" theory explains communication behaviors through seven dimensions, which enables an adequate evaluation of clinicians' health communication ability. These seven dimensions include What Aim, What Environment, Who, Says What, In Which Channel, To Whom, and With What Effects.

What Environment: This dimension focuses on the social, cultural, and political environment in which communication activities occur. It assesses the communicator's sensitivity, adaptability, and control of the environment, including their ability to cope with risks and utilize resources.

Who: The communicator initiates the communication activity and involves factors such as his/her intrinsic identity, intellectual background, and personal qualities. When evaluating the communicator's competence, it is essential to consider his/her professional competence, communication skills, and leadership.

What Aim: The aim and motivation of the communicator, mainly examining his/her awareness of the communication goal and inner motivation.

Says What: It is the core of communication, and its quality, accuracy, and attractiveness are crucial to its effectiveness. When evaluating communicators, examining their ability to collect content, integrate, and edit is necessary.

In Which Channel: This This refers to the medium of communication, and the selection of the appropriate channel significantly impacts its effectiveness. It evaluates a communicator's ability to understand and utilize different communication channels, including digital and traditional media.

To Whom: Understanding the audience's needs, preferences, and habits is essential.

With What Effects: This involves the effectiveness and impact of a communication campaign, which can be assessed in both subjective and objective ways.

Through these seven dimensions, Braddock's "7W" theory provides

- (1) A systematic framework for this study,
- (2) Enabling the evaluator to analyze the impact of each element on communication effectiveness in a targeted manner,
- (3) Thus, improving clinicians' health communication ability and knowledge more effectively.

2.1.6 Assessment of health communication ability

Evaluation of health communication ability focuses on developing and utilizing validated assessment tools to accurately assess the core competencies of healthcare workers in health communication (J. Hu et al., 2022). Currently, health communication ability assessment tools have been explored in the academic community, but mainly prior to the coronavirus-19 (COVID-19) epidemic. The application of these tools is limited, and they have failed to form a systematic system for evaluating clinicians' health communication ability.

On the international front, Coleman (2013), an American scholar, developed a set of health communication knowledge competency assessment scales for medical students and medical staff. The scale features three dimensions of knowledge, skills, and attitudes, with 62 evaluation sub-items covering communication skills, environmental grasp, language conditions,

assessment skills, and professional attitudes. Karuranga (2017) modified and improved on this basis, using the Delphi expert consultation method, and finally formed an evaluation system with three dimensions and 56 indicators, which applies to the evaluation of the health communication ability of European healthcare workers. Yilmaz et al. (2022) developed an evaluation system that covers knowledge, platforms, skills and competencies, attitudes, and other five domains of 46 program core competency evaluation indicators. American scholars S. Park et al. (2021) used the KSA model to develop lists for assessing the health communication abilities of health communication specialists, which included ten knowledge domains (e.g., cross-cultural communication, health behavior research, social marketing), three skills (e.g., communication essentials, media and journalism proficiency, and scientific research and writing skills), and five contextualized abilities (e.g., communicating with diverse audiences, completing health communication (e.g., communicating with diverse audiences, completing health communication projects). However, the assessment tool only applies to health communicators with a master's degree and has not been tested for reliability and validity, requiring further research.

On the Chinese front, Chang et al. (2017) established an evaluation system containing two dimensions and 49 indicators dedicated to the health communication ability of Chinese non-clinicians. Yin et al. (2018) used Lasswell's "5W" model. They constructed an evaluation index system for the health communication ability of medical personnel through the Delphi expert interview method, which included five primary and 20 secondary indicators. Shao et al. (2021) also constructed an evaluation system for clinicians' health science popularization with the form of science popularization, science popularization platform, and science popularization mediatization as the main framework through the Delphi expert consultation method, which included three primary indicators, nine secondary indicators, and 34 tertiary indicators. However, the academic community has not yet explored a systematic health communication ability evaluation system for the critical group of clinicians, and the existing evaluation system fails to take into full consideration the context of the era of health knowledge dissemination and the motivation of the communicators themselves, which is a significant shortcoming of the above studies. In recent years, the prevalence of COVID-19 has highlighted the importance of many new knowledge domains, skills, and competencies. It has also changed the public's demand for health knowledge, which has impacted medical personnel's health communication ability and content. The academic community needs to clarify the corresponding competence assessment tools further and establish a scientific and practical training system in light of the health information communication problems identified in the COVID-19 epidemic to enhance

the health communication ability of medical personnel and meet the growing health needs and overall health level of the people.

In summary, the existing health communication ability assessment tools have some shortcomings in practical application. First, most existing tools were developed before the COVID-19 epidemic and failed to fully consider the complexity and urgency of health communication in the context of epidemics. In addition, these tools usually lack an evaluation system specifically for clinicians to comprehensively assess their health communication ability in different contexts. Although some studies have constructed relatively comprehensive evaluation indicators, many tools still require third-party expert ratings and lack reliability and validity tests, resulting in insufficient reliability and validity. Especially in China, the existing evaluation system fails to adequately consider the contemporary context of health knowledge dissemination and the communicators' motivation, making these tools inadequate in the dynamically changing healthcare environment. The COVID-19 outbreak has exposed many new issues in health communication and highlighted the need for more accurate tools. Therefore, developing a health communication ability scale specifically for clinicians can better adapt to the current complex health communication environment, improve medical professionals' communication ability, and meet society's growing health needs.

2.2 Organizational support

2.2.1 Concept of organizational support

Organizational support is the process of reflecting the organization's vision at the firm level and aims to show employees what they need to achieve the organization's goals. Eisenberger et al. (1986) stated that organizational support refers to the organization's recognition of the contributions of its employees and whether or not the organization cares about the well-being of its employees. Organizational support can be categorized into tangible and intangible support; tangible support includes the provision of necessary physical items such as suitable equipment and training, while intangible support includes recognition and encouragement of employees. According to Wayne et al. (1997), organizational support is the perception of employees of supportive behaviors provided by the organization, which include recognition of the employee's job recognition, support for career development, and attention to employees' individual needs. For Lambert et al. (2009), organizational support is the process by which organizations help employees achieve their personal and professional goals by providing resources, guidance, and

emotional support. This definition emphasizes that organizational support goes beyond material assistance and includes career development opportunities, training, and psychological support.

The definition of organizational support adopted in this study is as follows: organizational support is the employees' perception of supportive behaviors provided by the organization, which include both material support and cover recognition of the employees' work, support for career development, and attention to the employees' personal needs (Eisenberger et al., 1986; Wayne et al., 1997).

2.2.2 Elements and dimensions of organizational support

Elements of organizational support. According to Eisenberger et al. (2020), organizational support consists of the following elements: valuing employee contributions, caring for employee well-being, providing resources, offering career development opportunities, and promoting work-life balance. Valuing employee contribution involves motivating employees to use their talents and initiative through rewards, recognition, and bonuses. Caring for employee well-being involves stress management facilities and paying attention to employees' physical, mental, and emotional state. Resources involve providing employees with the equipment, technology, training, and a reasonably organized work environment needed to do their jobs. Providing career development opportunities refers to supporting career development training and education, helping employees prepare for new career roles, and providing career support. Work-life balance is demonstrated by providing amenities such as flexible work schedules, telecommuting, and even wellness programs for employees' family needs and responsibilities.

Five dimensions of organizational support for clinicians. Organizational support is critical in healthcare because the healthcare environment is very demanding. These supports include adequate human resources, psychological services, staff development, organizational communication, employee rewards, the introduction of new technologies, teamwork, and health promotion initiatives (Purwanto, 2020). Based on clinicians' work characteristics and needs, Shumunya (2021) constructed five dimensions of organizational support for clinicians in China: developmental support, work support, benefit protection, interpersonal support, and respect support. These dimensions aim to comprehensively assess and reflect clinicians' perceptions of organizational support. Developmental support refers to clinicians' perception of the assistance the hospital or department provides regarding career development. This includes providing training, learning opportunities, career development platforms, and career planning advice to help physicians improve their professional skills and career advancement. On the other hand, work support involves the human, material, and environmental support provided by the hospital

or department to clinicians during diagnosis, treatment, and surgery. For example, when doctors encounter difficulties, the hospital assists by offering research resources, such as funding and laboratories, and setting up efficient and convenient information systems. The dimension of benefit protection includes both the strength of the hospital or department in terms of explicit support, such as performance and benefits, and the degree of invisible support, such as risk sharing and personal protection, covering salary, overtime compensation, position stability, and hospital support in the case of doctor-patient disputes. Interpersonal support refers to the degree to which clinicians feel tacit cooperation and pleasantness among colleagues in the hospital, which includes mutual recognition with leaders, good relationships among colleagues, and the help and support provided by colleagues when needed. Respect support, on the other hand, relates to the degree to which clinicians feel treated as equals and valued, which includes having their work respected, their opinions listened to, and having the opportunity to participate in decision-making in the department.

2.2.3 Outcomes of Organizational Support

Organizational support enhances employee well-being and leads to many positive outcomes for both employees and the organization, including increased effectiveness at the individual, team, and organizational levels and increased organizational and job stability.

Job satisfaction and employee retention. Workplace support is among the most critical factors affecting job satisfaction and employee attendance. Employees' job satisfaction increases significantly when they feel the organization values them and cares about their well-being. This feeling of being valued can change employees' attitudes and make them work harder to achieve the organization's goals and visions, resulting in positive actions (Rasool et al., 2021). When employees feel that the organization recognizes their contributions and cares about their well-being, they have a more positive view of the organization, increasing job satisfaction. This positive affective response helps to build a social exchange relationship between employees and the organization, making employees more willing to invest effort in the organization and expect to be rewarded accordingly. In addition, a high level of organizational support enhances employees' sense of organizational identity and emotional commitment, increasing employees' enthusiasm for their jobs and reducing their willingness to leave, increasing employee retention. Therefore, organizations should create a supportive and caring work environment to enhance employee loyalty and retention (Kurtessis et al., 2017).

Organizational commitment. Organizational commitment refers to employees' loyalty and commitment to the organization and is divided into three types: affective, normative, and

continuance commitment. Affective commitment refers to employees developing a solid bond with the organization and thus becoming more loyal and passionate about their work. On the other hand, normative commitment may stem from employees feeling bound by the organization's support and career development opportunities. Persistent commitment implies that employees perceive the rewards of staying with the company as more favorable than jumping ship to another company (H. Chen & Eyoun, 2021). Research has shown that organizational support has a significant impact on enhancing organizational commitment. When employees feel supported by the organization, they are more likely to utilize their knowledge and skills to benefit organizational goals. The study also showed that employees' perceptions of organizational support positively impacted their organizational commitment, although there were differences in perceptions of personal development and job structure. In particular, employees' level of organizational commitment is higher when organizational support focuses more on personal development rather than being limited to job structure. In addition, it was found that employees who received rewards showed higher levels of perceived organizational support and commitment, suggesting that organizational recognition and rewards can enhance employees' sense of belonging and loyalty. Therefore, organizations should pay attention to and provide supportive measures, especially support focusing on employees' personal development to enhance their commitment and loyalty to the organization (Gündüz, 2017).

Performance and productivity. When employees perceive that the organization recognizes and acknowledges their work, they tend to work harder and are even willing to work overtime; as a result, employees' organizational citizenship behaviors increase. These positive behaviors will be reflected in job performance, productivity, and the ability to go above and beyond the call of duty. In the healthcare system, this can lead to an increase in the quality-of-care delivery, a decrease in error rates, and an increase in the quality of patient care or treatment. For example, when the organization supports nurses, they may be more engaged and attentive, reconsider dosages, explain things to patients, and even be willing to work overtime to ensure a smooth handoff. As a result, improved performance is also seen in innovation and problem-solving. When employees feel fully supported, they take the time to make suggestions to improve the organization's operations and report problems. This contributes to continuous improvement in organizational practices and organizational outcomes. In addition, the level of organizational support fosters collaboration and knowledge sharing in the workplace. When employees feel valued and supported, they are more likely to share their knowledge and skills with colleagues and help new employees, resulting in a learning organization (Shehzad et al., 2023).

Burnout and stress. Burnout and stress are common problems in today's workplace, affecting employees' physical and mental health and performance. Organizational support, i.e., the care, respect, and support employees feel from their organizations, is essential in alleviating these problems (Z. Xu & Yang, 2021). First, organizational support helps alleviate burnout. Burnout usually manifests itself in the form of emotional exhaustion, work fatigue, and decreased personal fulfillment. In the long run, employees who feel unsupported at work often feel isolated and vulnerable to emotional exhaustion and burnout. On the contrary, when employees feel the care and support of the organization, their sense of belonging and security will increase. This support can be manifested in various forms, such as reasonable work distribution, providing career development opportunities, and constructing a healthy work environment. These measures can enhance employees' self-efficacy and reduce the risk of burnout. Second, organizational support has a significant mitigating effect on perceived stress. Perceived stress is an employee's subjective experience of work pressure, which is influenced by the individual's cognition of environmental requirements and coping ability. High perceived stress is often accompanied by psychological problems such as anxiety and depression and even leads to a decline in work performance. Organizational support can help employees reduce perceived stress and enhance their coping abilities by providing flexible work arrangements, increasing autonomy, and giving emotional support and resources to help them (Abid & Salzman, 2021).

Improving Patient Care and Satisfaction. Organizational support has a direct impact on patient care in healthcare settings. Research has shown that positive organizational support contributes to positive professional interactions between healthcare professionals and patients, making them more engaged as they perform their duties with empathy and concern for patients. This helps healthcare organizations improve patient satisfaction, reduce morbidity and mortality, and enhance their market image. On the contrary, absenteeism or lack of support from healthcare professionals may lead to employee dissatisfaction, which may lead to patient complaints and even loss of trust in healthcare professionals, resulting in their failure to comply with prescription requirements strictly. In addition, organizational support helps shape the environment conducive to safety and quality in healthcare facilities. Supported employees are more likely to observe errors and near-misses and initiate ideas on improving healthcare quality and receiving a high standard of care. The role of organizational support cannot be ignored because it directly affects the quality of patient care. As a result, organizational support can reduce readmission rates, improve chronic care, and improve population health. This benefits patients and can be financially rewarding for healthcare organizations that tie payment to quality

and patient status. In short, organizational support is associated with multiple interdependent positive outcomes, creating a virtuous cycle. Organizational efforts to support employees motivate organizations to provide more support in the future. Understanding these outcomes helps organizations recognize the importance of providing supportive practices that increase employee engagement and organizational effectiveness and enhance patient outcomes in healthcare organizations (Labrague & De Los Santos, 2020).

2.2.4 Factors affecting organizational support

Leadership and management practices, organizational culture, available resources, human resource practices, and employee perceptions and attitudes influence organizational support. These factors are critical for organizations looking to improve supportive behaviors and work environments.

Leadership and management practices. Leadership and management practices play a crucial role in improving organizational support. Leaders are influential in creating a healthy climate of organizational support through practical actions such as regular feedback, coaching, mentoring, advocating for employee needs, and showing empathy. Regular feedback improves employee performance and motivates them, while coaching and mentoring help create an environment conducive to learning and development. When leaders focus on the needs of their employees at a high level, they can ensure the overall well-being of their employees. Additionally, the care leaders show in dealing with employees' personal and professional issues often leads to positive results. Promoting open communication is also crucial, and an open platform for expression allows employees to be heard and enhances their sense of support for the organization. Effective leadership is critical to translating safety and quality strategies into a healthy corporate culture. Particularly in healthcare, only leaders who are attentive to the needs of both patients and employees can effectively improve the work environment and provide appropriate organizational support. For example, when a nursing manager suggests that the number of nurses should match the number of patients, it demonstrates support for employee well-being and the provision of quality services to patients (Azeem et al., 2021).

Organizational culture. Organizational culture plays a vital role in determining the level of organizational support. Organizations with supportive cultures usually have the following characteristics: open channels of communication and implementation of two-way communication between different departments of the company; emphasis on teamwork and creation of conditions for employees to work together amicably in order to achieve the set goals; recognition of the contributions of employees and frequent acknowledgment and valuing of

their achievements and hard work; focus on continuous learning and improvement, promotion of employee training and development of their competencies, and avoidance of mistakes that would be subject to punishment or condemnation. In addition, initiatives that support work-life balance are important and, through top-down policy practices, can effectively impact multiple aspects of employees' lives. In healthcare, a supportive culture should also focus on patient safety and interdisciplinary collaboration. For example, a culture that encourages employees to report errors without fear of retaliation and fosters collaboration between different healthcare professionals will help boost employee morale and improve the quality of patient services (Gojny-Zbierowska, 2024).

Available resources. Available resources are an essential factor in determining the level of organizational support. These resources include adequate staffing, up-to-date equipment and technology, and training and development opportunities. Staffing shortages can increase employees' workload and make it challenging to achieve organizational goals. Up-to-date equipment and technology can maximize the results of employees' work by providing them with the tools they need to perform their professional activities. Training and development opportunities, on the other hand, help employees grow professionally and advance in title or position. In addition, support services, such as employee assistance programs, corporate health promotion, and counseling services, are also crucial in enhancing organizational support (Morgantini et al., 2020). Material resources in the healthcare industry include new equipment, technology, or professional development programs. For example, purchasing new diagnostic equipment from a hospital improves the efficiency of healthcare services. It demonstrates that the hospital cares about its employees by providing them with the tools to do their jobs efficiently (Rudolph et al., 2021).

Human resource practices. Good human resource management practices can significantly increase employees' perception of organizational support by demonstrating that the company values employee productivity and helps employees succeed in their careers. HR practices that create a supportive environment include a fair and transparent hiring process that eliminates nepotism; a comprehensive onboarding program that helps new hires get a clear understanding of the organization and settle in quickly; regular performance evaluations with constructive feedback that ensures fairness and reasonableness, with an emphasis on learning and growth; opportunities for career development that point employees in the right direction for advancement in their careers; and a competitive compensation and benefits package to ensure that employees receive compensation commensurate with their work and have access to necessary health facilities. Healthcare organizations may also provide training programs to cope

with work-related stress, such as providing schedules that help with work-life balance, allowing nurses to make their work schedules, and career mobility opportunities that allow nurses to advance in the clinical field without transferring to another job (Kumari et al., 2021).

Employee perceptions and attitudes. Employees' perceptions and attitudes toward the organization directly affect their perception of organizational support. Factors that influence these perceptions include past experiences related to the organization, i.e., the way the organization has treated employees in the past affects their perception of current support; leadership communication, i.e., the leadership delivers precise, consistent, and transparent messages to employees; and congruence of organizational values and actions, which enhances employees' sense of trust and support for the organization when they perceive support from organizational behaviors. In addition, the treatment of colleagues and peers is one factor that influences employees' perception of organizational support. Organizational fairness, i.e., the fairness of decision-making and outcomes, also affects employees' perceptions of support. However, employees' perceptions of these factors may differ within the same company. Thus, personality traits, cultural backgrounds, or past experiences may affect employees' perceptions of organizational support and their assessment of its value (Anwar & Abdullah, 2021).

2.2.5 Related theories of organizational support

Theories related to organizational support provide a multidimensional perspective for understanding its impact on employee attitudes and behaviors. The standard theories are as follows: the Perceived Organizational Support (POS) theory, the Social Exchange Theory (SET), the Resource Based View (RBV) theory, and the Job Demand-Resource (JD-R) model. The Perceived Organizational Support (POS) theory, proposed by Eisenberger et al. (2019), emphasizes the employees' perception of organizational care and attention. The POS theory states that this perception comes from the organization's various activities and policies, such as the reward system and the sense of fairness, improving employees' organizational commitment (OC), job satisfaction, and performance. In addition, POS theory emphasizes that employees reciprocate to the organization through positive behaviors after perceiving organizational support, known as the reciprocity norm. Social Exchange Theory (SET) was first proposed by Homans (Blau, 1964; Homans, 1958) and further developed later by Blau (1964). The core idea of the theory is that social behavior is based on the principle that people exchange resources in interactions that can be material or non-material, such as status, information, or emotional support. When employees feel supported by the organization, they are rewarded with loyalty and high performance. The Resource-Based View (RBV), introduced by Wernerfelt (Barney,

1991; Wernerfelt, 1984) and then further developed and popularized by Barney (1991), views supportive practices in the context of organizational support as resources that can enhance employee performance and improve the overall effectiveness of the organization. Organizations can accumulate hard-to-imitate human capital through practical support and develop a sustainable competitive advantage. The Job Demand-Resources (JD-R) model, on the other hand, developed by Demerouti et al. (2001), explains how organizational support can reduce employee burnout due to high job demands by providing job resources, thereby increasing job engagement (Demerouti et al., 2001). These theories provide a theoretical basis for the importance of organizational support, how it works, what effects should be pursued at the organizational level, and what effects should be avoided (Qi et al., 2019).

2.2.6 Organizational support measurement tools

Perceived organizational support scale (POS)

The perceived organizational support (POS) scale was developed by Eisenberger et al. (1986) to measure employees' perceptions of whether the organization cares about their well-being and values their contributions. The core of the scale is to assess the social exchange relationship between the employee and the organization, specifically whether the organization fulfills its obligations in exchange for employee loyalty and high performance. The POS scale comprises 36 items dealing with employees' perceptions of organizational support. The items measure three main areas: Organizational care: whether employees perceive that the organization cares about their happiness and well-being. Contribution recognition: Whether employees perceive that the organization adequately recognizes and values their contributions to the workplace. Reciprocity: the relationship between employees perceived organizational support and their perception of the organization's obligation to reciprocate. The POS scale has been widely used across cultures and industries to examine the effects of organizational support on employees' attitudes (e.g., job satisfaction, organizational commitment) and behaviors (e.g., intention to leave, performance). Research has shown that higher POS scores are usually associated with higher employee satisfaction and performance (Rhoades et al., 2001).

Organizational support questionnaire (OSQ). The Organizational Support Questionnaire (OSQ) was developed by Shore and Tetrick (1991) to assess employees' perceptions of supportive organizational policies, working conditions, and fairness. Unlike the POS, the OSQ focuses more on the impact of specific supportive behaviors and policies on employees rather than just employees' perceptions of overall organizational support. The OSQ contains multiple entries focusing on the following areas: Supportive Policies, including

training opportunities, career development support. Working conditions: e.g., safety and comfort of the working environment. Fairness: the organization's fairness in resource allocation and performance appraisal. The OSQ has been used in various applications, particularly in organizational behavior and human resource management studies, to explore how organizational support affects employees' psychological well-being, job satisfaction, and job stress (Shore & Shore, 1995).

Clinician perceived organizational support scale. The Clinicians' Sense of Organizational Support Scale was developed by Chinese scholar Shu (2021). The scale was developed through a literature review, personal interviews, and focus group discussion to ensure its relevance and scientific validity. The scale took into full consideration the work characteristics and practical needs of clinicians, resulting in a scale containing five dimensions to measure clinicians' perceived level of support from the hospital or department in different aspects. These five dimensions include developmental support, work support, benefit protection, interpersonal support, and respect support. Developmental support involves the career development opportunities provided by the hospital or department for doctors, such as technical training and promotion opportunities; work support refers to the support provided by the hospital in daily work in terms of resources, research conditions, and information; benefits protection reflects the protection of clinicians' rights and interests in terms of performance appraisal, salary and benefits, and labor protection; interpersonal support involves the clinicians' interpersonal relationships in the hospital, such as colleague cooperation and leadership care; and respect support refers to the degree of respect doctors feel in the hospital, including the recognition of professional competence and respect for work autonomy. The reliability test confirms that the scale has good structural, convergent, and discriminant validity, as well as high internal consistency and split-half reliability, which makes it suitable for measuring clinicians' sense of organizational support in China.

The Clinicians' Perception of Organizational Support Scale is customized for the clinician population and comprehensively covers the support dimensions closely related to their daily work and career development. It can accurately measure physicians' perceptions of organizational support and provide a targeted and practical tool for research. Therefore, the Clinicians' Perception of Organizational Support Scale was used in the empirical research phase of this study.

2.3 Self-Efficacy

2.3.1 The concept of self-efficacy

The concept of self-efficacy was introduced by Bandura (1977), a famous American psychologist, who believed that self-efficacy is an individual's self-grasping and feeling of his or her ability judgment, belief, or subject's ability to accomplish a specific activity task at a certain level. Dembo and Gibson (1985) pointed out that self-efficacy is an individual's ability to a state of mind in which an individual responds to a particular situation. According to Schwarzer et al. (1997), self-efficacy is an individual's sense of competence and his/her feelings of self-confidence, self-priority, and self-esteem when faced with an activity task. According to X. Yang et al. (1993), in China, self-efficacy is the effective or ineffective self-experience individuals hold about their behaviors to influence behavioral outcomes. Although these definitions are slightly different, they share the same core idea: self-evaluation of one's abilities, an essential element of self-awareness, and an emotional expression of self-awareness. Self-efficacy refers to the degree of a person's confidence in his ability to perform a specific behavior in a given situation, i.e., whether he believes in himself or to what extent he is sufficiently capable of completing the activity task when confronted with a specific task.

Since self-efficacy is a conception of self-efficacy about a specific context, based on the fact that the subject of this study is healthcare professionals and the primary outcome variable of the study is health communication ability, the operationalized definition of self-efficacy adopted in this paper is the confidence held by healthcare professionals in their ability to demonstrate a specific behavior in a patient-centered model during the health communication process (Bandura, 1977; Zachariae et al., 2015).

2.3.2 Elements and dimensions of self-efficacy

In the division of dimensions of self-efficacy, various researchers have proposed a variety of categorizations. The dominant division is as follows:

General self-efficacy and specific self-efficacy. Bandura (1977) classified self-efficacy into two dimensions: general self-efficacy and specific self-efficacy. General self-efficacy refers to an individual's overall confidence in his or her ability to cope and solve problems in a wide range of situations and focuses on a cross-situational ability and belief. On the other hand, specific self-efficacy refers to an individual's sense of efficacy in a specific task or domain and reflects in more detail an individual's confidence in his or her ability to perform a specific

activity. This division emphasizes the distinction between self-efficacy in broad and specific contexts, highlighting the broad applicability of its theory.

Three dimensions of self-efficacy. Based on self-efficacy theory, the academic division of self-efficacy can be summarized into three dimensions: task, social, and emotional. Task self-efficacy refers to an individual's confidence in his or her ability to perform a specific task when faced with that task successfully and focuses primarily on an individual's beliefs and expectations regarding a specific job task (Bandura, 1977). Social self-efficacy emphasizes an individual's confidence in his or her abilities in social interactions, especially in communicating, interacting, and handling interpersonal relationships (Smith & Betz, 2000). Emotional self-efficacy refers to an individual's confidence in his or her ability to manage and regulate emotions in the face of emotional challenges, such as emotional control in stressful situations (Caprara et al., 2000). This categorization considers individuals' self-efficacy and competence to face different challenges and tasks. It provides firm support and a theoretical basis for understanding the role of self-efficacy in different contexts.

Dimensions of self-efficacy in medical professionals. According to Zachariae et al. (2015), medical staff's self-efficacy in communicating with patients during consultation consists of three dimensions: recognizing patient needs, sharing information and power, and coping with communication challenges. Identifying patient needs refers to the physician's ability to understand and identify the patient's health status, preferences, needs, and expectations. Through effective communication, physicians gather information about the patient's medical history, lifestyle, and feelings and perceptions about the disease and treatment in order to personalize the patient's care. Shared information and power emphasize information sharing and decision-making participation between physicians and patients. Physicians should not only clearly communicate medical information, including diagnoses, treatment options, possible risks, and expected outcomes, but also encourage patients to participate in treatment decisions and respect their choices and wishes. Coping with communication challenges involves a variety of challenges that physicians may encounter in communicating with patients, such as patients' lack of understanding, mood swings, or cultural differences. Physicians must have practical communication skills and emotion management abilities to ensure smooth communication, build trusting relationships, and promote patients' understanding and acceptance of treatment. These three dimensions are interrelated and constitute physicians' self-efficacy in providing patient-centered care, influencing physicians' treatment behaviors and patients' healthcare experience.

2.3.3 Outcomes of self-efficacy

Self-efficacy directly affects the dynamic psychological processes of individuals during executive activities, mainly in the areas of behavioral choices, motivational processes, cognitive processes, emotional processes, performance, and occupational tension (Cole & Hopkins, 1995; Schaubroeck & Merritt, 1997 ; Wood & Bandura, 1989).

Behavioral choices. People are products of their environment, but people also select particular activities and environments and change them through self-efficacy (Wood & Bandura, 1989). The well-known triadic interaction theory suggests that people are both products and modifiers of their environments. As modifiers of the environment, individuals choose environments based on self-efficacy and change them through their activities. Typically, individuals choose environments they believe they can effectively cope with and avoid those they cannot. Once individuals choose environments, these environments affect their behavior and personality development. Research has shown that individuals with low self-efficacy tend to see life challenges as threatening when faced with them and thus avoid them. Conversely, individuals with high self-efficacy will face environmental challenges positively, viewing them as opportunities to learn new skills (Staring & Breteler, 2004; Thorpe et al., 2005). Another aspect of behavioral choice is the individual's choice of behavioral activities. When an individual can solve a task through different behaviors, behavioral choice depends on the individual's sense of self-efficacy for those behavioral activities. Different behavioral activities lead to different experiences, which affects the individual's development. In other words, people develop different skills, interests, and social networks through behavioral choices, which have a significant impact on the formation of their outlook and values (Baskin et al., 2016; Fiorentine & Hillhouse, 2003; Zelle et al., 2016).

Motivational processes. Self-efficacy affects individuals through motivational processes. It affects an individual's level of effort in activities, persistence, and endurance in the face of difficulties, obstacles, and setbacks. Especially in challenging tasks, high self-efficacy motivates people to work harder until they reach their goals. In contrast, people with low self-efficacy doubt their abilities when encountering initial failures, thus settling for the middle of the road or even giving up on their efforts. In short, when individuals feel a high sense of self-efficacy, they work harder, whereas when they feel a low sense of self-efficacy, they are reluctant to put in the effort (Paglis & Green, 2002).

Cognitive processes. In cognitive processes, an individual's behavior is controlled by thinking, and one of the main functions of thinking is to predict future behavioral outcomes.

Desired goals primarily regulate human goal-based behavior, and the setting of desired goals is influenced by self-efficacy. The thought process may be self-help or self-impeding when encountering difficulties and frustrations. The higher the self-efficacy, the more challenging the goals set by the individual, and the higher the level of achievement. Individuals with high self-efficacy paint scenarios of success in their minds and take positive action, whereas individuals with lower self-efficacy tend to worry about failure, which reduces their level of effort (Bandura, 1989).

Emotional processes. Self-efficacy determines an individual's stress, anxiety, and depressive responses when faced with possible danger, misfortune, or disaster. Individuals who believe they can effectively control environmental threats do not feel excessive worry or fear in response to environmental events. Those who doubt their abilities, on the other hand, feel that the environment is fraught with danger, develop strong stress reactions and anxiety, and engage in adverse withdrawal or defensive behaviors. Threateningness is not an inherent property of an environmental event. However, it is determined by the properties of the relationship between an individual's sense of self-efficacy and environmental threat (Bandura & Wessels, 1997).

Performance. Self-efficacy is closely related to performance. Cole and Hopkins (Cole & Hopkins, 1995) stated that self-efficacy is one of the best predictors of individual performance. High self-efficacy drives performance, while low self-efficacy affects performance growth. Individuals with high self-efficacy typically attempt challenging tasks, set higher goals, and show strong goal commitment to improve performance (Appelbaum & Hare, 1996). In contrast, those with low self-efficacy avoid challenging work, set lower goals, and show less commitment to goals, compromising performance (Bandura & Wessels, 1997).

Occupational stress. Due to an imbalance between actual or perceived needs and adaptive capacity, individuals adapting to the environment can experience a state of physical tension known as stress. Stress triggered by work and related factors is called occupational stress or work stress. Long-term chronic occupational stress can lead to deterioration of mental health and induce various psychosomatic disorders. Numerous studies have shown that self-efficacy is a critical variable in occupational stress, with a significant negative correlation between the two. Individuals with low self-efficacy are more likely to experience occupational stress than those with high self-efficacy (Schaubroeck & Merritt, 1997). People with high self-efficacy tend to use problem-oriented coping strategies to positively eliminate or adapt to stress. In contrast, people with low self-efficacy use emotion-oriented coping strategies, feel

overwhelmed by stress, are highly stressed, and display negative attitudes. Thus, people who adopt problem-oriented coping strategies can better adapt to stress (Bandura & Wessels, 1997).

2.3.4 Factors affecting self-efficacy

Self-efficacy is formed in four different ways: firstly, through previous experiences of success or failure; secondly, through the modeling effects of others; thirdly, through social persuasion that tells people that they have what it takes to get results; and fourthly, through emotional state and physiological arousal. These four different sources of information often work together to form self-efficacy (Evans, 1989).

Past successes and failures. Previous experiences of success or failure have the most significant impact on an individual's self-efficacy formation. Successful experiences contribute to higher self-efficacy, whereas failures may reduce an individual's self-efficacy, especially if the individual has not yet developed a strong sense of self-efficacy (Marlatt et al., 1995). Of particular note, initial successes are essential for people to achieve more in the future. In modern business management, managers can break down complex tasks into several stages or small tasks and encourage employees to complete each small task step-by-step, thereby increasing their success experience, which in turn enhances their self-efficacy and ultimately leads to tremendous success in their future work (Bandura & Wessels, 1997).

Alternative experiences (Demonstration effect). Alternative experiences, i.e., the modeling effect provided through social "role models," also significantly impact the development of self-efficacy. If people see people like themselves succeeding through sustained effort, they may also believe they can succeed. Conversely, observing losers may reduce an individual's level of motivation and cause them to doubt their abilities. In addition, Bandura emphasized that the more similar the role model is to the individual in terms of demographic characteristics such as age, gender, physical characteristics, and education, as well as status and experience, the greater the effect of the role model's behavior on the observer's sense of self-efficacy, and, conversely, if the role model is more dissimilar to the observer, then the role model's behavior will have a lesser effect on the sense of self-efficacy (Marlatt et al., 1995).

Social persuasion. People are more likely to put in more effort and persevere when persuaded that they can accomplish a task. The role of social persuasion is particularly pronounced when they struggle with the work process or begin to doubt themselves. Therefore, social persuasion plays an essential role in the formation of self-efficacy. Corporate managers can significantly enhance employees' self-efficacy by praising and recognizing their high-performing employees promptly; similarly, teachers' verbal praise for students who perform

well or progress also helps enhance their learning self-efficacy. Of course, not all praise enhances self-efficacy, and criticism does not always diminish self-efficacy. Derogatory criticism may reduce self-efficacy, whereas constructive criticism may enhance self-efficacy (Marlatt et al., 1995).

Emotional state and physiological arousal. Bandura and Wessels (1997) noted that emotional and physiological states also influence the formation of self-efficacy. People often rely on the physiological and emotional feelings they are experiencing when assessing their competence. They tend to perceive perceived stress as a signal of poor performance and view fatigue and pain during endurance activities as physiological deficits. At the same time, emotional states can influence judgments about one's abilities. Positive emotional states can enhance self-efficacy, whereas negative emotional states may diminish self-efficacy (Marlatt et al., 1995).

2.3.5 Theories related to self-efficacy

There are three main theories related to self-efficacy: self-efficacy theory, the theory of reasoned action, and the multistage theory of change.

Self-efficacy theory. Self-efficacy theory is integral to Bandura's social learning theory and a logical outgrowth of his general learning theory perspective. Bandura's body of social learning theory is his rational grasp of human nature and the causal decision model, expressed theoretically as Ternary Interactive Determinism. Ternary interactional determinism explores the interaction between the environment, behavior, and human subjective factors (e.g., thinking, cognition, self-evaluation) (Bandura, 1963). However, ternary interactional determinism only deals with the mechanical aspects of behavior. It does not delve into the phenomenological aspects of behavior and is, therefore, insufficient to fully explain the complexity of human behavior. In behavioral performance, people with the same behavioral skills may exhibit very different effects under different conditions, suggesting that an essential area of action has not been addressed by ternary interactional determinism, namely, the mechanism of self-efficacy (Bandura, 1989). The concept and theory of self-efficacy have attracted much attention since its introduction. Scholars have verified the veracity of self-efficacy theory through various methods and applied it to several social life domains, thus playing an essential guiding role in practice (Schwarzer et al., 2009; Tannady et al., 2019; H. Wu & Li, 2020).

Theory of reasoned action. The theory of rational action was proposed by American scholars Ajzen and Fishbein (1988), which emphasizes the critical role of cognitive factors in the generation and change of individual health behaviors, moral behaviors, and other behaviors.

The theory suggests that human behavior is characterized by rationality and that behavioral intentions are the most important predictor of behavioral occurrence and change and the direct determining force for behavioral change. Behavioral attitudes and subjective norms influence behavioral intentions. Behavioral attitudes are an individual's overall evaluation of behavior, including beliefs about behavioral outcomes and evaluations of behavioral consequences. In contrast, subjective norms are the degree to which an individual perceives that significant others approve of and are predisposed to change his or her behavior, and consist of two components: normative beliefs and motivation to comply (Sideridis et al., 1998).

Multistage theory of change. Multistage change theory suggests that the developmental stages and processes of behavior change are more important than focusing on behavioral outcomes. *Behavior change* is a gradual, staged, spiraling, and complex process that may manifest as forward movement, i.e., from one stage to the next or backward. Behavior follows this spiral until all processes of change are completed. The multistage theory of change states that changes in individual health behaviors go through five stages: the first stage is the pre-contemplative stage, when the individual is not yet aware of the dangers of undesirable behaviors and has no intention of changing his or her behavior. The second stage is the contemplative stage, in which the individual begins to realize the seriousness of the problem and seriously considers changing the behavior. The third stage is the preparation stage, in which the individual begins to plan and prepare for a change in behavior and experiences intermittent behavioral changes. The fourth stage is the action stage, in which the individual experiences persistent behavioral change (lasting up to six months). Finally, there is the maintenance stage, where the individual maintains the new behavior for over six months. In the multistage theory, the ability of an individual to transition from one stage to the next depends on the cognitive processes at each stage. Integrating cognitive processes and the five stages of change ultimately explains an individual's behavior (Petrocelli, 2002). An individual's cognitive processes are divided into perceptual and behavioral factors. The theory also emphasizes the importance of self-efficacy and decision-making trade-offs for behavior change. Significant differences in the cognitive process factors at different stages influence an individual's transition from one stage to the next, ultimately leading to behavior change (Courneya & Bobick, 2000; Petrocelli, 2002).

2.3.6 Measurement of self-efficacy

General self-efficacy scale (GSES)

Measuring and assessing self-efficacy is a critical issue in self-efficacy research, and it is the basis for empirical research on self-efficacy. Due to the different understanding of the meaning

of self-efficacy, there are two different approaches to measuring self-efficacy: one is to examine self-efficacy at the level of general personality, as represented by Schwarzer et al. (2009). One is to examine self-efficacy at the level of general personality, as represented by Schwarzer et al. They believe there is a general self-efficacy that is not domain-specific and that general self-efficacy can be measured. They developed a 10-item General Self-Efficacy Scale (GSES), the reliability and validity of which have been confirmed in many field studies, and the Cronbach coefficients of internal consistency of the resulting scales used in many of these studies ranged from 0.75 to 0.91. The scales also have good convergent and discriminant validity. Scholars' empirical studies in China have also reached the same conclusion (L. Li, 2001; C. Wang et al., 2001).

However, the results of some studies indicate that the general self-efficacy scale measures a person's self-esteem level and does not have significant predictive power for performance; therefore, another orientation is the Measurement of domain-associated self-efficacy represented by Bandura, which should be targeted to the specific domains of activity in order to obtain a more accurate predictive power for performance because individuals have either solid or weak self-efficacy in different domains or specific functional situations. Bandura also believes that the main difference between self-efficacy and other self-mechanisms, such as self-esteem and achievement motivation, is that it is closely linked to specific domains and self-efficacy changes with the changes in context and tasks. Specific measures of self-efficacy are better than holistic measures (Pajares, 1996; Pajares, 1997).

“Patient-centered” self-efficacy scale (PCSES). In medicine, the patient-centered care model is becoming a meaningful way to improve patient satisfaction and quality of care. Self-efficacy, as an individual's confidence in his or her ability to perform a specific task, is one of the key factors influencing the behavior of healthcare professionals. Bandura (2006) emphasized that self-efficacy is a judgment of an individual's ability to perform a specific task or domain. It varies according to the context in which it is performed. Self-efficacy should be targeted in specific domains of activity to obtain a more accurate predictor of performance. “Patient-centered” self-efficacy is a specific application of self-efficacy in healthcare; Zachariae et al. (2015) introduced the concept of patient-centered self-efficacy, which refers to the beliefs of a medical student or physician about his or her ability to perform specific behaviors in a "patient-centered" manner. This belief is reflected in three main areas:

- taking into account patients' personal experiences, needs, and perspectives
- providing opportunities for patients to participate in health care
- improving the patient-physician partnership

They developed the PCSES, a healthcare-specific self-efficacy scale with 27 items in three dimensions: identifying patients' needs, sharing information and power, and coping with communication challenges. This scale has been widely recognized and used to measure patient-centered self-efficacy in groups such as pharmacy professionals and oncology teams (Karger et al., 2022; Michael et al., 2022). In China, D. Chen et al. (2023) translated and cross-culturally adapted the Patient-Centered Self-Efficacy Scale, which was validated with 1,318 clinicians at a tertiary general hospital in Guangdong Province, China, and found that the scale had good reliability and positively predicted physicians' diagnostic and treatment behaviors.

Clinicians' health communication services involve different tasks and situations from those in other fields, and the assessment of patient-centered self-efficacy needs to be both contextual and domain-specific. As a generalized scale, the GSES is only suitable for assessing physicians' general beliefs. However, it does not fully reflect physicians' specific beliefs about patient-centeredness in health communication. Therefore, the PCSES was selected for the empirical stage of this study.

2.4 Theoretical framework

2.4.1 Theoretical model

2.4.1.1 Social cognitive career theory model

Social cognitive career theory (SCCT), proposed by Lent et al. (1994), is based on social cognitive theory and emphasizes the roles of self-efficacy, outcome expectations, and career interests in career choice and development. The operational mechanism of SCCT can be explained in detail in the following aspects: 1) Self-Efficacy. Self-efficacy refers to an individual's confidence in his or her ability to succeed in a particular task or domain (Bandura & Wessels, 1997). In SCCT, self-efficacy is a core driver of career choice and development. Individuals with high self-efficacy are more inclined to choose challenging occupations and show higher persistence in the face of difficulties (Lent et al., 1994). For example, if medical professionals have high self-confidence in handling complex cases, they may choose these challenging tasks and be more persistent in the face of difficulties. 2) Outcome Expectations. Outcome Expectations refer to an individual's expectation of the possible outcome of a behavior or task (Lent et al., 2000). This factor influences an individual's career choice and career development. Individuals are more inclined to choose an occupation if they expect positive outcomes (e.g., career advancement, financial rewards, or personal satisfaction) from engaging

in that occupation (Hackett & Betz, 1981). Medical professionals may be more likely to choose and persist in a specialty field if they anticipate that pursuing that field will result in higher career satisfaction or opportunities for advancement. 3) Career Interests (CIs). Career interest refers to an individual's preference and enthusiasm for a particular occupational activity (Holland, 1997). In SCCT, career interests are not only influenced by self-efficacy and outcome expectations but also, in turn, influence career choice and career development. The level of an individual's interest directly affects his or her propensity to make career choices. For example, medical professionals' strong interest in a specialty field will motivate them to choose it and invest more time and energy in it (Lent & Brown, 2008).

The mechanism by which SCCT operates can be summarized in the following steps: The first step is forming a professional interest. Individuals are interested in a career based on confidence in their abilities (self-efficacy) and expectations of future outcomes (outcome expectations). This process is dynamic, and changes in self-efficacy and outcome expectations affect the strength of occupational interest. This is followed by career choice and goal setting. An individual's career interest influences his or her decision-making about career choice and goal setting. Interest in a particular field motivates individuals to set relevant career goals and develop plans for achieving those goals. Finally, there is action planning and career development. As career interest increases, individuals take action to achieve career goals. Changes in self-efficacy and outcome expectations affect the effectiveness of these actions, which in turn affects career development. High self-efficacy and positive outcome expectations make individuals more likely to take positive actions to overcome career challenges and achieve career goals (Lent & Brown, 2008). Thus, the SCCT provides a comprehensive framework for understanding how individuals develop career interests through self-efficacy and outcome expectations and how they make career choices and develop based on these interests.

2.4.1.2 Job demands-resources model

The Job demands-resources model (JD-R) was proposed by Bakker and Demerouti (Bakker & Demerouti, 2007) to explain the impact of work environment characteristics on employees, especially how to cope with job demands through job resources. In the employee's work environment, job demands and job resources are included. Job demands are the demands placed on employees' psychological and physiological resources at work, and these demands deplete employees' energy, leading to psychological and physiological stress (Demerouti et al., 2001). High job demands can increase employee fatigue, leading to burnout and health problems (Schaufeli & Bakker, 2004). Therefore, the high workload and time pressure healthcare workers

face may lead to increased burnout, affecting their performance and health. Job resources help employees cope with the demands of their jobs, achieve their work goals, and promote personal development and learning, such as supportive leadership, a favorable work environment, and adequate job autonomy (Bakker & Demerouti, 2007). These resources can reduce the stress associated with job demands and increase employee job satisfaction and performance (Demerouti et al., 2001). Therefore, the vocational training and supportive leadership that healthcare workers receive can help them cope with job stress more effectively and enhance job performance and career satisfaction.

The operational mechanism of the JD-R model can be summarized as follows: 1) Job demand and stress. Increased job demands lead to increased consumption of employees' psychological and physiological resources, leading to job stress and burnout (Schaufeli & Bakker, 2004). High job demands may cause employees to feel overworked and stressed, affecting their performance and health. 2) Job resources and job effectiveness. Adequate job resources can help employees cope with job demands and enhance job performance and satisfaction (Bakker & Demerouti, 2007). For example, appropriate support and training can alleviate the stress associated with high workloads and help employees improve their job effectiveness. 3) Buffering effect of resources. Job resources can not only directly enhance employees' job performance but also buffer the adverse effects of job demands, thus improving employees' job performance and psychological well-being (Demerouti et al., 2001).

2.4.1.3 Relationship between the SCCT model and the JD-R model

The SCCT and the JD-R provide different perspectives on career development and job stress but have complementary relationships.

Differences between the two. 1) The SCCT explains how individuals make career choices and develop through self-efficacy, outcome expectations, and career interests. It focuses on the individual's psychological processes in career decision-making and the formation of career interests (Lent et al., 1994). 2) The JD-R model, on the other hand, focuses on how the demands and resources in the work environment affect employees' job stress, job performance, and occupational health. It focuses on the sources of job stress and its effects on employees (Bakker & Demerouti, 2007).

The two are linked. 1) Career choice and job demands. In SCCT, self-efficacy and career interests influence an individual's career choices, which may involve different job demands and resources. The JD-R model explains the impact of these career choices in terms of specific job demands and resources. 2) Self-efficacy and job resources. Self-efficacy in SCCT influences

career choices and how an individual utilizes job resources in response to job demands. Job resources in the JD-R model can enhance an individual's self-efficacy, leading to improved work outcomes and health (Bakker & Demerouti, 2017).

Using the SCCT with the JD-R model provides a more comprehensive understanding of career development and job stress. For example, the SCCT can explain how individuals form career interests and choose careers. At the same time, the JD-R model can further explore how the specific job demands and resources involved in these career choices can affect an employee's work experience and health (Lent & Brown, 2013). Combining these two models allows the complex Relationship between self-efficacy, outcome expectations, job demands, and resources during career development to be explored in greater depth.

2.4.2 Research hypotheses

2.4.2.1 Relationship between organizational support and health communication ability

Organizational support is crucial in the healthcare industry, affecting medical staff's job satisfaction, and is closely related to their professional competence and performance. Organizational support for clinicians consists of five dimensions: developmental support, job support, benefit security, interpersonal support, and respect support (Shu, 2021). Health communication ability encompasses several dimensions, such as environmental conditions, communicators, communication motivation, communication channels, communication content, audience of communication, and effectiveness of communication (Braddock, 1958). The dimensions of organizational support may affect these dimensions of health communication ability through different mechanisms.

Research suggests that the influence of different dimensions of organizational support on health communication ability has essential theoretical and practical implications. Perceived organizational support positively affects employees' job satisfaction, competence, and performance. When employees feel supported and cared for by their organizations, they are more likely to experience higher job satisfaction, have a stronger sense of job competence, and demonstrate better performance at work. This support enhances employees' emotional commitment and organizational identification, which motivates them to be more engaged and effective in their work tasks (Kurtessis et al., 2017). Moreover, these factors directly impact health communication ability (Van Servellen, 2009). Developmental support refers to an organization's attention and investment in employee development, including training opportunities, career advancement, and skills upgrading (Shu, 2021). Literature suggests that

developmental support can significantly improve the professional skills of healthcare workers, thereby enhancing their health communication ability. For example, Al-Gassimi et al. (2020), through a survey of 90 primary care physicians in Saudi Arabia, found that confidence in communicating nutritional knowledge, experience with nutritional knowledge training, and assistance in upgrading professional qualifications positively predicted physicians' communication ability to communicate nutritional knowledge among patients. Through a survey of midwives in 116 hospitals in China, Shen et al. (2021) found that organizational support for staff development was a positive influence on perinatal grief counseling competence and that the knowledge dimension of perinatal grief counseling competence reflected midwives' health communication ability to some extent. Work support refers to the resources and help provided by the organization during the work process, such as technical support, material security, and optimization of the work environment (Shu, 2021). Studies have shown that work support can significantly improve medical staff's work efficiency and health communication ability. For example, Hertzberg et al. (2019) found through a survey of 445 physicians in Norway that reducing working hours reduced their job stress. Reduced work stress means that medical professionals are more inclined to improve their health communication ability and take the initiative in health communication (Abid & Salzman, 2021). Through a survey of 1,386 clinical nurses in a tertiary hospital in Nanjing, China, L. Yang et al. (2021) found that there was a positive correlation between evidence dissemination competence, which falls under the category of health communication ability, and perceptions of job support in evidence-based nursing competence. Interpersonal support refers to the degree to which clinicians feel that they work well and are pleasant to work with their colleagues in a hospital setting (Shu, 2021). The ability of healthcare professionals to communicate in a healthcare setting depends on their skills and is influenced by the support they receive from their coworkers. Research has shown that support from coworkers and positive interpersonal interactions can significantly enhance the communication effectiveness of healthcare workers. Establishing and maintaining an excellent interpersonal support network in healthcare is essential to enhance health communication ability (Pagano, 2016). Benefit security includes compensation and benefits, occupational safety, and other financial security. Bodenheimer and Sinsky's (2014) study in the United States found that providing adequate compensation and benefits and occupational safety and security increased healthcare workers' job satisfaction and enhanced their ability to communicate health information to patients. Griffiths et al.'s (2011) study of 1,280 nurses in the United Kingdom came to similar conclusion, suggesting that a secure work environment contributes to the effectiveness of health communication. Respect support refers to an organization's respect and

regard for healthcare workers, including recognition of their opinions, contributions, and professional development (Shu, 2021). Respectful support can enhance medical staff's job satisfaction, self-confidence, and sense of professional identity and belonging, promoting more positive and effective health communication. Laschinger and Finegan (2005) noted a significant positive correlation. Aiken et al. (2002) found that nurses supported by organizational respect reduced burnout and significantly improved patient health communication.

In summary, the following hypotheses are proposed:

H1: Clinicians' sense of organizational support is significantly and positively related to health communication ability.

H1a: Clinicians' developmental support is significantly and positively related to health communication ability.

H1b: Clinicians' job support is significantly and positively related to health communication ability.

H1c: Interpersonal support of clinicians is significantly and positively associated with health communication ability.

H1d: Clinicians' benefit security is significantly and positively associated with health communication ability.

2.4.2.2 Relationship between self-efficacy and health communication ability

Self-efficacy is an individual's belief in his or her ability to accomplish a task or cope with a situation. Self-efficacy significantly impacts healthcare professionals' performance and health communication ability. Different dimensions of self-efficacy (recognizing patient needs, sharing information and power, and coping with communication challenges) may affect various aspects of health communication (Bandura & Wessels, 1997; Schunk, 2012).

Self-efficacy has a significant impact on the ability of healthcare professionals to communicate effectively. Research has shown that self-efficacy enhances healthcare workers' performance when faced with complex communication tasks. Medical staff with high self-efficacy typically exhibit enhanced health communication abilities, including more effective messaging and higher patient satisfaction (de Sousa Mata et al., 2019). Additionally, healthcare professionals with higher confidence are more likely to adopt positive communication strategies and cope with challenges in communication (Lawrance & McLeroy, 1986). Recognizing patient needs is one of the essential dimensions of self-efficacy, which refers to the ability of medical staff to accurately understand and identify patient needs and adjust communication strategies accordingly (Zachariae et al., 2015). Research has shown that health communication ability is

significantly enhanced when health professionals can effectively identify patient needs (Arnold et al., 2012). Identifying patient needs helps provide personalized health information and enhances patient acceptance and understanding of health information. Specifically, health professionals who recognize patient needs can better develop communication strategies that enhance the relevance and effectiveness of information (Wright et al., 2012). Sharing information and power involves how healthcare professionals allocate and use information resources and power in communication. The impact of this dimension on health communication ability is reflected in two ways: On the one hand, effective sharing of information improves the comprehensiveness and accuracy of communication. On the other hand, proper distribution and power use help establish effective organizational communication mechanisms (Zachariae et al., 2015). Studies have shown that healthcare professionals who can share information and power effectively are usually better able to communicate about health and improve patients' health literacy (Coyne et al., 2016). Coping with communication challenges is another critical dimension of self-efficacy, which encompasses how healthcare professionals deal with barriers and problems in the communication process (D. Chen et al., 2023). Studies have shown that medical professionals with high self-efficacy demonstrate extraordinary coping abilities when facing communication challenges, improving health communication's effectiveness. The ability to cope with communication challenges enables medical professionals to remain calm and adopt effective strategies when facing complex communication situations (Kerr et al., 2022).

In summary, the following hypotheses are proposed:

H2: Clinician self-efficacy is significantly and positively related to health communication ability.

H2a: Clinician identification of patient needs is significantly and positively related to health communication ability.

H2b: Clinicians sharing information and power is significantly and positively associated with health communication ability.

H2c: Clinician coping with communication challenges is significantly and positively associated with healthy communication ability.

2.4.2.3 Organizational support and self-Efficacy

Self-efficacy refers to an individual's confidence in accomplishing a specific task. Different dimensions of organizational support significantly impact medical staff's self-efficacy in the medical field. Organizational support includes developmental support, job support, benefit security, interpersonal support, and respect support (Shu, 2021). These supports may affect

medical staff's self-efficacy in identifying patient needs, sharing information, and coping with communication challenges through different mechanisms.

Research has extensively demonstrated a significant association between increased organizational support and medical staff self-efficacy. Organizational support typically includes career development opportunities, job resources, and support from colleagues and supervisors, which positively influence medical staff's self-efficacy (Rhoades & Eisenberger, 2002). For example, Rhoades et al. (2001) stated that organizational support for employees can enhance their self-efficacy, job performance, and satisfaction. Supportive environments help healthcare workers better cope with work challenges and increase self-efficacy. In addition, adequate resources and a good organizational climate also enhance employees' job confidence (Sulistyo & Suhartini, 2019). A study by Nikhil and Arthi (2018) in India found that employees perceived organizational support significantly affected their self-efficacy. *Self-efficacy* is a psychological resource that can provide a competitive advantage to an organization. Battistelli et al. (2016) found a positive correlation between nurses' perceptions of organizational support and self-efficacy, and this relationship was strengthened by positive organizational commitment. Huang et al. (2024) also found that perceived organizational support was significantly and positively related to self-efficacy in a survey of 825 emergency nurses in Shanghai, China. Through a survey of nurses in public hospitals in China, Cui et al. (2018) found a significant positive correlation between perceived organizational support and self-efficacy, and both were positive predictors of individual-organizational fit. The study also found that self-efficacy partially mediated between perceptions of organizational support and individual organizational fit, further validating the importance of organizational support in enhancing individual self-efficacy. Developmental support refers to the career development opportunities and training the organization provides its employees. The training and professional development opportunities that medical staff receive can help them improve their professional competence, increasing their confidence in accomplishing their work. For example, a meta-analysis by Ardakani et al. (2019) showed that communication skills training can increase nurses' self-efficacy. Self-efficacy is one of the key factors for nurses to communicate effectively with patients, and this can be enhanced by improving communication skills. Job support includes resources, tools, and support systems provided by the organization to its employees, which are critical to the self-efficacy of healthcare workers. Research has shown that adequate job support can help medical staff perform their tasks better, enhancing their self-efficacy. For example, a Swedish and Norwegian nurses' study by Kallerhult et al. (2024) found that organizational support (e.g., providing necessary resources and a supportive work environment) was significantly associated

with healthcare workers' self-efficacy. Supportive work environments are essential for maintaining nurses' job satisfaction and self-efficacy. Bakker et al.'s (2003) study in the Netherlands emphasized that providing supportive work resources reduces work-related stress and enhances employees' self-efficacy. Interpersonal support refers to the support and assistance provided to employees by colleagues and superiors within the organization. This support can enhance employees' self-efficacy, especially when facing difficulties and challenges. For example, Yusuf et al. (2022) showed that interpersonal support can positively influence self-efficacy by improving communication and promoting diversity orientation. Effective interpersonal communication directly improves service quality and indirectly contributes to service quality by enhancing employees' self-efficacy. In addition, a work environment that is open and accepting of diversity also contributes to employees' self-efficacy. This suggests that good interpersonal support strengthens an individual's self-efficacy and competence in a diverse environment. Medical professionals in a supportive work environment can receive help from their coworkers and supervisors, enhancing their work self-efficacy (Bakker & Demerouti, 2007). There is a significant positive correlation between benefit security and self-efficacy. Studies have shown that measures such as compensation, benefits, and job security provided by organizations not only enhance employees' job satisfaction but also increase their sense of job security and self-confidence, enhancing self-efficacy. For example, Stajkovic and Luthans' (1998) meta-analysis showed that appropriate benefit security can help to increase employees' self-efficacy and job performance. Tims et al.'s (2011) study pointed out that leaders can enhance employees' self-efficacy by providing benefit resources and support. Eden (1990) emphasized the importance of benefit security in enhancing employees' self-efficacy by studying the Pygmalion effect. Respect support refers to an organization's respect and regard for its employees, including recognition of their opinions, contributions, and career development. In a healthcare setting, respect support enhances medical staff's professional identity and self-confidence, increasing their self-efficacy (Rhoades & Eisenberger, 2002). For example, a study by Peng et al. (2024) found that nurses perceived distributive justice and managers' respect were significantly and positively associated with job self-efficacy in a Chinese public hospital.

In summary, the following hypotheses are proposed:

H3: Clinicians' perception of organizational support is significantly and positively related to self-efficacy.

H3a: Clinician developmental support is significantly and positively related to self-efficacy.

H3b: Clinician job support is significantly and positively related to self-efficacy.

H3c: Clinicians' interpersonal support is significantly and positively related to self-efficacy.

H3d: Clinician benefit protection is significantly and positively related to self-efficacy.

H3e: Respectful support for clinicians is significantly and positively related to self-efficacy.

2.4.2.4 Mediating role of self-efficacy between organizational support and health communication ability

The mechanism by which self-efficacy mediates the relationship between organizational support and health communication ability is key to understanding how organizational support affects health communication ability. Self-efficacy refers to an individual's confidence in their ability to perform a specific task successfully, profoundly affecting their behavior and performance (Bandura & Wessels, 1997). In the healthcare field, self-efficacy affects the performance of healthcare professionals and plays an important role in their health communication ability. 1) Organizational support enhances self-efficacy. Organizational support enhances the self-efficacy of healthcare workers in various ways. These include providing training opportunities, career development support, positive feedback, and a supportive work environment. Eisenberger et al. (1990) found a significant positive correlation between perceived organizational support and employee self-efficacy. Specifically, training and career development opportunities provided by the organization can enhance the skills and knowledge of medical staff, making them more confident and effective in their work. Through systematic training programs and career guidance, medical staff can acquire more professional knowledge and skills, thus enhancing their self-efficacy. In addition, positive feedback and recognition provided by the organization can significantly increase employees' self-efficacy. Positive feedback enhances employees' confidence in their abilities and makes them more positive when facing challenges (Eisenberger et al., 1990; Griffin et al., 2020). Ashfaq et al. (2024) stated that organizational support, by boosting employees' self-efficacy, can improve employees' job performance and job engagement. In the healthcare industry, organizational support measures can significantly increase the self-efficacy of healthcare workers so that they can perform more confidently and effectively in health communication. 2) Self-efficacy enhances health communication ability. Improvement in self-efficacy has a direct impact on health communication ability. Healthcare professionals with high self-efficacy typically perform better in identifying patient needs, sharing information, and dealing with communication challenges (Pajares, 1997). Bandura and Wessels (1997) noted that individuals with high self-efficacy perform better when faced with work assignments. In health communication, healthcare professionals with high self-efficacy can better deal with patients'

problems and needs, thus enhancing the effectiveness of health communication (Schunk, 2012). For example, health professionals with high self-efficacy can better recognize patients' needs and provide relevant information. They can explain health information and treatment options more effectively during communication, enabling patients to understand better and accept treatment. In addition, health professionals with high self-efficacy show more comfort in dealing with communication challenges. They can better handle patients' concerns and questions, thus improving the quality of health communication (Pajares, 1997).

3) Mediating role of self-efficacy. The mediating role of self-efficacy between organizational support and health communication ability can be explained by several mechanisms: first, increased confidence. Organizational support enhances employees' self-efficacy by increasing their self-efficacy, which enhances their health communication ability performance. Griffin et al. (2020) stated that organizational support can improve employees' job performance and communication ability by increasing their self-efficacy. In the healthcare industry, organizational support can improve the effectiveness of health communication by boosting the self-efficacy of healthcare workers and increasing their confidence in health communication. Second, competence enhancement. Organizational support can improve employee engagement and performance by boosting their self-efficacy, and competence enhancement is also a form of job performance (Bandura & Wessels, 1997). High self-efficacy enables healthcare workers to cope more effectively with challenges in health communication. This mechanism also holds in health communication, i.e., organizational support can significantly enhance the health communication ability of medical staff by enhancing self-efficacy. For example, Huang et al.'s (2024) study of 825 emergency nurses in Shanghai, China, found that perceived organizational support affected nurses' resilience through enhanced self-efficacy. X. Chen (2019) found that self-efficacy mediated the relationship between organizational support and employee innovative behavior in a survey across multiple industries in China. Several studies among Chinese healthcare workers found that organizational support enhanced healthcare workers' self-efficacy, which led to improved health communication efficiency (X. Xu et al., 2021; Zhou & Guo, 2006). Alshammari and Alenezi's (2023) study in Saudi Arabia with 210 nurses demonstrated that nursing training and technology integration enhanced healthcare communication efficiency by boosting self-efficacy, and social support enhanced caregivers' competence and satisfaction. Organizations can support their employees with training and resources to increase their confidence and make them more proactive and effective in health communication (Lee, 2020).

Overall, the mediating mechanism of self-efficacy between organizational support and health communication ability suggests that organizational support can effectively improve employees' health communication ability by enhancing their self-efficacy. In summary, the following hypotheses are proposed:

H4, Clinicians' self-efficacy mediates the relationship between organizational support and health communication ability.

2.4.2.5 Relationship of demographic, sociological variables with health communication ability and self-efficacy level

Relationship between demographic, sociological variables and health communication ability

Based on the literature combined, the following are the effects of different demographic and sociological variables on health communication ability: studies have shown that specialty differences affect clinicians' health communication willingness and attitudes, e.g., doctors in general surgery, urology are more inclined to use social media to communicate with their patients (Numan, 2021), and obstetricians and gynecologists have higher levels of awareness of health knowledge (H. Xu et al., 2023). The educational level also influences health communication ability; However, there is no significant correlation between educational level and willingness to participate in the popularization of science (Y. Zhang et al., 2023); healthcare professionals with senior titles have higher health education ability (Y. Xu et al., 2022). Age was also an influential factor, with healthcare professionals over 40 years old and with long years of practice being more actively involved in health communication (Y. Zhang et al., 2023). In addition, hospital rank impacted physicians' health communication ability, with physicians in secondary hospitals being more experienced in implementing health communication. In contrast, physicians in tertiary hospitals were better at summarizing and analyzing (Y. Xu et al., 2022). The job title was also associated with willingness to engage in health communication, with doctors with senior titles more willing to participate in online health communication (Di et al., 2022). In terms of gender, although some studies did not find significant differences (C. Zhang, 2021), females have higher participation in information dissemination during public health events (L. Chen, 2022).

In summary, the following hypotheses are proposed:

H5: There is a significant difference in health communication ability among clinicians with different demographic and sociological variables.

Relationship between demographic, sociological variables and self-efficacy

The influence of the clinician's demographic variables on self-efficacy has received extensive attention, including factors such as age, gender, years of work experience, education level, hospital level, marital status, position, and title. For example, age and work experience significantly affect clinicians' self-efficacy. Younger doctors usually have a higher sense of self-efficacy because they are more capable of accepting new technologies, while doctors with more work experience are better at handling complex cases and communicating effectively with patients (Elkefi & Asan, 2023; Sharour et al., 2022). Gender and cultural background also lead to differences in self-efficacy. In some cultures, doctors strongly against collectivism rely on team rather than individual judgment when making decisions (Stennis, 2016). Doctors with a higher level of education generally exhibit higher self-efficacy, which is closely related to their more affluent knowledge base, practical experience, and peer support (Stenfors-Hayes et al., 2010). In a Chinese study, gender, age, education level, and years of work experience had a statistically significant effect on medical staff self-efficacy (Tang, 2017). In addition, the difference in hospital level also affects clinicians' self-efficacy. Doctors in high-level hospitals usually have higher self-confidence due to abundant resources and more training opportunities (Bougmitza et al., 2022). Marital status also has a significant impact on clinicians' self-efficacy. Married doctors usually have higher self-efficacy due to family support (C. Park et al., 2016). The differences in self-efficacy among doctors of different titles are reflected in their responsibilities, clinical experience, and professional skills. Doctors with higher titles are usually more confident (Gulbrandsen et al., 2020). At the same time, the different working environments also significantly affect clinicians' self-efficacy. Well-resourced and well-coordinated teams in high-level hospitals can give doctors more confidence when dealing with complex cases. In contrast, the self-efficacy of doctors in primary care hospitals may be limited to some extent due to a lack of resources (Kawamoto et al., 2023).

In summary, the following hypotheses are proposed:

H6: There is a significant difference in the level of self-efficacy among clinicians concerning their demographic sociological variables.

2.4.3 Hypothesized model of this study

Based on scholars' previous research results and combining the Social Cognitive Career Theory model (SCCT) and the Job Demand-Resource model (JD-R), this study constructed a comprehensive hypothesis model to explore the relationship between organizational support,

self-efficacy, and health communication ability. The specific hypothesized model is shown in Figure 2.1:

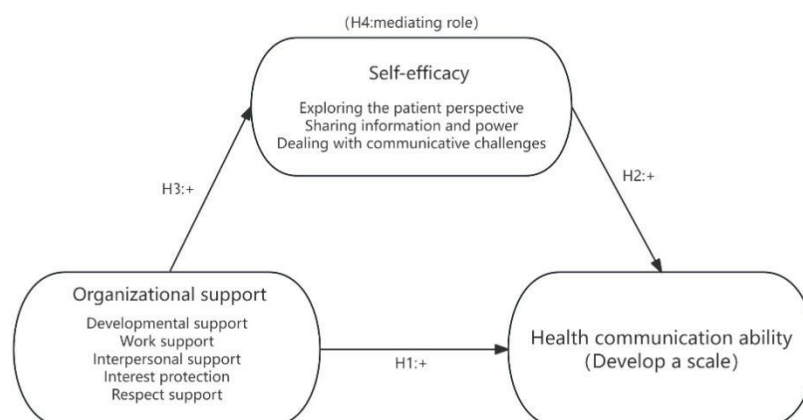


Figure 2.1 Diagram of the hypothesized model

The social-cognitive career theory model emphasizes the interactive process of cognition, motivation, and behavior in an individual's career development, whereas the job demand-resource model focuses on the effects of resource-demand interactions in the work environment on an individual's health and job performance (Bakker & Demerouti, 2017; Lent et al., 1994). By integrating these two theoretical models, this study proposes the following hypothesized pathways: 1) H1: Clinicians' sense of organizational support is significantly and positively related to health communication ability. Organizational support refers to the various types of support provided to clinicians by the organization. This paper is divided into five dimensions: developmental support, job support, benefit security, interpersonal support, and respect support. On the other hand, health communication ability comprises seven dimensions: environmental conditions, communicators, communication motives, communication channels, communication content, communication audience, and communication effects. Hypothesis H1 proposes a significant positive relationship between organizational support and health communication ability. Specifically, the Social Cognitive Career Theory model suggests that an individual's career development is influenced by environmental support. As an environmental support, organizational support can enhance clinicians' self-confidence and job satisfaction by providing developmental support, job support, benefit protection, interpersonal support, and respect support, thus enhancing their health communication ability. Organizational support enhances an individual's self-efficacy and positively influences professional behavior. In particular, developmental support, job support, interpersonal support, and respect support further influence clinicians' communication abilities in terms of health by enhancing their self-efficacy and job confidence. Benefit security positively affects clinicians' career stability and security and can

directly enhance their health communication ability by providing better resources and conditions. This hypothesis is further supported by the Job Demands-Resources Model, according to which various types of support provided by the organization as a critical component of job resources can reduce job stress and enhance clinicians' performance and career competence. These supports positively influence health communication ability as a job competency. 2) H2: Clinicians' self-efficacy is significantly and positively related to health communication ability. Self-efficacy refers to an individual's beliefs about his or her ability to perform a specific task and encompasses three dimensions: recognizing patient needs, sharing information and power, and dealing with communication challenges. In the Social Cognitive Career Theory model, self-efficacy is an important factor influencing an individual's professional behavior and performance. Clinicians with high self-efficacy can identify patient needs, share information, and cope with communication challenges more effectively, improving their health communication ability. This theoretical model emphasizes the central role of self-efficacy in professional behavior and predicts a positive relationship between self-efficacy and job competence. The job demands-resources model complements this view by suggesting that self-efficacy is a psychological resource that can help clinicians better cope with challenges at work and enhance their performance. In terms of health communication ability, increased self-efficacy implies that clinicians can better process and disseminate health information. Thus, the relationship between self-efficacy and health communication ability is significant. 3) H3: Clinicians' sense of organizational support is significantly and positively related to self-efficacy. In the Social Cognitive Career Theory model, an individual's career development is influenced by environmental support. Organizational support is considered to be an important factor in increasing self-efficacy. Developmental support, benefit security, job support, and interpersonal support enhance clinicians' self-efficacy by increasing their confidence and competence in their work tasks. Respect support, as a psychological support, contributes to clinicians' self-efficacy. The Job Demands-Resources Model suggests that organizational support as a job resource can increase self-efficacy by reducing job stress and enhancing clinicians' psychological resources. Resources provided by developmental support, benefit security, and job support directly influence clinicians' performance and psychological status, while interpersonal and respectful support further enhance their self-efficacy. 4) H4: Clinicians' self-efficacy mediates the relationship between organizational support and health communication ability. This hypothesis combines the perspectives of the Social Cognitive Career Theory model and the Job Demands-Resources model to highlight self-efficacy as an important pathway through which organizational support influences health communication ability. The Social Cognitive Career

Theory model states that self-efficacy is an important mediating variable influencing an individual's career performance. By increasing clinicians' self-efficacy, organizational support can enhance their competence and performance on the job, thereby influencing their health communication ability. Increased self-efficacy enables clinicians to utilize better the support resources they receive, thereby enhancing their health communication ability. The Job Demands-Resources Model further supports this view by suggesting that job resources (e.g., organizational support) can impact clinicians' performance through psychological resources (e.g., self-efficacy). Self-efficacy plays a key mediating role in this process, indirectly enhancing health communication ability by increasing an individual's confidence and competence in the task. 5) H5: Clinicians' different demographic and sociological variables showed significant differences in health communication ability. The Social Cognitive Career Theory model suggests that personal characteristics and background significantly impact professional behavior and competence. Age, education level, and years of experience can influence clinicians' knowledge and skills, and thus their health communication ability. The Job Demand-Resource Model also supports this view, suggesting that demographic and sociological variables impact clinicians' job resource and demands. Clinicians from different backgrounds may face different job demands and resources, which can affect their performance in health communication ability. 6) H6: Clinicians' different demographic and sociological variables show significant differences in self-efficacy. Hypothesis H6 proposes that there is a significant difference in self-efficacy across demographic sociological variables. The demographic and sociological variables include age, ethnicity, years of service, annual income, position, title, level of education, hospital class, type of institution, marriage, and establishment. The Social Cognitive Career Theory model states that an individual's background and experience influence self-efficacy. Different demographic and sociological variables may affect clinicians' self-efficacy, career performance, and competence. For example, clinicians with more work experience may have higher confidence in accomplishing tasks. The job demands-resources model further complements this idea by suggesting that an individual's social background and working conditions influence their access to and utilization of psychological resources, which may also affect self-efficacy.

By constructing the above hypothetical model, this study aims to deeply explore the complex relationship between organizational support, self-efficacy, and health communication ability and provide valuable references for research in related fields at the theoretical and empirical levels.

Chapter 3: Methodology

This chapter details the study's design and methods, covering scale development, reliability and validity verification, and empirical research design. A clinician health communication ability scale was constructed by combining the Gioia methodology and the "7W" theory. The relationships between health communication ability, organizational support, and self-efficacy were verified using ridge regression, mediation effect analysis, and structural equation modeling, laying a solid foundation for analyzing the research results in subsequent chapters.

3.1 Overview of the research design

3.1.1 Overall design

This study aimed to develop and validate a health communication ability assessment scale for clinicians and to explore the relationship between health communication ability, organizational support, and self-efficacy. Considering the importance of health communication in the clinician's occupation, a mixed-method approach was adopted, and the study was conducted in two phases. Phase 1: Based on qualitative research, combined with Gioia methodology and the "7W" theory, an evaluation system and scale for clinician health communication ability were developed, and the reliability and validity of the scale were verified. Phase 2: Quantitative research was conducted to explore the relationship between clinician health communication ability, organizational support, and self-efficacy through empirical research. The overall research design is shown in Figure 4.1. This phased research design can ensure the scientific nature of the theoretical framework while also testing its applicability among clinicians through empirical research.

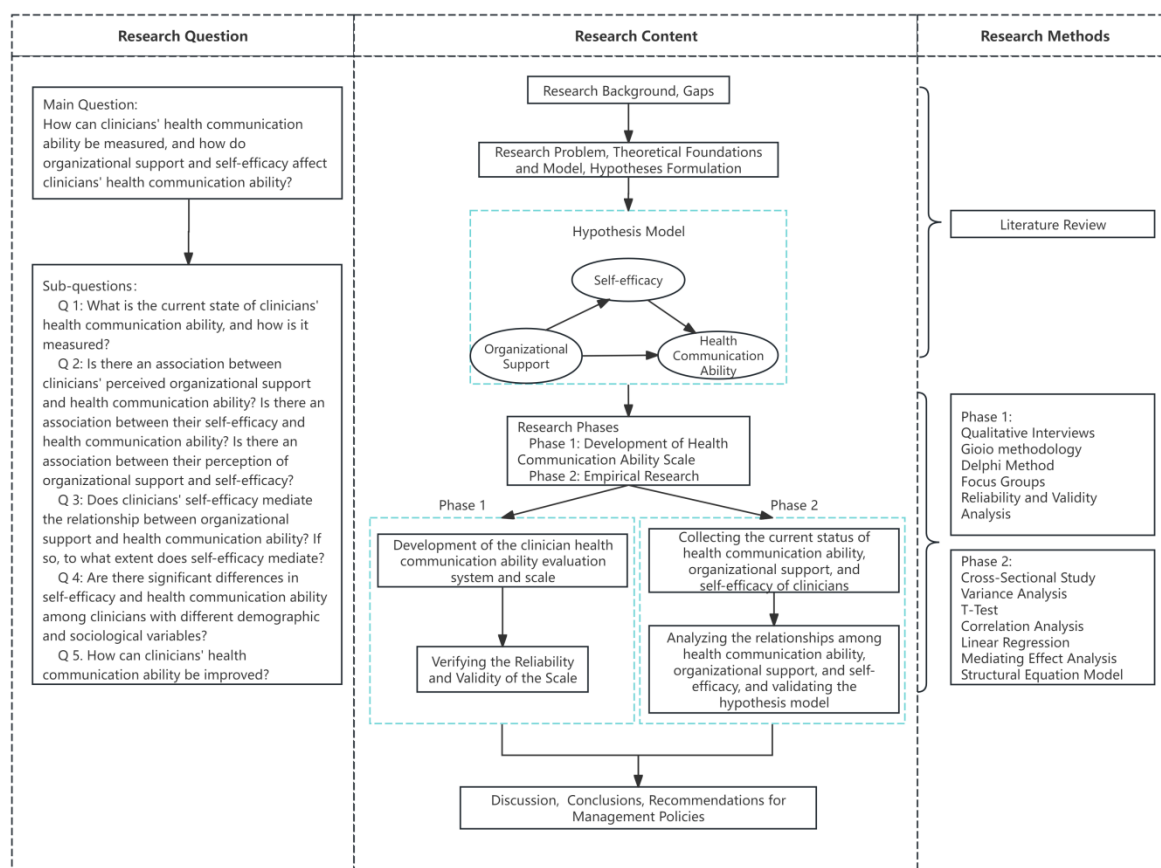


Figure 4.1 Technology roadmap

3.1.2 Theoretical basis and methodological choices

Phase 1: Scale development. Phase 1 involved scale development based on the "7W" theory of Breeding and the Gioia methodology. The "7W" theory provides the basis for constructing the scale by offering seven core dimensions of health communication. The Gioia methodology was used to systematically analyze interview data and extract critical concepts of clinicians' health communication ability through coding, ensuring the scientific and practical applicability of the scale. The "7W" theory provides a comprehensive analysis of the critical elements in the health communication process, covering seven dimensions: communicator, content, channel, audience, effect, environment, and motivation. In order to transform the information from the qualitative interviews into a practical indicator system, the Gioia methodology was used in this study. This systematic data analysis method provides a scientific basis for scale development by transforming the original ideas of the interviewees into theoretical concepts through a transparent coding process. After the scale was developed, this phase verified the reliability and validity. Through these methods, this study developed a scale with theoretical depth and practical application value.

Phase 2: Empirical research phase. In phase 2, three scales were used to collect data on clinicians' health communication ability, sense of organizational support, and self-efficacy and verify the hypothesized model. The theoretical basis for this phase was based on the SCCT and the JD-R model. The SCCT emphasizes the central role of self-efficacy in career behavior and explains how clinicians' self-efficacy affects their performance in health communication. The JD-R model states that organizational support, as a job resource, can enhance clinicians' health communication ability directly or indirectly by enhancing self-efficacy. Data collection during this phase was completed through questionnaires. A variety of statistical analysis methods were used: analysis of variance, t-tests, and correlation analysis were used to test the differences in health communication ability and self-efficacy among different demographic variables; regression analysis was used to assess the direct impact of organizational support and self-efficacy on health communication ability and test the mediating effect of self-efficacy; and finally, SEM was used to verify the path relationships between variables and the fitting degree of the theoretical model. Data analysis was completed using SPSS and AMOS software.

3.2 Research phases

3.2.1 Phase 1: Scale development and validation

In Phase 1, a preliminary item pool for evaluating the health communication ability of clinicians was constructed through semi-structured interviews based on the "7W" theory and the Gioia methodology. Then, the Delphi method was used to reduce the item pool and ensure its content's scientific and practical nature. Subsequently, we further improved the indicator system through focus group discussion and converted it into scale items. Finally, the scale was validated in tertiary, secondary, and primary hospitals in Guangdong Province to form the final version of the clinician health communication ability scale.

3.2.1.1 Application of the Gioia methodology in qualitative research

The Gioia methodology is a qualitative research method primarily used to explore complex social phenomena. It extracts the interviewee's original ideas through primary coding and then integrates these concepts into more abstract themes through secondary coding, ultimately constructing a new theoretical framework. This method emphasizes theory generation based on the participants' perspectives, ensuring transparency and traceability in data analysis. It is particularly suitable for exploratory research in organizational studies and management. The core steps of the Gioia methodology include: data collection to obtain opinions and experiences;

primary coding, which involves verbatim coding of the respondents' original ideas to form primary concepts; secondary coding, which builds on primary coding and integrates a theoretical framework to extract more abstract secondary themes; and theoretical construction, achieved by comparing existing theories to develop new theoretical frameworks or models. This methodology effectively captures the authentic voice of the research subject and, through systematic coding, ensures the transparency of data analysis. It is particularly suitable for exploratory research, combining the dual perspectives of the interviewee and the researcher to construct an explanatory theory or discover new theories (Gioia et al., 2013).

The Gioia methodology has been widely used in many qualitative studies. For example, Moreno et al. (2024) used the Gioia methodology to collect data through semi-structured interviews and analyze participant feedback using a hierarchical coding system to identify key themes and concepts, thereby improving the validity and practicality of the model when validating the quality model of a social collaboration company. Khan et al. (2020) applied the Gioia methodology to explore in-depth the entrepreneurial experiences, challenges, and support factors of female entrepreneurs in Pakistan through semi-structured interviews and N-Vivo analysis, revealing their internal motivations and external obstacles in the pursuit of economic independence and social recognition. The Gioia methodology helps researchers identify and refine critical concepts through systematic data analysis in scale development. First, primary codes are obtained from the raw data and converted into abstract themes through secondary coding. Finally, scale items are generated based on these themes. This methodology ensures the scientific nature of the scale items and their high relevance to real-world situations, providing a solid theoretical basis for scale construction (Gioia et al., 2013).

3.2.1.2 The "7W" theory and the design of the scale dimensions

The "7W" theory provides a comprehensive framework that covers the critical elements of health communication (Braddock, 1958). Based on this theory, the following dimensions were followed in the development of the scale for this study:

What Environment: Evaluate the policy and cultural environment where the communication activities occur.

Who: Assesses clinicians' role orientation and self-efficacy as health communicators.

Says What: Assess the scientific, practical, and exciting nature of clinicians' content in their communication.

To Whom: Evaluate clinicians' communication strategies for different audience groups.

What Aim: Assess clinicians' internal and external motivations for health communication activities.

In Which Channel: Evaluate the clinicians' ability to use new media, traditional media, and face-to-face communication.

With What Effects: Assess the impact of communication activities on the audience's health knowledge and behavior.

3.2.1.3 Research population

When developing the health communication ability scale, the study population included clinicians from several hospitals in Z City, health administrators, and public representatives. The clinicians and health managers provided professional insights and practical experience in health communication ability, while the patient representatives shared feedback and needs on health communication from the audience's perspective. This data was collected through qualitative interviews and provided a rich basis for scale development. In validating the health communication ability scale, the research population was expanded to include clinicians from tertiary, secondary, and primary hospitals in Guangdong Province to ensure the applicability and reliability of the scale.

3.2.1.4 Sample size

In scale validation, exploratory factor analysis (EFA) usually recommends a sample size of at least 200, or 5-10 samples per item, to ensure the stability of the results (MacCallum et al., 1999). Confirmatory factor analysis (CFA) usually requires a larger sample size, with at least 200–300 samples recommended, especially for more complex models, to ensure the accuracy of model fitting and parameter estimation (Hair et al., 2009; Kline, 2023; MacCallum et al., 1999). Based on the literature recommendations, the sample size set for EFA was not less than 430; for CFA, the sample size set was no less than 500.

3.2.1.5 Sampling method

In this phase, convenient sampling was used to select respondents from 29 tertiary, secondary, and primary hospitals in G, Z, M, and Y cities in Guangdong Province. The inclusion criteria for respondents were clinicians who were paid for their work and had more than two years of work experience. A total of 1,217 questionnaires were distributed, and 1,217 were returned. After excluding 123 invalid questionnaires through logical questions, a total of 1,094 valid questionnaires were recovered, of which 431 were used for EFA and 663 for CFA.

3.2.1.6 Data collection and analysis methods

This phase used data collection and analysis methods, including semi-structured interviews, Delphi expert consultation, focus group discussion, and scale reliability and validity analysis, to ensure the scales' scientific nature and coverage.

Semi-structured interviews. Semi-structured interviews are a type of interview that falls between structured and unstructured interviews. They are widely used in social science research, market research, and human resources management. Semi-structured interviews have both pre-set questions and allow the interviewer to improvise questions based on the interviewee's responses, thus allowing for a more flexible exploration of the interviewee's views and attitudes (Bryman, 2016). In this study, the participants of the semi-structured interviews included 16 clinicians, 16 health managers, and 15 public representatives from various hospitals in Guangdong Province. The interview content revolved around the seven dimensions of the "7W" theory, covering aspects such as the role of clinicians in the health communication process, the selection of communication content, and the communication channels used. The researchers obtained a wealth of raw data through in-depth exchanges with the interviewees, providing sufficient material for subsequent coding and scale development.

Delphi expert consultation method. The Delphi expert method is a systematic, multi-round feedback method that reaches consensus through expert opinions. This method relies on the participation of anonymous experts. It gradually summarizes expert opinions through questionnaires and feedback loops to reduce individual bias and achieve group consensus. The Delphi method is characterized by anonymity, feedback, and statistical aggregation and is widely used in fields such as forecasting, decision support, and policy formulation (Hsu & Sandford, 2007). In the process of developing the health communication ability evaluation system, a total of 19 experts with extensive experience in the fields of health communication, public health, and clinical medicine were invited to participate in three rounds of Delphi method consultations to reduce and adjust the evaluation system to ensure its scientific and effectiveness.

Semi-structured focus group. Semi-structured focus groups are a focus group discussion method used in qualitative research. They use pre-designed open-ended questions but allow for flexibility in the discussion process. This method provides structure to ensure that important topics are discussed and allows participants to express their views freely, thereby gaining more in-depth insights (Bryman, 2016). In order to further optimize the evaluation system, this study also organized a semi-structured focus group consisting of seven experts in the fields of public health, clinical medicine, management, and linguistics, who had in-depth discussion on issues such as the structural design of the evaluation system and the expression of indicators and converted the tertiary indicators into scale items. The focus group discussion and post-meeting

feedback formed a health communication ability evaluation scale with seven dimensions and 43 items.

Scale reliability and validity analysis. After the preliminary version of the scale was developed, this stage also involved reliability and validity analysis of the scale: **Reliability analysis:** The stability and consistency of the scale were assessed through internal consistency analysis (Cronbach's α coefficient) and test-retest reliability analysis. Internal consistency is used to assess the synergy of the items on the scale, while test-retest reliability measures the scale's reliability at different points in time. **Validity analysis:** This includes structural validity and content validity. Structural validity uses EFA and CFA to test the factor structure of the scale, and content validity is verified by expert review (DeVellis & Thorpe, 2021).

3.2.1.7 Measurement tools

Health communication ability scale. All respondents completed the clinician health communication ability scale and a personal information questionnaire. The health communication ability scale contains 43 items and uses a 5-point Likert scale, with scoring options ranging from "strongly disagree" (1 point) to "strongly agree" (5 points). In addition, the personal information questionnaire collected the respondents' demographic and sociological information, such as gender, age, educational background, years of professional experience, type of work position and level of the hospital where they work, and other essential information.

3.2.1.8 Phase 1 implementation steps

Step 1, semi-structured interviews

In the first step of this phase, the research team collected vital data on clinicians' health communication abilities through semi-structured interviews. The purpose of this interview was to gain an in-depth understanding of the perceptions and needs of different groups regarding health communication and to clarify further the abilities that clinicians should possess in health communication. In order to ensure the diversity and comprehensiveness of the data, the research team selected 47 interviewees, including clinicians, health administrators, and the general public. Clinicians were mainly from four general hospitals in Z City, covering multiple medical departments; health administrators were from the local health administrative department and hospital management; and public interviewees covered a wide range of groups, from patients undergoing treatment to the general public.

The interview questions were designed based on the "7W" theory to ensure that all critical dimensions of health communication were covered, including the communication environment, the communicator, the motivation for communication, the content of communication, the

communication channels, the target audience, and the communication effect. During the interviews, the research team focused on open-ended questions to guide the interviewees in sharing their views and suggestions on health communication based on their experiences. In this way, the research team collected a large amount of qualitative data on the health communication abilities of clinicians.

After the interviews, the research team conducted a preliminary analysis of the interview transcripts and identified the key elements of various health communication abilities. These elements provided the basis for subsequent coding and scale development. During this step, the research team paid particular attention to the connection between the interview results and the previous literature research to ensure that the indicators extracted were scientific and practically operable. At the same time, the research team not only gained insights into the health communication abilities of the interviewees but also identified some potential problems in practice, which provided valuable reference for subsequent research.

Step 2, coding based on the Gioia methodology

After completing the semi-structured interviews, the research team systematically coded and analyzed the data using the Gioia methodology. The Gioia methodology is a commonly used qualitative research method known for its unique approach to extracting theoretical concepts from data, transforming large amounts of complex raw data into explicit theoretical models (Gioia et al., 2013). In this step, the coding process of the Gioia methodology was divided into three main components: open coding, cluster analysis, and constructing the data structure.

Open coding. First, the research team conducted open coding of the interview data, which involved breaking down the content of the interviews into a list of basic concepts. These concepts are referred to as "first-person perspectives" or first-order codes and directly reflect the original views of the interviewees. To ensure comprehensiveness and accuracy, the research team kept true to the interviewees' language and gradually improved the coding results through multiple iterations and verifications. The research team identified many conceptual items related to health communication ability during this process, covering multiple elements. In the end, 148 free codes were extracted, fully demonstrating clinicians' specific ability requirements and challenges in health communication.

Cluster analysis. After completing the first-order coding, the research team conducted a cluster analysis of these free codes. The purpose of cluster analysis is to integrate similar codes into higher-level themes, referred to as "second-person perspectives" or second-order codes. Through in-depth analysis, the research team classified these codes of competencies. For

example, in the dimension of "communicator," the team identified and aggregated the codes related to expertise, communication skills, and teamwork; in the dimension of "communicated content," the team aggregated the codes into the scientific nature and practicality of the content. The results of this step not only helped the research team clarify the core competencies but also provided strong support for the subsequent theoretical classification.

Constructing the data structure. After the cluster analysis, the research team constructed the data structure. The data structure is constructed to organize the first-person and second-person perspectives into a conceptual framework. At this step, the research team not only integrated the second-order coding but also verified the scientific nature of the structure through theoretical rationality. The research team finally formed a preliminary conceptual framework by repeatedly comparing the consistency or contradictions between theory and data. This framework provides a solid theoretical foundation for the subsequent scale development and lays the evaluation system's initial structure.

Through Gioia's methodical coding, the research team successfully transformed a large amount of raw data into systematic theoretical concepts, laying a solid foundation for subsequent classification work. This work step demonstrated clinicians' multidimensional competency requirements in health communication and provided the necessary data support for constructing a scientific and systematic evaluation system for health communication ability.

Step 3, classification based on the "7W" theory

After completing the Gioia coding, the research team used the "7W" theory to classify the extracted codes systematically. At the same time, indicators related to health communication ability based on literature review were integrated into the coding. The "7W" theory is a classic health communication model covering seven core communication dimensions: communication environment, communicator, motivation, content, channel, target, and effect. This theoretical framework provides a comprehensive perspective for the study and helps the team organize and classify the previous coding results more orderly.

Communication environment dimension. Under the "communication environment" dimension, the research team identified and classified the codes related to the external environment. Six tertiary indicators were initially identified, covering policy sensitivity, sensitivity to social hotspots, cultural sensitivity, sensitivity to online information risks, and reasonable use of communication resources and venues inside and outside the hospital. These indicators reflect how clinicians effectively respond to and utilize the complexity of the external environment in the health communication process. Through these indicators, the research team could assess clinicians' adaptability and flexibility in different environments.

Communicator dimension. In the "communicator" dimension, the research team focused on the personal qualities and professional abilities required of clinicians in health communication. Initially, 18 tertiary indicators were formed, including professional medical knowledge, health communication awareness, medical ethics and legal awareness, communication skills, teamwork skills, and health communication work creation ability. These indicators help refine clinicians' role in the communication process, assess how effectively they translate medical knowledge into content that is easy for the public to understand, and assess their performance in teamwork and continuous learning.

Communication motivation dimension. In the "communication motivation" dimension, the research team has extracted five tertiary indicators through classification, covering both personal motivation and organizational motivation. For example, clinicians' recognition of health communication in improving personal career development and professional influence constitutes subjective motivation. In contrast, recognizing health communication in improving public health literacy and promoting the construction of a healthy China constitutes objective motivation. These indicators help reveal the mechanism behind clinicians' participation in health communication activities, especially how to balance personal interests and social responsibilities in the current medical environment.

Content dimension. In the "content" dimension, the research team divided all relevant codes into two categories: "basic features" and "extended features," forming eight tertiary indicators. The basic features cover content attributes such as scientific, practicality, public welfare, timeliness, and popularization to ensure the accuracy and usability of the information disseminated. The extended features focus on aspects such as interest and artistry to enhance the attractiveness and appeal of the information. This classification helps evaluate clinicians' comprehensiveness and innovation in designing content and how to attract audiences and effectively promote information dissemination.

Communication channel dimension. Under the "communication channel" dimension, the research team divided communication channels into three categories based on coding: online communication, traditional media, and in-person communication, forming five tertiary indicators. Online communication includes new and social media, while traditional media covers television, radio, and newspapers. In-person communication includes one-on-one and one-to-many face-to-face communication. This classification helps evaluate clinicians' ability to use various communication platforms and methods, especially their adaptability and innovation in today's digital information environment.

Communication target dimension. In the "communication target" dimension, the research team classified the relevant codes into two categories: "audience targeting ability" and "psychological grasp of the audience." A total of 10 tertiary indicators were identified. For example, indicators such as the ability to formulate targeted communication strategies, empathy, and the ability to put oneself in another's shoes help assess clinicians' ability to accurately identify and respond to audience needs. This classification focuses on how clinicians understand and guide audience behavior, improving the pertinence and effectiveness of health communication.

Communication effect dimension: Finally, under the "communication effect" dimension, the research team coded and organized the indicators into two categories: "physiological benefits" and "social benefits," based on audience feedback and actual results, forming eight tertiary indicators. These indicators include increased audience health knowledge, improved health behaviors, communication reach, and audience satisfaction. Through this classification, the research team can comprehensively evaluate the impact of health communication activities and clinicians' performance in promoting the effectiveness of health communication.

Using the "7W" theory, the research team finally constructed a systematic framework covering seven first-level indicators, 17 second-level indicators, and 60 third-level indicators. This framework helps comprehensively evaluate clinicians' multidimensional abilities in health communication and provides a clearly structured and scientifically rigorous basis for the subsequent development and application of the scale.

Step 4, Delphi method to reach consensus

In order to further verify and optimize the initially constructed health communication ability evaluation framework, the research team used the Delphi method for expert consultation. The Delphi method is a commonly used technique for reaching expert consensus. It involves collecting and analyzing experts' opinions through multiple rounds of questionnaires to continuously revise and improve the research content. In this study, a total of 19 experts from the fields of clinical medicine, public health, and health management participated in three rounds of Delphi questionnaire surveys.

In each survey round, the experts rated the importance and feasibility of the indicators of clinicians' health communication ability and provided suggestions for improvement. The research team often revised the indicator system based on the experts' feedback. Specifically, seven indicators were reduced at the tertiary level, mainly focusing on the two parts of "disseminator" and "dissemination effect" (Table 3.1). After the reduction, a health communication ability evaluation system was formed, including 7 primary indicators, 17

secondary indicators, and 53 tertiary indicators. Through the Delphi method, the research team ensured that the constructed evaluation system has high scientific and practical application value.

Table 3.1 The Delphi expert law removed the indicators

Level 3 indicators	
1	Knowledge in other fields (such as sociology, psychology, etc.)
2	Health communication sense of mission and identity
3	The spirit of dedication
4	Health transmission coverage and radiation population
5	Number of achievements, awards, or awards
6	Effective feedback from the audience
7	Patient and audience satisfaction

Step 5, revision and integration by focus groups

After reaching expert consensus through the Delphi method, the research team organized a semi-structured focus group discussion to revise further and integrate the evaluation system. The focus group consisted of seven theoretical and practical experts from public health, clinical medicine, management, linguistics, and health administration. First, the experts conducted in-depth discussion on the indicators' connotation, grammar, semantics, and applicability, identified potential problems, and proposed modifications. During the discussion, the team focused on the evaluation system's practicality and applicability in different clinical settings. The experts thoroughly analyzed each indicator's importance, applicability, and operability, discussed the indicators' connotation and relevance, confirmed the structure and content of the evaluation system, and deleted, integrated, and fine-tuned some indicators. Next, based on the opinions of the focus group, the research team renamed the names of two secondary indicators, merged one secondary indicator, and merged or deleted 11 tertiary indicators, forming a clinician health communication ability evaluation system with seven primary indicators, 16 secondary indicators, and 43 tertiary indicators. Finally, based on the focus group expert discussion, the research team converted these indicators into a self-assessment scale for clinicians' health communication ability. The focus group experts again discussed and improved the scale. A self-assessment scale for clinicians' health communication ability was formed, with seven dimensions and 43 items. The detailed evaluation system and scales are shown in Table C.1. This step improved the evaluation system, laying the foundation for subsequent field surveys and verification.

Step 6, pre-survey

Before the large-scale survey was officially launched, the research team conducted a pre-survey using the 43-item scale to test the scale design's rationality and the survey process's feasibility. The pre-survey was conducted in a tertiary hospital in Z City, Guangdong Province, and a total of 30 valid questionnaires completed by clinicians were collected. The research team conducted a preliminary analysis of the pre-survey data, focusing on checking the clinicians' understanding of the questionnaire and the problems identified during the filling process, and made corresponding adjustments to the scale based on the pre-survey results.

Step 7, formal survey

After making adjustments based on the pre-survey, the research team conducted an exploratory and confirmatory survey of the scale within Guangdong Province. In the EFA stage, 431 valid questionnaires were collected. The research team used statistical methods such as factor analysis to verify clinicians' health communication ability indicators and make preliminary adjustments to the evaluation system. In the CFA stage, the research team collected another 663 questionnaires and used structural validity and reliability to conduct further verification. The entire formal survey process was based on the principle of convenient sampling, considering both the diversity and representativeness of the sample.

Step 8, retest reliability

After the formal survey was completed, the research team also tested the scale's retest reliability. To determine the scale's stability, the team surveyed 44 respondents again after three weeks and compared and analyzed the data from the two surveys.

Through these steps, the research team verified and revised the clinician health communication ability evaluation system and formed the final version of the 7-dimensional, 29-item clinician health communication ability self-assessment scale, confirming its high scientific and applicability and providing a solid foundation for the second stage of empirical research.

3.2.2 Phase 2, empirical research

In the second phase, three scales were used to collect data on clinicians' health communication ability, organizational support, and self-efficacy through questionnaires, and the hypothesized model based on the SCCT and the JD-R model was verified. The SCCT emphasizes the role of self-efficacy in professional behavior. At the same time, the JD-R model states that organizational support as a resource can enhance clinicians' health communication ability by increasing self-efficacy. For data analysis, methods such as analysis of variance, T-test,

correlation analysis, regression analysis, and SEM were used, and SPSS and AMOS software were used.

3.2.2.1 Research hypotheses and model construction

In Chapter 3, through a literature review based on the SCCT and the JD-R model, this study constructs research hypotheses and a model (Table C.36).

3.2.2.2 Research population

The research population in phase 2 mainly consisted of clinicians from tertiary and secondary hospitals in Z City, covering different types and levels of hospitals, departments, positions, titles, educational backgrounds, and years of work experience. Data on their health communication ability, sense of organizational support, and sense of self-efficacy were collected through questionnaires to verify their relationship. This sample group represents the health communication practices of clinicians in different work environments and contexts, ensuring that the research results have broad applicability.

3.2.2.3 Sample size

In sociological surveys, sample size is generally calculated based on the number of scale items, the requirements of statistical analysis methods, and the requirements for ensuring the representativeness and robustness of research results. At this phase, the sample size is calculated based on three considerations: 1) The sample size requirement is based on the number of scale items. For the three scales, the number of items is 29, 25, and 26, respectively. According to the rule of thumb, each item requires at least 5-10 samples. Therefore, the minimum sample size for a single scale should be 145-290. Considering the analysis's stability and the results' reliability, the recommended minimum sample size is 290 or more. 2) The sample size requirements for factor analysis and SEM analysis. Factor analysis usually recommends a sample size of at least 200, and SEM generally requires more than 300 samples, especially for complex model structures. To ensure the accuracy of model fitting and parameter estimation, the sample size is usually set to 300-400 to meet the needs of factor analysis and SEM. 3) Sample size requirements in terms of statistical power and confidence intervals. This study used a 95% confidence level and a labeling error of 0.05 to calculate the sample size. According to the formula, when the confidence level is 95% and the labeling error is 0.05, the sample size is approximately 384. To ensure the robustness of data analysis and take into account possible data loss, a maximum invalid sample size of 20% was set, and the actual sample size collected

should be more than 460 to ensure that the research results are statistically significant and representative (Hair et al., 2009; Kline, 2023; MacCallum et al., 1999).

Considering the sample size requirements for the three aspects mentioned above, the sample size set for the second phase of this empirical study was at least 460 to ensure that the statistical requirements of each analysis were met and that the research results were robust.

3.2.2.4 Sampling method

In the second phase of the empirical study, the principle of stratified random sampling was adopted to ensure the representativeness and diversity of the sample. Stratified random sampling divided all secondary and tertiary hospitals in Z City into four levels according to their level characteristics: Grade 3A, Grade 3, Grade 2A, and Grade 2, and allocated the sample size of each level according to the proportion of clinicians in each level of the study population, and then randomly selected samples in each level. This sampling method reduces sampling errors and ensures that clinicians at different levels are fully represented.

In the implementation process, the research team recruited clinicians from 19 secondary and tertiary hospitals in Z City, Guangdong Province, as research subjects in July 2024. The inclusion criteria for respondents were clinicians who were paid for their work and had more than two years of work experience. Seven hundred ninety-two questionnaires were distributed during this phase, and 792 were finally recovered. Logical error correction questions excluded ninety-one invalid questionnaires, and 701 valid questionnaires were obtained, with an effective recovery rate of 88.5%.

3.2.2.5 Data analysis methods

In the second phase of the empirical study, data on clinicians' health communication ability, sense of organizational support, and self-efficacy were collected through questionnaires. In order to comprehensively analyze the relationship between these variables, various statistical analysis methods were used, including descriptive analysis, analysis of variance, t-test, correlation analysis, linear regression analysis, mediating effect analysis, and SEM analysis. The data processing software used includes Excel, SPSS, and AMOS. The specific methods are as follows:

3.2.2.5.1 Descriptive statistics

The primary purpose of descriptive statistics is to provide a basic summary and overview of the sample data. By calculating the mean, standard deviation, and minimum and maximum values of the sample, descriptive statistics can show the overall performance of clinicians in terms of health communication ability, sense of organizational support, and self-efficacy (Bryman, 2016).

3.2.2.5.2 Analysis of variance and T-test

Analysis of variance (ANOVA) and T-tests are used to test for group differences. Analysis of variance is used to compare the mean differences between multiple groups, such as the influence of hospital level, marriage, position, title, education level, and clinical department on health communication ability and self-efficacy. T-test is used to compare the mean differences between dichotomous groups, such as the influence of gender, ethnicity (Han, minority), and employment status (yes, no) on health communication ability and self-efficacy (Bryman, 2016).

3.2.2.5.3 Correlation analysis

Correlation analysis reveals the strength and direction of the relationship between variables by calculating the correlation coefficient (Bryman, 2016). In this study, the Spearman correlation coefficient was used in the analysis to assess the relationship between the respondents' quantitative demographic data and their health communication ability and self-efficacy.

3.2.2.5.4 Linear regression analysis

Linear regression analysis can reveal the direct effect relationship between variables and the degree of their influence. In regression analysis, control variables can be included, and the joint influence of independent and control variables on the dependent variable can be assessed through a multivariate regression model. In order to prevent the possible impact of multiple collinearities between variables, a more reliable linear regression model, namely ridge regression, was selected at this stage. By introducing a regularization term (the ridge parameter), ridge regression imposes constraints on the regression coefficients in the regression analysis, thereby reducing the complexity of the model and sensitivity to the high correlation between variables (Bryman, 2016). At this phase, linear regression analysis was used to explore the impact of organizational support and self-efficacy on health communication ability. By constructing a regression model, the predictive power of organizational support and self-efficacy on health communication ability can be quantified, and significant influencing factors can be identified.

3.2.2.5.5 Mediation effect analysis

The mediation effect analysis is used to explore the role of a mediating variable in the path between the independent and dependent variables. Specifically, it examines the effect of the independent variable on the dependent variable through the mediating variable. Typical steps include: 1) determining the direct effect of the independent variable on the dependent variable. 2) Examining the effect of the independent variable on the mediating variable. 3) Exploring the effect of the mediating variable on the dependent variable. If the introduction of the mediating variable significantly reduces the direct effect of the independent variable on the dependent

variable, it indicates the existence of a mediating effect (Preacher & Hayes, 2004). At this phase, the mediating effect analysis was used to test the mediating role of self-efficacy between perceived organizational support and health communication ability.

3.2.2.5.6 Structural equation modeling analysis

Structural equation modeling (SEM) is a statistical method verifying complex relationships between variables. It can analyze multiple causal relationships simultaneously and link observed variables with latent variables (i.e., variables that cannot be directly measured). SEM combines path and factor analysis, can handle direct and indirect effects, and verifies theoretical hypotheses by fitting indices to test the model's fit. SEM is commonly used in social science, psychology, and management research because it can quantify and test complex theoretical models (Kline, 2023). At this stage, SEM was used to comprehensively evaluate the complex relationships between health communication ability, organizational support, and self-efficacy. The structural equation model was constructed using AMOS software, and multiple causal relationships and path effects were analyzed simultaneously. This validated the theoretical model and revealed the complex relationships between variables.

3.2.2.6 Measurement tools

Health communication ability scale. The HCAS for Clinicians was developed and validated in phase 1. Based on the "7W" theory of Bredeker and the methodology of Gioia, the scale covers the critical elements of the health communication process and includes seven dimensions and 29 items. The scale is in the form of a 1–5-point Likert sliding questionnaire. Respondents rate each item according to their situation, ranging from "strongly disagree" to "strongly agree," to assess the clinician's ability level in health communication comprehensively.

Organizational support scale. Chinese scholar Shu (2021) developed the organizational support scale for clinicians. The scale fully considers the work characteristics and practical needs of clinicians. It covers five dimensions: resource support provided by the hospital or department, career development opportunities, working environment, management support, and colleague relationships. The items on the scale are designed to closely reflect the actual work situation of clinicians and accurately reflect the degree of organizational support perceived by clinicians. Therefore, the clinician's sense of organizational support scale was used in this stage. The scale is in the form of a 1–5-point sliding Likert scale, and respondents rate each item according to their feelings to assess their overall perception of organizational support.

Self-efficacy scale. The "patient-centered" self-efficacy scale developed by Zachariae et al. (2015) can measure medical students' or clinicians' beliefs in their ability to perform specific

behaviors in a "patient-centered" manner. This belief is mainly reflected in three aspects: considering the patient's experiences, needs, and perspectives, providing patients with opportunities to participate in medical services, and improving the partnership between patients and doctors. This self-efficacy scale specific to the medical field includes three dimensions: identifying patient needs, sharing information and power, and coping with communication challenges. D. Chen et al. (2023) translated and cross-culturally adapted China's "patient-centered" self-efficacy scale. After verifying it with 1318 clinicians from a tertiary general hospital in Guangdong Province, China, they found that the scale had good reliability and validity and could positively predict clinicians' clinical behaviors. Since the self-efficacy of clinicians in the process of health communication is reflected in their confidence in performing "patient-centered" tasks, the "patient-centered" self-efficacy scale was selected at this phase. The scale uses a 0–4-point Likert sliding questionnaire, in which respondents rate each item according to their actual situation, from "not at all confident" to "very confident," to assess their level of self-efficacy in their actual work.

3.2.2.7 Phase 2 implementation steps

This phase collected the current situation of clinicians' health communication ability, sense of organizational support, and self-efficacy, systematically analyzed the relationship between these variables, and verified the research hypotheses. SPSS and AMOS software were used to process and analyze the data to ensure scientific and accurate data analysis. The specific analyses included descriptive statistics, analysis of variance, t-tests, correlation analysis, ridge regression analysis, mediating effect analysis, and SEM analysis. The following are the specific implementation steps:

Step 1, development of the survey

Before starting data collection, the questionnaire was designed and produced. The questionnaire includes the following parts: the health communication ability scale, the organizational support perception scale, the self-efficacy scale, and the respondent's demographic information questionnaire. The health communication ability scale was used to assess the clinician's ability in the health communication process; the organizational support perception scale is used to measure the clinician's perception of the support provided by the hospital or department; and the self-efficacy scale was used to measure the doctor's confidence in the health communication process. In addition, the questionnaire on demographic information collected basic information about the respondents, including age, gender, education,

years of work experience, hospital level, position, professional title, and clinical department, to provide control variables and a basis for stratified analysis for subsequent data analysis.

Step 2, distribute questionnaires and collect data

After obtaining permission from the hospital management, the data collection officially began. Using a stratified random sampling method, questionnaires were distributed to clinicians in secondary and tertiary hospitals in Z City, Guangdong Province. To ensure the authenticity and validity of the questionnaire, it was completed on a voluntary, informed, and agreed basis. Respondents filled in and submitted the questionnaire after understanding the purpose and content of the study. The entire questionnaire distribution process strictly followed ethical requirements to ensure that the privacy of respondents was fully protected. Seven hundred ninety-two questionnaires were distributed in this phase, and 701 valid questionnaires were finally recovered, with an effective recovery rate of 88.5%.

Step 3, cleaning the data and verifying the reliability of the scales

After the data collection was complete, the questionnaire data was first cleaned. During the questionnaire data cleaning process, missing and abnormal values were processed, and invalid questionnaires were eliminated by checking for logical problems to ensure the data's accuracy and reliability. Next, the reliability and validity of the three scales were verified.

Step 4, analyzing and processing the questionnaire data

After data cleaning and reliability and validity verification, the analysis and processing of the questionnaire data began.

Through the implementation of the above steps, the relationship between clinicians' health communication ability, sense of organizational support, and self-efficacy was systematically analyzed at this stage, and robust data support was provided for the verification of related hypotheses.

3.3 Ethical approval and protection of respondents

Ensuring ethical compliance and the protection of respondents has been a crucial principle in this study. All research processes strictly followed ethical standards to ensure that the rights and interests of participants are fully respected and protected. The following are the specific

measures taken regarding ethical approval, authorization to use scales, and data storage and confidentiality in this study.

3.3.1 Ethics approval

Before the study was formally launched, it had been approved by the Ethics Committee of the A hospital of Z city (ethics approval number: PJKT2024-072). When the research plan was submitted to the Ethics Committee for review, the research objectives, methods, data collection procedures, and potential risks were explained in detail to ensure all steps aligned with ethical principles. During the data collection process, the research team ensured that each participant participated voluntarily, fully understood, and consented before completing the questionnaire. The research team informed the clinicians of the participants' purpose, content, possible impact, and rights. During the research process, we strictly followed the principle of data confidentiality to ensure that the personal information of all participants is fully protected and that the participants' privacy is not disclosed. Any potential risks associated with the research have been thoroughly assessed and controlled.

3.3.2 Authorization to use scales

The scales used in this study, such as the OSS and the self-efficacy scale, were used with legal authorization. The HCAS was developed by the research team in phase 1, verified and approved, and did not require additional authorization; the OSS and the SES were used with the consent of the original authors or relevant research institutions. The research team strictly abides by the usage requirements of the scale developers to ensure that the use of the scales complies with relevant intellectual property rights and copyright regulations.

3.3.3 Data storage and confidentiality measures

To ensure data security, the data for this study is stored in a protected database, and all data is encrypted. Only authorized research team members can access this data to prevent unauthorized access or data leaks. The data is anonymized before storage and analysis, and the identity of the participants is separated from the content of the data to ensure that no personal information can be identified during data analysis. In addition, the data source is obscured during the publication of the research results to protect the participants' privacy.

The research team has also formulated strict data management and backup measures to ensure the data will not be lost or tampered with during storage. The ethics committee's requirements manage the data retention period, and the data will be securely destroyed within a specified period after the end of the study to ensure data security and the permanent confidentiality of participant information.

Chapter 4: Results

4.1 Results of the validation of the health communication ability scale

From late April to early May 2024, based on convenience sampling, we selected respondents. We filled out questionnaires in 29 tertiary, secondary, and primary hospitals in G, Z, M, and Y cities in Guangdong. A total of 1,094 valid questionnaires were recovered, of which 431 were used for exploratory factor analysis and 663 were used for validation factor analysis.

For data analysis, Excel and SPSS22 software were used to process and analyze the data, and the reliability and validity of the health communication ability scale were successfully verified at this phase by analyzing the data from 1094 valid questionnaires. Firstly, 14 entries with substandard factor loadings were deleted through exploratory factor analysis. A validation factor analysis was conducted on 663 valid questionnaires using the remaining 29-entry scale. Cronbach's alpha coefficient of the scale is 0.987, indicating high internal consistency reliability. The KMO test value is 0.977, which further supports the applicability of the factor analysis. The reliability index test shows that Cronbach's alpha coefficient, retest reliability, factor loading coefficients, totally explained variance, convergent validity, construct reliability, discriminant validity, model fit, and factor covariance after deletion of the health communication ability scale items are good. Through exploratory factor analysis and validation factor analysis, seven main dimensions of health communication ability were identified at this phase. These cover various aspects, from health communication knowledge to influencing and comprehensively assessing the respondents' health communication ability.

4.1.1 Exploratory factor analysis results

4.1.1.1 Cronbach's α

Table C.2 shows that the overall Cronbach's alpha coefficient for the 43-entry health communication ability scale is 0.987, indicating a very high level of reliability. Meanwhile, the standardized Cronbach α coefficient is also 0.987, and the scale's internal consistency performs well regardless of standardization, indicating a strong correlation and consistency among the entries.

4.1.1.2 Deletion of analytical items

According to the results of deleting the analyzed items in Table C.3, Cronbach's alpha coefficients of the overall scale after deleting any single item are not significantly higher than the alpha coefficients of the total scale, and ostensibly, each item contributes to the overall reliability of the scale, which further confirms the high reliability of the scale. In addition, the correlations between the deleted items and the overall Deletion of the items are all greater than 0.3, indicating that the internal consistency between the deleted items and the remaining question items is good.

4.1.1.3 KMO test

Table C.4 states that the KMO value of the 43-entry health communication ability scale is 0.977, which is significantly higher than 0.9, indicating that the data is well suited for factor analysis. Also, the p-value of Bartlett's test of sphericity is significant at the 1% level, indicating a significant correlation between the variables and that the factor analysis is reasonable and appropriate. These results indicate that the data collected are sufficient to support the application of factor analysis.

4.1.1.4 Factor loading factors

When doing exploratory factor analysis, based on the 7W theory, the number of principal components was set as 7, the factors were rotated using the maximum variance method, and the table of factor loading coefficients was obtained after rotation. Based on the authoritative literature at home and abroad, the entry exclusion criteria are set in this study:

- 1) The factor loading coefficient after rotation is less than 0.5.
- 2) There is cross-loading, and the cross-loading is more than 0.4.
- 3) The maximum loading entries on the same factor (dimension) is less than 3.

In conducting the exploratory factor analysis, based on the 7W theory, seven factors were extracted in this study, and the factor loading coefficients after rotation by the maximum variance method indicated that the factor loadings of the 29 entries in the scale met the set criteria. The loading coefficients of these entries on their respective factors are all greater than 0.5, and there are no significant cross-loadings, indicating that these entries are well represented on the dimensions to which they belonged.

Table C.5 The table of factor loading coefficients shows that 29 items loaded up to the standard, indicating that these entries are well represented on the dimension to which they

belong. The items marked in red need to be removed as they did not meet the set criteria to improve the scale's validity further.

4.1.1.5 Exploratory factor analysis after removal of nonattainment items

According to the table of factor loading coefficients for the 43-entry scale, we deleted 14 entries with substandard loadings, retained 29 entries, and continued to do exploratory factor analysis on the 29-entry scale.

Table 4.1 Post-rotation factor loading coefficients show that the numbers marked in yellow are the maximum loadings of each scale entry on the same factor. The following conditions are met: 1) post-rotation factor loading coefficients are more significant than 0.5, 2) There is no cross-loading, and the criterion for cross-loading is more significant than 0.4, and 3) The number of maximum loading entries on the same factor (dimension) is greater than or equal to three.

Table 4.1 Table of factor loading coefficients after rotation

Table of factor loading coefficients after rotation								
Items	Post-rotation factor loading coefficients							Commonality
	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7	
Item1	0.18	0.236	0.251	0.167	0.773	0.211	0.138	0.84
Item2	0.228	0.212	0.225	0.186	0.747	0.24	0.226	0.849
Item3	0.323	0.146	0.153	0.18	0.744	0.16	0.221	0.81
Item4	0.191	0.309	0.304	0.251	0.603	0.186	0.221	0.734
Item8	0.222	0.292	0.783	0.208	0.177	0.177	0.166	0.881
Item9	0.188	0.252	0.801	0.158	0.247	0.2	0.165	0.893
Item 10	0.242	0.256	0.769	0.188	0.224	0.176	0.223	0.883
Item 11	0.305	0.182	0.631	0.305	0.277	0.166	0.243	0.781
Item 17	0.708	0.352	0.266	0.247	0.183	0.179	0.202	0.864
Item 18	0.723	0.33	0.22	0.222	0.219	0.21	0.186	0.855
Item 19	0.742	0.273	0.216	0.226	0.268	0.209	0.243	0.898
Item 20	0.697	0.133	0.244	0.253	0.285	0.207	0.337	0.865
Item 21	0.678	0.182	0.236	0.266	0.253	0.212	0.296	0.815
Item 22	0.29	0.742	0.263	0.223	0.249	0.18	0.137	0.867
Item 23	0.204	0.775	0.263	0.203	0.205	0.213	0.148	0.862
Item 24	0.288	0.721	0.257	0.221	0.23	0.193	0.284	0.888
Item 25	0.246	0.716	0.273	0.273	0.224	0.228	0.244	0.884
Item 26	0.325	0.266	0.286	0.244	0.276	0.261	0.65	0.885
Item 27	0.344	0.265	0.282	0.273	0.293	0.258	0.63	0.893
Item 28	0.332	0.207	0.215	0.228	0.265	0.205	0.737	0.906
Item 29	0.296	0.241	0.238	0.309	0.222	0.248	0.683	0.874
Item 34	0.262	0.216	0.224	0.742	0.256	0.238	0.224	0.888
Item 35	0.329	0.22	0.23	0.714	0.234	0.264	0.261	0.912
Item 36	0.295	0.321	0.257	0.668	0.19	0.303	0.204	0.872
Item 37	0.297	0.344	0.273	0.602	0.231	0.336	0.266	0.882
Item 38	0.247	0.359	0.256	0.556	0.227	0.357	0.3	0.832
Item 40	0.204	0.171	0.176	0.221	0.222	0.801	0.202	0.883
Item 41	0.201	0.223	0.196	0.254	0.218	0.805	0.204	0.93
Item 42	0.226	0.232	0.205	0.255	0.209	0.789	0.177	0.909

After several rounds of exploration, all 29 scale entries fell on seven factors, and the maximum loadings of the entries fell on the dimensions set based on the 7W theory, further validating the 7W theory.

4.1.2 Results of reliability analysis prior to validated factor analysis (29 entries)

After exploratory factor analysis of the 43-entry scale, we obtained a 29-entry scale. To validate the reliability of the retained 29-entry scale, we collected an additional 752 respondents' data for validation factor analysis, totaling 663 valid respondents.

Before the validation analysis, the Cronbach's alpha coefficient value of the total scale was measured to be 0.978 with good reliability. Based on the exploratory factor analysis of the health communication ability scale, the validation factor analysis also extracted seven factors, each representing a different dimension of health communication ability. After rotating through the factors, the results show that the differentiation between the factors is good, and the factor loadings of the entries of each dimension are above 0.6, indicating that these entries could explain the variance of the dimensions to which they belonged better. In addition, the indicators of total variance were explained, and model evaluation, discriminant validity, factor covariance, and retest reliability are better, further validating the structural validity of the scale.

The results of the analysis of the leading reliability indicators are presented below:

4.1.2.1 Reliability

4.1.2.1.1 Cronbach's α

Table C.6 states that the Cronbach's alpha coefficient value for the 29-entry health communication ability scale is 0.978, indicating that the questionnaire is reliable.

4.1.2.1.2 Deletion of analytic item statistics

Table C.7 shows that two indicators, the overall correlation (CITC) after each entry term of the scale and the alpha coefficient after deletion of the term, perform better and can be processed without correction of the scale entries.

4.1.2.1.3 Retest reliability

Test-retest reliability is an index that assesses the consistency of a scale's measurements at different points in time. It is based on the principle that the same group of subjects is measured using the same scale at two or more different points in time under the same conditions, and the consistency of these measurements is compared. Retest reliability is usually calculated by calculating a correlation coefficient (e.g., Pearson's correlation coefficient) between the scores

at the two time points. If the correlation coefficient is close to 1, the scale has good retest reliability, i.e., the measurements have high temporal consistency.

It should be noted that retest reliability is affected by various factors, such as the time interval, the stability of the subject, and the nature of the measurement content. If the time interval is too short, the subject may still remember the content of the first measurement, resulting in a falsely high correlation coefficient; if the time interval is too long, the subject's actual state may have changed, which will also affect the correlation coefficient. Typically, a time interval between two and four weeks is recommended for retesting reliability.

We randomly selected 44 respondents from the first batch at the A hospital of Z city and re-distributed the questionnaire after a 3-week interval, and 44 valid questionnaires were recovered. After analyzing the intraclass correlation coefficients (ICC) of the two batches of data, we found that the ICC of the total scale is 0.886 and that the ICC of the scale dimensions ranges from 0.852 to 0.913, which indicates that the results of the health communication ability scale are very consistent. The retest reliability is good.

Table 4.2 Intraclass correlation coefficient (ICC) table

	HCA	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7
ICC	0.886 (0.000***)	0.913 (0.000***)	0.867 (0.000***)	0.865 (0.000***)	0.854 (0.000***)	0.861 (0.000***)	0.88 (0.000***)	0.852 (0.000***)

Note: ***, **, * represent significance levels of 1%, 5%, and 10%, respectively

4.1.2.2 Validity

4.1.2.2.1 KMO test

Table C.8 shows that the KMO value of the 29-entry scale is 0.971. In contrast, of Bartlett's test of sphericity show that it presents significance at the 1% level, that there is a correlation between the variables, and that the factor analysis is valid to an excellent degree.

4.1.2.2.2 Explaining the total variance

In Table C.9, The total explained variance, when the number of principal components is chosen to be 7, the eigen root explained by the variable is lower than 1, and the contribution of the variable explanation reaches 82.641%.

4.1.2.2.3 Factor load factor

Table 4.3 shows that the measurement items of all factors of the 29-entry scale show significance at the level. At the same time, their standardized loading coefficients are all greater than 0.6, which can be considered as having sufficient variance explained to show that the variables can be presented on the same factor.

Table 4.3 Table of factor loading coefficients

Factor	Non-standard factors	loadStandardized factor	load _z	S.E.	P
Factor 1	1	0.786	-	-	-
	1.009	0.799	21.481	0.047	0.000***
	0.922	0.727	19.233	0.048	0.000***
	0.995	0.784	21.005	0.047	0.000***
Factor 2	1	0.803	-	-	-
	1.065	0.84	24.465	0.044	0.000***
	1.031	0.87	25.663	0.04	0.000***
	0.809	0.773	21.91	0.037	0.000***
Factor 3	1	0.805	-	-	-
	1.023	0.879	27.372	0.037	0.000***
	1.039	0.932	29.97	0.035	0.000***
	1.007	0.912	28.987	0.035	0.000***
Factor 4	0.982	0.864	26.669	0.037	0.000***
	1	0.768	-	-	-
	0.996	0.726	19.719	0.05	0.000***
	1.074	0.859	24.189	0.044	0.000***
Factor 5	1.104	0.897	25.531	0.043	0.000***
	1	0.929	-	-	-
	1.019	0.957	49.675	0.021	0.000***
	0.998	0.915	42.274	0.024	0.000***
Factor 6	0.967	0.888	38.5	0.025	0.000***
	1	0.88	-	-	-
	0.985	0.897	34.325	-	0.000***
	1.008	0.879	32.849	0.029	0.000***
Factor 7	1.008	0.902	34.774	0.031 0.029	0.000***
	1.01	0.896	34.256	0.029	0.000***
	1.003	0.939	-	-	-
	1.03	0.94	47.211	-	0.000***
	0.993	0.883	38.426	0.022 0.026	0.000***

4.1.2.2.4 Model evaluation

According to Table 4.4, the values of average variance extracted (AVE) for the seven factors of the scale are all greater than 0.5. The CR values of the combined reliabilities are all greater than 0.7, which indicates that the measures within the factors are excellently extracted and that the aggregated validity and construct reliability of the scale's latent variables are good.

Table 4.4 Model evaluation

Factor	Mean variance extraction AVE value	Combined Reliability
Factor 1	0.6	0.857
Factor 2	0.68	0.894
Factor 3	0.767	0.943
Factor 4	0.656	0.884
Factor 5	0.85	0.958
Factor 6	0.793	0.95
Factor 7	0.846	0.943

4.1.2.2.5 Distinguishing validity (Pearson's correlation vs. square root of AVE)

In Table 4.5 Pearson correlation and AVE square root values, the diagonal line is the square root of the AVE, which is used to indicate the strength of the correlation within the factors, and a comparison of the Pearson correlation coefficient with the AVE square root shows that the square root of the AVE is greater than the Pearson correlation coefficient values of the other factors for all the factors of the scale, which would indicate that the scale discriminant validity is excellent.

Table 4.5 Pearson correlation and AVE square root values

Distinguishing validity: Pearson's correlation vs. AVE root value							
	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7
Factor 1	0.775						
Factor 2	0.661 (0.000***)	0.825					
Factor 3	0.706 (0.000***)	0.685 (0.000***)	0.876				
Factor 4	0.655 (0.000***)	0.78 (0.000***)	0.782 (0.000***)	0.81			
Factor 5	0.689 (0.000***)	0.697 (0.000***)	0.821 (0.000***)	0.793 (0.000***)	0.922		
Factor 6	0.666 (0.000***)	0.706 (0.000***)	0.769 (0.000***)	0.789 (0.000***)	0.832 (0.000***)	0.891	
Factor 7	0.607 (0.000***)	0.646 (0.000***)	0.704 (0.000***)	0.757 (0.000***)	0.771 (0.000***)	0.875 (0.000***)	0.92

Note: The diagonal numbers are the root values of the AVE for the factor

4.1.2.2.6 Model fit

Table 4.6 shows that the model fit indicators for GFI, RMSEA, RMR, CFI, NFI, and NNFI are up to standard, indicating a good scale model fit.

Table 4.6 Model fit indicators

Commonly used indicators	χ^2	df	GFI	RMSEA	RMR	CFI	NFI	NNFI
Standard of judgment	-	-	>0.9	<0.10	<0.05	>0.9	>0.9	>0.9
Value	1904.447	356	0.913	0.081	0.026	0.928	0.913	0.918

4.1.2.2.7 Factor covariances

Table C.10 states that the standardized estimated coefficients between the scale's factors range from 0.676 to 0.926, indicating a strong correlation and that the factor structure has high explanatory power and reliability.

4.2 Results of the empirical study

In July 2024, based on the principle of stratified random sampling, we recruited respondents from 19 secondary and tertiary hospitals in Z City, Guangdong Province; 792 questionnaires

were distributed, 792 were recovered, 91 invalid questionnaires were excluded through the logic correction problem, and 701 valid questionnaires were obtained, with an effective recovery rate of 88.5% of the sample. The specific sampling situation is shown in Table 4.1.

Excel, SPSS22, and SPSS Amos24 software were used for data analysis. In particular, Excel was used for descriptive statistics of respondents' demographic and sociological information, health communication ability, organizational support, and self-efficacy. SPSS 22 was used for T-tests, ANOVA tests, correlation analysis, linear regression analysis, and mediation effect analysis of respondents' data. SPSS Amos24 was used for structural equation modeling of the data of the three scales.

The main results of the empirical study:

Organizational support is significantly and positively related to health communication ability.

Self-efficacy is significantly and positively related to health communication ability.

Organizational support is significantly and positively related to self-efficacy.

Self-efficacy partially mediates the relationship between organizational support and health communication ability.

The demographic and sociological variables of the respondents that show significant differences in health communication ability are age, years of working experience, annual income, position, title, education level, hospital grade, marriage, and authorized strength, and the variables that show significant differences in self-efficacy are age, years of working experience, annual income, position, title, hospital grade, and authorized strength.

The detailed validation results are as follows:

4.2.1 Descriptive analysis of statistics

In this study, the demographic and sociological information and the score levels of the three scales were analyzed descriptively and statistically (Tables C.11-C.19), with a total sample of 701 respondents, covering a variety of dimensions such as gender, ethnicity, marital status, hospital level, type of institution, establishment, education level, position, title, and clinical department:

4.2.1.1 Descriptive analysis of demographic, sociological information statistics

Gender and ethnic distribution. In terms of gender, there were 372 male respondents, accounting for 53.07% of the total sample, and 329 female respondents, accounting for 46.93%. This distribution shows that the proportion of men and women in the sample is relatively balanced, but men have a slight advantage. In terms of ethnic distribution, Han Chinese respondents occupy an absolute majority, totaling 690 respondents, accounting for 98.43%, while ethnic minority respondents' number only 11, accounting for 1.57%. This is consistent with the overall ethnic composition of China's population, reflecting the sample's representativeness.

Marital status. In terms of marital status, the majority of the respondents were married, totaling 548 (78.17%); unmarried, 136 (19.40%); divorced, 15 (2.14%); and widowed, only 2 (0.29%). This result shows that most respondents have stable marital status, reflecting this sample group's maturity and social responsibility.

Level of hospital and type of institution. The distribution of respondents' hospital grades was relatively balanced, with the most significant number of respondents in grade 2 hospitals, totaling 252 respondents, accounting for 35.95%; 229 respondents in grade 3A hospitals, accounting for 32.67%; 115 respondents in grade 3 hospitals, accounting for 16.41%; and 105 respondents in grade 2A hospitals, accounting for 14.98%. In terms of institution type, general hospitals accounted for the majority of respondents, with a total of 380, or 54.21%; maternity and child health centers had 147, or 20.97%; Chinese hospitals had 97, or 13.84%; and other types of institutions had 77, or 10.98%. These figures show that the sample was mainly concentrated in high-level and general hospitals, reflecting that the respondents' healthcare service environments were diverse and concentrated in higher-level healthcare institutions.

Authorized strength and level of education. Regarding authorized strength, 379 respondents (54.07%) had authorized strength, while 322 respondents (45.93%) had no authorized strength. In terms of education level, the majority of the respondents had a bachelor's degree (433 respondents, or 61.77%), 134 respondents had a master's degree (19.12%), 109 respondents had a college degree (15.55%), and fewer respondents had a doctoral degree (only 25 respondents, or 3.57%). This distribution shows that the overall education level of the respondents is high, with more than 80% having a bachelor's degree or higher, indicating a higher quality background of the medical staff.

Distribution of positions and titles. In terms of job titles, most respondents had no managerial positions, totaling 527 or 75.18%; there were 78 or 11.13% of deputy middle

management positions; 59 or 8.42% of regular positions; 32 or 4.57% of basic management positions; and 4 (0.57%) and 1 (0.14%) deputy and 1 (0.14%) of hospital leaders, respectively. In terms of title distribution, those with intermediate titles were the most numerous, totaling 231 (32.95%); those with junior titles (division, resident) had 179 (25.54%); those with deputy senior titles had 135 (19.26%); those with junior titles (bachelor's degree, assistant doctor) had 86 (12.27%); and those with full senior titles had 70 (9.99%). These figures reflect that most respondents in the sample were in mid-level titles and non-managerial positions in their career development, with a few in managerial or senior title positions.

Clinical section distribution. The number of respondents varied considerably according to the clinical department. The departments with the highest number of respondents were Internal Medicine (22.83%), Surgery (15.69%), Pediatrics, and Obstetrics and Gynecology (16.41%), which together accounted for more than 50% of the sample.

Age, years of employment, and annual income. The descriptive statistics of the quantitative variables showed that the age of the respondents spanned a wide range, from a minimum of 23 years old to a maximum of 60 years old, with a mean age of 37.73 years old and a standard deviation of 8.72, indicating a more centralized age distribution in the sample. In terms of years of working experience, the shortest is two years, and the longest is 40 years, with an average of 13.64 years and a standard deviation of 9.24, showing that the sample contains a wide distribution from recruits to senior employees. Most respondents' annual income was between 60,000 and 220,000 RMB, accounting for 86.31%; a few earned more than 220,000 RMB per year, with the highest annual income reaching 700,000 RMB per year.

Summarizing the above analysis, the sample of respondents in this study is relatively broadly representative, covering a diversity of different genders, ethnicities, marital statuses, educational levels, titles, positions, and clinical departments. The sample's overall characteristics indicate that most respondents had high educational backgrounds and career stability, were concentrated in high-level healthcare organizations, and had a more significant proportion of intermediate titles and non-managerial positions. This distribution provides a robust basis for this study and contributes to more generalizable conclusion.

4.2.1.2 Descriptive analysis statistics of respondents' health communication ability, organizational support, and self-efficacy levels

Tables C.14-C.19 show the respondents' scores on health communication ability, organizational support, and self-efficacy levels, including their performance on each dimension and overall scores. The following are the results of the descriptive statistical analysis of the three scales:

4.2.1.2.1 Health communication ability score

The health communication ability scale consists of seven dimensions: environmental conditions, communicators, motivation for communication, channels of communication, content of communication, audience of communication, and effectiveness of communication. The scores for each dimension are shown below:

Environmental conditions. Respondents' scores were concentrated between 3.0 and 5.0, accounting for 97.86% of the respondents, of which 47.50% scored between 4.0 and 5.0, indicating that most of the respondents rated the environmental conditions highly. The mean score was 3.755 with a standard deviation of 0.628, indicating that most people recognized the environmental conditions more highly, but there were some individual differences.

Communicators. The scores were concentrated between 3.125 and 5.0 (62.625%), with 49.36% scoring between 3.125 and 4.062. The mean score was 3.516 with a standard deviation of 0.65, indicating that respondents demonstrated moderate to high levels of competence on the communicator dimension.

Communication motivation. The scores were mainly centered between 3.2 and 5.0, accounting for 79.46%, with more than half of the respondents scoring between 3.2 and 4.1. The mean score was 3.894 with a standard deviation of 0.631, reflecting that the respondents generally possessed high motivation for dissemination.

Communication channels. On this dimension, scores were concentrated between 3.0 and 5.0, accounting for 94.865%, with more than half of the respondents scoring between 3.0 and 4.0. The mean score was 3.613, with a standard deviation of 0.652, indicating that respondents were generally more competent in using communication channels.

Dissemination of content. 98.43% of the respondents scored between 3.0 and 5.0, with 61.34% scoring between 4.0 and 5.0. The mean score was 3.856, with a standard deviation of 0.66, indicating that the respondents were more competent in disseminating content.

Communication audience. The scores were mainly between 3.5 and 5.0, accounting for 71.612%. The average score was 3.87 with a standard deviation of 0.63, showing that respondents better grasp communication audiences and can effectively target different audiences.

Communication effectiveness. Respondents' scores on the dissemination effectiveness dimension were concentrated between 3.0 and 5.0, accounting for 91.842%. The average score was 3.778 with a standard deviation of 0.628, showing a high dissemination effect, indicating that the respondents achieved better practical results in the dissemination process.

Overall health communication ability. The overall scores of the respondents were mainly centered between 3.759 and 4.379, accounting for 55.92% of the respondents, with a mean score of 3.763 and a standard deviation of 0.557, indicating that the majority of the respondents performed well in health communication ability and were able to accomplish the task of communicating health information effectively.

4.2.1.2.2 Organizational support score

The organizational support scale consists of five dimensions: developmental support, work support, benefit security, interpersonal support, and respect support. The scores for each dimension are shown below:

Development support. The scores are concentrated between 3.25 and 4.125, with 86.02% of the respondents scoring between 3.25 and 4.125, of which 53.78% scored between 3.25 and 4.125. The mean score is 3.517, with a standard deviation of 0.634, indicating more positive feedback from the organization regarding developmental support.

Work support. The scores are concentrated between 3.0 and 5.0 for 89.73% of the respondents, with 59.20% scoring between 3.0 and 4.0. The mean score is 3.514 with a standard deviation of 0.663, indicating that respondents felt more positively about work support.

Benefit security. Respondents' scores on the benefit security dimension are between 3.0 and 4.0, representing 56.776%. The mean score is 3.393, with a standard deviation of 0.693, indicating that the organization moderately supports the dimension.

Interpersonal support. The scores are concentrated between 3.0 and 5.0, with 95.008% of the respondents scoring between 4.0 and 5.0 and 43.367% scoring between 4.0 and 5.0. The mean score is 3.704, with a standard deviation of 0.653, indicating that the respondents felt better about the organization regarding interpersonal support.

Respect support. The scores are concentrated between 3.0 and 5.0, with 91.155% of the respondents, of which 53.78% scored between 3.0 and 4.0. The mean score is 3.613 with a standard deviation of 0.689, indicating that the organization gave the respondents a better feeling about respect and support.

Overall organizational support. Respondents' overall scores are between 3.08 and 4.04, or 74.02%. The mean score is 3.543 with a standard deviation of 0.604, indicating that respondents felt more positively about overall organizational support, but there is still room for improvement.

4.2.1.2.3 Self-efficacy score

The self-efficacy scale consists of three dimensions: identifying patient needs, sharing

information and power, and addressing communication challenges. The scores for each dimension are shown below:

Exploring the patient perspective. Sixty-nine percent of the respondents score between 3.0 and 4.0, with 32.382% scoring between 2.0 and 3.0. The mean score is 2.97, with a standard deviation of 0.691, indicating that the respondents' self-efficacy in identifying patient needs is more moderate.

Sharing information and power. The scores are centered between 3.0 and 4.0 (69.615%), with a mean score of 3.083 and a standard deviation of 0.694, indicating the respondents' high self-efficacy in sharing information and power.

Dealing with communicative challenges. The scores are concentrated between 3.0 and 4.0 (67.19%), with a mean score of 3.054 and a standard deviation of 0.705, indicating that the respondents show strong self-efficacy in coping with communication challenges.

Overall self-efficacy. The respondents' overall scores are between 3.0 and 4.0, with 59.772%. The mean score is 3.036, with a standard deviation of 0.663, indicating that most respondents had high confidence and competence in self-efficacy.

Summary. A descriptive statistical analysis of the respondents' performance on the three scales of health communication ability, organizational support, and self-efficacy shows that: 1) Health communication ability. Respondents demonstrate strong competence in all dimensions of health communication ability, especially in communication motivation and content, showing that respondents were able to communicate health information and achieve better communication results effectively. 2) Organizational support. Respondents' overall feelings about organizational support are relatively buoyant, especially in interpersonal and respect support, showing that the organization is doing a better job providing support and security. However, there is still room for improvement in benefit security and work support. 3) Self-efficacy. Respondents show high confidence in self-efficacy, especially in sharing information and dealing with communication challenges, indicating that respondents have solid professional competence and self-confidence. Overall, the respondents' scores on all dimensions indicate that they performed better in health communication ability, organizational support, and self-efficacy and possess strong professional qualities and abilities. This provides a solid foundation for subsequent research and helps to explore further how to improve the overall efficacy and career support of medical staff.

4.2.2 Scale reliability analysis

Before validating the hypothesized model, the data collected from the three scales were analyzed for reliability and validity, and the results show that the Cronbach's alpha coefficients of the health communication ability scale, the organizational support scale, and the self-efficacy scale are well-behaved; the indicators of the KMO test and Bartlett's test are excellent, and the factor analysis is valid to the extent of a perfect fit; and the factor loadings coefficients and the degree of fit of the model are up to standard. Therefore, the scale data passed the reliability test and can be used for further analysis.

4.2.2.1 Reliability

Tables C.20, C.21, C.22 show that the Cronbach's alpha coefficients for the health communication ability scale, the organizational support scale, and the self-efficacy scale are 0.975, 0.969, and 0.983, respectively. These results indicate that these scales have extremely high internal consistency and are highly reliable.

4.2.2.2 Validity

4.2.2.2.1 KMO test and Bartlett's test

Tables C.23, C.24, and C.25 show that the KMO values of the health communication ability scale, the organizational support scale, and the self-efficacy scale are 0.968, 0.972, and 0.98, respectively. In contrast, Bartlett's sphericity test results show that the significance p-value is less than 0.001, which presents significance at the 1% level. Therefore, the factor analysis is valid, and the degree of fit is very high.

4.2.2.2.2 Factor loading factors

Tables C.26, C.27, and C.28 show that the standardized loading coefficient values for each entry of the health communication ability scale, the organizational support scale, and the self-efficacy scale are all greater than 0.6 and show significance at the 1% level, so it can be assumed that all the entries have sufficient variance to explain the performance of the variables to show on the same factor.

4.2.2.2.3 Model fit tests

Tables C.29, C.30, and C.31 show that the RMSEA and RMR values for all three models meet the judgment criteria, i.e., RMSEA is less than 0.10, and RMR is less than 0.05. This means that the fit of all three scale models is acceptable.

4.2.3 T-tests and ANOVAs

4.2.3.1 T-test

4.2.3.1.1 Gender

Table 4.7 shows that: (1) The mean values of male and female respondents on health communication ability are 3.791/3.731; the significance result of Welch's t-test is 0.154 due to non-satisfaction of chi-square and the p-value of 0.154 is used for the significance result, so the statistical result is not significant, which means that there is no significant difference between the male and female respondents on health communication ability. (2) The mean values of self-efficacy of male and female respondents are 3.025/3.048, respectively; due to the satisfaction of chi-square, independent samples t-test was used, and the p-value of significance result is 0.647, so the statistical result is not significant, which indicates that there is no significant difference between male and female respondents in self-efficacy.

Table 4.7 Table of results of T-test analysis (gender)

Variable name	Variable value	Sample size	Average value	Standard deviation	T-test	Welch's T-test	T-Mean difference	Cohen's d-value
Health communication ability	1.0	372	3.791	0.592	T=1.414 P=0.158	T=1.427 P=0.154	0.06	0.107
	2.0	329	3.731	0.513				
Self-efficacy	1.0	372	3.025	0.657	T=-0.459 P=0.647	T=-0.458 P=0.647	0.023	0.035
	2.0	329	3.048	0.671				

4.2.3.1.2 Authorized strength

Table 4.8 shows that: 1) The mean values of health communication ability of respondents with no authorized strength and those with an authorized strength are 3.662/3.848, respectively; as the chi-square is satisfied, the independent samples t-test is used, and the significance result P-value is less than 0.01. Thus, the statistical result is significant, indicating that there is a significant difference in health communication ability between respondents with and without authorized strength. 2) The mean value of self-efficacy of respondents without and with authorized strength is 2.954/3.106; due to the satisfaction of variance chi-square, independent samples t-test was used, and the significance result has a P-value of less than 0.01, so the statistical result is significant, which indicates that there is a significant difference in self-efficacy between respondents with and without authorized strength.

Table 4.8 Table of results of T-test analysis (authorized strength)

Variable name	Variable value	Sample size	Average value	Standard deviation	T-test	Welch's T-test	Mean difference	Cohen's d-value
Health communication	2.0	322	3.662	0.541	T=-4.471 P=0.000***	T=-4.481 P=0.000***	0.186	0.339
	1.0	379	3.848	0.556				

ability								
Self-efficacy	2.0	322	2.954	0.638	T=-3.04	T=-3.055	0.152	0.23
	1.0	379	3.106	0.677	P=0.002***	P=0.002***		

4.2.3.1.3 Ethnicity

Table 4.9 shows that: (1) The mean values of Han Chinese and ethnic minorities on health communication ability are 3.762/3.809; the significance result of the independent samples t-test is 0.782 due to the satisfaction of chi-square, and the significance result has a P value of 0.782, so the statistical result is not significant, which means that Han Chinese and ethnic minorities do not have a significant difference in their health communication ability. (2) The mean values of self-efficacy of Han Chinese and ethnic minorities are 3.034/3.133, respectively; due to the satisfaction of chi-square, independent samples t-test is used, the significance result is the p-value of 0.626, so the statistical result is not significant, which indicates that there is no significant difference in self-efficacy between Han Chinese and ethnic minorities.

Table 4.9 Table of results of T-test analysis (ethnic groups)

Variable name	Variable value	Sample size	Average value	Standard deviation	T-test	Welch's T-test	Mean difference	Cohen's d-value
Health communication ability	1.0	690	3.762	0.554	T=-0.277	T=-0.208	0.047	0.084
	2.0	11	3.809	0.743	P=0.782	P=0.839		
Self-efficacy	1.0	690	3.034	0.663	T=-0.488	T=-0.443	0.099	0.148
	2.0	11	3.133	0.732	P=0.626	P=0.667		

4.2.3.1.4 Marriage

Table 4.10 shows that: (1) The means of health communication ability of respondents with the following marital status: married, unmarried, divorced, and widowed are 3.803, 3.603, 3.766, and 3.603, respectively. Since the variance is homogeneous, a one-sample variance test is used, and the P value of the analysis of variance is 0.002. Therefore, the statistical results are significant, indicating that there are significant differences in health communication ability among respondents with different marital statuses. (2) The means of self-efficacy for respondents with different marital statuses (married, unmarried, divorced, and widowed) are 3.061, 2.935, 3.064, and 2.904, respectively. Because the variance is homogeneous, a one-sample variance test is used, and the P value of the analysis of variance is 0.257, so the statistical result is not significant, indicating that there is no significant difference in self-efficacy among respondents with different marital statuses.

Table 4.10 ANOVA results table (marital status)

Variable name	Variable value	Sample size	Average value	Standard deviation	Variance test	Welch's ANOVA test
Health communication ability	2.0	548	3.803	0.558	F=4.829 P=0.002***	F=3.863 P=0.096*
	1.0	136	3.603	0.539		
	3.0	15	3.766	0.421		

	4.0	2	3.603	0.756		
	2.0	548	3.061	0.665		
Self-efficacy	1.0	136	2.935	0.645	F=1.35	F=1.078
	3.0	15	3.064	0.685	P=0.257	P=0.442
	4.0	2	2.904	1.278		

4.2.3.1.5 Hospital level

Table 4.11 shows that: 1) The mean values of respondents from Grade 3A, Grade 3, Grade 2A, and Grade 2 hospitals on health communication ability are 3.839, 3.812, 3.789, 3.66, respectively, due to the satisfaction of ANOVA chi-square, the one-sample ANOVA test was used, and the p-value from the ANOVA result is 0.003, thus the statistical result is significant, indicating that there is a significant difference between different levels of hospitals on health communication capacity there is a significant difference. 2) The mean values of self-efficacy of respondents from Grade 3A, Grade 3, Grade 2A, and Grade 2 hospitals are 3.113, 3.042, 3.091, 2.94, respectively; since the variance chi-square was satisfied, one-sample ANOVA test was used, and the p-value of the ANOVA result is 0.028, so the statistical result is significant, indicating that there is a significant difference between different hospital grades in terms of self-efficacy.

Table 4.11 Table of ANOVA results (hospital level)

Variable name	Variable value	Sample size	Average value	Standard deviation	Variance test	Welch's test	ANOVA
Health communication ability	Grade 3A	229	3.839	0.54			
	Grade 3	115	3.812	0.568	F=4.775	F=4.922	
	Grade 2A	105	3.789	0.588	P=0.003***	P=0.002***	
	Grade 2	252	3.66	0.54			
Self-efficacy	Grade 3A	229	3.113	0.604			
	Grade 3	115	3.042	0.68	F=3.045	F=2.981	
	Grade 2A	105	3.091	0.646	P=0.028**	P=0.032**	
	Grade 2	252	2.94	0.705			

4.2.3.1.6 Hospital type

Table 4.12 states that: 1) the mean values of respondents from general hospitals, Chinese hospitals, maternal and child health centers, and other hospitals in terms of health communication ability are 3.783, 3.804, 3.709, 3.711, respectively, due to the satisfaction of variance chi-square, a one-sample ANOVA test was used, and the p-value from the ANOVA result is 0.375, so the statistical result is not significant, which means that there is no significant difference in health communication ability among the different institution types do not have significant differences in health communication ability. 2) The mean values of self-efficacy of respondents from general hospitals, Chinese hospitals, maternal and child health centers, and other hospitals are 3.05, 3.116, 2.957, 3.015, respectively; because variance chi-square was not satisfied, Welch's ANOVA test was used, and the ANOVA result has a p-value of 0.327, so the

statistical result is not significant, which indicates that there is no significant difference between different types of institutions in terms of self-effectiveness are not significantly different.

Table 4.12 Table of ANOVA results (hospital type)

Variable name	Variable value	Sample size	Average value	Standard deviation	Variance test	Welch's test	ANOVA
Health communication ability	General hospital	380	3.783	0.532	F=1.038 P=0.375	F=0.967 P=0.409	
	Chinese medicine hospital	97	3.804	0.589			
	Maternal and child health hospital	147	3.709	0.581			
	Else	77	3.711	0.585			
	General hospital	380	3.05	0.625			
Self-efficacy	Chinese medicine hospital	97	3.116	0.657	F=1.245 P=0.292	F=1.157 P=0.327	
	Maternal and child health hospital	147	2.957	0.707			
	Else	77	3.015	0.762			

4.2.3.1.7 Level of education

Table 4.13 shows that (1) The means of health communication ability for respondents with a master's degree, bachelor's degree, associate degree, and doctorate are 3.8, 3.765, 3.638, and 4.066, respectively. Since the variance meets the requirement of uniformity, a one-sample variance test is used. The P value of the analysis of variance is 0.004, so the result is statistically significant, indicating that there are significant differences in health communication ability among respondents with different education levels. (2) The means of self-efficacy for respondents with master's, bachelor's, associates ', and doctoral degrees are 3.032, 3.035, 2.978, and 3.318, respectively. Because the variance is homogeneous, a one-sample variance test is used, and the P value of the analysis of variance is 0.147, so the statistical result is not significant, indicating that there is no significant difference in self-efficacy among respondents with different education levels.

Table 4.13 Table of ANOVA results (level of education)

Variable name	Variable value	Sample size	Average value	Standard deviation	Variance test	Welch's test	ANOVA
Health communication ability	3.0	134	3.8	0.535	F=4.568 P=0.004***	F=5.123 P=0.002***	
	2.0	433	3.765	0.56			
	1.0	109	3.638	0.554			
	4.0	25	4.066	0.494			

	3.0	134	3.032	0.623		
Self-efficacy	2.0	433	3.035	0.666	F=1.792	F=3.038
	1.0	109	2.978	0.727	P=0.147	P=0.032**
	4.0	25	3.318	0.478		

4.2.3.1.8 Titles

Table 4.14 shows that: 1) The means of the health communication abilities of respondents with different job titles are 3.645, 3.775, 3.889, 3.613, and 3.961, respectively. Since the variance meets the requirement of uniformity, a one-sample variance test is used. The P value of the analysis of variance result is less than 0.01, so the statistical result is significant, indicating that there are significant differences in health communication abilities among respondents with different job titles. 2) The means of self-efficacy of respondents with different job titles are 2.948, 3.052, 3.14, 2.853, and 3.232, respectively. Because the variance is homogeneous, a one-sample variance test is used, and the P value of the analysis of variance is 0.001. Therefore, the statistical result is significant, indicating that there are significant differences in self-efficacy among respondents with different job titles.

Table 4.14 Table of ANOVA results (titles)

Variable name	Variable value	Sample size	Average value	Standard deviation	Variance test	Welch's test	ANOVA
Health communication ability	2.0	179	3.645	0.54	F=7.831 P=0.000***	F=8 P=0.000***	
	3.0	231	3.775	0.561			
	4.0	135	3.889	0.539			
	1.0	86	3.613	0.538			
	5.0	70	3.961	0.536			
Self-efficacy	2.0	179	2.948	0.655	F=4.911 P=0.001***	=4.683 P=0.001***	
	3.0	231	3.052	0.64			
	4.0	135	3.14	0.615			
	1.0	86	2.853	0.79			
	5.0	70	3.232	0.605			

4.2.3.1.9 Positions

Table 4.15 states that: 1) The means of respondents' positions on health communication ability are 3.708, 3.746, 4.01, 3.932, 3.0, 3.974, respectively; and since the chi-square is satisfied, the one-sample ANOVA test was used, and the p-value of the ANOVA result is less than 0.001. Therefore, the statistical results indicate a significant difference in health communication ability among respondents with different positions. 2) The means of respondents' positions on self-efficacy are 2.984, 3.008, 3.31, 3.155, 2.308, 3.135, respectively; due to the fulfillment of variance chi-square, the one-sample ANOVA test was used, and the P-value of the ANOVA result is 0.001, thus the statistical result is significant, indicating that there is a significant difference in self-efficacy among respondents in different positions.

Table 4.15 Table of ANOVA results (positions)

Variable name	Variable value	Sample size	Average value	Standard deviation	Variance test	Welch's test	ANOVA
Health communication ability	1.0	527	3.708	0.541	F=5.88 P=0.000***	F=5.016 P=0.002***	
	2.0	32	3.746	0.567			
	3.0	78	4.01	0.587			
	4.0	59	3.932	0.544			
	6.0	1	3	0.000			
	5.0	4	3.974	0.279			
Self-efficacy	1.0	527	2.984	0.669	F=4.028 P=0.001***	F=4.147 P=0.005***	
	2.0	32	3.008	0.698			
	3.0	78	3.31	0.601			
	4.0	59	3.155	0.598			
	6.0	1	2.308	0.000			
	5.0	4	3.135	0.19			

4.2.3.1.10 Clinical departments

Table C.32 shows: 1) The means of clinical department respondents on health communication ability are 4.001, 3.714, 3.791, 3.829, 3.676, 3.832, 3.509, 3.491, 3.742, 3.772, 3.533, 3.727, 3.655, 3.526, 3.503, 4.01, respectively; due to the fulfillment of variance chi-square, one-sample ANOVA test was used, and the ANOVA results in p-value of 0.149, so the statistical result is not significant, which means that there is no significant difference between the respondents of the different clinical departments in terms of health communication ability. 2) The means of clinical department respondents on self-efficacy are 3.255, 3.002, 3.035, 3.073, 2.923, 3.126, 2.871, 2.837, 3.113, 2.99, 2.786, 3.037, 2.881, 3.221, 2.885, 3.126, respectively; due to fulfillment of ANOVA chi-square, one-sample ANOVA test was used, and ANOVA results in p-value of 0.818, so the statistical result is not significant, which means that the respondents of different clinical departments on self-efficacy do not significant differences exist.

4.2.4 Correlation analysis

Table 4.16 shows that the quantitative variables such as the respondents' age, years of working experience, annual income, health communication ability, organizational support, and self-efficacy did not satisfy normality; as a result of the normality test, Spearman's correlation was used to analyze the relationship between the quantitative variables.

Table 4.16 Results of normality tests for quantitative variables

Variable name	Sample size	Upper quartile	Average value	Standard deviation	Skewness	kurtosis	S-W test	K-S test
Age	701	36	37.725	8.724	0.561	0.555	0.954 (0.000***)	0.112 (0.000***)
Years of service		12	13.642	9.243	0.682	-0.46	0.928 (0.000***)	0.111 (0.000***)
Annual income		12	14.994	7.775	1.97	6.441	0.838 (0.000***)	0.156 (0.000***)

Health communication ability	3.828	3.763	0.557	0.231	0.457	0.959 (0.000***)	0.087 (0.000***)
Organizational support	3.52	3.543	0.604	0.184	0.384	0.975 (0.000***)	0.074 (0.001***)
Self-efficacy	3	3.036	0.663	0.509	0.209	0.945 (0.000***)	0.11 (0.000***)

Table 4.17 shows that the respondents' age, years of employment, and annual income variables are significantly and positively correlated with health communication ability, organizational support, and self-efficacy levels at a significance level of 1% after the relationship was analyzed using Spearman's correlation.

Table 4.17 Spearman correlation coefficient table

	Health communication ability	Self-efficacy
Age	0.193 (0.000***)	0.175 (0.000***)
Years of service	0.166 (0.000***)	0.164 (0.000***)
Annual income	0.142 (0.000***)	0.11 (0.004***)

4.2.5 Direct effects analysis

In statistics, direct effects analysis is the analysis of the direct effect of an independent variable on a dependent variable without considering the indirect effects or mediating effects of other variables. Direct effects analysis is usually performed in multiple regression models where the relationship between the independent variables (predictor variables) and the dependent variables (response variables) is directly modeled. When using the regression model, the ridge regression model was chosen to address the problem of multicollinearity better to avoid the occurrence of multicollinearity in some of the variables, which would impact the study results (Bryman, 2016).

In the ridge regression, the independent variables are organizational support and self-efficacy, and the dependent variables are health communication ability and self-efficacy, respectively. Meanwhile, control variables that are significantly related to the dependent variable are added to the model; specifically, when the dependent variable is health communication ability, the control variables are age, years of working experience, annual income, position, title, education level, hospital grade, marriage, and authorized strength; when the dependent variable is self-efficacy, the control variables are age, years of working experience, annual income, position, title, hospital grade, and authorized strength. The detailed ridge regression results are as follows:

4.2.5.1 Impact of organizational support on health communication ability

Table 4.18 reveals the Impact of organizational support on health communication ability, and the following is an interpretation of the data:

Table 4.18 Results of ridge regression analysis (dependent variable: organizational support)

K=0.201	Non-standardized coefficient		Standardized coefficient	t	P	R ²	Adjustment of R ²		F
	B	standard error	Beta						
constant	1.902	0.108	-	17.689	0.000***				
Organizational support	0.487	0.022	0.529	22.058	0.000***				
Age	0.002	0.001	0.024	1.119	0.264				
Years of work	0	0.001	0.007	0.339	0.735				
Annual income	0.001	0.002	0.015	0.566	0.572				
Marital status_2.0	0.071	0.034	0.053	2.052	0.041**				
Marital status_3.0	0.118	0.093	0.031	1.261	0.208				
Marital status_4.0	0.02	0.248	0.002	0.08	0.937				
Hospital grade_3	0.015	0.037	-0.01	-0.407	0.684				
Hospital grade_2A	0.018	0.038	0.012	0.483	0.630	0.456	0.437	24.636	(0.000***)
Hospital grade_2	0.065	0.03	-0.056	-2.203	0.028**				
No authorized strength	0.082	0.03	-0.074	-2.784	0.006***				
Education_2	0.031	0.029	0.027	1.066	0.287				
Education_3	0.06	0.036	0.042	1.664	0.097*				
Education_4	0.043	0.074	0.014	0.583	0.560				
Position_2.0	0.017	0.063	-0.006	-0.264	0.792				
Position_3.0	0.015	0.045	0.008	0.326	0.745				
Position_4.0	0.036	0.051	-0.018	-0.709	0.478				
Position_5.0	0.01	0.176	0.001	0.055	0.956				
Position_6.0	0.591	0.349	-0.04	-1.692	0.091*				
Title_2.0	0.017	0.032	-0.013	-0.532	0.595				
Title_3.0	0.043	0.028	0.036	1.496	0.135				
Title_4.0	0.077	0.034	0.055	2.264	0.024**				
Title_5.0	0.033	0.047	0.018	0.707	0.480				

Dependent variable: health communication ability

For the independent variable, the standardized coefficient of Beta for "organizational support" is 0.529, which is highly significant ($P < 0.001$), indicating that organizational support has a positive and significant effect on health communication ability.

For the control variables, the standardized coefficients for "age" and "years of experience" are small and insignificant, indicating that these two variables have a weak direct effect on health communication ability. The "annual income" coefficient is positive but insignificant, probably due to data distribution or sample characteristics. Compared with unmarried respondents, married respondents have a significant positive effect on health communication

ability. Compared with respondents from tertiary hospitals, respondents from secondary hospitals have a significant negative effect on health communication ability. Compared with respondents with authorized strength, the beta coefficient for respondents without authorized strength is negative and significant ($P=0.006$), indicating that the status of no authorized strength may reduce health communication ability. The relationship between the different categories of “education level” and “position” and health communication ability are not significant. Compared with respondents with junior titles, the beta coefficient for respondents with associate senior titles is significantly positive ($P=0.024$), indicating a positive correlation between senior titles and health communication ability.

The results in table C.33 reveal the effect of the five dimensions of organizational support on health communication ability. Specifically, developmental support ($\text{Beta}=0.259$, $p<0.001$), work support ($\text{Beta}=0.103$, $p<0.001$), interpersonal support ($\text{Beta}=0.190$, $p<0.001$), and respect support ($\text{Beta}=0.128$, $p<0.001$) all have significant positive effects on health communication ability, indicating that these organizational support factors are crucial for enhancing clinicians' health communication ability. However, the benefit security effect is insignificant ($\text{Beta}=0.004$, $p=0.875$), probably due to its less direct role in promoting health communication ability than other support factors.

For the control variables, age and years of work have a weak and non-significant effect on health communication ability ($\text{Beta}=0.026$, $p=0.204$; $\text{Beta}=0.007$, $p=0.752$), suggesting that these two variables may not be the main factors influencing health communication ability. Annual income likewise did not show a significant effect ($\text{Beta}=0.023$, $p=0.379$), implying that economic factors are not critical determinants of health communication ability. Among marital status, married has a positive effect on health communication ability ($\text{Beta}=0.051$, $p=0.042$) compared to unmarried (set as the reference group), but the effects of other marital statuses are not significant. Regarding hospital level, clinicians in grade 2 hospitals have significantly lower health communication ability than those in grade 3A hospitals ($\text{Beta}=-0.054$, $p=0.030$). In contrast, grade 3 and grade 2A hospitals have a non-significant effect on health communication ability compared to 3A hospitals. Authorized strength significantly affects health communication ability, clinicians with no authorized strength showing lower health communication ability than those with authorized strength ($\text{Beta}=-0.062$, $p=0.015$). The overall effect of education level on health communication ability is not significant. In terms of position and title, there is no significant effect of different positions on health communication ability. Compared with junior titles, associate senior titles are significantly positively correlated with

health communication ability, indicating that promotion to these titles may be accompanied by stronger health communication ability.

4.2.5.2 Impact of self-efficacy on health communication ability

Table 4.19 shows the results of the impact of self-efficacy on health communication ability: in the model, the standardized coefficient of the independent variable self-efficacy is high (Beta=0.527) and highly significant ($P<0.001$), indicating that self-efficacy is an important predictor of health communication ability. As self-efficacy increases, health communication ability also significantly improves.

For the control variables, compared to the reference group, the variables of the respondents being married, having no authorized strength, and having a master's or doctoral degree showed a significant effect ($P<0.05$) respectively. Although these standardized coefficients are relatively low, they still show that these variables contributed to health communication ability to varying degrees. Other variables have no significant effect on health communication ability.

Table 4.19 Results of ridge regression analysis (independent variable: self-efficacy)

K=0.201	Non-standardized coefficient		Standardized coefficient t		P	R ²	Adjusted R ²	F
	B	standard error	Beta	t				
constant	2.374	0.093	-	25.411	0.000***			
Self-efficacy	0.442	0.02	0.527	22.045	0.000***			
Age	0	0.001	0.004	0.187	0.852			
Years of work	0.002	0.001	-0.027	-1.28	0.201			
Annual income	0	0.002	-0.003	-0.122	0.903			
Marital status_2.0	0.073	0.034	0.054	2.121	0.034**			
Marital status_3.0	0.031	0.093	0.008	0.328	0.743			
Marital status_4.0	-0.006	0.248	-0.001	-0.023	0.981			
Hospital Grade_3	0.044	0.037	0.029	1.198	0.231			
Hospital Grade_2A	0.005	0.038	-0.003	-0.12	0.905	0.458	0.439	24.84
Hospital Grade_2	0.055	0.03	-0.047	-1.844	0.066*			(0.000***)
No authorized strength	0.069	0.03	-0.062	-2.325	0.020**			
Education_2	0.032	0.029	0.028	1.114	0.266			
Education_3	0.075	0.036	0.053	2.069	0.039**			
Education_4	0.124	0.074	0.041	1.673	0.095*			
Position_2.0	0.014	0.063	0.005	0.226	0.822			
Position_3.0	0.082	0.045	0.046	1.813	0.070*			
Position_4.0	0.086	0.051	0.043	1.695	0.091*			
Position_5.0	0.168	0.176	0.023	0.957	0.339			
Position_6.0	0.466	0.349	-0.032	-1.336	0.182			

Title_2.0	0.044	0.032	-0.035	-1.387	0.166
Title_3.0	0.005	0.028	-0.005	-0.189	0.850
Title_4.0	0.025	0.034	0.017	0.725	0.469
Title_5.0	0.012	0.047	0.007	0.261	0.794

Dependent variable: health communication ability

Table C.34 shows the direct impact of the three dimensions of self-efficacy on health communication ability, specifically recognizing patient needs (Beta=0.243, $P<0.001$) shows a significant positive impact, indicating that improving the ability to recognize patient needs can significantly enhance health communication ability. Sharing information and power (Beta=0.193, $P<0.001$) also shows a significant positive relationship, emphasizing the importance of information sharing and balance of power in health communication. Dealing with communication challenges (Beta=0.187, $P<0.001$) also shows a significant positive effect, indicating that dealing with communication challenges positively impacts health communication ability.

For the control variables, some categories of the classified variables such as marital status, authorized strength, and education level show significant effects.

4.2.5.3 The effect of organizational support on self-efficacy

Table 4.20 shows that organizational support (Beta=0.482, $p<0.001$) has a significant positive impact on self-efficacy and is the most important predictor in the model, indicating that an increase in the sense of organizational support can significantly improve an individual's self-efficacy. Among the control variables, years of work experience (Beta=0.069, $p=0.004$) shows a significant positive effect on self-efficacy, but the effect size is relatively small. Compared to junior titles, middle-level titles have a significant positive effect on self-efficacy (Beta=0.055, $p=0.040$), indicating that an increase in title can enhance an individual's self-efficacy, but the effect size is relatively small. The effects of other control variables on self-efficacy are not significant.

Table 4.20 Results of ridge regression analysis (independent variable: organizational support)

K=0.191	Non-standardized coefficient		Standardized coefficient		P	R ²	Adjustment of F R ²	
	B	standard error	Beta	t				
constant	0.938	0.135	-	6.926	0.000***			
Organizational support	0.529	0.029	0.482	18.493	0.000***			
Age	0.003	0.002	0.045	1.94	0.053*			
Years of experience	0.005	0.002	0.069	2.87	0.004***	0.361	0.345	22.698 (0.000***)
Annual income	0.002	0.002	0.021	0.709	0.479			
Hospital Grade_3	-0.058	0.048	-0.032	-1.205	0.229			
Hospital	0.043	0.05	0.023	0.874	0.382			

Grade_2A					
Hospital Grade_2	-0.065	0.038	-0.047	-1.706	0.088*
No authorized strength	-0.032	0.038	-0.024	-0.828	0.408
Position_2.0	-0.029	0.082	-0.009	-0.348	0.728
Position_3.0	0.014	0.059	0.007	0.233	0.816
Position_4.0	-0.12	0.066	-0.05	-1.817	0.070*
Position_5.0	-0.178	0.228	-0.02	-0.782	0.435
Position_6.0	-0.493	0.453	-0.028	-1.09	0.276
Title_2.0	0.045	0.042	0.03	1.073	0.284
Title_3.0	0.078	0.038	0.055	2.06	0.040**
Title_4.0	0.067	0.045	0.04	1.487	0.138
Title_5.0	0.023	0.062	0.011	0.378	0.706
Dependent variable: self-efficacy					

Table C.35 demonstrates the effect of the five dimensions of organizational support on self-efficacy. Specifically, developmental support (Beta=0.157, $p<0.001$), work support (Beta=0.091, $p=0.003$), interpersonal support (Beta=0.236, $p<0.001$), and respect support (Beta=0.092, $p=0.003$) all have a significant positive impact on self-efficacy, indicating that these organizational support factors are essential for enhancing clinicians' self-efficacy. Among them, interpersonal support has the most significant effect, emphasizing the central role of good interpersonal support in enhancing individual efficacy.

For the control variables, age (Beta=0.049, $p=0.034$) and years of work experience (Beta=0.07, $p=0.004$) both have a positive impact on self-efficacy, albeit to a lesser extent, indicating that with the accumulation of experience, individuals' sense of self-efficacy in their careers will improve. In terms of position, the middle management positions (Beta=-0.054, $p=0.048$) has a significant negative impact on self-efficacy, which may imply that the responsibilities and pressures associated with a particular position level exceed the coping ability of some medical staff, which in turn affects their sense of self-efficacy. In terms of job title, the middle-level title (Beta=0.06, $p=0.023$) has a positive impact on self-efficacy, which still indicates that promotion in the title is an effective way to improve the self-efficacy of medical staff. The impact of other control variables on self-efficacy is not significant.

4.2.6 Results of the mediation effects test

According to the regression model coefficient table (Table 4.21) and the summary result table of the mediating effect test (Table 4.22), we can make a complete, coherent, logical interpretation from the following aspects:

First, examine the total effect c , that is, the direct impact of organizational support on health communication ability (path: organizational support $\rightarrow$ health communication ability).

The regression coefficient is 0.599, indicating that organizational support has a significant positive impact on health communication ability.

Next, the effect of the mediating variable self-efficacy was analyzed. The data shows that the regression coefficient a of organizational support on self-efficacy is 0.636 ($p < 0.001$), indicating that organizational support significantly enhances clinicians' self-efficacy; meanwhile, the regression coefficient b of self-efficacy on health communication ability is 0.361 ($p < 0.001$), suggesting that self-efficacy significantly contributes to health communication ability. The significance of these two coefficients verified the existence of the mediating path.

Furthermore, the value of the indirect effect $a*b$, that is, the effect of organizational support indirectly influencing health communication ability through self-efficacy, is 0.23 ($p < 0.001$), indicating that the indirect effect is statistically significant. The 95% confidence interval (0.192 - 0.275) obtained by Bootstrap sampling does not include 0, further confirming the existence of the indirect effect.

In the direct effect c' test, after adding the mediating variable self-efficacy, the direct effect of organizational support on health communication ability remained significant with a c' value of 0.369 ($p < 0.001$). This suggests that organizational support still directly affects health communication ability despite a significant mediating effect.

Finally, according to the test criteria for mediating effects, since a , b , and c' are all significant, and $a*b$ and c' have the same sign, it indicates that there is partial mediating effect (effect ratio: $a*b/c = 38.4\%$). That is, organizational support not only directly promotes health communication ability, but also indirectly promotes health communication ability by enhancing clinicians' sense of self-efficacy.

Table 4.21 Table of coefficients for the mediated effects regression (mediating variable: self-efficacy)

Results of mediation analysis (n=701)															
	HCA					SE					HCA				
	ratio	standard error	t	P	Standardized coefficient	ratio	standard error	t	P	Standardized coefficient	ratio	standard error	t	P	Standardized coefficient
constant	1.639	0.095	17.233	0.000**	-	0.781	0.122	6.42	0.000**	-	1.357	0.087	15.622	0.000**	-
OS	0.599	0.026	22.648	0.000**	0.651	0.636	0.034	18.811	0.000**	0.58	0.369	0.029	12.813	0.000**	0.401
SE											0.361	0.026	13.766	0.000**	0.431
R ²	0.423					0.336					0.546				
Adjustment of R ²	0.422					0.334					0.544				
F	F(1, 699) = 512.915, p = 0.000***					F(1, 699) = 353.842, p = 0.000***					f(2, 698) = 420.374, p = 0.000***				

Note: OS = Organizational support, HCA = Health communication ability, SE = Self-efficacy

Table 4.22 Summary result of the mediated effects test

Path	c Total effect	a	b	a*b mediating effect	a*b (SE)	(Boot a*b value)	(z- a*b value)	(p- a*b (95% BootCI)	c' Direct effect	Result
OS => SE => HCA	0.599***	0.636***	0.361***	0.23	0.021	10.713	0.000***	0.192 - 0.275	0.369***	Partial mediation effect

4.2.7 Structural equation modeling analysis

Structural Equation Modeling (SEM) is a statistical method used to validate complex relationships between variables, capable of analyzing multiple causal relationships simultaneously and linking observed variables with latent variables (i.e., variables that cannot be directly measured). SEM combines path and factor analysis, handling both direct and indirect effects, and tests the model's fit through fit indices, thereby verifying theoretical hypotheses. SEM can quantify and test complex theoretical models, revealing intricate relationships between variables (Kline, 2023). At this stage, SEM was utilized to comprehensively assess the complex relationships among health communication ability, organizational support, and self-efficacy.

4.2.7.1 Indicators for fitting structural equation models

Table 4.23 shows the model fit indicators. The RMSEA, RMRPGFI, PNFI, PCFI, and SRMR indicators show that the model has good fit. The root mean square error approximation (RMSEA) is 0.067, which is less than 0.1, indicating that the model is acceptable. Considering the sample size and model complexity, this value reflects the model's good performance in controlling errors. The root mean square of the standardized residuals (RMR) is 0.033, which is lower than the threshold of 0.05, indicating that the difference between the predicted values of the model and the actual observed values is very small, and the model performs well in terms of residual control.

Table 4.23 Structural equation model fit metrics

Indicators	χ^2	df	RMSEA	RMR	PGFI	PNFI	PCFI	SRMR
Judgment criteria	-	-	<0.10	<0.05	>0.5	>0.5	>0.5	<0.1
Value	12617.187	3069	0.067	0.033	0.605	0.779	0.818	0.054

4.2.7.2 Structural equation modeling plots

The entries and dimensions of the three scales were brought into the hypothesized model as explicit and latent variables, respectively, and the following structural equation modeling results were obtained (Figure 5.1).

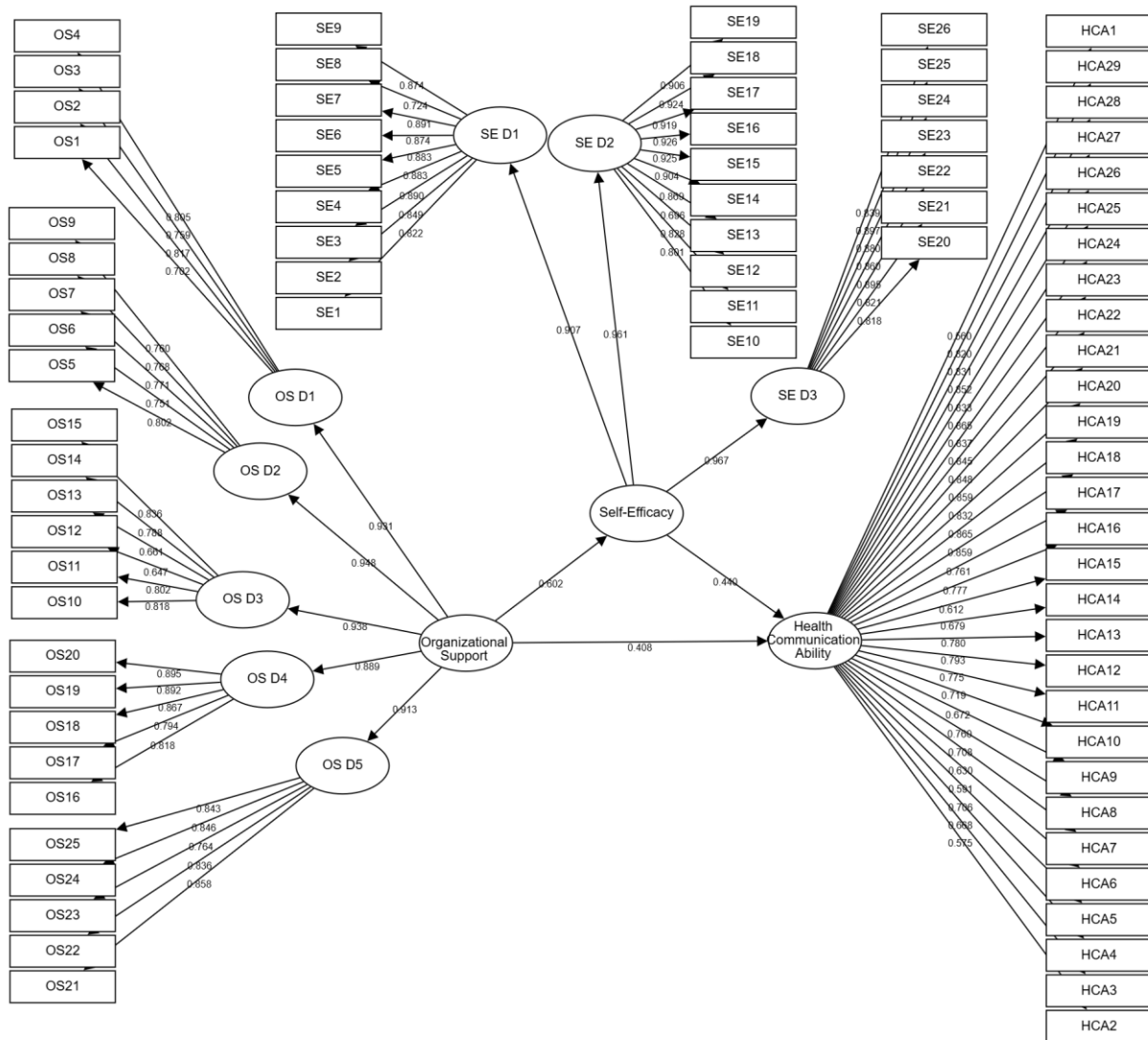


Figure 4.1 SEM of the relationship between HCA, OS and SE

4.2.7.3 Structural equation modeling path analysis

According to table 4.24, the table of model path coefficients can be seen:

Based on the paired term Organizational Support -> Self-Efficacy, the significance p-value is less than 0.001, which presents significance at the 1% level. Therefore, this path is valid, and its impact coefficient is 0.602.

Based on the paired term Organizational Support -> Health Communication Ability, the significance p-value is less than 0.001, which presents significance at the 1% level. Therefore, this path is valid, and its impact coefficient is 0.408.

Based on the paired term self-efficacy -> health communication ability, the significance p-value is less than 0.001, which presents significance at the 1% level. Therefore, this path is valid, and its impact coefficient is 0.440.

The structural equation modeling analysis shows the path relationship between organizational support, self-efficacy, and health communication ability and their corresponding statistical significance. Specifically, organizational support has a significant positive effect on self-efficacy (standardized coefficient = 0.602, $P < 0.001$), indicating that each unit increase in organizational support will significantly increase an individual's self-efficacy and that this effect is exceptionally statistically significant. Similarly, organizational support significantly positively affects health communication ability (standardized coefficient=0.408, $P<0.001$), suggesting that increased organizational support effectively promotes health communication ability.

In addition, self-efficacy has a significant positive effect on health communication ability (standardized coefficient = 0.440, $P<0.001$), indicating that an increase in an individual's sense of self-efficacy significantly enhances their health communication ability. At the same time, self-efficacy plays a mediating role between organizational support and health communication ability. These results not only reveal the direct effect of organizational support on individual health communication ability, but also reveal its indirect path of action through the mediating variable of self-efficacy, that is, organizational support improves an individual's health communication ability by increasing their sense of self-efficacy.

Table 4.24 Table of model regression coefficients

Latent variable	→ Analysis variable	Non-standardized coefficient	Standardized coefficient	Standard error	Z	P
OS	→ SE	0.740	0.602	0.056	13.181	0.000***
OS	→ HCA	0.363	0.408	0.04	9.140	0.000***
SE	→ HCA	0.319	0.440	0.032	9.955	0.000***

Note: OS = Organizational support, HCA = Health communication ability, SE = Self-efficacy

4.2.8 Results of hypotheses validation

H1, Organizational support is significantly and positively associated with health communication ability. The direct effect result shows that the Beta coefficient of organizational support on health communication ability is 0.529 and highly significant ($P<0.001$); the SEM result shows that for the path "Organizational support -> health communication ability", it shows significance at the 1% level with an impact coefficient of 0.408, and the path is valid. Therefore, it indicates that organizational support positively and significantly affects health communication ability, and hypothesis H1 is valid.

H1a, Developmental support is significantly and positively associated with health communication ability. The direct effect result shows that the Beta coefficient of the first

dimension of organizational support, developmental support, on health communication ability is 0.259 and highly significant ($P < 0.001$), indicating that developmental support is essential for enhancing clinicians' health communication ability. Therefore, hypothesis H1a is valid.

H1b, Work support is significantly and positively associated with health communication ability. The direct effect result shows that the Beta coefficient of the second dimension of organizational support, work support, on health communication ability is 0.103 and highly significant ($p < 0.001$), indicating that work support significantly affects clinicians' health communication ability. Therefore, hypothesis H1b is valid.

H1c, Interpersonal support is significantly and positively associated with health communication ability. The direct effect result shows that the Beta coefficient of the third dimension of organizational support, interpersonal support, on health communication ability is 0.190 and highly significant ($p < 0.001$), indicating that interpersonal support is essential for clinicians' health communication ability. Therefore, hypothesis H1c is valid.

H1d, There is no significant correlation between interest protection and health communication ability. The direct effect result shows that the Beta coefficient of the fourth dimension of organizational support, interest protection, on health communication ability is 0.004, insignificant ($p = 0.875$), suggesting that interest protection has a lesser direct effect in promoting health communication ability compared to other support factors. Therefore, hypothesis H1d is not valid.

H1e, Respect support is significantly and positively related to health communication ability. The direct effect result shows that the Beta coefficient of the fifth dimension of organizational support, respect support, on health communication ability is 0.128 and highly significant ($p < 0.001$), indicating that respect support has a significant positive effect on health communication ability. Therefore, hypothesis H1e is valid.

H2, Self-efficacy is significantly and positively related to health communication ability. The direct effect results show that the Beta coefficient of self-efficacy on health communication ability is 0.527 and highly significant ($P < 0.001$); the SEM result shows that for the path "self-efficacy $\rightarrow$ health communication ability", which shows significance at 1% level with an impact coefficient of 0.440, the path is valid. Therefore, it indicates that self-efficacy positively and significantly affects health communication ability, and hypothesis H2 is valid.

H2a, Exploring the patient perspective is significantly and positively associated with health communication ability. The direct effect result shows that the Beta coefficient of dimension one of self-efficacy, exploring the patient perspective on health communication ability is 0.243, and highly significant ($p < 0.001$), indicating that recognizing patients' needs

significantly enhance clinicians' health communication ability. Therefore, hypothesis H2a is valid.

H2b, Sharing information and power are significantly and positively related to health communication ability. The direct effect result shows that the Beta coefficient of dimension two of self-efficacy, sharing information and power on health communication ability is 0.193 and highly significant ($P < 0.001$), indicating the importance of sharing information and power in health communication. Therefore, hypothesis H2b is valid.

H2c, Dealing with communicative challenges is significantly and positively related to health communication ability. The direct effect result shows that the Beta coefficient of dimension three of self-efficacy, dealing with communicative challenges, on health communication ability is 0.187 and highly significant ($p < 0.001$), indicating that the ability to deal with communication challenges has a positive effect on health communication ability. Therefore, hypothesis H2b is valid.

H3, Organizational support is significantly and positively related to self-efficacy. The direct effect result shows that the Beta coefficient of organizational support on self-efficacy is 0.482, and it is highly significant ($p < 0.001$); the SEM result shows that for the path "Organizational support $\rightarrow$ Self-efficacy," the coefficient is 0.602, and the path is valid and presents significance at a 1% level. Therefore, it indicates that organizational support is the most important predictor in the model, and the increase in the sense of organizational support can significantly improve individuals' self-efficacy, and hypothesis H3 is valid.

H3a, Developmental support is significantly and positively related to self-efficacy. The direct effect result shows that the Beta coefficient of dimension one of organizational support, developmental support, on self-efficacy is 0.157 and highly significant ($p < 0.001$), which indicates that developmental support plays a vital role in enhancing the self-efficacy of clinicians. Therefore, hypothesis H3a is valid.

H3b, Work support is significantly and positively related to self-efficacy. The direct effect result shows that the Beta coefficient of dimension two of organizational support, work support, on self-efficacy is 0.091 and highly significant ($p = 0.003$), indicating that work support can enhance clinicians' self-efficacy to some extent. Therefore, hypothesis H3b is valid.

H3c, Interpersonal support is significantly and positively related to self-efficacy. The direct effect result shows that the Beta coefficient of interpersonal support on self-efficacy for dimension three of organizational support is 0.236 and highly significant ($p < 0.001$), indicating the central role of the interpersonal support dimension of organizational support in enhancing the sense of individual efficacy. Therefore, hypothesis H3c is valid.

H3d, Interest protection is not significantly associated with self-efficacy. The direct effect result shows that the Beta coefficient of dimension four of organizational support, interest protection, on health communication ability is 0.039 and insignificant (0.217), indicating that interpersonal support has a lesser direct effect in promoting self-efficacy than other support factors. Therefore, hypothesis H3d is not valid.

H3e, Respect support is significantly and positively related to self-efficacy. The direct effect result shows that the Beta coefficient of the dimension of organizational support, respect support on self-efficacy is 0.092 and highly significant ($p=0.003$), which indicates that respectful support has a significant positive effect on self-efficacy. Therefore, hypothesis H1e is valid.

H4, Self-efficacy plays a partial mediating role in the relationship between organizational support and health communication ability. According to the mediation effect model test results, since a , b , and c 's are all significant and $a*b$ has the same sign as c , 'the value of the $a*b$ mediation effect is 0.23, accounting for 38.4%, indicating a partial mediation role. Organizational support promotes healthy communication directly and indirectly by enhancing employees' self-efficacy. Therefore, hypothesis H4 is valid.

H5, Some demographic and sociological variables show significant differences in health communication ability. The results of the T-test, ANOVA, and correlation analysis show that the following demographic and sociological variables of the respondents significantly differ in terms of health communication ability: age, years of work experience, annual income, position, title, education level, hospital level, marital status, and authorized strength. Therefore, hypothesis H5 is partially valid.

H6. Some of the demographic and sociological variables show significant differences in self-efficacy levels. The T-test, ANOVA, and correlation analysis results show that the following demographic and sociological variables of the respondents significantly differ in terms of self-efficacy: age, years of work experience, annual income, position, title, hospital level, and authorized strength. Therefore, hypothesis H6 is partially valid.

Chapter 5: Discussion

5.1 Discussion of the results of the development and validation of the clinician health communication ability scale in the first phase

In the first phase, we constructed a scale for measuring the health communication ability of Chinese clinical doctors based on Gioia's methodology and the 7W theory, filling the gap in assessment tools in this field. Through exploratory factor analysis and confirmatory factor analysis, seven dimensions and 29 items of the scale were determined. The scale demonstrated good reliability and validity, and its test-retest reliability further verified its stability, indicating that the scale has high reliability and validity in the Chinese clinical environment and can serve as an effective tool for assessing the health communication competence of clinical doctors. However, the applicability and item accuracy of the scale still need to be further validated in a broader sample and different cultural contexts. Future research can explore its relationship with other variables and expand its application value.

5.1.1 Discussion on the scale development process based on Gioia's methodology and 7W theory

The scale development process adopted the Gioia methodology and Braddock's 7W theory, aiming to comprehensively assess the health communication abilities of clinical doctors. The Gioia methodology ensures the accuracy of concepts and the applicability of the scale through in-depth interviews and inductive data analysis. Braddock's 7W theory provides us with a multi-dimensional framework, clarifying the key elements in health communication and offering theoretical support for the construction of the scale. Compared with existing literature, our study has significant advantages in theoretical support and methodological systems. For instance, Yin et al. (2018) constructed a health communication ability evaluation system using Lasswell's "5W" model and the Delphi method, but did not employ the Gioia methodology, and the model is relatively simple, lacking exploration of multi-dimensional factors. In contrast, our scale combines the inductive analysis of the Gioia methodology with the 7W theoretical framework of Braddock, capturing more comprehensively all aspects of clinical doctors' health communication abilities. Furthermore, Shao et al. (2021) constructed a health science

popularization evaluation system based on the form, platform, and media of science popularization through the Delphi method. Although they designed a detailed indicator system, they lacked theoretical support and did not fully consider the multi-dimensional factors of communication ability, limiting its flexibility and applicability. In comparison, our scale combines theoretical depth with practical needs, providing a more practical measurement tool.

First, the coding process based on the Gioia methodology demonstrates the advantages and innovation of qualitative research. This method allows researchers to carefully extract concepts and categories related to the research topic based on the original language and opinions of the interviewees. During the data collection phase, the research team obtained a lot of honest feedback and opinions on clinicians' health communication ability through in-depth semi-structured interviews, covering various aspects from communication skills and emotional management to policy understanding. The open coding stage fully respected the language and experiences of the interviewees, breaking down the complex interview content into 148 free codes and demonstrating the diversity and complexity of the research data (Gioia et al., 2013). This process helped researchers maintain the authenticity of the data while delving deeper into the critical elements of clinicians' health communication ability.

Secondly, the Gioia methodology integrates free codes into higher-level themes through continuous refinement and cluster analysis during the conceptual integration process, ultimately constructing a preliminary conceptual framework. In the theoretical abstraction stage, the research team not only further explored the critical ability of clinicians in health communication through code integration but also provided data support for the multidimensional structure of the scale. For example, research shows that clinicians need medical knowledge in health communication, effective teamwork, and emotional management skills. These abilities are systematically presented through the Gioia methodology (Corley & Gioia, 2011).

Based on the Gioia methodology, Braddock's 7W theory provides a clear theoretical framework for classifying clinicians' health communication ability. As a classic communication theory model, the 7W theory covers seven critical dimensions of the communication process: communication environment, communicator, communication motivation, communication content, communication channel, communication object, and communication effect (Braddock, 1958). This structured theoretical framework guided scale development, enabling the research team to identify specific evaluation dimensions within clinicians' complex health communication behaviors. Combining the 7W theory, the research team integrated the 148 free codes extracted from the Gioia methodology into seven first-level

indicators, 17 second-level indicators, and 55 third-level indicators. In this way, the research not only uncovered the core abilities of clinicians in different communication situations but also analyzed in depth the potential impact of different dimensions on the effectiveness of health communication. For example, under the dimension of communicator, the study found that clinicians need to have a high degree of emotional empathy and practical information delivery skills when dealing with patients, and these abilities play a crucial role in the ultimate effectiveness of health communication. Through further classification and induction, the research team refined the 18 tertiary indicators under the communicator dimension into detailed indicators such as medical knowledge, communication skills, and teamwork. This process demonstrates the effectiveness of combining Braddock's 7W theory with the Gioia methodology.

In addition, the research team further optimized the theoretical framework and practical application of the scale through the Delphi method and focus group discussion. The Delphi method provided multiple rounds of expert consensus for the study, and anonymous expert review ensured the scientific and rational development of the evaluation system. Through multiple rounds of feedback in the Delphi method, the research team continuously optimized the content of each dimension and indicator to align with the actual working environment of clinicians and their health communication needs (Hsu & Sandford, 2007). After the Delphi experts reached a consensus, the evaluation system framework included seven first-level indicators, 17 second-level indicators, and 55 third-level indicators, covering not only the communication skills of clinicians but also their policy understanding, emotional management, and teamwork abilities.

Focus group discussion further improved the applicability and rationality of these indicators. In discussion with clinicians, linguists, public health experts, management scholars, and hospital administrators, the research team carefully adjusted the indicators based on actual work scenarios to ensure that the scale universally applies to clinicians in different hospital levels, types, and departments. This enhances the scale's practicality and makes it more operable in future practical applications (Morgan, 1997). The study also explored emerging digital health communication methods through focus group discussion and considered using digital tools in communication channels.

Overall, combining the Gioia methodology and the 7W theory provides a solid theoretical and empirical basis for scale development and demonstrates the unique advantages of combining qualitative research with structured theory. This study enriches the library of assessment tools for health communication ability and provides a solid theoretical basis and practical experience for future promotion in practical applications. The scale's development

process fully reflects the combination of theory and practical needs and lays a solid foundation for subsequent quantitative research.

5.1.2 Discussion of the results of the reliability and validity verification of the health communication ability scale

This study systematically assessed the reliability and validity of the health communication ability scale through exploratory factor analysis (EFA), confirmatory factor analysis (CFA), and retest reliability verification. This process verified the scale's reliability, validity, and stability in assessing clinicians' health communication ability.

Exploratory factor analysis (EFA) is a preliminary step in validating the structure of a scale, and its purpose is to determine the potential structure of each factor in the scale by reducing the number of items (Tabachnick & Fidell, 2013). In this study, the research team conducted an EFA analysis on data from 431 valid questionnaires. The initial scale contained 43 items. Through factor loading analysis, the research team eliminated 14 items with substandard loadings and determined 29 items for subsequent analysis. After eliminating these items, the structure of the scale became more apparent, and the correlation between each factor was further enhanced. The EFA analysis of the 29-item scale found that all items were included in the seven factors based on the "7W theory". These seven factors correspond to different dimensions of health communication ability, including communication environment, communicator, motivation, content, communication channel, object, and effect (Braddock, 1958). The identification of these dimensions is similar to the structure of health communication competence as described in the literature. For instance, Yin et al. (2018) proposed that the health communication competence of medical personnel includes five dimensions: the basic professional literacy of communicators, the production capacity of communication content, the ability to choose and apply communication channels, the communication skills with the audience, and the feedback capacity of communication effects.

Based on the exploratory factor analysis, the study further used confirmatory factor analysis (CFA) to verify the structure of the scale. The purpose of CFA is to test whether the proposed factor model fits the data and thus confirm the structural validity of the scale (Tabachnick & Fidell, 2013). The research team used data from 663 valid questionnaires to conduct CFA in this study. The CFA results showed that the factor loadings of all items on the scale were more significant than 0.6, indicating that each item had explanatory solid power on its respective factor (Brown, 2015). Through CFA, the structural model of the scale was further verified, showing that the seven dimensions of health communication ability had good discriminant and

convergent validity. Specifically, the average variance extracted (AVE) values of the convergent validity were all greater than 0.5, and the composite reliability (CR) of each dimension was more significant than 0.7, which indicates that the items within each factor have explanatory solid power and have good convergent validity (Fornell & Larcker, 1981). In addition, the CFA's model fit indices showed that the scale's overall model fit was good. Fit indices such as GFI, CFI, NFI, and RMSEA all meet general model fit criteria (Byrne, 2013), indicating that the constructed health communication ability model performs well on the data and has a high model fit. These results show that the construct validity of the health communication ability scale has been further verified in a sample of clinicians, which is in line with theoretical expectations.

To further verify the consistency and stability of the scale over time, the research team analyzed the test-retest reliability of the scale. Test-retest reliability measures the consistency of the scale at different points in time, i.e., whether the scale produces similar results across multiple measurements. Generally, the intraclass correlation coefficient (ICC) is used to measure the degree of test-retest reliability. An ICC value greater than 0.75 indicates good test-retest reliability (Cohen et al., 1996). In this study, the research team collected valid questionnaires from 44 clinicians who completed two repeated measurements three weeks apart. The results show that the scale's test-retest reliability (ICC) is 0.886, indicating high temporal consistency. The test-retest reliability of the dimensions of the scale ranged from 0.852 to 0.913, further verifying the stability of the scale (Koo & Li, 2016). This indicates that the clinician's health communication ability scale can consistently assess the health communication ability of the same group at different times. The test-retest reliability results further demonstrate the scale's reliability and support the long-term use of the scale in practical applications.

The Health Communication Ability Scale demonstrated excellent reliability and validity through comprehensive validation using exploratory factor analysis, confirmatory factor analysis, and test-retest reliability. The results of the EFA helped identify the seven core dimensions of health communication ability. The CFA further verified the structural validity of these dimensions, and the test-retest reliability demonstrated the scale's stability over time. These validation results show that the Health Communication Ability Scale is a reliable and valid tool that can comprehensively assess the multidimensional abilities of clinicians in health communication.

5.1.3 Implications for research

The health communication ability scale developed in this study has important theoretical and practical implications. First, the development of the scale enriches the theoretical framework of health communication ability and provides a systematic assessment tool for follow-up research. In existing health communication research, clinicians' communication abilities are often overlooked, and the scale in this study provides necessary theoretical support for research in this area (Kreps, 2006). Second, the development of the scale provides a standardized measurement tool for subsequent empirical research. With this scale, researchers can systematically assess the health communication ability of different clinicians and explore its relationship with variables such as patient satisfaction and treatment outcomes. This provides a wealth of data and analytical tools for future empirical research (Rubin & Martin, 1994). Third, the development and validation of the scale also guide health communication education and training research. Using this scale, educators and trainers can investigate the use of targeted training programs designed and implemented to improve health communication abilities in clinicians. This can help improve doctor-patient relationships, patient compliance, and overall treatment outcomes (Schneider, 2020). Fourth, in applying the scale, researchers can also explore the specific impact of different dimensions of health communication ability on clinical practice through data analysis of the scale. For example, the influence of cultural sensitivity on cross-cultural communication or the influence of communication skills on the patient decision-making process can be studied. These studies deepen our understanding of the health communication process and provide valuable guidance for clinical practice (Rogers, 2003).

5.1.4 Impact on management

The development of the health communication ability scale has provided healthcare organizations with new tools and methods for management. First, by using the scale, healthcare managers can systematically assess and understand the health communication abilities of clinicians to develop targeted training plans and improvement strategies. For example, for doctors who perform poorly in the assessment, the scale results can be used to develop personalized training plans to help them improve their health communication abilities. This helps improve clinicians' overall health communication ability, improves the quality of medical services, and enhances patient satisfaction (Epstein & Street, 2007). Second, the scale can also be used for clinicians' performance evaluation and career development planning. Through regular ability assessments, managers can identify clinicians who excel in health

communication ability and provide them with more career development opportunities (Schneider, 2020). Third, in management practice, improving health communication ability is not only the enhancement of individual clinician ability but also the manifestation of medical team collaboration ability. Through this scale, managers can also assess the overall health communication ability of the team and identify potential problems in team collaboration. This provides a new perspective and method for managing medical institutions, which helps improve the entire team's work efficiency and service quality (Rogers, 2003).

5.1.5 Limitations

Although this study has made significant progress in developing and validating the health communication ability scale, some limitations still need further exploration.

First, this study used a cross-sectional research design, which means that the data can only reflect the situation at a specific time and cannot reveal the dynamic process of changes in health communication ability over time. Therefore, future studies should consider using a longitudinal research design better to understand clinicians' health communication ability development trends.

Secondly, the sample size and geographical scope of this study are limited, which may affect the generalizability of the results. Although efforts have been made to ensure sample diversity, the samples mainly come from hospitals in a specific region of Guangdong Province, which may restrict the applicability of the scale. At the same time, the composition of health communication ability may vary across cultural backgrounds. Future research should expand the sample range and validate the applicability of the scale in different cultural contexts to enhance its broader applicability.

Third, although we used multiple methods to ensure content and construct validity during the scale development process, there is still potential for bias. For example, during the Delphi expert consultation process, experts' personal opinions and experiences may have influenced the selection of indicators. Although we minimized this influence through multiple rounds of consultation and focus group discussion, the impact of this factor on the research results cannot be completely ruled out.

5.2 Discussion of empirical research results

In phase 2, the relationships between these variables were explored in depth by analyzing data from the three scales of health communication ability, self-efficacy, and organizational support.

The results show a significant positive correlation between organizational support, self-efficacy, and health communication ability. That self-efficacy partially mediated the relationship between organizational support and health communication ability. These findings are consistent with the core ideas of the Social Cognitive Career Theory (SCCT) and the Job Demand-Resource Model (JD-R), further verifying these theories' applicability in explaining clinicians' health communication ability.

The results of phase 2 verified the initial research hypotheses and provided empirical support for the existing literature, revealing potential pathways and mechanisms for improving health communication ability. These findings provide necessary theoretical and practical guidance for further optimizing the working environment for clinicians, helping medical institutions more effectively improve the health communication ability of clinicians and thus meet the growing health needs of patients.

5.2.1 Discussion on the relationship between health communication ability evaluation, self-efficacy, and organizational support

5.2.1.1 The relationship between organizational support and health communication ability

The results of hypotheses testing in this study show that organizational support significantly impacts clinicians' health communication ability, and most dimensions of organizational support are positively correlated with health communication ability.

Specifically, hypothesis H1 was established, indicating that organizational support as a critical factor affecting clinicians' health communication ability has been empirically supported, consistent with existing literature's conclusion (Kurtessis et al., 2017; Van Servellen, 2009). These findings enrich the research in this field, reveal the differentiated impact of different dimensions of organizational support on health communication ability, and further clarify the critical role of organizational support in improving clinicians' health communication ability.

The verification results of hypothesis H1a show that developmental support is significantly positively correlated with health communication ability. Developmental support mainly enhances the professional competence of clinicians by providing training, career advancement opportunities, and skills improvement, which directly affects their health communication ability. Developmental support such as training opportunities and career development support not only enhances the professional knowledge of clinicians but also enhances their self-confidence, making them more effective when communicating health information with patients. In addition,

career development support helps clinicians feel valued and cared for by the organization, which will further enhance their job satisfaction and sense of belonging and thus actively engage in health communication. This is consistent with the findings of other scholars. According to Al-Gassimi et al. (2020), primary care physicians' ability to communicate with patients was improved through nutrition knowledge training. Shen et al. (2021) found that the organization's development support can significantly improve hospital midwives' performance and health communication skills. Therefore, the results of this study further demonstrate that developmental support is a critical factor in improving the health communication ability of clinicians. In the future, managers of medical institutions should pay more attention to supporting the career development of clinicians in order to improve their health communication ability.

The verification results of hypothesis H1b show that job support is significantly positively correlated with health communication ability. In actual work, the work environment, technical support, and clinicians' access to resources impact their health communication ability. When clinicians have access to adequate technology and supplies, they are more likely to initiate health communication activities and effectively deliver health information to patients. This result supports the findings of Hertzberg et al. (2019) that providing adequate work resources and reducing work stress in the medical environment can help improve the health communication ability of medical staff. In addition, Abid and Salzman (Abid & Salzman, 2021) pointed out that a reduction in work stress can improve the work efficiency and communication effectiveness of medical staff and that work support can help reduce work stress, thereby further improving health communication skills. Therefore, this study verifies the significant positive impact of work support on health communication skills. In the future, hospital managers should help clinicians communicate more effectively by optimizing the work environment and providing the necessary resources.

The results of hypothesis H1c were verified, showing that interpersonal support is significantly and positively correlated with health communication ability. Medical work is highly team-based. The work performance of clinicians depends on their abilities and is also affected by their cooperation with colleagues. An excellent interpersonal support network can help clinicians get timely feedback and advice, improving their work efficiency and communication effectiveness. This is consistent with existing literature. For example, Pagano (2016) pointed out that good interpersonal relationships can help medical staff improve their communication effectiveness and, thus, their health communication capabilities. Medical staff who receive support from colleagues at work will be more likely to establish a good

communication atmosphere, which is crucial for improving the effectiveness of health communication. Therefore, the research results further verify the importance of interpersonal support. In the future, medical managers should promote teamwork and support networks among clinicians to improve their health communication ability.

The results of hypothesis H1d show that there is no significant correlation between benefit security and health communication ability. This result is somewhat different from the findings of some literature. For example, Bodenheimer and Sinsky (2014) pointed out in a study in the United States that adequate compensation and benefits and job security can improve the job satisfaction of medical staff and enhance their ability to communicate health information with patients. However, this study failed to find a significant effect of benefit security on clinicians' health communication ability, which may be related to differences in research environment and sample characteristics. The remuneration system in China's medical industry is relatively fixed, and the factor of benefit security may not be a significant driver of clinicians' job satisfaction and professional identity, especially in the context of health communication. Therefore, although some literature has emphasized the importance of remuneration and benefits, the results of this study show that the role of benefit security in improving health communication ability may be limited. Future research could further explore the differential impact of security of benefits on health communication ability among medical staff in different cultural contexts.

The results of hypothesis H1e show that respect support is significantly positively correlated with health communication ability, consistent with the findings of Laschinger and Finegan (2005), indicating that organizational respect and attention for medical staff had an essential impact on their health communication ability. Respectful support enhances medical staff's professional identity and sense of belonging, making them more confident and motivated at work. Aiken et al. (2002) pointed out that respectful support helps reduce medical staff's sense of burnout and significantly improves the effectiveness of health communication with patients. This study validates this view, showing that when clinicians feel respected and valued by the organization, they can communicate with patients more confidently and effectively during health communication. Therefore, future hospital managers should focus on enhancing the professional identity of medical staff by recognizing and respecting their opinions and contributions, thereby promoting the improvement of health communication skills.

Overall, the results of this study's hypotheses validation further support the positive impact of organizational support on clinicians' health communication skills. Different dimensions of organizational support have a differentiated role in improving health communication skills. Development support, work support, interpersonal support, and respect support significantly

impact health communication skills, while the role of interest protection is more limited. This finding provides an essential reference for the management practices of medical institutions. In the future, when improving the health communication skills of clinicians, attention should be focused on career development, work support, interpersonal support, and respect support to promote the effective implementation of health communication work.

5.2.1.2 The relationship between self-efficacy and health communication ability

A significant positive correlation was established between clinicians' self-efficacy and health communication ability, and hypothesis H2 was established. Specifically, the three dimensions of self-efficacy – identifying patient needs, sharing information and power, and coping with communication challenges – positively impacted health communication ability. Hypotheses H2a, H2b, and H2c were all established.

The overall positive impact of self-efficacy confirms Bandura's (1977) social cognitive theory, which states that an individual's sense of self-efficacy significantly affects their ability to cope with tasks and challenges. In the medical field, the self-efficacy of medical staff is an essential prerequisite for their ability to cope with complex communication situations and accurately convey health information (de Sousa Mata & de Azevedo et al., 2019). The results of this study are also consistent with Lawrance and McLeroy's (1986) conclusion that a higher sense of self-efficacy among medical staff can help improve performance in health communication. This means clinicians with high self-efficacy are more confident when facing communication tasks, can effectively convey information, and improve patient acceptance and satisfaction with health information.

Identifying patient needs is an essential dimension of self-efficacy, and the results show that this dimension is significantly positively correlated with health communication ability. Hypothesis H2a is, therefore, valid. Identifying patient needs is a critical step in effective health communication, as it helps medical staff better understand patients' health status and needs and adjust communication strategies according to the individual circumstances of patients (Wright et al., 2012). For example, Zachariae et al. (2015) found that health communication ability significantly increased when clinicians could identify patient needs, enabling doctors to provide more targeted and personalized health information. The results of this study further confirm this view, indicating that by improving clinicians' ability to identify patient needs, their performance in health communication can be effectively enhanced, thereby improving patient health outcomes.

The positive impact of shared information and power as a second dimension of self-efficacy on health communication ability was also verified, and hypothesis H2b was established. Sharing information and power plays a vital role in the performance of medical staff in the communication process. Effective information sharing can improve the comprehensiveness and accuracy of medical staff when disseminating health information (Coyne et al., 2016). Zachariae et al. (2015) mentioned that medical staff can reasonably allocate and use information resources and power in the communication process, which helps improve communication effectiveness and promote patients' better understanding and acceptance of health information. This is further verified by the results of this study, which shows that in medical situations, the distribution of power and adequate information sharing by clinicians can promote interaction and understanding between doctors and patients and ultimately improve health communication skills.

Coping with communication challenges is the third dimension of self-efficacy, which is significantly positively correlated with healthy communication skills. Hypothesis H2c is established. Facing various obstacles and challenges in communication, medical staff with high self-efficacy generally have more vital coping abilities. They can remain calm and adopt effective strategies in complex communication situations (Kerr et al., 2022). This is also consistent with the findings of D. Chen et al. (2023) that the performance of medical staff in coping with communication challenges is crucial to the effectiveness of health communication. By enhancing their ability to cope with communication challenges, clinicians can better cope with various complex health communication situations and improve the effectiveness of health information delivery.

Overall, self-efficacy plays a crucial role in clinicians' health communication. By enhancing self-efficacy, clinicians can communicate health information more confidently and effectively. This finding has important implications for medical practice. It suggests that self-efficacy should be a key focus of training and professional development for healthcare professionals to promote better health communication outcomes and ultimately improve patient health outcomes.

5.2.1.3 The relationship between organizational support and self-efficacy

Organizational support plays a significant and positive role in enhancing the self-efficacy of clinicians, and hypothesis H3 was therefore valid. According to the data analysis, organizational support is not only a key predictor of self-efficacy, but its different dimensions also impact self-efficacy differently.

The results of hypothesis H3, that is, the significant positive correlation between organizational support and self-efficacy, are consistent with the conclusion of previous studies. Rhoades and Eisenberger (2002) pointed out that organizational support can help employees improve their self-confidence in many ways, especially when facing complex tasks. Similarly, Battistelli et al. (2016) also demonstrated that organizational support for medical staff can enhance their sense of self-efficacy in the medical field, thereby improving their motivation and performance at work.

Hypothesis H3a was also validated regarding the relationship between developmental support and self-efficacy. Career development opportunities and training are essential factors in improving clinician self-efficacy. Ardakani et al. (2019) showed that training medical staff in communication skills can improve their self-efficacy and enhance their confidence and ability in patient communication. Development support enables clinicians to acquire more advanced knowledge and skills. It increases their sense of professional achievement and belonging, directly improving their self-efficacy.

Job support is significantly positively correlated with self-efficacy. Hypothesis H3b is established, which verifies the role of job resources in improving clinician self-efficacy. In Swedish and Norwegian nurse studies, Kallerhult et al. (2024) found that providing adequate resources and a supportive environment is critical to improving nurses' self-efficacy. Bakker et al. (2003) further emphasize that support from work resources can help medical staff reduce work stress and thus enhance their sense of self-efficacy. For clinicians, work support refers to providing material resources and includes support systems, such as help with high-stress tasks and complex medical decisions. A sound work support system can enhance clinicians' confidence in their ability to work and improve their ability to cope with challenges.

The verification results of hypothesis H3c show a significant positive correlation between interpersonal support and self-efficacy. This shows that support from colleagues and superiors is crucial for enhancing clinicians' sense of self-efficacy in a clinical environment. Yusuf et al. (2022) pointed out that interpersonal support can significantly enhance employees' self-efficacy by promoting effective communication and collaboration. Especially when faced with complex doctor-patient communication and treatment plans, clinicians will feel more confident in completing their tasks if they can receive help from colleagues and superiors. In addition, Rhoades et al. (2001) also showed that an excellent interpersonal support system can further enhance the self-efficacy of medical staff by increasing their sense of belonging and job security. In this study, interpersonal support was critical in helping clinicians improve their self-confidence when dealing with complex work tasks.

However, the result that the hypothesis H3d does not hold, the significant correlation between benefit security and self-efficacy, is inconsistent with the conclusion in some of the literature. For example, Stajkovic and Luthans' (1998) study showed that material security, such as compensation and benefits, can help improve employees' self-efficacy. However, the beta coefficient of the benefit guarantee in this study was only 0.039, and it did not reach the significance level ($P=0.217$), which may be related to the occupational characteristics of clinicians. Material treatment may not be the main factor for clinicians' self-efficacy. In contrast, a sense of achievement at work and feedback on patients' health may be more critical for improving their self-efficacy. Therefore, future research can further explore the specific impact mechanism of benefit guarantees on self-efficacy in different occupational groups.

The significant positive correlation between respectful support and self-efficacy was also verified, and H3e was established. This is similar to the results of some previous studies. Rhoades and Eisenberger (2002) mentioned that respectful support can effectively enhance employees' self-efficacy by increasing their professional identity and accomplishment. Peng et al. (2024) concluded from a study of nurses in Chinese public hospitals that respectful support can significantly enhance the self-efficacy of medical staff. For clinicians, respect support is reflected in the recognition of their professional abilities by superiors and colleagues and in the respect shown by the organization for their contributions. This respect and support make doctors feel valued, enhancing their self-confidence at work.

In summary, organizational support has a significant impact on self-efficacy. Organizations can effectively improve clinicians' sense of self-efficacy and thus their health communication ability by providing developmental, job, interpersonal, and respect support. This finding has important practical implications for hospital management and medical staff training.

5.2.1.4 The mediating role of self-efficacy

The mediation analysis results of the mediating effect of self-efficacy between organizational support and health communication ability show that organizational support directly affects clinicians' health communication ability and indirectly enhances this competence by improving self-efficacy. Therefore, hypothesis H4 holds. This finding is consistent with existing theoretical research and further deepens our understanding of the relationship between organizational support, self-efficacy, and health communication ability. Eisenberger et al. (1990) found that perceived organizational support can enhance employees' self-efficacy, making them more confident and effective at work. Huang et al. (2024) also showed that perceived

organizational support affects nurses' coping and job performance by enhancing their self-efficacy. The current study partially verified this mechanism.

Similarly, Griffin et al. (2020) showed that organizational support improves employees' work performance and communication skills by enhancing their self-efficacy. In clinical settings, doctors who receive organizational support can convey health information more effectively and better cope with communication challenges with patients through enhanced self-efficacy, improving the effectiveness of health communication (Pajares, 1997). In addition, Ashfaq et al. (2024) pointed out that organizational support can improve employee engagement by enhancing their self-efficacy, which also strongly supports this study. Specifically, training, career development opportunities, and the organization's positive feedback can help clinicians improve their skills and self-confidence to perform more confidently and effectively in health communication. The combined effect of these supportive measures strengthens the relationship between organizational support and health communication ability, further confirming the mediating role of self-efficacy in this process.

This study reveals the mediating role of self-efficacy, providing new insights into how organizational support influences health communication ability through psychological mechanisms at the individual level. By enhancing self-efficacy, organizational support can indirectly improve clinicians' health communication ability, a finding that has important implications for hospital management practices. Specifically, hospital managers can enhance the self-efficacy of medical staff by strengthening organizational support (e.g., providing opportunities for career development and creating a supportive work environment), thereby indirectly improving their health communication ability. This mechanism provides an essential reference for future management practices, especially when formulating strategies to improve the communication skills of medical staff; it is possible to focus on how to improve self-efficacy effectively.

5.2.1.5 Differences in health communication ability and self-efficacy among respondents' demographic variables

This study explored the impact of these variables on health communication ability and self-efficacy using T-tests, variance tests, and correlation analysis. The results show that multiple demographic variables significantly differ in health communication ability and self-efficacy.

Differences in respondents' demographic variables in health communication ability

The results of phase 2 show that different demographic variables significantly impact clinicians' health communication ability, supporting part of hypothesis H5. Specifically, age,

years of work experience, position, professional title, education level, hospital level, marital status, establishment, and annual income significantly impacted clinicians' health communication ability. 1) Age and years of work experience are significantly correlated with health communication ability. This is consistent with the research of S. Zhang et al. (2023), which found that medical staff over 40 years old and with longer years of work experience are more proactive in health communication. This may be because senior doctors have accumulated rich experience and knowledge over a long career and are better able to effectively identify patient needs and adjust communication strategies, thereby improving the effectiveness of their communication. 2) Annual income shows significant differences in health communication ability. Studies have shown that clinicians with higher annual incomes are better at health communication, possibly because high-income groups generally have access to more educational opportunities and resources, which help them gain an advantage in professional knowledge. This result is also supported by the research of S. Zhang et al. (2023), who found a significant correlation between annual income and the health education ability of medical personnel and that medical personnel with higher incomes are more actively involved in health communication. Therefore, higher-income doctors may be better equipped and have more resources for effective health communication. 3) Position and title are important factors affecting health communication ability. Clinicians with senior titles and management positions generally have more robust health communication capabilities because they have higher professional and management capabilities and can share knowledge more confidently during health communication. Di et al. (2022) also showed that doctors with senior titles are more inclined to participate in online health communication, which further verifies the impact of titles on health communication ability in this study. 4) Significant differences in health communication ability based on education level were also verified. The results show that clinicians with higher education perform better in health communication. Y. Xu et al. (2022) also pointed out that healthcare professionals with higher education have more vital health education abilities due to their more affluent knowledge base and higher professional quality. 5) The hospital level significantly impacts clinicians' health communication ability. The impact of this difference in hospital level on health communication skills may be related to the resource allocation and number of patients in different hospitals. Compared to doctors in secondary hospitals, doctors in tertiary hospitals usually have more experience in communication due to more frequent contact with patients, and they tend to be more concise and professional in communication. 6) The marital and employment status differences regarding health communication ability are also significant. Married doctors may be more willing to devote

themselves to patient health education due to family support; doctors with employment status are more motivated to make long-term investments in health communication due to their relatively stable job security. This is also supported by the research of X. Xu et al. (2021).

Differences in self-efficacy of respondents' demographic variables

The results of phase 2 also show that different demographic variables significantly impact clinicians' sense of self-efficacy, which verifies part of hypothesis H6. Specifically, age, years of work experience, position, title, hospital level, establishment, and annual income show significant differences in self-efficacy. 1) Age and years of work experience significantly impact self-efficacy. As age and years of work experience increase, clinicians accumulate more professional experience and can handle complex cases more effectively, which improves their sense of self-efficacy. This is consistent with the research of Elkefi and Asan (2023), who pointed out that doctors with more work experience are more confident in coping with and dealing with patient needs. 2) Annual income has a significant difference in self-efficacy. Stajkovic and Luthans (1998) pointed out that doctors with higher annual incomes generally exhibit higher self-efficacy, which may be because high incomes not only mean better job security but also mean that they have access to more resources and training opportunities, which enhances their self-confidence. Higher income enhances clinicians' professional identity and social status, improving their self-efficacy. 3) Research results also support the significant differences in self-efficacy between positions and titles. Physicians with senior titles generally have higher self-efficacy. Gulbrandsen et al. (2020) also found that highly titled physicians exhibit stronger self-confidence and decision-making abilities when dealing with complex tasks, further enhancing their self-efficacy. 4) Hospital level and establishment also significantly impact self-efficacy. Physicians in high-level hospitals have significantly higher self-efficacy than those in low-level hospitals due to abundant resources and training opportunities. This may be because high-level hospitals provide more technical support and training opportunities to help doctors improve their skills and self-confidence (Bougimiza et al., 2022). 5) Doctors with career appointments will show higher self-efficacy because of their more stable job security. Stajkovic and Luthans' (1998) study pointed out that appropriate job security can significantly enhance employees' self-confidence, which was also verified in this study.

5.2.2 Discussion of the relationship mechanism of the three variables based on the social cognitive career theory model

The Social Cognitive Career Theory (SCCT) provides the theoretical framework for this study, explaining the relationships between organizational support, self-efficacy, and health

communication ability. The SCCT model suggests that organizational support influences individuals' career decisions and behaviors by increasing their self-efficacy (Bandura, 2001). In this study, organizational support was found to influence health communication ability and indirectly promote health communication ability by increasing self-efficacy. This result validates the critical role of a supportive environment in career development in the SCCT model.

According to the SCCT theory, organizational support influences individuals' career behaviors and performance by enhancing their self-efficacy (Bandura, 2001). Specifically, the SCCT emphasizes the critical role of individuals' self-efficacy, outcome expectations, and goal setting in career choice and performance (Lent et al., 1994). The results of this study indicate that organizational support influences health communication ability directly and indirectly by enhancing self-efficacy. This finding is consistent with the theoretical expectations of the SCCT model, and further supports organizational support as an essential resource for career development (Wood & Bandura, 1989). Bandura (2001) states that self-efficacy influences an individual's choice and persistence in challenging tasks. In medicine, healthcare workers' self-efficacy significantly impacts their health communication ability. This study verifies this mechanism and finds that self-efficacy partially mediates the relationship between organizational support and health communication ability. This indicates that organizational support improves healthcare workers' health communication ability by enhancing their self-efficacy.

The SCCT also emphasizes the influence of environmental factors on professional behavior, mainly how organizational support influences an individual's self-efficacy and professional performance (Bandura, 2001). Organizational support directly influences healthcare workers' health communication ability and indirectly promotes their professional behavior performance by enhancing self-efficacy. This theoretical framework is consistent with the empirical results of this study, which further verifies the applicability of the SCCT in understanding the development of health communication ability. In practical terms, organizations can enhance healthcare professionals' self-efficacy by providing a supportive environment. For example, providing professional development opportunities, training, and resource support can enhance healthcare professionals' confidence and competence, improving their health communication ability (Lent et al., 1994). This mechanism provides theoretical support for future health communication ability improvement strategies, emphasizing the importance of increasing organizational support while improving healthcare professionals' self-efficacy.

The SCCT analysis showed that organizational support significantly impacted health communication ability by increasing self-efficacy. This mechanism supports the application of

SCCT theory in this study and provides a theoretical basis for future health communication ability improvement strategies. By increasing organizational support and self-efficacy, hospitals can more effectively improve the health communication ability of medical staff, thereby better serving patients and the community.

5.2.3 Discussion of the relationship between the three variables based on the job demand-resource model

The job demands-resources (JD-R) model provides a theoretical framework for analyzing the impact of job demands and resources in the work environment on employee behavior and performance. According to the JD-R model, the balance of job resources and job demands significantly impacts employee work status and performance. In this study, organizational support was found to be a job resource that not only directly enhanced clinicians' health communication ability but also indirectly promoted the development of health communication ability through the psychological resource of self-efficacy. This result validates the core assumption of the JD-R model, which suggests that job resources can alleviate the pressure of job demands and thus enhance work performance (Bakker & Demerouti, 2007).

According to the JD-R model, resources at work can alleviate the negative impact of work demands on employees' physical and mental health while stimulating positive occupational behaviors and performance (Schaufeli & Bakker, 2004). *Organizational support* is a critical work resource that significantly affects clinicians' health communication ability. This effect was not only direct but also further promoted the improvement of health communication ability by enhancing self-efficacy. This finding is consistent with the theoretical expectations of the JD-R model and verifies the critical role of organizational support in improving the health communication ability of medical staff. Research shows that organizational support directly improves employee performance and indirectly enhances workability by increasing psychological capital (such as self-efficacy) (Bakker & Demerouti, 2007). In the medical industry, organizational support can reduce burnout by increasing healthcare workers' self-efficacy and improving health communication ability and job satisfaction. This shows that organizational support is vital in relieving work stress and improving employee performance.

The JD-R model also suggests that an imbalance between high job demands and low resources may lead to job stress and burnout. However, when organizations provide sufficient work resources (e.g., training, development support, and work environment improvements), they can effectively reduce job stress and improve self-efficacy and work performance. In this study, organizational support not only had a direct positive impact on health communication

ability but also further promoted the improvement of health communication ability by enhancing self-efficacy (Schaufeli & Bakker, 2004). Empirical analysis of this mechanism shows that organizational support forms a positive path to promote clinicians' health communication ability through the intermediary role of self-efficacy. This is consistent with the theoretical expectations of the JD-R model and further verifies the critical impact of work resources on occupational behavior (Bakker & Demerouti, 2007).

From a practical application perspective, hospital managers can alleviate the pressure on medical staff in health communication work and enhance their self-efficacy by improving organizational support, optimizing the work environment, and resource allocation. This finding provides a theoretical basis for hospitals to develop strategies to improve health communication capabilities, emphasizing the importance of organizational resource allocation and employee self-efficacy.

5.2.4 Implications for research

This stage provides new empirical evidence for understanding the relationship between organizational support, self-efficacy, and health communication ability, further enriching the existing theoretical framework and verifying the interaction mechanism between these variables based on the social cognitive career theory (SCCT) and the job demand-resource (JD-R) model.

First, the results of this stage show that organizational support not only directly enhances clinicians' health communication ability but also indirectly through enhancing self-efficacy. This finding consolidates the existing literature's understanding of organizational support and provides new supporting evidence for the SCCT and JD-R models. In particular, this study demonstrates that organizational support, as a critical work resource, can further promote the development of health communication ability by enhancing the psychological resource of self-efficacy.

Second, this study further validates the applicability of the SCCT and JD-R models in the healthcare industry, revealing the critical mediating role of self-efficacy between organizational support and health communication ability. This result expands the scope of applying these two theories and provides a solid theoretical basis for health communication ability improvement strategies. This study provides a broader perspective and direction for future research by applying these two theories to health communication.

In summary, this stage provides new insights into the relationship between organizational support, self-efficacy, and health communication ability, strengthens the theoretical framework

of the SCCT and JD-R models, and provides new empirical support for career development and employee performance in the medical industry. These findings provide an essential reference for future research and practical guidance for improving the health communication ability of medical staff.

5.2.5 Implications for management

The results of this stage provide valuable insights for hospital managers and policymakers, especially in improving medical staff's health communication ability and career performance.

First, the study shows that organizational support directly enhances health communication ability and indirectly increases self-efficacy. This means hospital managers should enhance clinicians' organizational support through various means, such as professional training, regular feedback, and career development opportunities. These measures will enhance their health communication ability and improve the overall quality of healthcare services.

Second, based on the job demand-resource (JD-R) model, the role of job resources (such as organizational support) in alleviating work stress and promoting career development was further verified. Hospital managers can improve healthcare workers' job satisfaction and professional performance by optimizing the working environment and increasing supportive resources (such as teamwork and leadership support). In particular, providing adequate organizational support and resource allocation is crucial when dealing with the increasing work demands of healthcare workers.

Third, the study found differences in health communication ability and self-efficacy among respondents based on demographic variables (e.g., age, years of work experience, position, title, and education level), suggesting that managers must manage healthcare workers differently based on their characteristics.

Fourth, the study also revealed the mediating role of self-efficacy between organizational support and health communication ability, further emphasizing the importance of enhancing healthcare workers' self-efficacy. Hospital managers should emphasize measures to enhance self-efficacy when formulating employee support strategies, including professional development support and improving the working environment.

Overall, the results of this stage provide a new perspective for hospital management, highlighting the close relationship between organizational support, self-efficacy, and health communication ability. This finding provides essential guidance for hospitals in formulating human resource management, staff training, and development strategies, helping hospitals

better support medical staff's development and professional performance to benefit both the hospital and the patient.

5.2.6 Limitations

Although this stage provides essential findings on the relationship between organizational support, self-efficacy, and health communication ability, some limitations remain.

First, this study used a cross-sectional design, limiting causality inferences. Although significant effects of organizational support and self-efficacy on health communication ability were found, the potential influence of other unmeasured variables (such as work motivation and work pressure) on these relationships cannot be ruled out. Future research can use a longitudinal design to verify the causal relationships between these variables.

Second, this phase of the study was mainly conducted in the hospital setting in Z City, and the geographical and industry limitations of the sample may have limited the external validity of the research results. The relationship between organizational support, self-efficacy, and health communication ability may differ in different cultural contexts and healthcare systems. Future research could consider conducting similar studies in healthcare settings in different countries and regions to verify the generalizability of the results of this study.

Third, this phase mainly collected data through self-reported questionnaires, which may be subject to social desirability effects and reporting biases. Although measures have been taken to reduce these biases, such as anonymity and ensuring data confidentiality, future research could consider combining objective behavioral data and third-party assessments to improve the validity of the research results.

Finally, this study focused on the relationship between organizational support, self-efficacy, and health communication ability. Future research could expand to other related variables, such as burnout, job satisfaction, and organizational commitment, to provide a more comprehensive understanding. These variables may also be essential in healthcare workers' career development and job performance.

Chapter 6: Conclusion

6.1 Main conclusion

This study developed and validated a tool to assess clinicians' health communication ability, explored the relationship between organizational support, self-efficacy, and health communication ability, and validated the hypothetical model. The following are the main conclusions, which also provide detailed answers to the research questions.

6.1.1 Phase 1, the conclusion of the development and validation of the clinician health communication ability scale

In the study's first phase, we successfully developed and validated a health communication ability scale for clinicians, demonstrating its validity and reliability in practical applications. The scale consists of seven dimensions: environmental conditions, communicator, communication motivation, communication channels, communication content, communication audience, and communication effects. The validation results show that the scale is reliable and valid and can be essential for assessing clinicians' communication ability. This answers the research question: How is the health communication ability of Chinese clinicians measured?

The development of this scale not only fills the gap in assessment tools for clinicians' health communication ability but also provides an important measurement tool for follow-up research. With this scale, medical institutions can more accurately assess clinicians' communication ability, identify dimensions and indicators that need improvement, and provide data support for follow-up training and development plans.

6.1.2 Phase 2, the conclusion of validating the relationship between organizational support, self-efficacy, and health communication ability

In the study's second phase, we measured the status of clinicians' health communication ability, organizational support, and self-efficacy and explored the relationship between these variables in depth.

1) The status of clinicians' health communication ability, organizational support, and self-efficacy levels. In terms of health communication ability, more than half of the clinicians

(55.98%) have a high level of ability, but nearly half (44.02%) still need further training or support. In terms of organizational support, most clinicians (73.81%) feel a high level of organizational support, which may help to improve their job satisfaction and efficiency. However, 26.19% of clinicians feel that the support they receive is insufficient, which may affect their work performance and career development. Nearly 60% of clinicians (59.77%) have high self-efficacy, essential for their professional growth and patient care. However, more than 40% (40.23%) of clinicians have low self-efficacy, which may need to be improved through training, mentoring, or other support measures. This answers Research Question 1: What is the current state of clinicians' health communication ability?

2) The relationship between clinicians' health communication ability, organizational support, and self-efficacy. By analyzing the relationship between organizational support, self-efficacy, and health communication ability, this study found that both organizational support and self-efficacy are significantly and positively correlated with health communication ability, and organizational support is significantly and positively correlated with self-efficacy. This answers Research Question 2. Organizational support directly affects health communication ability and indirectly promotes improving health communication ability by enhancing self-efficacy.

3) The critical influence of organizational support on health communication ability. Organizational support is a critical factor in improving clinicians' communication healthily. Work support, development support, interpersonal support, and respect support provided by medical institutions can significantly enhance clinicians' work motivation and self-confidence, enhancing their communication skills in practical work. This answers Research Question 2. Organizational support is essential in medical management and the basis for improving the quality of medical services.

4) The multiple effects of self-efficacy. Self-efficacy shows significant dual effects. First, self-efficacy directly affects clinicians' health communication ability. Clinicians with higher self-efficacy demonstrated more vital communication and information-processing abilities at work. Second, self-efficacy partially mediates the relationship between organizational support and health communication ability. This answers Research Question 3: Does clinicians' self-efficacy mediate the relationship between organizational support and health communication ability? If so, to what extent does self-efficacy mediate? Organizations can further enhance their health communication ability by improving clinicians' sense of self-efficacy.

5) Differential effects of demographic and sociological variables. The study also revealed the differential effects of demographic and sociological variables on clinicians' health

communication ability and self-efficacy. Variables such as the respondents' age, years of work experience, annual income, position, title, education level, hospital level, marital status, and authorized strength show significant differences in health communication ability. In contrast, variables such as the respondents' age, years of work experience, annual income, position, title, hospital level, and authorized strength show significant differences in self-efficacy. This answers Research Question 4: Are there significant differences in self-efficacy and health communication ability among clinicians with different demographic and sociological variables? This indicates that the influence of these variables must be considered in actual management to formulate more targeted support measures and management strategies.

6.2 Management policy recommendations

This study has revealed the key factors and effective paths for improving clinicians' health communication ability through developing and validating the health communication ability scale and an in-depth exploration of the relationship between organizational support, self-efficacy, and health communication ability. These findings not only lay the foundation for subsequent theoretical research but also provide practical suggestions for the management practices of medical institutions. Based on the findings of the two phases, this study proposes the following management policy recommendations (It is also the answer to Research Question 5), which aim to improve clinicians' health communication ability and thus improve the overall quality of public health services:

1) Promote the use of the health communication ability scale. First, it is recommended that the health communication ability scale for clinicians developed in this study be promoted nationwide. The application of this scale is not limited to daily assessment but can also be incorporated into clinicians' recruitment, training, and performance appraisal. By using this tool regularly, medical institutions can systematically evaluate and track the development of clinicians' health communication ability, promptly identify deficient dimensions and indicators, and formulate targeted improvement measures accordingly. In addition, the health communication ability scale can also be used as part of the quality control of medical institutions. Quantitative assessment data can help institutional managers understand the overall effect of communication and take necessary intervention measures to improve the quality of medical services.

2) Develop personalized training plans. Based on the assessment results of the health communication ability scale, medical institutions can develop more personalized training plans.

The organization should provide additional training opportunities for clinicians who score low on the assessment to improve their communication skills in practical work. For example, simulation training, case studies, role-playing, and other methods can be introduced to help medical staff improve their health communication abilities in complex situations. At the same time, the organization should provide higher-level professional development opportunities for medical staff who score high to improve their communication skills and leadership further. This will help with personal career development and drive the improvement of the entire team's abilities through "mentoring."

3) Strengthen the organizational support system. To comprehensively enhance clinicians' sense of organizational support, it is recommended that medical institutions start from multiple levels and build a comprehensive and systematic support system. Specific strategies are as follows: in terms of development support, regularly organize professional training and academic lectures, encourage doctors to participate in scientific research projects, and provide guidance on title promotion and career development planning; in terms of work support, ensure sufficient research funding and laboratory resources, optimize the hospital information system to improve work efficiency, and ensure the supply of medical supplies and the safety of the working environment; in terms of interpersonal support, create a positive work atmosphere, strengthen communication between management and doctors, promote teamwork, and encourage mutual assistance and support among colleagues; in terms of respect and support, respect the work and contributions of doctors, establish a fair system for evaluating excellence and prioritization, encourage doctors to participate in departmental decision-making, and provide autonomy at work, while also listening to and valuing clinicians' opinions and suggestions. Through the above measures, clinicians' self-efficacy can be improved, and their enthusiasm and innovation in health communication work can be enhanced through the satisfaction brought about by career development.

4) Establish an efficient communication and feedback mechanism. Efficient communication channels and feedback mechanisms are the key to ensuring the effective operation of an organizational support system. Medical institutions should establish multi-level communication platforms to ensure information flows smoothly between all levels. Through regular communication meetings and feedback collection mechanisms, management can keep abreast of the needs and opinions of frontline medical staff to make more accurate and effective management decisions. At the same time, institutions should also pay attention to external communication, especially regarding patients and the public. By improving health communication ability, medical staff can better convey medical information and enhance public

trust and satisfaction with medical services. This will not only help reduce doctor-patient disputes but also enhance the social image and reputation of the hospital.

5) Strengthen self-efficacy training. Medical institutions should design and implement systematic training programs to enhance clinicians' self-efficacy, especially in identifying patient needs and addressing communication challenges. Methods such as scenario simulation and case analysis can enhance clinicians' problem-solving ability and confidence in their work.

6) Improve the communication environment and resource allocation. In health communication, the effectiveness of environmental conditions and communication channels directly affects the communication effect. Medical institutions should improve the communication environment, increase information technology support, and provide more communication resources to ensure clinicians can efficiently disseminate health information.

7) Establish incentive mechanisms. To motivate clinicians in health communication, medical institutions should establish effective incentive mechanisms, linking communication effectiveness with career advancement, compensation, and other factors to encourage clinicians to actively participate in health communication activities at work and enhance their motivation to communicate.

8) Implement differentiated human resource management strategies. Based on the differential impact of demographic and sociological variables found in the study, medical institutions should adopt more differentiated strategies in human resource management. For example, young clinicians should pay more attention to their career development paths and technical support, providing precise career planning and guidance to help them proliferate in the early stages of their careers. For senior clinicians, management strategies should focus on continuing education and leadership development. By providing them with research opportunities and involving them in management decisions, their central role in the team can be brought into full play, and their sense of identity with the organization can be enhanced while improving their self-efficacy. In addition, management should consider the different work needs and career development of clinicians with different positions, titles, education levels, annual incomes, hospital levels, marital status, and types of employment and provide them with corresponding support and resources to ensure differentiated and equal organizational support within the organization, thereby enhancing their self-efficacy and health communication ability.

By implementing the above management policies, medical institutions can effectively improve the health communication ability of clinicians, thereby improving the overall quality of medical services and providing the public with better health communication services.

6.3 Limitations

Although this study has achieved some results in developing and validating the health communication ability scale for clinicians and exploring the relationship between organizational support, self-efficacy, and health communication ability, some limitations remain that need to be overcome in future research.

First, the study used a cross-sectional research design, which cannot clarify causal relationships but can reveal the correlation between variables. Although the study's results show a significant correlation between organizational support, self-efficacy, and health communication ability, whether these relationships are causal remains to be further studied.

Second, the sample's geographical and industry limitations may affect the research results' external validity. The sample in this study mainly came from hospitals in Guangdong Province, China. Although this region is representative, the results may not be fully generalized to other regions or countries. The relationship between organizational support, self-efficacy, and health communication ability may differ in different cultural backgrounds and medical systems.

Third, although this study paid attention to content and structural validity during the development of the scale, potential bias still exists in the Delphi method of expert consultation. In screening expert opinions, the experience and bias of individual experts may affect the items.

Fourth, the study mainly relies on self-report questionnaires to collect data. Although measures have been taken to reduce social desirability effects and reporting biases, these biases cannot be avoided entirely. Self-reported data may be affected by individuals' subjective perceptions, which may affect the accuracy of the results.

Finally, this study focused on the relationship between organizational support, self-efficacy, and health communication ability. However, other important variables, such as burnout, work motivation, job satisfaction, and organizational commitment, may also significantly impact clinicians' health communication ability.

6.4 Future research prospects

Based on the limitations of this study, future research can be expanded and deepened in the following ways:

First, future research can explore using longitudinal research designs to reveal better the causal relationships between variables and the dynamic process over time. By tracking clinicians' health communication ability over time, we can understand its trend and clarify how

factors such as organizational support and self-efficacy continue to affect its improvement. This design will help reveal the long-term effects of interventions and provide a scientific basis for policymakers and managers.

Second, future research should expand the sample size and cover a broader range of clinicians from different regions and countries. The sample in this study was limited to hospitals in Guangdong Province, future research could be conducted on a national or even international scale to explore the composition of health communication ability and its influencing factors in the context of different levels of economic development. In addition, the differences in health communication ability in different medical systems and organizational structures also merit in-depth research, which will help verify the scale's cross-regional applicability and explore the commonalities and differences in global health communication.

Third, future research should focus on applying multiple data collection methods. Combining self-report questionnaires with objective behavioral data, third-party assessments, clinical observations, and other methods can improve the effectiveness and credibility of research. For example, by observing actual health communication behaviors or using third parties to assess clinicians' health communication abilities, possible biases in self-reporting can be avoided, thereby obtaining more objective data support.

Fourth, future research should continue optimizing the health communication ability scale to ensure broad applicability in different cultural contexts and healthcare systems. In cross-cultural research, attention should be paid to the unique impact of different cultures on health communication to adapt the scale and improve its value for application worldwide.

Finally, future research should expand the research framework to include more relevant variables to provide a more comprehensive understanding. For example, burnout, job satisfaction, and organizational commitment may indirectly or directly impact clinicians' health communication ability. By exploring the relationship between these variables and health communication ability, medical staff's complex psychological and behavioral mechanisms can be more fully revealed, providing more intervention pathways to improve their work performance and health communication ability.

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Annex A: Phase I Questionnaire

Questionnaire on Verification of Health Communication Ability Scale

Dear Clinical Physician:

Hello! Thank you for taking the time to participate in this survey. The survey is conducted by Dr. CAI Dingbin's team from the A hospital of Z city to assess clinical physicians' health communication capabilities. The Biomedical Ethics Committee of the A hospital of Z city has approved this survey. The questionnaire is anonymous, with no right or wrong answers. The survey results are strictly for academic research purposes, and we assure you of absolute confidentiality, so there is no need for any concerns. Your participation and cooperation are genuinely appreciated, and we hope you have a happy and successful career!

Part 1: Your basic information

1. Gender: A male ☐ B female ☐
2. Age: _____ years old
3. Ethnic group: A Han ethnic group ☐ B Minority ethnic group ☐
4. Marital status: A unmarried ☐ B married ☐ C divorced ☐ D other ☐
5. Years of service: _____ years
6. Institutional level: A tertiary hospital ☐ B secondary hospital ☐ C hospitals below secondary level ☐
7. Institution type: A General Hospital ☐ B Women's and Children's Hospital ☐
C Traditional Chinese Medicine Hospital ☐ D Other Hospital ☐
8. Pre tax annual income (including salary, benefits, etc., rounded to whole numbers): _____ 10000 RMB.
9. Are you a permanent staff: A Yes ☐ B No ☐
10. Education level: ① Associate degree ☐ ② Undergraduate degree ☐
③ Master's degree ☐ ④ Doctoral degree ☐
11. Position: ① None ☐ ② Basic management position ☐ ③ Middle-level management deputy position (department deputy position) ☐ ④ Middle-level management main position (department main position) ☐ ⑤ Deputy position of institute leadership (vice president, center deputy director) ☐ ⑥ Institute leadership main position (dean, center director) ☐
12. Title: ① Junior (Assistant Physician) ☐ ② Junior (Resident Physician) ☐ ③ Intermediate ☐
④ Deputy High ☐ ⑤ Senior High ☐
13. Clinical departments: A. Internal Medicine Department ☐ B. Surgery Department ☐ C. Obstetrics and Gynecology Department ☐ D. Pediatrics Department ☐ E. Mental Health Department ☐ F. Eye, Ear, Nose and Throat Department ☐ G. General Surgery ☐ H. Anesthesiology ☐ I. Infectious Diseases ☐ J. Emergency Medicine ☐ K. Rehabilitation Medicine ☐ L. Preventive Health Care ☐ M. Department of Dermatology and Sexually Transmitted Diseases ☐ N. Department of Stomatology ☐ O. Department of Traditional Chinese Medicine ☐ P. Other departments ☐

14. Do you have a certain understanding of health transmission: A Yes ☐ B No ☐

15. Have you received training related to health communication: A Yes ☐ B No ☐

Part 2: Clinical Physician Health Communication Ability Scale (Please choose an appropriate number in the multiple-choice questions below and tick "√" to indicate your level of approval: 1=strongly disagree; 2=disagree; 3=neutral (neither agree nor disagree); 4=agree; 5=strongly agree)

No	Items	options				
1	I am sensitive to health communication-related policies and documents.	1	2	3	4	5
2	I am sensitive to social issues related to health.	1	2	3	4	5
3	I can respect cultural differences between ethnic groups, regions, and urban and rural areas in health communication.	1	2	3	4	5
4	I can utilize existing health communication channels, platforms, teams, venues, and other related resources.	1	2	3	4	5
5	I have the basic knowledge, theories, and skills in medical specialties.	1	2	3	4	5
6	I know medical ethics and medical laws and regulations.	1	2	3	4	5
7	I can create health communication works (written materials, PPT, or short videos, jitterbugs, etc.).	1	2	3	4	5
8	I can organize and plan health communication activities.	1	2	3	4	5
9	I can condense and summarize relevant clinical cases and apply them to health communication.	1	2	3	4	5
10	I can express myself verbally, listen, and interact.	1	2	3	4	5
11	I can work in a team.	1	2	3	4	5
12	I am health communication conscious.	1	2	3	4	5
13	I value and respect intellectual property rights related to health communication.	1	2	3	4	5
14	I can be consistent in my health communication practice.	1	2	3	4	5
15	I can enhance my professional knowledge and health communication skills through self-learning.	1	2	3	4	5
16	I recognize the role of health communication in building a personal brand.	1	2	3	4	5
17	I recognize the role of health communication in my professional development.	1	2	3	4	5
18	I recognize the role of health communication in enhancing the influence of specialties and promoting the development of hospitals.	1	2	3	4	5
19	I recognize the role of health communication in improving public health literacy and promoting the construction of a healthy China.	1	2	3	4	5
20	I recognize the role of health communication in counteracting health-related rumors.	1	2	3	4	5
21	I can use new media (e.g., WeChat, Tiktok, Weibo, etc.) to communicate about health.	1	2	3	4	5
22	I can communicate health through traditional media (e.g., TV, radio, newspapers, and magazines).	1	2	3	4	5
23	I can conduct "one-to-one" health communication with patients and audiences in outpatient clinics and wards.	1	2	3	4	5
24	I can communicate with patients and audiences in "one-to-many" situations (e.g., patient groups, clinics, lectures, etc.).	1	2	3	4	5

No	Items	options				
25	My health communication content is scientific.	1	2	3	4	5
26	My health communication content is practical.	1	2	3	4	5
27	My health communication content is public service and contains no commercial information.	1	2	3	4	5
28	My health communication content is easy to understand.	1	2	3	4	5
29	My health communication content is timely and relevant to current events and social issues.	1	2	3	4	5
30	My health communication content is interesting.	1	2	3	4	5
31	My health communication content is artistic.	1	2	3	4	5
32	I can develop personalized health communication programs and content according to the characteristics and needs of different audiences.	1	2	3	4	5
33	I am good at listening to my audiences.	1	2	3	4	5
34	I can think differently and put myself in my audience's shoes.	1	2	3	4	5
35	I can detect and grasp the psychological changes of the audiences and take countermeasures.	1	2	3	4	5
36	I can encourage my audiences to apply health knowledge and improve their health through practice.	1	2	3	4	5
37	I can summarize the key points of health communication and help audiences understand and remember them.	1	2	3	4	5
38	I can guide my audiences to discuss and share their health knowledge with people around them and encourage them to improve their health behaviors.	1	2	3	4	5
39	I can help my audiences to form good health concepts and improve their health behaviors.	1	2	3	4	5
40	I can increase my audience's health knowledge.	1	2	3	4	5
41	I can improve the health of my audiences.	1	2	3	4	5
42	Judging from the number of readers of my health works, the number of sessions of my health talks, and the number of audiences, my health	1	2	3	4	5
43	I am sensitive to health communication-related policies and documents.	1	2	3	4	5

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Annex B: Phase 2 Questionnaire

Questionnaire on Health Communication Ability, Sense of Organizational Support and Self-efficacy

Dear Clinicians:

Greetings! Thank you for taking your valuable time to participate in this questionnaire. This survey was initiated by the Health Communication Research Team of Guangdong Medical University and Southern Medical University to find out the health communication ability, organizational support and self-efficacy of clinicians. The questionnaire is anonymous, there is no right or wrong answer, and the results of the survey are for academic research only, and are promised to be absolutely confidential, so there is no need to have any concerns. Thank you for your participation and cooperation! We wish you a happy working life!

Part 1: Your basic information

1. Gender: A male ☐ B female ☐
2. Age: _____ years old
3. Ethnic group: A Han ethnic group ☐ B Minority ethnic group ☐
4. Marital status: A unmarried ☐ B married ☐ C divorced ☐ D other ☐
5. Years of service: _____ years
6. Institutional level: A tertiary hospital ☐ B secondary hospital ☐ C hospitals below secondary level ☐
7. Institution type: A General Hospital ☐ B Women's and Children's Hospital ☐
C Traditional Chinese Medicine Hospital ☐ D Other Hospital ☐
8. Pre tax annual income (including salary, benefits, etc., rounded to whole numbers): _____ 10000 RMB.
9. Are you a permanent staff: A Yes ☐ B No ☐
10. Education level: ① Associate degree ☐ ② Undergraduate degree ☐
③ Master's degree ☐ ④ Doctoral degree ☐
11. Position: ① None ☐ ② Basic management position ☐ ③ Middle-level management deputy position (department deputy position) ☐ ④ Middle-level management main position (department main position) ☐ ⑤ Deputy position of institute leadership (vice president, center deputy director) ☐ ⑥ Institute leadership main position (dean, center director) ☐
12. Title: ① Junior (Assistant Physician) ☐ ② Junior (Resident Physician) ☐ ③ Intermediate ☐
④ Deputy High ☐ ⑤ Senior High ☐
13. Clinical departments: A. Internal Medicine Department ☐ B. Surgery Department ☐ C. Obstetrics and Gynecology Department ☐ D. Pediatrics Department ☐ E. Mental Health Department ☐ F. Eye, Ear, Nose and Throat Department ☐ G. General Surgery ☐ H. Anesthesiology ☐ I. Infectious Diseases ☐ J. Emergency Medicine ☐ K. Rehabilitation Medicine ☐ L. Preventive Health Care ☐ M. Department of Dermatology and Sexually Transmitted

- Diseases ☐ N. Department of Stomatology ☐ O. Department of Traditional Chinese Medicine ☐ P. Other departments ☐
14. Do you have a certain understanding of health transmission: A Yes ☐ B No ☐
15. Have you received training related to health communication: A Yes ☐ B No ☐

Part 2: Clinical Physician Health Communication Ability Scale (Please choose an appropriate number in the multiple-choice questions below and tick "√" to indicate your level of approval: 1=strongly disagree; 2=disagree; 3=neutral (neither agree nor disagree); 4=agree; 5=strongly agree)

Items	options				
1. I am sensitive to health communication-related policies and documents.	1	2	3	4	5
2. I am sensitive to social issues related to health.	1	2	3	4	5
3. I can respect cultural differences between ethnic groups, regions, and urban and rural areas in health communication.	1	2	3	4	5
4. I can utilize existing health communication channels, platforms, teams, venues, and other related resources.	1	2	3	4	5
5. I can organize and plan health communication activities.	1	2	3	4	5
6. I can condense and summarize relevant clinical cases and apply them to health	1	2	3	4	5
7. I can express myself verbally, listen, and interact.	1	2	3	4	5
8. I can work in a team.	1	2	3	4	5
9. I recognize the role of health communication in my professional development.	1	2	3	4	5
10. I recognize the role of health communication in enhancing the influence of specialties and promoting the development of hospitals.	1	2	3	4	5
11. I recognize the role of health communication in improving public health literacy and promoting the construction of a healthy China.	1	2	3	4	5
12. I recognize the role of health communication in counteracting health-related rumors.	1	2	3	4	5
13. I can use new media (e.g., WeChat, TikTok, Weibo, etc.) to communicate about health.	1	2	3	4	5
14. I can communicate health through traditional media (e.g., TV, radio, newspapers, and magazines).	1	2	3	4	5
15. I can conduct "one-to-one" health communication with patients and audiences in outpatient clinics and wards.	1	2	3	4	5
16. I can communicate with patients and audiences in "one-to-many" situations (e.g., patient groups, clinics, lectures, etc.).	1	2	3	4	5
17. My health communication content is scientific.	1	2	3	4	5
18. My health communication content is practical.	1	2	3	4	5
19. My health communication content is public service and contains no commercial information.	1	2	3	4	5
20. My health communication content is easy to understand.	1	2	3	4	5
21. My health communication content is timely and relevant to current events and	1	2	3	4	5
22. I can think differently and put myself in my audience's shoes.	1	2	3	4	5
23. I can detect and grasp the psychological changes of the audiences and take countermeasures.	1	2	3	4	5
24. I can encourage my audiences to apply health knowledge and improve their health communication.	1	2	3	4	5
25. I can summarize the key points of health communication and help audiences understand and remember them.	1	2	3	4	5

Items	options				
26. I can guide my audiences to discuss and share their health knowledge with people around them and encourage them to improve their health behaviors.	1	2	3	4	5
27. I can help my audiences to form good health concepts and improve their health behaviors.	1	2	3	4	5
28. I can improve the health of my audiences.	1	2	3	4	5
29. Judging from the number of readers of my health works, the number of sessions of my health talks, and the number of audiences, my health communication reaches a	1	2	3	4	5

Part 3: Clinicians' Sense of Organizational Support Scale (please indicate your level of approval by ticking the appropriate number in the following multiple choice questions: 1=Strongly Disagree; 2=Disagree; 3=Neutral (Neither Agree nor Disagree); 4=Agree; 5=Strongly Agree)

Items	options				
1. Hospital / department to provide adequate training or lectures	1	2	3	4	5
2. The hospital/department will provide opportunities and platforms for development	1	2	3	4	5
3. The department is not too concerned about my personal development	1	2	3	4	5
4. The hospital's title/position promotion system is reasonable.	1	2	3	4	5
5. The hospital/department will provide suggestions for my career development planning.	1	2	3	4	5
6. The hospital or department will help me when I encounter difficulties at work.	1	2	3	4	5
7. The hospital will provide research resources, such as funding, laboratories, etc.	1	2	3	4	5
8. The hospital's information platform (e.g., doctor's workstation, medical technology system) is efficient and convenient.	1	2	3	4	5
9. The hospital has sufficient medical supplies and instruments	1	2	3	4	5
10. My working environment is safe	1	2	3	4	5
11. The hospital/department has a fair and reasonable performance appraisal system	1	2	3	4	5
12. I think the salary offered by the hospital is reasonable	1	2	3	4	5
13. I can be paid for overtime work.	1	2	3	4	5
14. I believe that the hospital will not dismiss me easily.	1	2	3	4	5
15. The hospital has relevant measures to prevent violent behaviors such as medical malpractice.	1	2	3	4	5
16. The hospital is my strong support in case of doctor-patient disputes.	1	2	3	4	5
17. I think the working atmosphere in the hospital is very harmonious.	1	2	3	4	5
18. I think the leadership cares about me	1	2	3	4	5
19. I work well with my colleagues	1	2	3	4	5
20. Colleagues will help me when I need them.	1	2	3	4	5
21. Colleagues will be happy for me when I make achievements in my work.	1	2	3	4	5
22. I think the department respects my efforts and contributions.	1	2	3	4	5
23. The hospital/departmental merit system selects the best candidates.	1	2	3	4	5
24. I have the opportunity to participate in the decision-making of the department.	1	2	3	4	5

Items	options				
25. The department will give me the autonomy to work within my ability.	1	2	3	4	5
26. Leaders are willing to listen to my reasonable suggestions.	1	2	3	4	5

Part 4: Patient-Centered Self-Efficacy Scale (please read carefully and judge how confident you are that you can treat patients in the way described in the health communication process by ticking the box that best matches your situation. 0=not at all convinced, 1=somewhat convinced, 2=somewhat convinced, 3=more convinced, 4=fully convinced)

Items	options				
1. Make the patient feel that I am genuinely interested in knowing what he/she thinks about his/her situation	0	1	2	3	4
2. Make the patient feel that I have time to listen	0	1	2	3	4
3. Recognize the patient's thoughts and feelings	0	1	2	3	4
4. Be attentive and responsive	0	1	2	3	4
5. Be aware of when the patient is scared or concerned	0	1	2	3	4
6. Treat the patient in a caring manner	0	1	2	3	4
7. Make the patient experience me as empathetic	0	1	2	3	4
8. Make the patient feel that he/she can talk with me about confidential, personal issues	0	1	2	3	4
9. Show a genuine interest in the patient and his/her situation	0	1	2	3	4
10. Focus on compassion, care and symptomatic treatment, when there is no curative treatment	0	1	2	3	4
11. Record a complete medical history	0	1	2	3	4
12. Reach agreement with the patient about the treatment plan to be implemented	0	1	2	3	4
13. Advise and support the patient in making decisions about his/her treatment	0	1	2	3	4
14. Ensure that the patient makes his/her decisions on an informed basis	0	1	2	3	4
15. Explain the diagnosis and treatment plan to the patient so that he/she understands	0	1	2	3	4
16. Explain things so that the patient feels well-informed	0	1	2	3	4
17. Inform the patient about the expected side effects, so the patient understands them	0	1	2	3	4
18. Explain how the treatment works or is expected to work	0	1	2	3	4
19. Explain how the treatment is likely to affect the patient's condition, so that the patient understands	0	1	2	3	4
20. Explain the treatment procedures, so that the patient understands them	0	1	2	3	4
21. Accept when there is no longer curative treatment for the patient	0	1	2	3	4
22. Be aware of when my own feelings affect my communication with the patient	0	1	2	3	4
23. Deal with my own emotional reactions when the situation is difficult for me	0	1	2	3	4
24. To maintain the relationship with the patient when he/she is angry	0	1	2	3	4
25. To stay focused on what is best for the patient if there is a professional disagreement about the diagnosis and treatment	0	1	2	3	4
26. Avoid letting myself be influenced by preconceptions about the patient	0	1	2	3	4

Items	options				
27. Separate my personal views from my approach in the professional situation	0	1	2	3	4

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Annex C: Tables Not in The Text

Table C.1 Index system of health communication ability of clinician

First Indexes	Level	Second indexes	Level	Third Level Indexes	Index Connotation	Scale Conversion Problems (0-5 Likert sliding problems)
1.Environmental conditions		1.1 Ability to grasp soft environment		1.1.1 Policy sensitivity	Pay attention to the policies and documents in national health communication, health education, health promotion, and other related fields, have a relatively sensitive insight and judgment of the policy and situation, and apply them to health communication.	I am sensitive to health communication-related policies and documents.
				1.1.2 Social hotspot sensitivity	Pay attention to social hot issues and development trends, have sensitive insight and judgment on the health events concerning the audience, and carry out health communication according to the hot spots.	I am sensitive to social issues related to health.
				1.1.3 Cultural sensitivity	Respect cultural differences between ethnic groups, regions, and urban and rural areas.	I can respect cultural differences between ethnic groups, regions, and urban and rural areas in health communication.
2.Disseminator		1.2 Ability to grasp hard environment		1.2.1Rational use of health communication resources and places inside and outside hospitals	Use existing communication channels, platforms, teams, and other relevant resources to carry out health communication.	I can utilize existing health communication channels, platforms, teams, venues, and other related resources.
				2.1.1 Have the basic theory, basic knowledge and basic skills of medical profession	Have the basic knowledge, theory, and skills of the medical profession.	I have the basic knowledge, theories, and skills in medical specialties.

2.2 Health communication concerning ability	2.1.2 Knowledge of medical ethics and medical laws and regulations	Have professional ethics, have a certain sense of law-abiding and legal judgment, and practice ability.	I know medical ethics and medical laws and regulations.
	2.1.3 Health communication awareness	Have a certain understanding and knowledge of the communication conditions, motives, people, content, channels, audience and effects of health communication.	I have some knowledge of or have received training in health communication.
	2.2.1 Ability to create health communication production (such as written materials, PPT, or short videos, jitterbugs, etc.)	Can plan or write copywriting or create health communication production (written materials, PPT, or short videos, jitterbugs, etc.) through various forms.	I can create health communication works (written materials, PPT, or short videos, jitterbugs, etc.).
	2.2.2 Organization and planning ability	Have the ability to organically integrate various resources and organize and plan a series of health communication activities.	I can organize and plan health communication activities.
	2.2.3 Case sharing capability	Have the ability to summarize relevant clinical cases and apply them to health communication practice	I can condense and summarize relevant clinical cases and apply them to health communication.
2.3 Health communication concerning literacy	2.2.4 Communication and expression ability	Good ability of language expression, empathy listening and interaction (including doctor-patient communication and audience interaction).	I can express myself verbally, listen, and interact.
	2.2.5 Teamwork ability	Be proactive and active in the team, respect others, and establish a good communication and collaboration mechanism to effectively complete health communication activities together.	I can work in a team.
	2.3.1 Health communication awareness	To recognize the purpose, value and significance of health communication.	I am health communication conscious.
	2.3.2 Intellectual property awareness	Attach importance to laws and regulations related to intellectual property protection, respect the intellectual property rights of others, and avoid infringement.	I value and respect intellectual property rights related to health communication.

3.Motive	3.1Self-interested motive	2.3.3 Continue to carry out health communication	Ability to carry out health communication activities and sustain them over a relatively long period.	I can be consistent in my health communication practice.
		2.3.4 Self-learning to improve ability	Continually learn and improve their professional knowledge level and health communication ability.	I can enhance my professional knowledge and health communication skills through self-learning.
		3.1.1 Recognize the role of health communication in building personal branding	It is recognized that health communication can improve the personal visibility of clinicians, allow more people to know clinicians' professional expertise and characteristics, and improve patients' trust and loyalty.	I recognize the role of health communication in building a personal brand.
		3.1.2 Recognize the role of health communication in career development	It is recognized that health communication can broaden the influence of doctors in the profession and can provide a boost to professional development.	I recognize the role of health communication in my professional development.
	3.2Altruistic motive	3.2.1To recognize the role of health communication in enhancing the influence of specialties and promoting the development of hospitals	The recognition of health communication can enhance the reputation of clinicians' specialties and hospitals, enhance the influence of specialties, and increase the competitiveness of hospitals.	I recognize the role of health communication in enhancing the influence of specialties and promoting the development of hospitals.
		3.2.2 To recognize the role of health communication in improving public health literacy and promoting the construction of a healthy China	Recognize that health communication can encourage the audience to read, understand, and use health information and thus promote the improvement of residents' health literacy.	I recognize the role of health communication in improving public health literacy and promoting the construction of a healthy China.
		3.2.3 Recognize the role of health communication in countering pseudoscience	The participation of clinicians in health communication can occupy the position of health communication with scientific and authoritative health knowledge, and increase the high-quality supply of health communication knowledge in society.	I recognize the role of health communication in counteracting health-related rumors.

4.Channels	4.1 Online communication	4.1.1 Use of new media (such as wechat, Tiktok, Weibo, etc.)	Able to effectively use new media, including but not limited to WeChat, TikTok, Weibo, Red, Bilibili, etc.	I can use new media (e.g., WeChat, Tiktok, Weibo, etc.) to communicate about health.
		4.1.2 Use of traditional media (e.g. TV, radio, newspapers, magazines, etc.)	Effective use of traditional media, including but not limited to television, radio, newspapers and magazines.	I can communicate health through traditional media (e.g., TV, radio, newspapers, and magazines).
	4.3 Personal communication	4.2.1 One-on-one communication (such as during diagnosis, treatment, outpatient, hospitalization, etc.)	In outpatient, ward rounds, return visits, and other situations, can effectively carry out health communication with audiences and patients in one-to-one communication.	I can conduct "one-to-one" health communication with patients and audiences in outpatient clinics and wards.
		4.2.2 One-to-many communication (such as patient association, free clinic, popular science seminar, industry conference, etc.)	Health communication can be effectively carried out in one-to-many situations such as patient meetings, free clinical treatment, popular science lectures, and industry conferences.	I can communicate with patients and audiences in "one-to-many" situations (e.g., patient groups, clinics, lectures, etc.).
5.Content	5.1Basic characteristics	5.1.1Scientific	It can ensure that health communication content is authoritative, scientific, credible, correct, and accurate.	My health communication content is scientific.
		5.1.2 Practicability	The communication content meets the immediate needs of the audience and can be applied by the audience.	My health communication content is practical.
		5.1.3 Commonweal	The communication does not contain any commercial information.	My health communication content is public service and contains no commercial information.
		5.1.4 Popularity	The communication content is easy to understand and easy to be understood by the audience.	My health communication content is easy to understand.
	5.2 Extended features	5.2.1 Timeliness	The communication content can be updated promptly based on current events and social hot spots.	My health communication content is timely and relevant to current events and social issues.
		5.2.2 Interest	The content of communication can arouse the interest of the audience, have attraction and appeal, and help them understand and remember.	My health communication content is interesting.

6. Audiences	6.1 Audience targeting	5.2.3 Artistry	Communication content with various forms of artistic expression enhances the readability and ornamental value of the content.	My health communication content is artistic.
		6.1.1 Identify the health status and health needs of the audience, and develop targeted health communication strategies	According to the characteristics and needs of different audiences, the corresponding communication plan and content can be customized to increase the effectiveness of health communication.	I can develop personalized health communication programs and content according to the characteristics and needs of different audiences.
		6.2.1 Be good at listening to audience	Be good at listening to the audience's voice and understanding the audience's emotions.	I am good at listening to my audiences.
	6.2 Audience psychology grasping	6.2.2 The ability to empathize and establish a shared understanding with the audience	Think from the audience's perspective, put the needs, expectations, and rights of the audience in an important position, and think and carry out health communication from their perspective.	I can think differently and put myself in my audience's shoes.
		6.2.3 Observation and adaptability, can detect and grasp the psychological changes of the audience	It can detect the emotional changes of the audience, detect the audience's acceptance, and flexibly adjust the health communication activities according to the psychological changes of the audience.	I can detect and grasp the psychological changes of the audiences and take countermeasures.
		6.3.1 Encourage the audience to use health knowledge and improve health behavior	Be able to encourage the audience to use what they learn about health and turn it into health actions to improve their health.	I can encourage my audiences to apply health knowledge and improve their health through practice.
	6.3 Audience health behavior guidance	6.3.2 Summarize the key points of health communication knowledge to help the audience understand and remember	It can sort out and summarize complex health knowledge and present it to the audience concisely and transparently so that the audience is easier to understand and remember.	I can summarize the key points of health communication and help audiences understand and remember them.
		6.3.3 Guide the audience to discuss and share health knowledge with people around them, and drive people around	Encourage the audience to share what they have learned about health with family, friends or colleagues to inspire others to pay attention and improve their own health behaviors.	I can guide my audiences to discuss and share their health knowledge with people around them and encourage them to improve their health behaviors.

		to improve health behavior together		
7.Effect	7.1 Physiological benefits	7.1.1 Increased health knowledge of the audience	After clinicians carry out health communication, the audience can effectively acquire health knowledge and transform it into their own health literacy.	I can increase my audience's health knowledge.
		7.1.2 The audience formed a good health concept, and the health behavior was improved	After the clinicians carry out health communication, the audience can understand the health knowledge and apply it to their own preventive care.	I can help my audiences to form good health concepts and improve their health behaviors.
		7.1.3 The health of the audience has improved	After the clinician conducts health communication, the audience can promote or maintain a healthy situation.	I can improve the health of my audiences.
	7.2 Social benefits	7.2.1 Coverage and audience of health communication	Readers of health communication works, the scope and audience of health communication.	Judging from the number of readers of my health works, the number of sessions of my health talks, and the number of audiences, my health communication reaches a wide range of people and scope.

Table C.2 Table of Cronbach's alpha coefficients for the 43-entry health communication ability scale

Cronbach's alpha coefficient	Standardized coefficient	Cronbach's alpha	Item count	sample size
0.987	0.987		43	431

Table C.3 Summary statistics of deleted analysis items

Items	Average value after deletion of entries	Variance after deletion of terms	Correlation of deleted items with the total after deletion of items	Cronbach's coefficient after deletion of terms	alpha after
Item1	162.763	694.097	0.716	0.986	
Item2	162.68	693.353	0.748	0.986	
Item3	162.522	694.306	0.701	0.986	
Item4	162.684	692.082	0.762	0.986	
Item5	162.367	696.716	0.693	0.986	
Item6	162.508	694.967	0.739	0.986	
Item7	162.824	692.071	0.673	0.987	
Item8	162.877	688.02	0.764	0.986	
Item9	162.921	688.598	0.762	0.986	
Item10	162.814	688.575	0.779	0.986	
Item11	162.643	691.463	0.793	0.986	
Item12	162.543	692.565	0.805	0.986	
Item13	162.506	691.106	0.849	0.986	
Item14	162.503	689.678	0.798	0.986	
Item15	162.733	688.112	0.795	0.986	
Item16	162.543	690.086	0.804	0.986	
Item17	162.587	690.592	0.811	0.986	
Item18	162.548	690.36	0.804	0.986	
Item19	162.466	690.403	0.824	0.986	
Item20	162.415	692.109	0.804	0.986	
Item21	162.443	691.805	0.79	0.986	
Item22	162.761	688.885	0.787	0.986	
Item23	162.875	687.728	0.766	0.986	
Item24	162.696	687.993	0.821	0.986	
Item25	162.71	687.913	0.823	0.986	
Item26	162.52	691.227	0.841	0.986	
Item27	162.508	690.855	0.865	0.986	
Item28	162.485	692.548	0.791	0.986	
Item29	162.561	691.033	0.821	0.986	
Item30	162.742	687.303	0.856	0.986	
Item31	162.77	688.335	0.845	0.986	
Item32	162.886	689.529	0.809	0.986	
Item33	162.807	690.621	0.833	0.986	
Item34	162.601	690.836	0.81	0.986	
Item35	162.575	690.905	0.844	0.986	
Item36	162.691	690.739	0.845	0.986	
Item37	162.638	689.776	0.876	0.986	
Item38	162.668	690.218	0.857	0.986	
Item39	162.712	690.061	0.83	0.986	
Item40	162.731	690.295	0.723	0.986	
Item41	162.74	690.086	0.763	0.986	
Item42	162.752	689.573	0.76	0.986	
Item43	162.993	692.044	0.685	0.987	

Table C. 4 KMO test and Bartlett's test

KMO test and Bartlett's test		
KMO value		0.977
	approximate chi-square	23600.796
Bartlett's test of sphericity	df	903
	P	0.000***

Table C.5 Table of factor loading coefficients (43 items)

Items	Post-rotation factor loading coefficients							Commonality (common factor variance)
	Factor1	Factor2	Factor3	Factor4	Factor5	Factor6	Factor7	
1. I am sensitive to health communication-related policies and documents.	0.188	0.273	0.195	0.249	0.147	0.205	0.752	0.84
2. I am sensitive to social issues related to health.	0.26	0.228	0.196	0.215	0.248	0.225	0.727	0.844
3. I can respect cultural differences between ethnic groups, regions, and urban and rural areas in health communication.	0.357	0.154	0.18	0.169	0.223	0.156	0.725	0.811
4. I can utilize existing health communication channels, platforms, teams, venues, and other related resources.	0.206	0.324	0.259	0.296	0.267	0.163	0.578	0.734
5. I have the basic knowledge, theories, and skills in medical specialties.	0.436	0.06	0.164	0.332	0.521	0.147	0.232	0.678
6. I know medical ethics and medical laws and regulations.	0.305	0.143	0.224	0.47	0.484	0.215	0.161	0.691
7. I have some knowledge of, or training in, health communication.	0.14	0.377	0.181	0.402	0.038	0.457	0.243	0.625
8. I can create health communication works (written materials, PPT, or short videos, jitterbugs, etc.).	0.209	0.353	0.205	0.732	0.206	0.159	0.146	0.835
9. I can organize and plan health communication activities.	0.193	0.315	0.18	0.772	0.155	0.19	0.218	0.872
10. I can condense and summarize relevant clinical cases and apply them to health communication.	0.24	0.306	0.19	0.716	0.282	0.143	0.188	0.836
11. I can express myself verbally, listen, and interact.	0.358	0.179	0.305	0.632	0.255	0.125	0.241	0.792
12. I can work in a team.	0.451	0.195	0.344	0.505	0.23	0.154	0.239	0.748
13. I am health communication conscious.	0.485	0.226	0.36	0.412	0.228	0.282	0.249	0.779
14. I value and respect intellectual property rights related to health communication.	0.559	0.165	0.272	0.417	0.173	0.262	0.261	0.755
15. I can be consistent in my health communication practice.	0.323	0.441	0.343	0.395	0.046	0.25	0.287	0.72
16. I can enhance my professional knowledge and health communication skills through self-learning.	0.532	0.178	0.278	0.435	0.201	0.26	0.24	0.748
17. I recognize the role of health communication in building a personal brand.	0.681	0.396	0.235	0.23	0.238	0.156	0.15	0.832
18. I recognize the role of health communication in my professional development.	0.69	0.382	0.224	0.196	0.203	0.197	0.185	0.825
19. I recognize the role of health communication in enhancing the influence of specialties and promoting the development of hospitals.	0.728	0.315	0.224	0.192	0.255	0.194	0.235	0.875
20. I recognize the role of health communication in improving public health literacy and promoting the construction of a healthy China.	0.696	0.172	0.259	0.217	0.336	0.185	0.255	0.841
21. I recognize the role of health communication in counteracting health-related rumors.	0.668	0.218	0.266	0.198	0.321	0.184	0.221	0.79

22. I can use new media (e.g., WeChat, Tiktok, Weibo, etc.) to communicate about health.	0.337	0.719	0.213	0.242	0.156	0.147	0.219	0.829
23. I can communicate health through traditional media (e.g., TV, radio, newspapers, and magazines).	0.217	0.78	0.233	0.245	0.154	0.179	0.177	0.857
24. I can conduct "one-to-one" health communication with patients and audiences in outpatient clinics and wards.	0.358	0.686	0.208	0.241	0.278	0.16	0.203	0.844
25. I can communicate with patients and audiences in "one-to-many" situations (e.g., patient groups, clinics, lectures, etc.).	0.315	0.681	0.259	0.252	0.247	0.19	0.197	0.829
26. My health communication content is scientific.	0.359	0.283	0.263	0.259	0.631	0.23	0.252	0.861
27. My health communication content is practical.	0.371	0.293	0.3	0.272	0.587	0.242	0.269	0.863
28. My health communication content is public service and contains no commercial information.	0.355	0.238	0.236	0.196	0.688	0.199	0.249	0.852
29. My health communication content is easy to understand.	0.298	0.287	0.343	0.214	0.654	0.227	0.201	0.854
30. My health communication content is timely and relevant to current events and social issues.	0.249	0.438	0.438	0.231	0.413	0.283	0.227	0.802
31. My health communication content is interesting.	0.188	0.488	0.467	0.247	0.353	0.277	0.224	0.805
32. My health communication content is artistic.	0.12	0.545	0.49	0.296	0.211	0.276	0.193	0.797
33. I can develop personalized health communication programs and content according to the characteristics and needs of different audiences.	0.189	0.438	0.533	0.313	0.242	0.263	0.214	0.784
34. I am good at listening to my audiences.	0.319	0.191	0.712	0.235	0.242	0.206	0.227	0.853
35. I can think differently and put myself in my audience's shoes.	0.379	0.214	0.7	0.224	0.264	0.224	0.207	0.891
36. I can detect and grasp the psychological changes of the audiences and take countermeasures.	0.316	0.343	0.676	0.232	0.205	0.264	0.164	0.867
37. I can encourage my audiences to apply health knowledge and improve their health through practice.	0.342	0.344	0.599	0.241	0.279	0.291	0.204	0.857
38. I can summarize the key points of health communication and help audiences understand and remember them.	0.283	0.374	0.575	0.221	0.288	0.32	0.202	0.826
39. I can guide my audiences to discuss and share their health knowledge with people around them and encourage them to improve their health behaviors.	0.288	0.423	0.58	0.237	0.169	0.297	0.172	0.802
40. I can increase my audience's health knowledge.	0.232	0.187	0.257	0.17	0.209	0.778	0.198	0.872
41. I can help my audiences to form good health concepts and improve their health behaviors.	0.23	0.232	0.281	0.18	0.239	0.776	0.189	0.913
42. I can improve the health of my audiences.	0.249	0.245	0.288	0.182	0.216	0.75	0.179	0.88

43. Judging from the number of readers of my health works, the number of sessions of my health talks, and the number of audiences, my health communication reaches a wide range of people and scope.

Table C.6 Cronbach's alpha coefficient table

Cronbach's alpha coefficient	Standardized Cronbach's alpha coefficient	Item count	Sample size
0.978	0.979	29	663

Table C.7 Summary of deleted analysis statistics

Items	Average value after deletion of items	Variance after deletion of items	Correlation of deleted items with the total after deletion of items	Cronbach's coefficient after deletion of terms	α after
Item 1	108.46	275.361	0.625	0.978	
Item 2	108.395	275.091	0.641	0.978	
Item 3	108.054	275.39	0.626	0.978	
Item 4	108.324	273.54	0.702	0.977	
Item 8	108.627	272.177	0.658	0.978	
Item 9	108.771	271.364	0.675	0.978	
Item 10	108.502	270.498	0.759	0.977	
Item 11	108.291	272.883	0.761	0.977	
Item 17	108.247	271.77	0.748	0.977	
Item 18	108.207	271.475	0.814	0.977	
Item 19	108.113	272.043	0.827	0.977	
Item 20	108.045	272.59	0.81	0.977	
Item 21	108.066	272.89	0.773	0.977	
Item 22	108.481	270.761	0.739	0.977	
Item 23	108.637	271.208	0.683	0.978	
Item 24	108.231	269.815	0.809	0.977	
Item 25	108.271	269.34	0.841	0.977	
Item 26	108.161	271.229	0.854	0.977	
Item 27	108.148	271.329	0.859	0.977	
Item 28	108.13	271.43	0.833	0.977	
Item 29	108.202	271.279	0.841	0.977	
Item 34	108.187	271.889	0.816	0.977	
Item 35	108.158	272.393	0.823	0.977	
Item 36	108.326	271.909	0.808	0.977	
Item 37	108.246	271.603	0.842	0.977	
Item 38	108.276	271.702	0.837	0.977	
Item 40	108.228	271.986	0.827	0.977	
Item 41	108.267	271.794	0.811	0.977	
Item 42	108.297	272.191	0.771	0.977	

Table C.8 KMO test and Bartlett's test

KMO test and Bartlett's test		
KMO value		0.971
	approximate chi-square	21600.487
Bartlett's test of sphericity	df	406
	P	0.000***

Table C.9 Explaining Total Variance

Total Variance Explained				Post-rotation variance explained		
Ingredient	characteristic root	Explanation of variance (%)	Cumulative percentage (%)	Characteristic root	Explanation of variance (%)	Cumulative percentage (%)
	Characteristic root					
1	18.269	62.997%	62.997%	7.225	24.915%	24.915%
2	1.521	5.245%	68.242%	4.57	15.758%	40.673%

3	1.364	4.704%	72.946%	3.363	11.597%	52.27%
4	1.037	3.577%	76.523%	3.167	10.92%	63.19%
5	0.673	2.322%	78.845%	2.319	7.995%	71.185%
6	0.572	1.973%	80.818%	1.914	6.6%	77.786%
7	0.529	1.824%	82.641%	1.408	4.856%	82.641%
8	0.485	1.672%	84.313%			
9	0.43	1.482%	85.795%			
10	0.405	1.397%	87.192%			
11	0.378	1.302%	88.494%			
12	0.329	1.134%	89.628%			
13	0.297	1.026%	90.654%			
14	0.288	0.992%	91.646%			
15	0.267	0.919%	92.565%			
16	0.234	0.807%	93.372%			
17	0.216	0.745%	94.116%			
18	0.197	0.68%	94.796%			
19	0.191	0.659%	95.455%			
20	0.178	0.614%	96.069%			
21	0.172	0.595%	96.664%			
22	0.165	0.568%	97.232%			
23	0.157	0.54%	97.772%			
24	0.133	0.46%	98.231%			
25	0.126	0.434%	98.665%			
26	0.115	0.397%	99.062%			
27	0.106	0.365%	99.427%			
28	0.095	0.327%	99.754%			
29	0.071	0.246%	100%			

Table C.10 Factor covariates

Factor A	Factor B	Non-standard estimated coefficients	Standard error	z	P	Standardized estimated coefficient
Factor 1	Factor 2	0.309	0.025	12.397	0.000***	0.756
Factor 1	Factor 3	0.286	0.023	12.688	0.000***	0.772
Factor 1	Factor 4	0.284	0.023	12.212	0.000***	0.754
Factor 1	Factor 5	0.29	0.022	13.138	0.000***	0.747
Factor 1	Factor 6	0.273	0.021	12.763	0.000***	0.734
Factor 1	Factor 7	0.263	0.021	12.383	0.000***	0.676
Factor 2	Factor 3	0.314	0.025	12.521	0.000***	0.728
Factor 2	Factor 4	0.372	0.028	13.133	0.000***	0.848
Factor 2	Factor 5	0.338	0.025	13.389	0.000***	0.747
Factor 2	Factor 6	0.329	0.025	13.258	0.000***	0.761
Factor 2	Factor 7	0.318	0.025	12.924	0.000***	0.702
Factor 3	Factor 4	0.34	0.026	13.299	0.000***	0.854
Factor 3	Factor 5	0.352	0.024	14.547	0.000***	0.857
Factor 3	Factor 6	0.318	0.023	13.854	0.000***	0.81
Factor 3	Factor 7	0.309	0.023	13.617	0.000***	0.75
Factor 4	Factor 5	0.367	0.026	14.3	0.000***	0.881
Factor 4	Factor 6	0.348	0.025	13.946	0.000***	0.874
Factor 4	Factor 7	0.351	0.025	14.028	0.000***	0.841
Factor 5	Factor 6	0.354	0.023	15.265	0.000***	0.863
Factor 5	Factor 7	0.347	0.023	15.102	0.000***	0.804
Factor 6	Factor 7	0.381	0.024	15.869	0.000***	0.926

Table C.11 Results of frequency analysis of respondents' demographic sociological information (disaggregated data)

Form	Categories	Frequency	Percentage (%)
Gender	Male	372	53.067
	Female	329	46.933
Ethnic group	Han ethnic group	690	98.431
	National minority	11	1.569
Marital status	Married	548	78.174
	Unmarried	136	19.401
	Divorcee	15	2.14
	Bereaved of one's spouse	2	0.285
Hospital level	Grade 2	252	35.949
	Grade 3A	229	32.668
	Grade 3	115	16.405
	Grade 2A	105	14.979
	General hospital	380	54.208
Type of organization	Maternal and child health hospital	147	20.97
	Chinese medicine hospital	97	13.837
	Others	77	10.984
Authorized strength	Yes	379	54.066
	No	322	45.934
Educational level	Undergraduate	433	61.769
	Master's degree	134	19.116
	Three-year college	109	15.549
	Doctoral	25	3.566
	not have	527	75.178
Position	Deputy in middle management post	78	11.127
	Middle management post	59	8.417
	Basic management positions	32	4.565
	Deputy to the Head of the Faculty	4	0.571
	Head of the Faculty	1	0.143
add up the total		701	100.000
Title	Middle level (in a hierarchy)	231	32.953
	Junior A	179	25.535
	Deputy senior	135	19.258
	Junior B	86	12.268
	Full senior	70	9.986
	16	162	23.11
	1	160	22.825
	2	110	15.692
	4	63	8.987
	3	52	7.418
	15	34	4.85
	11	28	3.994
	8	26	3.709
	10	22	3.138
	14	10	1.427
Clinical department	13	9	1.284
	12	7	0.999
	7	5	0.713
	9	5	0.713

6	4	0.571
5	4	0.571

Table C.12 Results of describing demographic sociological information of respondents (quantitative)

Variable name	Sample size	Maximum values	Minimum value	average value	Standard deviation	Upper quartile	Variance	Kurtosis	Skewness	CV
Age	701	60	23	37.725	8.724	36	76.106	0.555	0.561	0.231
Years of experience	701	40	2	13.642	9.243	12	85.442	-0.46	0.682	0.678
Annual income	701	70	6	14.994	7.775	12	60.451	6.441	1.97	0.519

Table C.13 Results of frequency analysis of demographic sociological information of respondents (quantitative)

Variable name	Groups	Frequency	Percentage (%)
Age	[23.0,32.25]	230	32.81
	[32.25,41.5]	256	36.519
	[41.5,50.75]	142	20.257
	[50.75,60.0]	73	10.414
Years of experience	[2.0,11.5]	338	48.217
	[11.5,21.0]	216	30.813
	[21.0,30.5]	107	15.264
	[30.5,40.0]	40	5.706
Annual income	[6.0,22.0]	605	86.305
	[22.0,38.0]	81	11.555
	[38.0,54.0]	14	1.997
	[54.0,70.0]	1	0.143

Table C.14 Results of frequency analysis of respondents' health communication ability scores

Variant name	Groups	Frequency	Percentage (%)
environmental conditions	[1.0,2.0]	2	0.285
	[2.0,3.0]	13	1.854
	[3.0,4.0]	353	50.357
	[4.0,5.0]	333	47.504
evangelist	[1.25,2.188]	7	0.999
	[2.188,3.125]	255	36.377
	[3.125,4.062]	346	49.358
	[4.062,5.0]	93	13.267
Motivation for dissemination	[1.4, 2.3]	1	0.143
	[2.3, 3.2]	143	20.399
	[3.2, 4.1]	364	51.926
	[4.1,5.0]	193	27.532
Channels of communication	[1.0,2.0]	2	0.285
	[2.0,3.0]	34	4.85
	[3.0,4.0]	388	55.35
	[4.0,5.0]	277	39.515
Dissemination of content	[1.0,2.0]	1	0.143
	[2.0,3.0]	10	1.427
	[3.0,4.0]	260	37.09
	[4.0,5.0]	430	61.341
Target audience	[2.0,2.75]	4	0.571
	[2.75,3.5]	195	27.817
	[3.5,4.25]	363	51.783
	[4.25,5.0]	139	19.829
Propagation effect	2	2	0.285
	2.3333333333333333	1	0.143

	2.6666666666666667	6	0.856
	3	184	26.248
	3.3333333333333333	46	6.562
	3.6666666666666667	58	8.274
	4	279	39.8
	4.3333333333333333	39	5.563
	4.6666666666666667	21	2.996
	5	65	9.272
	[2.517,3.138]	144	20.542
health communication	[3.138,3.759]	165	23.538
ability	[3.759,4.379]	300	42.796
	[4.379,5.0]	92	13.124

Table C.15 Results of Frequency Analysis of Respondents' Organizational Support Scores

Variant name	Groups	Frequency	Percentage (%)
Development support	[1.5,2.375]	20	2.853
	[2.375,3.25]	226	32.24
	[3.25,4.125]	377	53.78
	[4.125,5.0]	78	11.127
Work support	[1.0,2.0]	7	0.999
	[2.0,3.0]	65	9.272
	[3.0,4.0]	415	59.201
	[4.0,5.0]	214	30.528
Interest protection	[1.0,2.0]	16	2.282
	[2.0,3.0]	114	16.262
	[3.0,4.0]	398	56.776
	[4.0,5.0]	173	24.679
Interpersonal support	[1.0,2.0]	5	0.713
	[2.0,3.0]	30	4.28
	[3.0,4.0]	362	51.641
	[4.0,5.0]	304	43.367
Respect support	[1.0,2.0]	9	1.284
	[2.0,3.0]	53	7.561
	[3.0,4.0]	377	53.78
	[4.0,5.0]	262	37.375
Organizational support	[1.16, 2.12]	6	0.856
	[2.12,3.08]	178	25.392
	[3.08,4.04]	411	58.631
	[4.04,5.0]	106	15.121

Table C.16 Results of frequency analysis of respondents' self-efficacy scores

Variant name	Groups	Frequency	Percentage (%)
Exploring the patient perspective	[0.0,1.0]	1	0.143
	[1.0,2.0]	46	6.562
	[2.0,3.0]	227	32.382
	[3.0,4.0]	427	60.913
Sharing information and power	[0.0,1.0]	1	0.143
	[1.0,2.0]	25	3.566
	[2.0,3.0]	187	26.676
	[3.0,4.0]	488	69.615
Dealing with communicative challenges	[0.0,1.0]	1	0.143
	[1.0,2.0]	27	3.852
	[2.0,3.0]	202	28.816
	[3.0,4.0]	471	67.19
Self-efficacy	[0.0,1.0]	1	0.143

[1.0,2.0)	33	4.708
[2.0,3.0)	248	35.378
[3.0,4.0]	419	59.772

Table C.17 Overall descriptive results of respondents' health communication ability scores

variable name	sample size	maximum values	minimum value	average value	(statistics) standard deviation	upper quartile	variance (statistics)	kurtosis	skewness	CV
environmental conditions	701	5	1	3.755	0.628	3.75	0.394	-0.032	0.091	0.167
evangelist	701	5	1.25	3.516	0.65	3.5	0.423	-0.008	0.326	0.185
Motivation for dissemination	701	5	1.4	3.894	0.631	4	0.399	-0.505	0.02	0.162
Channels of communication	701	5	1	3.613	0.652	3.5	0.425	0.113	0.218	0.18
Dissemination of content	701	5	1	3.856	0.66	4	0.436	-0.237	-0.058	0.171
target audience	701	5	2	3.87	0.63	4	0.397	-0.617	0.083	0.163
Communication effect	701	5	2	3.778	0.628	4	0.395	-0.563	0.172	0.166
health communication ability	701	5	2.517	3.763	0.557	3.828	0.31	-0.457	0.231	0.148

Table C.18 Overall descriptive results of respondents' Organizational Support Score

variable name	sample size	maximum values	minimum value	average value	(statistics) standard deviation	upper quartile	variance (statistics)	kurtosis	skewness	CV
Development support	701	5	1.5	3.517	0.634	3.5	0.402	0.087	0.204	0.18
Work support	701	5	1	3.514	0.663	3.4	0.44	0.461	0.129	0.189
Interest protection	701	5	1	3.393	0.693	3.333	0.48	0.206	0.08	0.204
Interpersonal support	701	5	1	3.704	0.653	3.8	0.426	0.71	-0.109	0.176
Respect support	701	5	1	3.613	0.689	3.8	0.474	0.667	-0.137	0.191
Organizational support	701	5	1.16	3.543	0.604	3.52	0.365	0.384	0.184	0.171

Table C.19 Overall Descriptive Results of Respondents' Self-Efficacy Scores

variable name	sample size	maximum values	minimum value	average value	(statistics) standard deviation	upper quartile	variance (statistics)	kurtosis	skewness	CV
Exploring the patient perspective	701	4	0	2.97	0.691	3	0.478	-0.027	-0.377	0.233
Sharing information and power	701	4	0	3.083	0.694	3	0.481	0.128	-0.55	0.225
Dealing with communicative challenges	701	4	0	3.054	0.705	3	0.498	-0.071	-0.451	0.231
Self-efficacy	701	4	0	3.036	0.663	3	0.44	0.209	-0.509	0.219

Table C.20 Table of Cronbach's alpha coefficients for the health communication ability scale

Cronbach's coefficient	alpha	Standardized coefficient	Cronbach's alpha	Item count	Sample size
0.975		0.975		29	701

Table C.21 Table of Cronbach's alpha coefficients for the Organizational Support Scale

Cronbach's coefficient	alpha	Standardized coefficient	Cronbach's alpha	Item count	Sample size
0.969		0.969		25	701

Table C.22 Cronbach's alpha coefficients for self-efficacy scale

Cronbach's coefficient	alpha	Standardized coefficient	Cronbach's alpha	Item count	Sample size
0.983		0.983		26	701

Table C.23 KMO test and Bartlett's test for health communication ability scale

KMO test and Bartlett's test					
KMO value					0.968
		approximate square	chi-		20887.743
Bartlett's test of sphericity		df			406
		P			0.000***

Table C.24 KMO test and Bartlett's test for organizational support scale

KMO test and Bartlett's test					
KMO value					0.972
		approximate chi-square			15215.07
Bartlett's test of sphericity		df			300
		P			0.000***

Table C.25 KMO test and Bartlett's test for self-efficacy scale

KMO test and Bartlett's test					
KMO value					0.98
		approximate square	chi-		22262.433
Bartlett's test of sphericity		df			325
		P			0.000***

Table C.26 Table of factor loading coefficients for the health communication ability scale

Factor	Variant	Non-standard load factors	Standardized load factor	z	S.E.	P
Factor 1	Item 1	1	0.738	-	-	-
	Item 2	1.054	0.767	19.636	0.054	0.000***
	Item 3	1.012	0.755	19.321	0.052	0.000***
	Item 4	1.078	0.816	20.898	0.052	0.000***
Factor 2	Item 5	1	0.82	-	-	-
	Item 6	1.035	0.857	26.575	0.039	0.000***
	Item 7	0.962	0.84	25.821	0.037	0.000***
	Item 8	0.746	0.708	20.462	0.036	0.000***
Factor 3	Item 9	1	0.726	-	-	-
	Item 10	1.083	0.819	21.788	0.05	0.000***
	Item 11	1.203	0.905	24.24	0.05	0.000***
	Item 12	1.206	0.923	24.735	0.049	0.000***
	Item 13	1.15	0.85	22.676	0.051	0.000***

Factor 4	Item 14	1	0.765	-	-	-
	Item 15	0.947	0.728	19.968	0.047	0.000***
	Item 16	0.971	0.807	22.535	0.043	0.000***
	Item 17	1.012	0.828	23.255	0.044	0.000***
Factor 5	Item 18	1	0.907	-	-	-
	Item 19	1.028	0.93	41.683	0.025	0.000***
	Item 20	1.007	0.872	35.236	0.029	0.000***
	Item 21	0.999	0.896	37.739	0.026	0.000***
Factor 6	Item 22	1	0.874	-	-	-
	Item 23	1.03	0.887	33.811	0.03	0.000***
	Item 24	1.039	0.883	33.559	0.031	0.000***
	Item 25	1.05	0.906	35.488	0.03	0.000***
Factor 7	Item 26	1.011	0.866	32.161	0.031	0.000***
	Item 27	1	0.892	-	-	-
	Item 28	0.967	0.888	34.728	0.028	0.000***
	Item 29	0.972	0.873	33.457	0.029	0.000***

Table C.27 Table of factor loading coefficients for the organizational support scale

Factor	Variant	Non-standard load factors	Standardized load factor	z	S.E.	P
Factor 1	Item 1	1	0.694	-	-	-
	Item 2	1.154	0.813	19.836	0.058	0.000***
	Item 3	1.171	0.764	18.742	0.063	0.000***
	Item 4	1.32	0.809	19.756	0.067	0.000***
Factor 2	Item 5	1	0.801	-	-	-
	Item 6	0.954	0.755	22.167	0.043	0.000***
	Item 7	1.061	0.78	23.111	0.046	0.000***
	Item 8	0.96	0.765	22.548	0.043	0.000***
Factor 3	Item 9	0.91	0.753	22.088	0.041	0.000***
	Item 10	1	0.828	-	-	-
	Item 11	0.988	0.813	25.691	0.038	0.000***
	Item 12	0.891	0.658	19.147	0.047	0.000***
Factor 4	Item 13	0.653	0.648	18.791	0.035	0.000***
	Item 14	0.797	0.777	24.024	0.033	0.000***
	Item 15	0.92	0.828	26.382	0.035	0.000***
	Item 16	1	0.81	-	-	-
Factor 5	Item 17	0.999	0.8	24.647	0.041	0.000***
	Item 18	0.954	0.866	27.673	0.034	0.000***
	Item 19	1.002	0.893	29.004	0.035	0.000***
	Item 20	1.036	0.897	29.216	0.035	0.000***
Factor 6	Item 21	1	0.883	-	-	-
	Item 22	1.049	0.831	29.844	0.035	0.000***
	Item 23	0.945	0.749	24.795	0.038	0.000***
	Item 24	0.943	0.84	30.443	0.031	0.000***
Factor 7	Item 25	0.981	0.827	29.581	0.033	0.000***

Table C.28 Table of factor loading coefficients for the self-efficacy scale

Factor	Variant	Non-standard load factors	Standardized load factor	z	S.E.	P
Factor 1	Item 1	1	0.822	-	-	-
	Item 2	1.034	0.849	27.893	0.037	0.000***
	Item 3	1.107	0.89	30.103	0.037	0.000***
	Item 4	1.05	0.883	29.732	0.035	0.000***
	Item 5	1.083	0.883	29.722	0.036	0.000***
	Item 6	1.044	0.874	29.208	0.036	0.000***

	Item 7	1.101	0.891	30.149	0.037	0.000***
	Item 8	1.011	0.723	22.034	0.046	0.000***
	Item 9.	1.038	0.874	29.212	0.036	0.000***
	Item 10	1	0.801	-	-	-
	Item 11	0.992	0.828	25.955	0.038	0.000***
	Item 12	0.927	0.696	20.55	0.045	0.000***
	Item 13	1.058	0.868	27.832	0.038	0.000***
Factor 2	Item 14	1.085	0.904	29.595	0.037	0.000***
	Item 15	1.116	0.925	30.734	0.036	0.000***
	Item 16	1.108	0.926	30.78	0.036	0.000***
	Item 17	1.101	0.919	30.407	0.036	0.000***
	Item 18	1.096	0.924	30.638	0.036	0.000***
	Item 19	1.064	0.907	29.753	0.036	0.000***
	Item 20	1	0.818	-	-	-
Factor 3	Item 21	0.953	0.82	26.202	0.036	0.000***
	Item 22	0.989	0.895	30.072	0.033	0.000***
	Item 23	0.987	0.86	28.162	0.035	0.000***
	Item 24	1.02	0.881	29.277	0.035	0.000***
	Item 25	1.024	0.897	30.182	0.034	0.000***
	Item 26	1.016	0.84	27.168	0.037	0.000***

Table C.29 Health communication ability scale model fit indicators

Commonly used indicators	X ²	df	RMSEA	RMR
Standard of judgment	-	-	<0.10	<0.05
Value	2473.149	356	0.092	0.032

Table C.30 Organizational support scale model fit indicators

Commonly used indicators	X ²	df	RMSEA	RMR
Standard of judgment	-	-	<0.10	<0.05
Value	1863.629	265	0.093	0.035

Table C.31 Self-efficacy scale model fit indicators

Commonly used indicators	X ²	df	RMSEA	RMR
Standard of judgment	-	-	<0.10	<0.05
Value	1597.995	296	0.079	0.02

Table C.32 Table of ANOVA results (clinical departments)

Variable name	Variable value	Sample size	Average value	Standard deviation	Variance test	Welch's ANOVA test
health communication ability	11.0	28	4.001	0.606	F=1.384 P=0.149	F=1.586 P=0.112
	16.0	162	3.714	0.549		
	1.0	160	3.791	0.558		
	2.0	110	3.829	0.573		
	7.0	5	3.676	0.398		
	15.0	34	3.832	0.604		
	8.0	26	3.509	0.57		
	6.0	4	3.491	0.192		
	3.0	52	3.742	0.57		
	4.0	63	3.772	0.505		
	13.0	9	3.533	0.509		
	10.0	22	3.727	0.566		
	14.0	10	3.655	0.476		
	5.0	4	3.526	0.425		

self-efficacy	9.0	5	3.503	0.48	F=0.667 P=0.818	F=0.632 P=0.834
	12.0	7	4.01	0.44		
	11.0	28	3.255	0.566		
	16.0	162	3.002	0.675		
	1.0	160	3.035	0.649		
	2.0	110	3.073	0.71		
	7.0	5	2.923	0.523		
	15.0	34	3.126	0.761		
	8.0	26	2.871	0.833		
	6.0	4	2.837	0.591		
	3.0	52	3.113	0.628		
	4.0	63	2.99	0.619		
	13.0	9	2.786	0.664		
	10.0	22	3.037	0.571		
	14.0	10	2.881	0.549		
	5.0	4	3.221	0.522		
	9.0	5	2.885	0.641		
	12.0	7	3.126	0.501		

Table C.33 Results of ridge regression analysis (independent variable: five dimensions of organizational support)

K=0.198	Non-standardized coefficient		Standardized coefficient	t	P	R ²	Adjustment of R ²	F
	B	standard error	Beta					
constant	1.526	0.114	-	13.417	0.000***	0.497	0.477	24.603 (0.000***)
Development support	0.227	0.024	0.259	9.339	0.000***			
Work support	0.087	0.023	0.103	3.749	0.000***			
Interest protection	0.004	0.022	0.004	0.158	0.875			
Interpersonal support	0.162	0.023	0.19	6.995	0.000***			
Respect support	0.104	0.022	0.128	4.73	0.000***			
Age	0.002	0.001	0.026	1.272	0.204			
Years of experience	0	0.001	0.007	0.317	0.752			
Annual income	0.002	0.002	0.023	0.88	0.379			
Marital status_2.0	0.068	0.033	0.051	2.042	0.042**			
Marital status_3.0	0.121	0.09	0.032	1.342	0.180			
Marital status_4.0	0.089	0.24	0.009	0.373	0.709			
Hospital grade_3	0.027	0.036	-0.018	-0.758	0.449			
Hospital grade_2A	0.006	0.037	0.004	0.158	0.874			
Hospital	0.062	0.029	-0.054	-2.17	0.030**			

grade_2					
No					
authorized strength	-0.07	0.029	-0.062	-2.428	0.015**
Level of education_2.0	0.025	0.028	0.022	0.878	0.380
Level of education_3.0	0.052	0.035	0.037	1.479	0.140
Level of education_4.0	0.031	0.072	0.01	0.43	0.667
Position_2.0	0.024	0.061	-0.009	-0.395	0.693
Position_3.0	0.004	0.044	0.003	0.101	0.920
Position_4.0	0.049	0.049	-0.024	-0.988	0.323
Position_5.0	0.04	0.17	-0.005	-0.235	0.814
Position_6.0	0.564	0.338	-0.038	-1.669	0.096*
Title_2.0	0.014	0.031	-0.011	-0.453	0.650
Title_3.0	0.048	0.028	0.041	1.745	0.082*
Title_4.0	0.088	0.033	0.063	2.675	0.008***
Title_5.0	0.03	0.046	0.016	0.656	0.512

Dependent variable: health communication ability

Table C.34 Results of ridge regression analysis (independent variable: three dimensions of self-efficacy)

K=0.201	Non-standardized		Standardized		t	P	Adjust		F
	coefficient	standard error	coefficient	Beta			R ²	ment of R ²	
	B								
constant	2.222	0.097	-	22.912	0.000***				
Identifying Patient Needs	0.196	0.022	0.243	8.939	0.000***				
Sharing information and power	0.155	0.021	0.193	7.492	0.000***				
Addressing communication challenges	0.148	0.021	0.187	7.131	0.000***				
Age	0	0.001	0	0.012	0.991	0.468	0.449	23.777	
Years of experience	-0.002	0.001	-0.032	1.544	0.123			(0.000***)	
Annual income	0	0.002	-0.003	0.11	0.912				
Marital status_2.0	0.073	0.034	0.054	2.137	0.033**				
Marital status_3.0	0.038	0.092	0.01	0.407	0.684				
Marital status_4.0	-0.001	0.245	0	-0.003	0.997				
Hospital Grade_3	0.043	0.036	0.029	1.182	0.238				
Hospital Grade 2A	-0.006	0.038	-0.004	-0.167	0.867				

Hospital Grade_2	-0.049	0.029	-0.043	-1.678	0.094*
No authorized strength	-0.067	0.029	-0.06	-2.277	0.023**
Level of education_2.0	0.032	0.029	0.028	1.131	0.259
Level of education_3.0	0.074	0.036	0.053	2.081	0.038**
Level of education_4.0	0.116	0.073	0.039	1.583	0.114
Position_2.0	0.01	0.063	0.004	0.163	0.871
Position_3.0	0.072	0.045	0.041	1.616	0.107
Position_4.0	0.083	0.05	0.041	1.65	0.100*
Position_5.0	0.17	0.174	0.023	0.976	0.329
Position_6.0	0.427	0.346	-0.029	-1.234	0.218
Title_2.0	0.046	0.032	-0.036	-1.44	0.150
Title_3.0	0.008	0.028	-0.007	-0.287	0.774
Title_4.0	0.023	0.034	0.016	0.682	0.496
Title_5.0	0.011	0.047	0.006	0.243	0.808

Dependent variable: health communication ability

Table C.35 Results of ridge regression analysis (dependent variable: five dimensions of organizational support)

K=0.188	Non-standardized coefficient	Standardized coefficient	t	P	R ²	Adjustment of R ²	F
	B	standard error	Beta				
constant	0.553	0.146	-	3.783	0.000***		
Development support	0.164	0.033	0.157	5.019	0.000***		
Work support	0.092	0.031	0.091	2.942	0.003***		
Protection of interests	0.037	0.03	0.039	1.234	0.217		
Interpersonal support	0.24	0.031	0.236	7.717	0.000***		
Respect Support	0.089	0.029	0.092	3.006	0.003***		
Age	0.004	0.002	0.049	2.125	0.034**		
Years of experience	0.005	0.002	0.07	2.928	0.004***	0.387	20.389 (0.000***)
Annual income	0.002	0.002	0.027	0.938	0.348		
Hospital Grade_3	-0.07	0.047	-0.039	1.472	0.142		
Hospital Grade_2A	0.032	0.049	0.017	0.66	0.509		
Hospital Grade_2	-	0.038	-0.042	-1.546	0.122		
No authorized strength	-	0.022	-0.016	-0.577	0.564		
Position_2.0	-	0.033	-0.01	-0.407	0.684		

Position	-				
_3.0	0.003	0.058	-0.002	-0.055	0.956
Position	-				
_4.0	0.129	0.065	-0.054	-1.984	0.048**
Position	-				
_5.0	0.221	0.225	-0.025	-0.984	0.325
Position	-				
_6.0	0.452	0.446	-0.026	-1.014	0.311
Title_2.0	0.048	0.042	0.031	1.136	0.256
Title_3.0	0.085	0.037	0.06	2.272	0.023**
Title_4.0	0.077	0.045	0.046	1.716	0.087*
Title_5.0	0.025	0.061	0.011	0.407	0.684
Dependent variable: self-efficacy					

Table C.36 Stratified random sampling table

Type of hospital	Number of clinicians	Percentage	Sample size	Effective sample size
Grade 3A	2648	0.325	258	229
Grade 3	1350	0.166	131	115
Grade 2A	1189	0.146	116	105
Grade 2	2959	0.363	287	252
Total	8146	1	792	701