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Differences in Evaluation of Perceived Physician Communication Behaviours from Dual Perspectives of Physicians and Patients

ZHAO Ying

Doctor of Management

Supervisors:
PhD Sílvia da Silva, Full Professor,
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Abstract

Communication is a vital element of medical humanism and an important factor in the physician-patient relationship. This research aims to establish a physician-patient relationship evaluation system using physician communication behaviours as key indicators. It investigates the disparities in evaluating perceived physicians' communication behaviours from dual perspectives of doctors and patients.

This research utilized CiteSpace software to analyse literature from CNKI and PubMed, identifying trends and hotspots in humanism and doctor-patient relationships. A questionnaire survey was conducted with 504 patients and 189 primary care doctors. The patient questionnaire covered demographics, medical visits preferences, and PCBES (Physician Communication Behaviours Evaluation Scale), while the doctor questionnaire included demographics, PCBES, and PCBRQ (Physician Communication Behaviours Recognition Questionnaire).

The results reveal that: 1) Patient's age, educational, concern about physician's qualification, medical knowledge, and preference in listing concerns before a visit impact their PCBES scores. 2) Doctors' demographics minimally affect their PCBES scores compared to their PCBRQ scores; doctors consistently rate their PCBRQ scores higher than their PCBES scores. Additionally, a positive correlation exists between doctors' PCBES and PCBRQ scores. 3) Apart from Item Q12 (doctor's affability), significant discrepancies in PCBES scores between physicians and patients are noted for all other items. Moreover, physicians' PCBES scores exceed patients' evaluations for all items except for Q15 (doctor's directive questioning).

This research addresses a theoretical gap in studying cognitive differences regarding communication skills between physicians and patients. Practical recommendations include enhancing physician communication training, aligning cognition with behaviour, and implementing targeted strategies.

Keywords: communication, physician-patient relationship, doctor's perspective, patient's perspective, KAP model

JEL: I11; I18

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Resumo

A comunicação é um elemento vital para o humanismo na atividade do médico e um fator importante na relação médico-paciente. O objetivo desta tese é estabelecer um sistema de avaliação da relação médico-paciente utilizando os comportamentos de comunicação dos médicos como indicadores centrais. Investiga-se as disparidades na avaliação das perceções dos comportamentos de comunicação na perspetiva dos médicos e dos pacientes.

Nesta investigação usou-se o CiteSpace software para analisar a literatura nas bases CNKI e PubMed identificando as tendências principais e "hotspots" sobre humanismo e relações médico-paciente. Foi aplicado um questionário a 504 pacientes e 189 médicos de cuidados primários. O questionário dos pacientes incluiu variáveis demográficas, preferências sobre as consultas médicas e a escala PCBES (*Physician Communication Behaviours Evaluation Scale*). O questionário dos médicos incluiu características demográficas, a escala PCBES, e a escala PCBRQ (*Physician Communication Behaviours Recognition Questionnaire*).

Os resultados revelam que: 1) A idade do paciente, a educação, a preocupação com a qualificação do médico, o conhecimento médico e a identificação de preocupações antes de uma visita afetam a pontuação na PCBES. 2) As características demográficas dos médicos afetam ligeiramente a pontuação na PCBES em comparação com os resultados na PCBRQ; os médicos apresentam pontuações mais elevadas na PCBRQ do que na PCBES. Além disso, os resultados dos médicos na PCBES estão positivamente correlacionados com a PCBRQ. 3) Excluindo o item Q12 (afabilidade dos médicos), foram observadas discrepâncias significativas entre médicos e pacientes para todos os outros itens da escala PCBES. Além disso, os resultados dos médicos na PCBES excedem as avaliações dos pacientes para todos os itens, exceto para o Q15 (questões diretivas colocadas pelos médicos).

Esta investigação aborda a lacuna teórica no estudo das diferenças cognitivas sobre as competências de comunicação entre médicos e pacientes. As recomendações práticas incluem melhorar a formação dos médicos na área da comunicação, alinhar a cognição com o comportamento e implementar estratégias para melhorar a comunicação.

Palavras-chave: comunicação, relação médico-paciente, perspetiva do médico, perspetiva do paciente, modelo KAP

JEL: I11; I18

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摘 要

沟通是医学人文素养的主要内涵，也是影响医患关系的重要因素。本研究旨在构建以医生沟通技巧为评价指标的医患关系评价体系，并探究医患双方视角下，对其感知的医生沟通技巧进行评价的差异。

本研究采用 CiteSpace 软件对 CNKI 及 PubMed 文献进行分析，确定了人文素养与医患关系研究中的热点和变化趋势。本研究还对 504 名患者和 189 名初级保健医生进行了问卷调查。患者问卷涉及了人口学特征、就医偏好以及对医生沟通行为的评价（即 PCBES 问卷），而医生问卷则包括了人口学特征、PCBES 问卷以及对自身沟通技巧的认可度评价（即 PCBRQ 问卷）。

结果显示：1）患者的年龄、教育程度、对医生资质的关注、医学知识、就诊前会列出自己关心问题的偏好程度，影响患者的 PCBES 评分；2）医生的人口学特征对医生的 PCBES 自评分的影响相对其对 PCBRQ 自评分的影响来说比较小；医生的 PCBRQ 自评分高于 PCBES 自评分；医生的 PCBRQ 自评分与 PCBES 自评分呈正相关；3）除了 Q12 条目（医生具有亲切感），其他条目的医生 PCBES 自评分与患者的 PCBES 评分相比具有显著差异；而且，除了 Q15 条目（医生提问有诱导性），其他条目的医生 PCBES 自评分都高于患者的 PCBES 评分。

本研究在理论上填补了医患双方对沟通技巧认知差异的研究空白，在实践层面的建议包括加强沟通技巧培训，促进医生认知与行为的统一，并实施有针对性的策略。

关键词：沟通, 医患关系, 医生视角, 患者视角, 知信行理论

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List of Abbreviations

BATHE	Background-Affect-Trouble-Handling-Empathy
BBN	Breaking bad news
CAT	Communication Assessment Tool
CHS	Community health service
CNKI	China National Knowledge Infrastructure
COVID-19	Corona Virus Disease 2019
CVD	Cardiovascular disease
DDPRQ	Difficult Doctor-Patient Relationship Questionnaire
EHR	Electronic health records
GDHC	Goal-directed health care
GPs	General practitioners
HIV	Human immunodeficiency virus
KAP	Knowledge-attitude-practice
LCSAS	Liverpool Communication Skills Assessment Scale
MCA	Milestones Communication Approach
MIPS	Merit-based Incentive Payment System
PCC	Patient-centred communication
PCCS	Patient confidence in communication scale
PCMC	Person-centred maternity care
PCSS	Patient's Communication Perceived Self-efficacy Scale
PCBRQ	Physician Communication Behaviours Recognition Questionnaire
PCBES	Physician Communication Behaviours Evaluation Scale
PDRQ	Patient-Doctor Relationship Questionnaire
PDA	Patient decision aids
QOL	Quality-of-life
RCGP	Royal College of General Practitioners
RCS	Relational/communication skills
SDM	Shared decision making
SMART	Specific, Measurable, Acceptable, Realistic and Timely
SP	Standardized patient
T2DM	Type 2 diabetes mellitus

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Chapter 1: Introduction

1.1 Harmonious doctor-patient relationship: the foundation of medical development

In discussions of various issues related to contemporary societal development, health care stands as an irreplaceable cornerstone, vital for ensuring public health and promoting social harmony and progress. Health care services are not only about curing diseases and alleviating suffering; they also form an emotional bond between doctors and patients, built on trust and mutual efforts in facing life's challenges. In this complex and delicate interaction, the harmony of the doctor-patient relationship directly affects patients' health and lives, the efficient utilization of medical resources, and the overall stability and harmony of society.

A harmonious doctor-patient relationship, simply put, refers to a balanced and coordinated mutual interaction between doctors and patients within medical activities. It is characterized by mutual understanding, trust, and a friendly rapport. This relationship is fundamental to the health care delivery process, influencing various critical areas.

1) A harmonious doctor-patient relationship is the foundation for health promotion and treatment. In the medical process, patient trust is a prerequisite for successful treatment. When mutual respect, trust, and understanding are established between doctors and patients, patients are more likely to follow medical advice, improving treatment adherence, thereby accelerating recovery and enhancing treatment outcomes. Such positive interaction not only aids in disease recovery but also significantly boosts patient satisfaction, promoting the overall physical and mental well-being of the patient (He et al., 2020).

2) A harmonious doctor-patient relationship is a key guarantee of medical quality. The quality of health care directly impacts patient safety and well-being. In a harmonious doctor-patient relationship, doctors can better understand the patients' condition and needs. This leads to more personalized and accurate treatment plans. Moreover, good communication helps promptly identify and resolve potential issues during treatment, reducing the risk of misdiagnosis or improper treatment, and preventing potential medical disputes from arising. This further strengthens public trust in the health care system.

3) A harmonious doctor-patient relationship enhances doctors' sense of professional

identity and belonging. When doctors feel respected and trusted by patients, they are more likely to maintain their passion for medicine and remain committed to providing high-quality health care. This positive sense of professional fulfilment contributes to the stability of the health care workforce and the continuous development of medical services.

In conclusion, a harmonious doctor-patient relationship not only mirrors the quality of medical services but is also an essential marker of social harmony and advancement. Addressing the challenges in doctor-patient relationships and gradually improving and optimizing them is crucial for promoting the healthy development of the medical field.

1.2 Current tension in doctor-patient relationships

Despite the critical importance of a harmonious doctor-patient relationship in ensuring health care quality, patient well-being, and societal stability, recent trends in China reveal growing tensions. These strains are evident in various aspects.

1) Escalating medical disputes: There is a troubling increase in discontent among patients and their families concerning medical treatments and outcomes. Such dissatisfaction has even escalated into violent confrontations directed at health care workers. A survey (Jia et al., 2014) by the Chinese Hospital Association from 2008 to 2012 highlighted a steady rise in such violence. It found that health care workers increasingly faced verbal abuse and threats, with affected hospitals rising from 90% in 2008 to 96% in 2012. More alarmingly, physical assaults on medical personnel leading to severe injuries or deaths rose from 47.7% in 2008 to 63.7% in 2012. These unfortunate events act as catalysts, further intensifying the already strained doctor-patient relationship.

2) Psychological burden on health care professionals: Doctors are increasingly experiencing significant psychological stress and professional burnout. In response, some doctors choose to minimize their interactions with patients to avoid potential conflicts, which further deepens the gap between doctors and patients. Additionally, certain media outlets exacerbate this issue by offering biased or exaggerated reports on medical disputes, fostering greater public distrust in the healthcare system and creating a vicious cycle.

It is important to note that the current tension in doctor-patient relationships has not emerged overnight, but rather is the result of multiple factors accumulating over time.

On one hand, the highly specialized nature of the medical field creates an inherent information asymmetry between doctors and patients. Patients often lack sufficient medical knowledge and find it difficult to fully understand the complexity of diseases and the details of

treatment plans. Meanwhile, due to heavy workloads or inadequate communication skills, doctors may fail to clarify these issues clearly, leading to misunderstandings or dissatisfaction among patients. In some instances, some doctors may dominate consultations, limiting patients' opportunities to voice their concerns, which can make patients feel sidelined and compelled to passively accept diagnoses and treatment results. This communication barrier hinders the development of a trusting relationship between doctors and patients.

On the other hand, as medical technology advances and patient awareness of health issues increases, expectations for healthcare quality and safety also rise. However, due to the uneven distribution of health care resources, some patients face difficulties in accessing affordable medical care, which fuels dissatisfaction with the healthcare system. Furthermore, the over-concentration of medical resources can result in inconsistent quality of care, further intensifying the tension between doctors and patients.

1.3 Doctors' humanistic qualities: a factor influencing doctor-patient relationships

After analysing the root causes of doctor-patient disputes, we increasingly recognize that behind these complex issues often lies a fundamental shortcoming—the lack of humanistic qualities in doctors. A doctor's humanistic qualities, as a bridge between medical technology and patient emotions, not only serve as a lubricant to ease information asymmetry but also as a key to resolving communication barriers and rebuilding trust between doctors and patients. The understanding, attitude, awareness, and sense of mission of medical professionals toward medical humanities directly affect the current state and future development of harmonious doctor-patient relationships. Therefore, enhancing doctors' humanistic qualities and their capacity for humanistic care is a core driving force in improving doctor-patient relationships and fostering a harmonious healthcare environment.

Humanistic qualities in doctors encompass respect, empathy, compassion, and ethical integrity within medical practice. These qualities extend beyond mere technical expertise to include emotional engagement, psychological insight, and social responsibility, which are pivotal in interactions with patients.

More specifically, in the article "Ten Traits of Great Physicians! And Tips to Help You Improve", Higgins (2023) details ten qualities that distinguish great doctors from good doctors. These include being curious and investigative, maintaining personal health, effective listening skills, finding passion for work, treating the whole patient—not just the illness, showing

compassion, paying attention to detail, resilience, relaxing, a strong sense of responsibility, and adherence to their original motivations. Higgins uses ten case studies to demonstrate how these humanistic qualities benefit both doctors and patients, emphasizing that doctors should offer more than just technical medical services—they should also impart a spirit of humanity.

Doctors with robust humanistic qualities can communicate more effectively with their patients. They prioritize a patient-centred approach, attentively listening to patients' needs and concerns, and simplifying medical jargon to ensure patients fully grasp their health conditions and treatment options. This humanistic communication style helps alleviate patients' fears and anxiety, enhances trust and understanding between doctors and patients, and reduces misunderstandings and disputes arising from information asymmetry.

Enhancing humanistic qualities also positively affects doctors' attitudes towards service. Such doctors exhibit increased patience, attentiveness, and empathy, addressing not only the physical symptoms of their patients but also considering their mental and social well-being, thus providing comprehensive care and support. This holistic approach not only increases patient satisfaction with their treatment but also effectively prevents and reduces the occurrence of medical disputes. A study by Zhang (2015) of 13 public hospitals in Dongguan City revealed that, out of 630 medical disputes that occurred between 2007 and 2011, 266 were attributed to issues within the hospitals themselves. Among these, 11.7% were due to inadequate communication or failure to properly inform patients, 11.6% were aroused by the poor medical skills that did not meet the expected level of care, and 11.2% were engendered by weak sense of responsibility and poor service attitude, with other causes accounting for 7.7%. Notably, medical disputes arising from communication failures and inadequate responsibility were markedly higher than those from clinical errors, underscoring the critical need to enhance humanistic qualities in the medical profession.

Doctors' humanistic qualities significantly include their commitment to medical ethics and moral integrity. In practice, doctors often face complex ethical challenges; those with deep-rooted humanistic values navigate these challenges by upholding patient-centred care, respecting patient autonomy and privacy, and adhering strictly to ethical standards. This ethical commitment not only safeguards patients' rights and dignity but also enhances the physician's professional stature and public image.

Edward Livingston Trudeau's philosophy, "to cure sometimes, to relieve often, to comfort always" (Mathew, 2019, p. 1), resonates deeply within the medical community. While seemingly idealistic, this statement crucially steers medical professionals towards greater understanding and empathy in their practice.

1.4 Causes behind the lack of humanistic qualities in doctors

The underlying reasons for the current insufficiency of humanistic qualities in doctors can be analysed from several dimensions.

Firstly, the double-edged effect of technological advancement has led to an imbalance between technical reliance and humanistic care. With the rapid development of modern medical technology, high-precision equipment and intelligent diagnostic systems are widely applied in the medical field, significantly improving the efficiency and accuracy of diagnosis and treatment. However, this technological progress also poses a potential risk—doctors may become overly dependent on technology, neglecting emotional communication and humanistic care with patients. While technology can precisely treat diseases, it cannot replace the warmth and comfort that patients seek from their doctors. The traditional direct interaction between doctors and patients is increasingly being replaced by advanced instruments, and the trust in the doctor-patient relationship is gradually shifting toward a reliance on high-tech solutions by both parties (Wu, 2016). However, patients suffering from the torment of illness, while in contact with cold inspection equipment and hoping for the treatment of their diseases, also hope to hear warm words, detailed explanations of their conditions, protection of their privacy, and more care from their health care providers. A study conducted by Jiang et al. (2003) at the People's Liberation Army No. 302 Hospital found that the two most important factors affecting patient satisfaction were excellent medical skills (30.1%) and humanistic care (26.8%), highlighting that patients both value medical expertise and humanistic care equally.

Secondly, shortcomings in the educational framework are another key factor contributing to the lack of humanistic qualities in doctors. Currently, medical training in China has been skewed towards developing technical expertise and medical knowledge, driven by competitive academic environments and employment pressures. This method of teaching often concentrates on defining technical terms and imparting foundational principles while neglecting the cultivation of humanistic qualities. Consequently, this approach falls short of achieving the intended outcomes in humanistic quality education (Wang, 2007). Medical students trained under this system may have insufficient knowledge of the humanities, lack training in communication skills and empathy, and are not fully aware of the importance of providing proactive humanistic care in clinical practice (Zhou, 2015). Despite some advancements in incorporating humanistic education into medical curricula in some medical schools, the emphasis remains insufficient compared to the technical aspects. Regarding medical education, a study by Han et al. (2019) suggests that the future trend should aim to cultivate more

humanistic physicians who can work collaboratively to ensure patient safety. Medical students are urged to adapt to societal changes, embrace diversity, and actively engage in learning with the help of advanced technology. The context for medical education is extending beyond hospital walls into society at large, preparing students to handle more complex health challenges and interact with a broader spectrum of patient groups. Therefore, it is crucial to teach students to respect patient diversity and raise their awareness of healthcare disparities.

Lastly, societal misperceptions also contribute to the neglect and undervaluation of doctors' humanistic qualities. At the levels of health care institutions, society, and individuals, there is generally insufficient emphasis placed on the importance of humanistic qualities in doctors. Medical institutions often prioritize advancements in medical technology and revenue growth, overlooking the critical role that doctors' humanistic qualities play in improving health care service quality. Additionally, the absence of structured training programs and incentives that promote humanistic skills further exacerbates this issue. In the wider social context, utilitarian values have influenced the behaviour of some doctors, leading them to focus excessively on economic gains and professional status, while neglecting the social responsibility and humanistic care inherent in the medical profession. Moreover, individual doctors may struggle to invest sufficient time and energy in providing humanistic care and psychological support due to heavy workloads or insufficient awareness of its importance. Some doctors may adopt conservative treatment strategies out of fear of medical disputes, reducing communication with patients and further limiting the expression of humanistic qualities in their practice. These societal misperceptions collectively result in an incomplete understanding and uneven levels of humanistic qualities among health care professionals. Surveys have shown that the awareness of humanistic qualities among practicing doctors is relatively low (56.8%) (Huang & Qian, 2019), and perceptions of the problems within humanistic education vary depending on years of experience in the medical profession (Qi & Cui, 2017).

Modern medicine is a comprehensive inter-discipline integrating natural sciences, social sciences, and humanities. The era puts forward new requirements for medical staff. Doctors should treat patients as the object of diagnosis and treatment that integrates nature, society, and psychology, and they shall understand the common concept of "patient" as the organic unity of "illness" and "person". Therefore, the discussion on the role of humane accomplishment in the harmonious doctor-patient relationship, the call for the return of medical staff's humane accomplishment, and the emphasis upon strengthening the education of medical students' humane accomplishment can play a positive role in the healthy development of medical undertakings in the future.

With the increasing accessibility of the internet and media, patients can now obtain biomedical knowledge as easily as doctors. And the integration of artificial intelligence is streamlining the process for doctors to analyse digital data, thereby improving their diagnostic and prognostic abilities. Consequently, the non-analytical, humanistic aspects of medicine are becoming increasingly crucial, as they remain irreplaceable by technology (Johnston, 2018; Obermeyer & Emanuel, 2016).

1.5 Research problem and objectives

In exploring the current state of doctors' humanistic qualities and their potential impact on doctor-patient relationships, a major research challenge we face is the lack of a unified evaluation system and standards that effectively link doctors' humanistic qualities with patient satisfaction.

This issue is particularly evident in clinical practice, where patients may be discharged after successful treatment yet provide low satisfaction ratings for their doctors. The reasons behind this phenomenon are complex and multifaceted. One major factor is the discrepancies in expectations between doctors and patients. While patients may expect immediate recovery through treatment, whereas doctors focus more on the gradual control and improvement of the condition. Additionally, due to the specialized and complex nature of medical information, patients often find it difficult to fully understand the treatment plan, leading to misunderstandings or dissatisfaction with the treatment outcome. Another key factor is poor communication and lack of humanistic care. Due to heavy workloads, medical staff may focus too much on the technical aspects of treatment and fail to provide sufficient explanations and communication. This can also lead to neglecting patients' emotional care and psychological support. As the bearers of illness, patients often require more attention, reassurance, and encouragement. When these needs are not met, patient satisfaction naturally declines.

However, the existing evaluation systems in China have obvious limitations in reflecting patients' true experiences and doctors' humanistic care. The assessment of doctors' humanistic qualities and patient satisfaction often relies on different systems and perspectives, leading to an oversight of the intrinsic connection between the two. In China, the evaluation of doctors' humanistic qualities is typically conducted by medical institutions or educational departments, and the subjects of assessment are usually medical students and resident doctors (Peng et al., 2022; Wang et al., 2022; Zhang et al., 2022). Conversely, the evaluation of patient satisfaction primarily comes from health care regulatory authorities. Although hospitals also measure

patient satisfaction, they mostly use the evaluation system provided by the healthcare regulatory bodies, which mainly focuses on the assessment of health care institutions rather than individual health care providers (Yin et al., 2024). This separated approach to evaluation makes it difficult to fully and accurately reflect the impact of doctors' humanistic qualities on patient satisfaction. Additionally, it does not provide health care institutions and doctors with clear and actionable directions for improvement.

From a practical standpoint, doctors' humanistic literacy is primarily expressed through specific communication behaviours. It extends beyond compassion and psychological support to include an understanding of social and cultural factors, medical ethics, and diverse values. These elements are reflected in language, attitude, and communication style, directly shaping patients' trust and satisfaction. However, without effective communication skills and practical humanistic care, even doctors with high humanistic literacy may struggle to convey genuine empathy and respect. Likewise, an evaluation system that overlooks emotional interactions may fail to accurately capture doctors' humanistic literacy and its real-world influence on doctor-patient relationships.

Given these factors, communication serves as the critical bridge linking doctors' humanistic literacy with patient satisfaction. Through effective communication, doctors can fully express humanistic care, while patients can better perceive and evaluate doctors' professionalism and empathy. Thus, when designing an integrated evaluation system that reflects both doctor and patient perspectives, communication must be a core component. The evaluation criteria should emphasize communication methods, communication attitude, and communication skills.

Through the review of relevant literature, we also found that communication is a core component of doctors' humanistic qualities and a key factor influencing doctor-patient relationships. Therefore, constructing an evaluation system based on the perspectives of both doctors and patients, with communication skills as the primary assessment metric, can more accurately reveal the intrinsic connection between doctors' humanistic qualities and patient satisfaction. Such a system would help discover and improve doctor's deficiencies in achieving harmonious doctor-patient relationships, thereby standardizing and enhancing their professional qualities and skills. This, in turn, would support the healthy development of the medical workforce, foster harmonious doctor-patient interactions, and align with broader societal development goals.

1.6 Research questions and approaches

Establishing the aforementioned doctor-patient relationship evaluation system is the core objective of this research. To successfully achieve this goal, we have explored and focused on the following two core research questions:

Research Question 1: **What are the potential factors that influence the evaluation of physicians' communication behaviours by both patients and doctors?** These factors are complex and intertwined, encompassing specific behaviours like communication style and attitude, as well as deeper elements such as socio-cultural understanding, medical ethics, and values. This study particularly examines the demographic characteristics of both doctors and patients, along with patients' medical preferences, as these may impact their evaluations of physician communication.

Research Question 2: **Are there differing perceptions between patients and physicians regarding the physicians' communication behaviours during consultations?** Such differences might arise from varying expectations of communication effectiveness or discrepancies in understanding of medical information, which may further affect the harmony and trust in doctor-patient relationships. Specifically, patients might prioritize doctors' attentive listening and thorough explanations, whereas physicians might focus on the precision and completeness of information conveyed. Disparities in how communication skills are perceived and evaluated can lead to communication challenges, potentially impacting treatment outcomes and patient satisfaction.

In exploring these research questions, we have employed a combination of theoretical and empirical research methods to provide a deep and comprehensive analysis of these issues.

Theoretical study: We began by conducting a literature review and utilizing the CiteSpace software to perform a bibliometric analysis of the literature network, identifying and analysing high-frequency keywords in doctor-patient relationship studies related to humanistic qualities. This approach allowed us to pinpoint the key topics and trends in research on humanistic qualities and doctor-patient relationships. Through this theoretical exploration, we aim to develop a theoretical framework for evaluating doctors' humanistic qualities and doctor-patient relationships, providing a solid foundation for subsequent empirical analysis.

Empirical study: Building on the theoretical study, we selected communication as the focal element for this study, aiming to quantify doctors' communication behaviours and their self-assessment of communication skills. To achieve this, we crafted a measurement model and collected data through a questionnaire survey. The questionnaire was designed to assess doctors'

communication behaviours in clinical practice by both doctors and patients, as well as doctors' views on their own communication skills. Additionally, we conducted statistical analysis to examine how various demographic characteristics of both patients and doctors influence the evaluation of doctors' communication behaviour and doctors' recognition of their own communication skills. This step provides empirical evidence of the role that doctors' humanistic qualities play in real-world medical settings.

By integrating theoretical and empirical research, this study aims to offer a multi-dimensional perspective on the relationship between doctors' humanistic qualities and patient satisfaction. It also seeks to provide strategic recommendations for improving doctor-patient communication. Through this process, we hope that the study can deliver targeted and practical guidance for medical institutions and doctors to enhance humanistic care, refine communication methods, and optimize doctor-patient interactions in clinical practice.

1.7 Thesis Structure

Chapter 1: Introduction. This chapter provides an overview of the study, emphasizing that a harmonious doctor-patient relationship is essential for the medical field's sustainable development. It highlights current tensions in doctor-patient interactions and identifies doctors' humanistic literacy as a key influencing factor. The chapter analyses deficiencies in humanistic literacy among doctors and clarifies the study's problem and objectives—exploring disparities in doctors' and patients' evaluations of communication skills and their underlying factors. The chapter concludes by detailing two core research questions and the specific research methods used to pursue the research goals.

Chapter 2: Theoretical Background. This chapter presents a comprehensive review of key literature and theories on doctor-patient relationships and communication, laying a strong theoretical foundation for the study. Given the current research state on doctor-patient communication evaluation in China, it highlights the pressing need for an assessment system that integrates perspectives from both doctors and patients, using doctors' communication behaviours as the primary evaluation criterion.

Chapter 3: Network Analysis of Literature. Using CiteSpace software, this chapter conducts a literature analysis of CNKI and PubMed databases, identifying key research trends and hotspots related to humanism and doctor-patient relationships.

Chapter 4: Theoretical Model and Research Hypotheses. This chapter presents the study's theoretical model and hypotheses. Based on literature review, a theoretical model is

developed to analyse disparities in how doctors and patients evaluate doctors' communication skills. Corresponding hypotheses are proposed to guide the empirical research.

Chapter 5: Methodology. This chapter details the study's methodology, including the principles and steps for constructing the research questionnaire, data collection methods, statistical analysis methods, participant characteristics, and test results for reliability and validity.

Chapter 6: Results and Discussion. This chapter presents the statistical findings and their interpretation for the proposed research hypotheses. It examines how doctors' and patients' demographic characteristics, along with patients' medical preferences, influence their evaluations of doctors' communication behaviours.

Chapter 7: Conclusion. This chapter summarizes the key research findings and addresses the two core research questions. It then discusses their theoretical and managerial implications, acknowledges the study's limitations and offers suggestions and prospects for future research directions.

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Chapter 2: Theoretical Background

2.1 Physician-patient relationship

Physician-patient relationship is a vital concept in health care, especially in primary care. However, it is also a complex topic that means different things to different people. Some research in China has expanded the notion of physician-patient relationship beyond just the individual doctors and patients. It encompasses the broader relationship between the medical side (all institutions and personnel involved in medical activities, including doctors, nurses, administrators) and the patient side (patients and their families). This wider view is considered as the broad sense of the physician-patient relationship (Feng & Jin, 2022; Fu et al., 2010; Zhang et al., 2023). The narrow sense focuses on the specific therapeutic relationship between individual doctors and patients (Wang et al., 2022). In analysis of this complex concept, the connotation of physician-patient relationship often depends on the specific research context and objectives.

The broad connotation of doctor-patient relationships is mainly reflected in China's domestic research, focusing on two main aspects: a) sociological factors (Fu et al., 2010; Zhang & Zhu, 2021) such as social system construction, problem-solving mechanisms, philosophical ideologies, legal frameworks, and public opinion, b) social psychological aspects (Cui et al., 2022; Feng & Jin, 2022), including group identity formation, intergroup cognitive bias, institutional trust, and shifts in social mentalities. This body of research typically examines the macro-level influences that shape interactions within the health care system, providing a comprehensive view of the societal and psychological frameworks that impact these relationships.

In contrast, research such as that by Tang and Kang (2021) and Wang (2020) within China also frequently addresses doctor-patient dynamics from a narrower perspective. This approach concentrates on immediate, actionable solutions to improve strained doctor-patient interactions, such as enhancing medical humanistic care and improving communication strategies. This focus is more aligned with personal interactions and the direct relationship between health care providers and patients, emphasizing practical interventions to alleviate tensions and foster better mutual understanding.

However, our review of English literature using the search keyword of "Physician-Patient Relations" reveals a different emphasis. Studies from outside China rarely adopt the sociological lenses prevalent in Chinese research. Instead, international research tends to prioritize elements such as humanities, communication, empathy, and shared decision-making. These studies focus more on the interpersonal elements of the doctor-patient relationship, emphasizing medical humanistic care and doctors' humanistic literacy. This narrower interpretation typically homes in on the specific interactions between doctors and patients during the diagnostic and therapeutic processes.

Therefore, the assumption that differences in understanding doctor-patient relationships between China and other countries stem solely from variations in interpreting these relationships broadly or narrowly might be overly simplistic. More likely, these differences are rooted in distinct cultural background, variations in national health care systems, and the unique challenges each country faces in managing doctor-patient relationships. This suggests that while the conceptual framework may differ, the underlying concerns—effective communication, mutual respect, and the quality of patient care—remain universally important.

This thesis specifically explores the significant impact that doctors' communications skills have on the physician-patient relationship. The quality of this relationship is profoundly influenced by the interactions and mutual perceptions between individual doctors and patients. Analytical research centred on these interactions may directly and effectively enhance the harmony of these relationships. The focus on individual interpersonal dynamics allows for a more detailed and practical examination of how communication skills affect the therapeutic alliance. Therefore, rather than adopting a broader view that might encompass sociological or social psychological aspects of health care interactions, the analysis in this research adopts a narrower connotation of the physician-patient relationship, namely the interpersonal therapeutic alliance between individual doctors and patients. More specifically, we make an in-depth exploration of the dual perspectives of physicians and patients on the evaluation of physician communication behaviours, enabling the identification of key factors that influence the physician-patient relationship.

2.1.1 Models of physician-patient relationship

Regarding the models of doctor-patient relationships, there are two mainstream classifications. One is the four models of doctor-patient relationships described by Emanuel and Emanuel (1992): the paternalistic model, the informative model, the interpretive model, and the deliberative model. These models describe different perspectives on the goals of the physician–

patient interaction, the physicians' obligations, the role of patients' values, and the conception of patient autonomy.

In the paternalistic model, the physician steers the decision-making process, providing selective information to guide the patient towards consenting to the intervention deemed best by the physician. At its most extreme, the physician might dictate the terms of the intervention to ensure the patient's health is prioritized, thereby placing the physician in a position of authority over the patient's choices.

The informative model, also known as the scientific, engineering, or consumer model, positions the physician as a provider of all relative information, allowing the patient to choose their preferred medical interventions, and the physician to execute the selected interventions. In the extreme case, the patient can learn about all the medical information and available interventions, and then choose the interventions that most effectively realize their values. Here, the physician's role is a technical expert to execute the patient's decisions, emphasizing the patient's autonomy in controlling medical decisions.

In the interpretive model, the physician serves more as a counsellor or advisor, helping to clarify the patient's values and suggesting medical interventions that align with these values. At its deepest level, the physician aids the patient in understanding their life goals comprehensively, identifying their priorities, and deciding on treatments that best reflect their values, thus enhancing the patient's self-understanding.

The deliberative model casts the physician in the role of a teacher or friend, engaging in discussions with the patient about the best course of action. In the most involved scenario, the physician and patient deliberate on health-related values that the patient should consider, fostering the patient's moral self-development. This model focuses on enabling the patient to not just follow preferences but to thoughtfully consider their health-related values and the implications for their treatment.

These models fundamentally differ in their conception of patient autonomy. Through case analyses and critiques of these models, it is concluded that the deliberative model represents the ideal in physician-patient relationships, as it respects the patient's autonomy and encourages them to critically evaluate their values and preferences.

The other classification is the three basic models proposed by American doctors Szasz and Hollender (1956): activity-passivity, guidance-cooperation, and mutual participation. Within the conventional framework of activity-passivity, the doctor adopts an active and dominated role with absolute information advantage, while the patient remains wholly passive and disadvantaged. The second model, guidance-cooperation, constitutes the mainstream current

framework for physician-patient relationships in China. Under this framework, both doctors and patients exhibit initiative. In communication between both parties, doctors' opinions are more respected, and their professional guidance and services mobilize the initiative of patients in a limited capacity. This results in patients being willing to cooperate and coordinate with diagnosis and treatment. The third model is mutual participation, in which doctors and patients position equally and share healing as a collective goal. Both parties collaborate and take initiative in the healing process. This is undoubtedly the most reasonable and ideal model of doctor-patient relationship (Chen et al., 2019). According to Xiao (1999) a harmonious doctor-patient relationship signifies the coordinated interconnection through medical activities between doctor-centred and patient-centred groups. That is, a balance in rights and robust mutual trust are obtained between doctors and patients. Moreover, they form a moral community with common values, within which the two sides cooperate with each other, understand each other, and work together to restore health.

Another study by Ridd et al. (2009) suggests that an optimal doctor-patient relationship is characterized by four key elements: knowledge, trust, loyalty, and regard. Moreover, comprehensively delineating such relationships should encompass a high level of trust in the doctor's competence, interpersonal receptivity, mutual respect and understanding, alongside assurances of ease and liking. In contrast, inferior physician-patient relationships elicit patients' perceptions of neglect, disrespect, and dissolved cooperative alliance with the doctor (Chipidza et al., 2015).

In summary, among Emanuels' four models, the deliberative model is deemed the most ideal for physician-patient relationships, while in the framework of Szasz and Hollender, the mutual participation model is seen as the most reasonable. Both models emphasize equality between the physician and patient, with both parties collaboratively discussing treatment options and balancing rights effectively. Consequently, we have reason to consider, as Ridd et al. (2009) suggest, that a successful physician-patient relationship, irrespective of the model used, should encompass knowledge, trust, understanding, caring, and respect.

2.1.2 Research methods for analysing doctor-patient relationship

The relationship between doctors and patients is fundamentally based on effective communication. Consequently, there is a need for tools to assess the effectiveness of this communication. To gather relevant insights on these tools, we conducted a literature search using the PubMed platform. The PubMed search function enables retrieval of various types of articles, such as Books and Documents, Clinical Trial, Meta-Analysis, Randomized Controlled

Trial, Review, and Systematic Review. We used the keyword "Physician-Patient Relations AND communication" for our search on PubMed and categorized the resulting literature accordingly. Through detailed analysis of the search outcomes, we identified that the primary approaches to studying doctor-patient communication skills and their effectiveness include theoretical method, scale method, and interview method. Theoretical method involves developing frameworks and models for research, scale method typically utilizes questionnaires, and interview method often employ structured interviews to gather data. Each of these methods are explained as follows.

2.1.2.1 Theoretical method

The theoretical method often entails the development and refinement of theoretical frameworks and models by synthesizing literature reviews, expert insights, and practical experiences. An exemplar of this approach is "The Four Habits Model" devised by Frankel and Stein (2001). This model was crafted by drawing from extensive literature concerning medical interviews, enriched by the authors' own clinical and teaching experiences. The authors delineated four distinct behavioural patterns, which they termed "habits", and systematically reviewed the research evidence linking these habits to biomedical and functional outcomes in health care. This model serves as a practical and easy tool for physicians, offering a step-by-step approach to enhance doctor-patient interactions. By adopting this model, physicians can more effectively collect and apply clinical information, improving the accuracy and quality of their decisions. Consequently, this leads to a higher degree of mutual satisfaction between doctors and patients in medical practice.

Theoretical research on doctor-patient relationships is comprehensive and detailed, addressing a spectrum of topics. These range from broad studies on doctor-patient relationships such as the medical insurance system, dispute resolution mechanisms, medical confidentiality, and patient rights, to more focused discussions on specific aspects of the doctor-patient relationship, particularly theories related to social roles and doctor-patient communication.

The theoretical method is a staple in researching doctor-patient relationships. Researchers typically conduct a thorough review of existing literature, selecting sources based on specific criteria to align with their research goals. They then deeply analyse these sources within defined contexts or specific medical conditions. For instance, a study by Grauman et al. (2023) examined the influence of precision medicine on doctor-patient relationships during cancer treatment. They searched four databases, including PubMed and Scopus, initially retrieved 3,273 articles. After screening the titles and abstracts, they selected 114 articles for full-text review to ensure they met the research requirements. Finally, 35 articles were chosen for

detailed analysis. Their findings emphasized the impact of precision medicine on the doctor-patient relationship due to the increased complexity it brings to communication.

Similarly, a study by Fong et al. (2023) delved into the communication preferences of male patients regarding prostate cancer screening discussions with primary care physicians. They utilized databases such as Medline and Embase, filtering the results to 29 studies that fulfilled all inclusion criteria. Their research identified four primary needs of male patients on their doctors: using everyday language, providing comprehensive and balanced information, dedicating adequate time for discussion, and establishing a treatment relationship based on respect and trust. This research provides valuable insights into male patients' communication preferences in a specific medical context.

Below are some key advantages of the theoretical method.

1) Systematic analysis: Theoretical research offers a structured approach to dissecting and synthesizing existing knowledge, yielding a thorough understanding of defined topics. As previously mentioned, the studies conducted by Grauman et al. (2023) and Fong et al. (2023) exemplify this point. Through exhaustive analysis of extensive literature from multiple databases, these researchers delivered detailed and systematic insights into how specific medical practices—precision medicine in cancer treatment and prostate cancer screening, respectively—affect the dynamics of the doctor-patient relationship.

2) Theory development: Through literature reviews, researchers can identify connections and differences between theories, thereby fostering the evolution of novel theoretical frameworks. The aforesaid Four Habits Model proposed by Frankel and Stein (2001), was developed through the analysis and synthesis of literature reviews. It has become a classic framework in the study of physicians' behavioural habits in doctor-patient interactions.

3) Furthermore, the theoretical method offers significant advantages such as cost-efficiency, high effectiveness, and the capacity to provide an in-depth understanding of the historical development and evolution of a particular topic. It helps clarity in defining and refining key research concepts and terms and can effectively guide empirical research. An illustrative example is the systematic review by Zill et al. (2014), which meticulously analysed and evaluated research on doctor-patient communication measurement tools, published in English and German across databases such as PubMed, PsycINFO, and EMBASE from their inception until August 15, 2013. This study provides a valuable reference for researchers in selecting appropriate measurement tools for their projects. The findings highlighted significant differences in methodological quality and psychometric properties quality among the selected studies on these measurement tools. In response, the authors recommended the application of

standardized instruments, such as the COSMIN checklist, to enhance the quality and comparability of future psychometric evaluations. This example clearly demonstrates the strengths of the theoretical method.

The theoretical method also has some obvious disadvantages as the followings.

1) Empirical deficiency: Theoretical research may rely too heavily on literature and logical reasoning, lacking direct empirical data to support its conclusions.

2) Subjectivity risks: Researchers' subjective judgments may influence the selection and interpretation of theories, leading to potential biases.

3) Temporal limitations: Theories may be limited by the context of the time in which they were developed, making them less applicable to current or different social environments.

4) Risk of overgeneralization: There's a potential to overly generalize findings, which may not account for nuances and complexities in different scenarios.

5) Theoretical conflicts: Disparities among theories can pose challenges in selecting the most appropriate or relevant framework.

6) Application challenges: Theoretical findings often require further empirical validation before practical application can be realized.

7) Data limitations: Reliance on published literature and sources may introduce issues like publication bias or lack of comprehensive data coverage.

2.1.2.2 Survey method

The survey method, is a strategic approach used to assess and understand the dynamics of the doctor-patient relationship through the application of a questionnaire to a sample. This method involves crafting a set of questions aimed at gathering data from various stakeholders including patients, health care professionals, and the public about their experiences, perceptions, and suggestions concerning the doctor-patient interaction. Below are some key points of employing questionnaires to study doctor-patient relationships.

1) Questionnaire design: Questionnaires usually gather basic demographic information (like gender, age, occupation) and delve into specific areas such as satisfaction with medical services, trust in health care providers, and the effectiveness of communication between doctors and patients.

2) Question types: To capture a broad spectrum of responses, questionnaires may include various types of questions such as single-choice, multiple-choice, ranking, and open-ended questions.

3) Target audience and sample selection**:** The questionnaire can be directed at different

groups, such as patients, medical staff, and the wider public, to obtain a comprehensive view of the doctor-patient relationship from multiple perspectives.

4) Data analysis: The collected data needs to be statistically analysed to identify the main issues and trends within doctor-patient relationships.

5) Survey objectives: The main goal of utilizing this method is to enhance understanding of the current state of doctor-patient interactions, identify existing problems, and suggest measures for improvement.

6) Distribution channels: Questionnaires can be disseminated through multiple channels, including online survey platforms, on-site distribution in health care settings, social media, to ensure wide participation.

7) Privacy considerations: It is crucial to design surveys that protect the confidentiality of participants, ensuring that all personal data collected is kept anonymous.

8) Incentive strategies: Implementing incentives such as entry into a draw or small rewards can help boost participation rates in the survey.

9) Adherence to legal and ethical standards: Conducting these surveys needs strict compliance with legal and ethical norms to ensure the legality and ethical soundness of the research process.

Depending on the subject being evaluated, scales are divided into those targeting health care service providers and those assessing patients' communication skills.

Scales designed for health care service providers can be categorized based on their target groups. Some tools focus on medical and nursing students, such as the SEGUE scale (Makoul, 2001a), which evaluates how they communicate with patients. Other scales assess nurse-patient communication: measuring the communication effectiveness between nurses and patients. Additionally, certain instruments, like the "Liverpool Communication Skills Assessment Scale-LCSAS" (Humphris & Kaney, 2001), are specifically developed to assess interactions between doctors and patients.

Scales for assessing patients' communication skills help evaluate how effectively patients interact with their doctors, as research indicates that the quality of these interactions significantly affects the overall communication effectiveness (Capone & Petrillo, 2014). Zou et al. (2016) introduced and adapted the Patient Confidence in Communication Scale (PCCS), a tool developed internationally, for use in China. This scale measures how confident patients feel about their communication with health care providers during medical interactions. Higher scores on this scale indicate greater patient confidence, suggesting more effective communication capabilities.

The questionnaire method is a widely utilized technique for gathering extensive data to analyse and understand specific subjects. Here are the advantages and disadvantages of employing this research approach.

Advantages of the questionnaire method:

1) Cost-effectiveness: Compared to other data collection methods, questionnaires are usually low-cost, especially online questionnaires.

2) Scalability: Questionnaires can be easily distributed to large populations, making them suitable for extensive studies.

3) Standardization: This method offers a standardized way of collecting data, ensuring that all respondents answer the same questions.

4) Anonymity: Questionnaires can be designed to be anonymous, encouraging respondents to provide more honest feedback.

5) Flexibility: Questionnaires can be implemented in various formats—paper, electronic mail, or online—to meet diverse research requirements.

6) Rapid response collection: Questionnaires can collect data quickly, especially when using online survey tools.

7) Ease of Analysis: Questionnaire data is often easy to quantify and analyse, making it convenient for processing with statistical software.

8) Adaptability: Questionnaires can be tailored to suit specific groups or research objectives.

Disadvantages of the questionnaire method:

1) Non-response bias: Respondents who do not answer the questionnaire may differ from those who do, which can affect the representativeness of the results.

2) Social desirability bias: Respondents may answer questions based on perceived social expectations or moral standards, rather than their true thoughts.

3) Misunderstanding risks: Respondents may misinterpret questions or options, leading to inaccurate data collection.

4) Limitations with open-ended questions: Questionnaires are generally better suited for closed-ended questions and may lack the flexibility needed for in-depth exploration of open-ended topics.

5) Data quality control: Ensuring high-quality responses can be difficult, particularly in large-scale surveys.

6) Lack of depth: Questionnaires may fail to capture complex or subtle emotions and motivations, which are crucial in qualitative research.

7) Technical issues: Online questionnaires may be affected by technical problems, such as

software malfunctions or data loss.

8) Sampling challenges: Selecting an appropriate sample is crucial for the validity of the survey results, but this can sometimes be difficult to achieve.

9) Time pressure: Participants might rush or skip questions due to time constraints, affecting the quality of their responses.

10) Cultural and language barriers: Questionnaires need to be adapted to different cultural and linguistic backgrounds to avoid misunderstandings.

While the questionnaire method is a powerful tool, it requires careful consideration of these limitations during its design and implementation to minimize potential biases.

2.1.2.3 In-depth interview method

The in-depth interview method in doctor-patient relationship research is a qualitative research approach commonly used in the medical field. It helps researchers gain a deeper understanding of issues related to doctor-patient interactions, communication, and relationship building. Below are key details and steps involved in using the in-depth interview method for studying doctor-patient relationships.

1) Research objective and question formulation: First, define the research objectives and develop specific questions that reflect the real concerns in clinical interactions between doctors and patients.

2) Sampling method: Select a representative sample relevant to the research questions. Typical sampling methods include purposive, convenience, and snowball sampling.

3) Data collection: Interviews can be conducted face-to-face, over the phone, or via the internet. These interviews may be structured, semi-structured, or unstructured depending on the study requirements.

4) Conducting interviews: Interviews usually last from 30 to 90 minutes and should be recorded and subsequently transcribed into text. Transcription usually takes about ten times the duration of the interview.

5) Data analysis: The data analysis process in qualitative research involves identifying themes, coding responses, categorizing and summarizing information, and performing both descriptive and detailed analyses.

6) Report writing and quality assessment: The research report should clearly describe the coding framework, research steps, sample size and other details to ensure study transparency. At the same time, the report should assess the research quality, considering ethical standards, transparency, generalizability, and credibility.

7) Integrating research methods: To offset the limitations of qualitative research, such as lack of representativeness and excessive subjectivity, integrating it with quantitative methods can enhance the objectivity and validity of the conclusions.

By adhering to these guidelines, researchers can obtain a more comprehensive understanding of the current state of doctor-patient relationships and the issues involved, providing scientific evidence and practical guidance for improving these relationships.

While the in-depth interview method provides deep insights and understanding, it also has limitations like potential interviewer bias and the limited transferability of findings. Therefore, researchers should carefully design and conduct interviews to mitigate these issues and improve the study's reliability and validity.

In summary, each of the research methods discussed above has its own advantages and disadvantages. Employing a mixed-methods approach can yield more comprehensive and reliable results in the research on doctor-patient relationships. Therefore, this study will employ a blend of the theoretical and scale methods to thoroughly investigate the doctor-patient relationship. This dual approach ensures that our findings are both comprehensive and reliable.

2.1.3 Criteria for assessing physician-patient relationships

Almost all doctors have to provide health care for some patients that they find challenging or frustrating at times. These difficult patients can bring out negative reactions from doctors that may affect the care provided. Due to a lack of reliable methods for identifying difficult patients, the specific factors causing strained doctor-patient relationships remain unclear. This has limited study on difficult doctor-patient relationship.

To address this gap, McGaghie and Whitenack (1982) developed the 15-item Difficult Doctor-Patient Relationship Questionnaire (DDPRQ-15). This scale describes six types of problematic patient behaviours, with a particular focus on how physicians view patients. It was tested on 49 patients. The researchers identified what percentage of primary care patients were perceived as "difficult" by doctors. They also assessed whether being difficult was related to psychosomatic and functional disorders. The report provided a quantitative measurement tool for key qualitative impressions in the doctor-patient relationship, offering an effective means to identify difficult patients encountered by physicians.

Later, Hahn et al.'s (1994) research developed a 30-item DDPRQ containing five dimensions. The researchers argued that since patients are central to difficult doctor-patient relationships, first attention should be given to patient characteristics. These authors created a new scale aimed at recognizing and measuring the challenges faced by physicians within the

doctor-patient relationship. Diverging from McGaghie's (1982) approach, Hahn and colleagues delved into the link between these challenges and specific patient attributes like demographics, significant Axis I disorders (for instance, severe depression, panic, or anxiety disorders), personality disorders, and somatization, viewing these traits as primary contributors to the complexities encountered in doctor-patient interactions. The insights garnered from examining difficult patients lay the groundwork for medical professionals to better identify, comprehend, and address challenges in managing such patient interactions.

Another study by Hahn et al. (1996) utilized a streamlined version, the DDPQR-10, to evaluate the prevalence of difficult patients within a primary care setting. Their findings indicated a correlation between such patients and distinct characteristics, notably including mental health issues. The research also highlighted a link between challenging patient interactions and health-related outcomes. Specifically, patients experiencing more severe functional impairments likely have increased needs, potentially leading to higher demands on physicians. Moreover, frequent use of medical services and dissatisfaction with these services could act as both a cause and an effect of these challenges. The DDPQR-10 offers a more user-friendly tool for such assessments.

The research above discussed the difficult doctor-patient relationships from the clinician's viewpoint and the instruments for measuring physician responses. In 2004, Dutch researchers created a short questionnaire (Van der Feltz-Cornelis et al., 2004) from the patient's perspective to quantify the relationship between patients and doctors, with a focus on the doctor's helping attitude. This 9-item Patient-Doctor Relationship Questionnaire (PDRQ-9) has been adapted for different cultures and applied in many countries like Thailand (Sangngam et al., 2023), Spain (Mingote et al., 2009), and China (Yang & Wang, 2011).

In conclusion, the doctor-patient relationship is garnering growing interest, with numerous scales crafted and implemented tailored to particular research requirements. Broadly speaking, the doctor-patient dynamic encompasses both a process and an outcome (Ong et al., 1995). These instruments scrutinize the doctor-patient relationship from varied angles, appraising the outcomes of these interactions. Yet, they fall short in examining the processes leading to these outcomes and in contrasting the perceptions of the doctor-patient relationship from both the physicians' and patients' viewpoints.

2.2 Physician-patient communication

2.2.1 Communication substantially influences physician-patient relationships

Doctor-patient communication is a fundamental aspect of medical practice. Research consistently indicates that a significant portion of complaints against physicians is attributed to inadequate communication skills with patients. Ineffective communication often leads to diminished patient satisfaction, higher complaint rates, a heightened likelihood of allegations of misconduct, and deteriorated health outcomes (Halperin, 2000; Taylor et al., 2002). In health care settings, effective communication is not only central to delivering high-quality care (Laidlaw & Hart, 2011) but also plays a critical role in maintaining doctor-patient trust, enhancing patient satisfaction and adherence, and reducing medical disputes (Stockdale et al., 2018).

Research has also demonstrated that a doctor's communication ability can serve as a predictor of future complaints. A Canadian study found that performance on the national clinical skills examination could predict the likelihood of facing complaints to medical regulatory authorities. Specifically, physicians who scored in the lowest quartile for communication were notably more prone to receiving complaints (Tamblyn et al., 2007). Further studies have shown that structured communication training, such as narrative and appreciative inquiry exercises, not only improves doctors' well-being but also promotes a more patient-centred approach to clinical care (Krasner et al., 2009). These findings underscore that high-quality communication is fundamental to fostering a positive doctor-patient relationship, benefiting both patient experience and the overall medical work environment.

2.2.2 Doctors' communication behaviours

Doctors' communication behavior refers to the ways in which they exchange information, convey emotions, and engage in decision-making with patients and their families during medical interactions. It includes verbal communication, non-verbal cues, and emotional expression. Effective communication plays a crucial role in fostering patient trust, improving treatment adherence, influencing disease outcomes, and enhancing the overall health care experience(Hall & Roter, 1992).

2.2.2.1 Main types of doctors' communication behaviours

Researchers classify doctors' communication behaviours into different dimensions to better

understand their impact on patient experience. These behaviours can generally be categorized as follows.

1) Information delivery: providing patients with essential details about diagnosis, treatment options, potential side effects, and necessary precautions. The clarity and accuracy of this communication significantly influence patients' understanding and adherence to treatment (Street & Epstein, 2007).

2) Expression of empathy: acknowledging and responding to patients' emotional states through verbal and non-verbal cues to convey comfort, understanding, and support (Mercer & Reynolds, 2002).

3) Patient engagement: encouraging active patient participation in medical decision-making, allowing them to express preferences and contribute to shared decision-making processes (Elwyn et al., 2012).

4) Non-verbal communication: utilizing eye contact, tone of voice, and body language to foster trust and enhance patients' sense of security during interactions (Bird & Cohen-Cole, 1990).

5) Contextual adaptation: modifying communication strategies based on patients' cultural backgrounds, social environments, and emotional needs to improve interaction effectiveness (Silverman et al., 2013).

2.2.2.2 Factors influencing doctors' communication behaviours

Doctors' communication behaviours are primarily shaped by the following factors.

1) Professional training and experience: formal communication training significantly enhances doctors' ability to interact effectively with patients. Roter and Larson (2002) found that doctors who received systematic training were more likely to gain patients' trust and exhibited more advanced communication skills than those without training. However, increased clinical workload over time may reduce emotional engagement with patients, as some experienced doctors prioritize efficiency under heightened work pressure (Henry et al., 2012).

2) Work pressure and time constraints: high workloads often limit the scope of doctor-patient communication. Kurtz et al. (2003) noted that in fast-paced medical environments, doctors are more likely to adopt a direct and concise communication style rather than a comprehensive and interactive approach, potentially impacting patient experience and satisfaction.

3) Patient characteristics: factors such as age, and education level influence how doctors communicate. Bensing et al. (1995) observed that doctors tend to provide more informational

communication but less empathic expression when interacting with older patients, whereas with younger patients, they may place greater emphasis on psychological support and engagement.

4) Medical system and cultural background: communication styles vary across health care systems and cultural contexts. In Western countries, doctors often follow a shared decision-making model, encouraging patients to participate in treatment decisions (Charles et al., 1997). In contrast, in some regions, a doctor-centred decision-making approach remains prevalent, with less emphasis on patient involvement.

2.2.2.3 Effective use of communication skills to improve communication outcomes

Applying effective communication strategies in patient interactions enhances doctor-patient relationships, improves medical quality, and increases patient satisfaction (Agarwal et al., 2011). Key aspects of doctors' communication skills include listening, verbal communication, non-verbal communication, and attitude. Among these, listening skills are particularly vital, as they enable doctors to gather comprehensive patient information, clarify diagnoses, and foster a harmonious communication environment (Liu et al., 2016). Using plain and understandable language when discussing medical conditions and treatment plans helps patients and their families better understand their situation, significantly improving treatment adherence and overall comprehension (Koech et al., 2024). Additionally, non-verbal communication techniques, such as smiling, handshakes, appropriate gestures, and eye contact, can reduce patient anxiety, enhance their sense of being understood and cared for, and strengthen trust (Pettit et al., 2019). Moreover, adapting communication styles based on individual patient needs, timing, and contextual factors while remaining attentive to patients' emotional cues can greatly enhance the effectiveness of doctor-patient interactions (Essers et al., 2011).

2.2.2.4 Training methods for doctors' communication behaviours and existing issues in China

Internationally, many Western countries have developed standardized communication frameworks and practical training models for doctors. For instance, the Calgary-Cambridge Guide structures medical consultations into five stages: opening, information gathering, physical examination, explanation and planning, and closing, with empathy techniques integrated throughout. Additionally, patient-centred communication models emphasize understanding patients' thoughts, emotions, and expectations, promoting active participation in medical decision-making. Training methods often include role-playing, simulated patients, and practical feedback (Jaeken et al., 2024). Research indicates that training programs incorporating three to four intervention types—such as modelling, feedback, and practice—significantly

enhance doctors' communication behaviours, with 76% of physician intervention programs adopting this combination (Rao et al., 2007). In the United States, Haskard et al. (2008) developed interactive workshops to improve patient adherence, while in palliative care, the "Teach to Talk" program uses role-playing to help doctors manage difficult conversations (Tanzi et al., 2020).

China has only recently begun formalizing training programs for doctors' communication skills, with some medical schools and hospitals incorporating communication training into their curricula. However, several challenges remain:

1) Lack of systematic training programs: influenced by the traditional biomedical model, communication education has long been overlooked. Studies show that Chinese medical schools lack standardized textbooks and theoretical frameworks, with only 49% offering independent communication courses (Chen et al., 2009; Deng et al., 2021). Most training focuses on specific situations, such as breaking bad news, rather than providing comprehensive communication training across all stages of medical consultations (Guo & Wang, 2021).

2) Mismatch between training content and clinical needs: current programs emphasize basic communication skills, such as standardized history-taking and informed consent, but fail to incorporate complex, real-world clinical scenarios. As a result, doctors struggle to apply communication techniques effectively when dealing with diverse and challenging patient interactions (Deng et al., 2021).

3) Limited training methods: training is still largely lecture-based, with minimal interactive or experiential learning. The lack of hands-on practice opportunities makes it difficult for doctors to refine their communication skills in actual clinical settings (Deng et al., 2021).

4) Insufficient continuous evaluation and feedback mechanisms: post-training assessments and feedback mechanisms for communication skills remain inadequate. Without ongoing evaluation and feedback, doctors have limited opportunities to identify and improve their communication weaknesses in a timely manner (Deng et al., 2021).

2.2.2.5 Physician communication behaviours and the KAP model

The Knowledge, Attitude/Belief, Practice (KAP) model is a theoretical framework designed to explain how an individual's knowledge and beliefs influence their health-related behavioural changes. It delineates three successive processes of human behaviour changes: acquiring knowledge (Knowledge), forming attitudes or beliefs (Attitude/Belief), and adopting actions or behaviours (Practice). According to this model, knowledge is the foundation for changing behaviour; beliefs/attitudes, shaped by this knowledge, act as the driving force for behaviour

change. Only when an individual acquires relevant knowledge and engages in active reflection on that knowledge, which fosters a strong sense of responsibility, can he or she gradually form beliefs. It is only when knowledge is elevated into beliefs that an individual can adopt a positive attitude to change behaviour.

The KAP model is widely applied in various fields, particularly in health education, behavioural research, and health care communication. 1) In health education and promotion, it is commonly used to assess the current state of a population's knowledge, beliefs, and practices through surveys. Based on these assessments, targeted interventions are designed, implemented, and subsequently evaluated to enhance public health behaviours (Li et al., 2017). For example, to help a person change the smoking behaviour and quit smoking, the first step is to educate the smoker about the harms of smoking and the benefits of quitting, along with the methods of how to quit smoking. This knowledge helps instil a firm belief in the health risks of smoking, motivating a positive attitude towards voluntary quitting, which may eventually lead to successful behaviour changing. 2) The model is also valuable in research on behavioural influences in special populations (Harikiran et al., 2008). This includes studies that focus on discovering critical factors influencing health behaviours in specific groups, and tailoring informational campaigns based on these findings to influence these behaviours positively. 3) The KAP model serves as a guide for caregivers and medical staff in delivering targeted health education and communication (Umnuaypornlert et al., 2021). For example, enhancing the health knowledge of caregivers can help improve the quality of life for patients by ensuring better-informed care and support.

The strength of the KAP model is that it offers a practical guide for health education from a management perspective. It helps health educators begin with the dissemination of accurate health knowledge and the reinforcement of health beliefs, ultimately encouraging individuals to adopt positive preventative measures (Alzghoul & Abdullah, 2015; Zhang et al., 2023). However, the KAP model is not without drawbacks. A major criticism is its overly single-track approach, which lacks a feedback mechanism. Additionally, the absence of a standardized measurement toolkit for the research methods based on the KAP framework can lead to inconsistencies in research outcomes. Furthermore, in the context of today's digital age, where the internet and new media dominate, the KAP model also encounters new challenges and opportunities. The interactive nature of digital platforms calls for the model to be updated and expanded to better meet the diverse needs of modern audiences and leverage the dynamic capabilities of digital communication (Hesaraki et al., 2021; Yang & Yao, 2024).

When studying the evaluation on physician communication behaviours, the KAP model

provides a valuable framework for understanding and optimizing physician-patient interactions. Here is how it is applied in both research and practice in this context.

1) Assessing level of knowledge: The KAP model underscores the need to evaluate physicians' knowledge of effective communication techniques. This key application is insightfully demonstrated in the study of Zolnierek and Dimatteo (2009), which synthesized literature from 1949 to August 2008 and clearly demonstrated a significant positive correlation between effective physician communication and higher patient adherence within the health care field. Further, this suggests that enhancing physicians' communication knowledge through professional training essentially enhances their awareness of communication strategies, directly leading to a significant increase in patient adherence. Therefore, strengthening doctors' understanding and application of communication skills can undoubtedly optimize their communication behaviours and provide patients with more effective and caring medical services. These findings validate the applicability of the KAP model in the evaluation of physicians' communication behaviour.

2) Analysing attitude and belief: This application of the KAP model involves examining physicians' views and beliefs regarding communication, shared decision-making (SDM), and patient education. For example, the study by Huang et al. (2020) described the current applications, challenges, and improvement direction of the SDM model in China's clinical settings, and explored doctors' views and beliefs about SDM. And Yuan et al. (2023) further delved into the implicit prototype theory, conducting an in-depth analysis of both doctors' and patients' implicit prototypes of themselves and each other in SDM. Based on this, the authors explained the psychological pathways through which individual characteristics of doctors and patients influence SDM behaviour. These studies have enriched our understanding of doctors' attitudes and beliefs regarding communication behaviour, SDM, and patient education. They provide a robust theoretical foundation for improving doctor-patient communication and enhancing the quality of healthcare services.

3) Observing behaviour and practice: The KAP model also involves observing and evaluating doctors' specific communication behaviours with their patients in actual clinical settings. This includes how physicians convey information, provide emotional support, and encourage patient involvement in decision-making. By closely observing these practices, the actual application of doctors' communication skills can be directly assessed, thereby providing empirical evidence to further optimize communication strategies and enhance the humanization of health care services.

Numerous studies focus on evaluating doctors' communication behaviours with patients in

real clinical settings. These studies are typically categorized based on the type of evaluator, falling into three main dimensions: third-party evaluation, patient evaluation, and doctors' self-evaluation.

There are many third-party evaluation tools utilized to assess doctor-patient communication. One of the most frequently used is the SEGUE Framework, developed by Makoul (2001a) at Northwestern University Medical School, encompasses both communication content and skills. This framework outlines essential doctor's behaviours and techniques linked to medical outcomes, offering an effective and practical structured approach for clinical practice, particularly beneficial for general practitioners. Another key tool is the Calgary-Cambridge Guides (Kurtz & Silverman, 1996), developed in 1996 through a collaboration between Kurtz from the University of Calgary and Silverman, a general practitioner from Linton, Cambridgeshire. This guide is designed to cultivate and assess doctors' communication skills through specific patient interaction tasks. Additionally, the Liverpool Communication Skills Assessment Scale (LCSAS), developed by Humphris and Kaney (2001) from the University of Liverpool, is tailored to the European health care system for general practitioners, broadening the scope of third-party evaluations.

Patient evaluation tools for doctor-patient communication directly reflect patients' satisfaction and perceptions of health care quality. For instance, the PDRQ-9 scale, developed by Dutch scholar Van der Feltz-Cornelis and colleagues (2004), offers a quick assessment of patients' views on their doctors' helpfulness and attitude. Concurrently, Professor Mercer and his team (2004) from the Universities of Glasgow and Edinburgh introduced the consultation and relational empathy (CARE) measure. This scale has become a widely used evaluation tool in the UK for training and assessing general practitioners.

Doctors' self-evaluation focuses on physicians' reflection and assessment of their own communication skills. This introspective approach helps doctors identify their competency levels and areas needing improvement. Though literature on specific doctor self-evaluation tools is sparse, the Medical Communication Competence Scale (MCCS) created by Cegala et al. (1998) stands out. This scale is designed to aid doctors in evaluating their communication abilities during medical interviews and is extensively used in general practice settings.

The application of the KAP model in evaluating doctors' communication behaviour offers valuable insights to health care institutions and professionals in identifying training needs and designing effective communication strategies to enhance patient satisfaction and adherence to treatment. However, the KAP theory may sometimes focus too heavily on one-way information transmission without sufficient feedback mechanisms, which could hinder its effectiveness in

complex health care environments. Additionally, the need for more unified and standardized measurement tools is evident to ensure consistent and accurate assessments of communication behaviours.

To maximize the KAP model's practical utility, a diversified approach should be adopted, incorporating surveys, observational studies, and in-depth interviews, thereby comprehensively assessing doctors' communication behaviour (Du, 2022; Yang et al., 2024). These complementary methods can systematically collect data on doctors' knowledge levels, attitudes, beliefs, and actual communication practices, providing a robust foundation for improving communication behaviours.

In conclusion, while the KAP model is suitable for evaluating doctors' communication behaviour, its effective implementation requires careful adaptation to specific health care contexts and the characteristics of the target group. Making appropriate adjustments and optimizations is crucial to ensure that the practical application of this model yields optimal outcomes.

2.2.3 Tools for measuring physician communication

To effectively quantify and assess doctors' communication behaviours, researchers have developed various communication assessment tools. These tools vary in measurement dimensions, evaluators, and application contexts, depending on specific research objectives. The following are some of the most widely recognized models and scales used to evaluate doctor-patient communication.

In 1999, the new approach development group of the Royal College of General Practitioners (RCGP)'s membership examination introduced assessing the primary tasks of family physicians across five units: 1) discover the reason(s) for a patient's visit; 2) define the clinical problem(s); 3) explain the problem(s) to the patient; 4) address the patient's problem(s); 5) make effective use of the consultation. Each unit is further divided into elements, and each element contains more specific performance criteria. Ultimately, the full definition of physician-patient communication competence includes five units along with 16 elements and 21 performance criteria. These performance criteria provide granularity to otherwise broad tasks which enable reliable assessment. Compared to other communication assessment questionnaires, this instrument emphasizes clinical practice for family physicians (Tate et al., 1999).

The SEGUE Framework, developed by Makoul, is the most widely used tool for teaching and evaluating communication skills in North America (Guo & Wang, 2021; Makoul, 2001a).

This framework targets specific communication tasks and focuses on whether they are accomplished during medical encounters. SEGUE categorizes the tasks of clinical communication into units including Set the stage, Elicit information, Give information, Understand the patient's perspective, End the encounter, and if suggested a new or modified treatment/prevention plan. SEGUE can be applied for education, assessment, and research. China Medical University introduced and tested it starting in 2006. Over the past decade, numerous studies in mainland China have confirmed SEGUE's high reliability and validity for evaluating Chinese physicians' communication competence (Guo & Wang, 2021; Zhou et al., 2020).

In 2001, the development group of Kalamazoo Consensus Statement, through reviewing and synthesizing the essential elements of five models, including the E4 Model of Bayer Institute for Health Care Communication (Keller & Carroll, 1994), the Three-Function Model/Brown Interview Checklist (Novack et al., 1992), the Calgary-Cambridge Observation Guide (Kurtz et al., 1998), the Patient-Centred Medicine: Transforming the Clinical Method, and the SEGUE Framework for teaching and assessing communication skills (Makoul, 2001a), identified seven essential sets of communication tasks (Makoul, 2001b): 1) build the doctor-patient relationship; 2) open the discussion; 3) gather information; 4) understand the patient's perspective; 5) share information; 6) reach agreement on problems and plans; 7) provide closure. This comprehensive outline of core communication tasks provides a coherent framework that can be utilized for teaching and assessing communication skills, determining relevant knowledge and attitudes, and evaluating educational programs for improving physician-patient communication.

The "Four Habits Model" of Frankel and Stein (2001) and Krupat et al. (2006) offered a fresh perspective conducting medical interviews. The four habits are: investing in the beginning, eliciting the patient's perspective, demonstrating empathy, and investing in the end. Each habit involves a set of skills. Additionally, these habits bear a sequential relationship to one another and are thus interdependent. This approach is designed to streamline medical visits within a practical framework, foster quick trust-building, enable efficient information exchange, convey caring, and ultimately leading to better adherence to medical advice and positive health outcomes. The model's advantage lies in its organization of skill sets directly linked to care results into distinct habits, and in making clear how these habits interconnect.

Building on this, Lundeby et al. (2015) established the Expanded Four Habits Model to improve consultations with patients experiencing emotional distress or other psychosocial concerns. This expanded model merges the original Four Habits Model (Frankel & Stein, 2001)

with the "Six Skills" concept (Stensrud et al., 2014), offering a comprehensive tool for both patient consultations and communication skills training, like the objectives of the original model.

The Communication Assessment Tool (CAT), consisting of 14 items, was designed to measure physicians' interpersonal communication skills, as seen through the eyes of their patients, within clinical environments. This tool, developed in English, is meant for practical use in real-world settings (Makoul et al., 2007). The creation of the CAT involved an extensive review of established models and instruments in the field, such as the SEGUE Framework (Makoul, 2001a) and the Four Habits Model (Frankel & Stein, 2001; Krupat et al., 2006), alongside incorporating feedback from patients about the questions and how they are answered. The CAT is a synthesis from several established communication assessment models and tools, leading to overlapping its performance criteria with other instruments. Where it differs is its focus on capturing patients' views on communication skills, and its accessibility, being written at the fourth grade reading level. This makes the CAT a simple and practical instrument with discrete items, capable of being used by patients at various literacy levels.

2.2.4 Current research status of physician-patient communication assessment in China

Reviewing numerous studies in China and abroad, most focuses on the perspectives of physicians and medical students, primarily applying the SEGUE Framework. Consequently, findings largely reflect doctor's self-evaluations or expert assessments, with minimal patient input. However, patient evaluations are equally important for evaluating doctor-patient communication.

A study by Zhou et al. (2020) used the SEGUE Framework to assess physician interactions with standardized patients (SPs) in rural China. The research covered 21 counties randomly selected from three provinces in eastern, western, and central China, with. Within the selected counties, 209 township health centres and 139 village clinics were randomly selected as the study sample (441 in total). The results showed that the overall communication skills of health care providers in these rural areas were relatively poor, especially in aspects such as empathizing with patients, understanding their concerns, and encouraging patient participation in interactions. The study also noted that differences in certain dimensions were associated with the health care provider's gender and age. To some extent, this study illuminated the status quo of doctor-patient communication in rural China. However, it adopted the SEGUE Framework without incorporating patient input into the questionnaire design. Also, using SPs may not have accurately simulated real patients. Thus, evaluating communication skills from the perspective

of a third party outside the doctor-patient relationship might not accurately reflect the challenges and dynamics present in real-world doctor-patient interactions. Although the study aimed to eliminate the impact introduced by patient's communication abilities to improve the accuracy in observing physician's communication behaviours, which facilitated comparative analysis across different physician groups, it obscured the real effects of doctor-patient communication.

Recent research has found significant discrepancies between how doctors rate their own communication skills and how patients rate them in mainland China (Guo & Wang, 2021). Physicians overall rated their skills as "good", while patient ratings were more moderate, leaning towards a "pass". Researchers attributed this to differing perceptions between physicians and patients regarding what constitutes effective communication. When interacting with patients, physicians may think they are communicating effectively, but patients do not feel the same. Several studies also highlighted that conflicts between doctors and patients often stem from patients' unmet medical needs, which in turn affect patients' satisfaction and adherence to treatment (Costantini et al., 2015; Garvelink et al., 2015). This research was the first in China to demonstrate the gap between physicians' self-evaluations and patients' evaluations of communication skills, noting that these differences could be related to factors such as region and gender. However, it did not explore the deeper reasons behind these perceptual gaps (Guo & Wang, 2021).

Although the PDRQ-9 scale (Van der Feltz-Cornelis et al., 2004) offers a way to evaluate doctor-patient relationships from the patient perspective, it focuses on patients' subjective feelings about physicians like "My doctor can help me" and "I trust my doctor". Thus, while addressing limitations of physician-centred scales, it does not reveal what specific physician behaviours shape these perceptions. Additionally, there is limited research employing the PDRQ-9 scale to study China's doctor-patient relationships.

In conclusion, the doctor-patient relationship has different definitions, with the Szasz and Emanuel models (Emanuel & Emanuel, 1992; Szasz & Hollender, 1956) based on a narrow conceptualization focusing on the therapeutic alliance. There are numerous scales for evaluating doctor-patient relationships from the perspective of either doctors or patients, which have been widely applied. A harmonious doctor-patient relationship should encompass elements like knowledge, trust, understanding, caring, and respect, with communication playing a crucial role in shaping this dynamic. Commonly used basic scales include the SEGUE Framework (Makoul, 2001a), the Four Habits Model (Frankel & Stein, 2001; Krupat et al., 2006), and the CAT (Makoul et al., 2007), often tailored to specific languages and contexts to fit the actual situation when applied.

The elements and evaluation methods of communication as described above are commonly used in teaching, doctor training, doctor's self-evaluation, and patient evaluation. While there is substantial studies on evaluating doctor-patient relationships and communication with findings widely applied, also evidence suggests that communication skills are evaluable and can be enhanced through training (Gorniewicz et al., 2017; Wundrich et al., 2017)—thereby potentially improving doctor-patient relationships—these efforts predominantly focus on the medical professionals' side. Consequently, numerous practices exist for improving doctor-patient relationships by training doctors or medical students. Yet, it is crucial to recognize that the dynamics of doctor-patient relationships are not solely determined by the medical side; the patient side also plays a significant role in shaping these interactions.

In the UK, RCGP administers the only postgraduate qualification examination in family medicine. It includes a direct evaluation of a candidate's interpersonal competence through the analysis of videotaped real-life doctor-patient encounters (Tate et al., 1999). The RCGP's approach is unique in that it prioritizes the outcomes of doctor-patient interactions over the adherence to specific behavioural styles by doctors. This philosophy aims to avoid the pitfall of standardizing doctors' behaviour, which could lead to a lack of diversity in how doctors interact with patients. Instead, effective task-based consulting should be promoted rather than prescribing a uniform style of interaction.

Embracing the same philosophy, we consider that assessment of doctors' communication skills should extend beyond academic or examination settings and focus on real-world outcomes of doctor-patient interactions. And it is essential to explore discrepancies between doctors' and patients' perceptions of these interactions. Understanding the root causes of these discrepancies can offer valuable insights into further improving doctor-patient relationships.

In this study, the hospital is the largest comprehensive facility in eastern Shenzhen, serves a substantial portion of the community with its 29 community health service (CHS) centres and over 600 medical professionals. The introduction of graded diagnosis and treatment within China's health care system has elevated the CHS centres to a pivotal role within the primary health care sector. Consequently, this transformation has substantially increased the workload borne by medical staff at these CHS centres. Located in Longgang District, which is home to around four million residents, the hospital being studied here and its CHS centres cater to over one million people, accounting for a quarter of the district's population.

Given this context, the need to evaluate and analyse the effectiveness of doctor-patient communication within the studied CHS centres becomes paramount. Such an assessment is crucial not only for fostering positive doctor-patient relationships but also for enhancing the

quality of communication between community doctors and their patients. Despite existing research on evaluation of community doctors' communication practices, there are no reports specifically examining whether the assessment of these doctors' communication behaviours is perceived consistently by both doctors and patients.

Therefore, it is essential to develop an evaluation system for doctor-patient relationships that incorporates viewpoints from both doctors and patients, with a focus on physicians' communication behaviours as key indicators. The goal of this thesis is to realize this evaluation system and pinpoint issues within the doctor-patient communication process and provide a basis for enhancing these vital relationships. Under this goal, a survey questionnaire based on the core elements of communication within the narrow sense of the doctor-patient relationship was used, in order to investigate potential discrepancies in how each group (doctors and patients) perceives the same communication elements. These differences will be used as a measure to evaluate the effectiveness of communication outcomes.

From the physicians' standpoint, this thesis will examine how their cognition of communication elements affects the communication outcomes and whether there is a correlation between doctors' demographic characteristics and the effectiveness of their communication. On the patients' side, this study will investigate how patients' demographic characteristics, along with certain medical consultation preferences and beliefs, impact communication outcomes.

By conducting these analyses, this thesis is expected to identify the primary factors that affect the quality of doctor-patient communication. This will contribute to enhancing the effectiveness of communication and fostering more positive relationships between doctors and patients within the CHS centres of the hospital being studied here, which holds significant practical importance as it seeks to improve the overall patient care experience and satisfaction.

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Chapter 3: Network Analysis of Literature

3.1 Objective

This study applies the co-occurring keyword network analysis method, a technique from information science, to quantitatively explore the keywords in existing literature related with doctors' humanism and physician-patient relationship as published from 2011 to 2020.

Co-occurring keywords refer to pairs of keywords that appear together within the same document. By statistically analysing these keyword pairs and creating a visualization network diagram of the co-word matrix, researchers can examine the connections between various keywords (Mao et al., 2017; Xu & Sheng, 2015; Zhao et al., 2021). This method is extensively used across multiple fields, including competitive intelligence, knowledge management, public health, web network analysis, network communities, bibliometrics, and the evaluation and management of scientific research.

Utilizing the China National Knowledge Infrastructure (CNKI) and PubMed databases along with CiteSpace software, our study analyses and visualizes the high-frequency keywords and their co-occurrence relationships. The objective is to identify research hotspots and observe the evolving trends in the study of doctors' humanism and doctor-patient relationships in China and overseas over the past decade. This analysis aims to explore the changing patterns of research hotspots and trends, summarize past research experiences, and help determine future research priorities.

3.2 Hotspots and trends on humanism and physician-patient relationship based on literature in CNKI via CiteSpace software

3.2.1 Data sources

The CNKI database stands as the largest and most comprehensive online academic library in China. It contains a vast collection of Chinese academic journals, dissertations, conference proceedings, newspapers, books, patents, and other resources across various disciplines. Given its broad coverage, searching this database is likely to encompass the majority of Chinese academic literature, that can help us discover the research hotspots and trends within the

academic landscape in China.

On July 20, 2021, we conducted an advance search in CNKI with the search criteria in Chinese as "subject = 人文 And 医患关系". This search retrieved 2,114 articles that have relation with both "humanism" (standing for the Chinese word "人文" in the search criteria) and "physician-patient relationship" (represented by the Chinese word "医患关系" in the search criteria).

3.2.2 Research methods

CiteSpace is a Java-based software developed by Dr. Chaomei Chen at Drexel University. Through co-citation analysis and pathfinder network algorithm, this software can conduct visualization analysis of the literatures in a specific knowledge domain – to show the structure, distribution, and development patterns of this domain. CiteSpace is popularly applied in social science and natural science fields, and its visualization result is called "Knowledge Map" (Zhang & Zhao, 2019).

We first utilized the metrological visualization analysis of CNKI platform to get statistics chart on the publication year trend of the search result. Besides, we employed CiteSpace (version 5.8.R1) to generate related knowledge maps. After making multiple trials in adjusting the parameter settings of CiteSpace, like Time Slicing, Text Processing, Node Types, Selection Criteria, and Minimum Spanning Tree, and evaluating the effectiveness of generated diagrams according to relative indexes, we finally achieved the ideal visual maps created by CiteSpace.

3.2.3 Results

3.2.3.1 Analysis on annual number of published papers

The change in annual number of published papers directly reflects the general development trend of a research domain. Figure 3.1 shows the year-wise distribution of the publications in CNKI that made research on both humanism and physician-patient relationship.

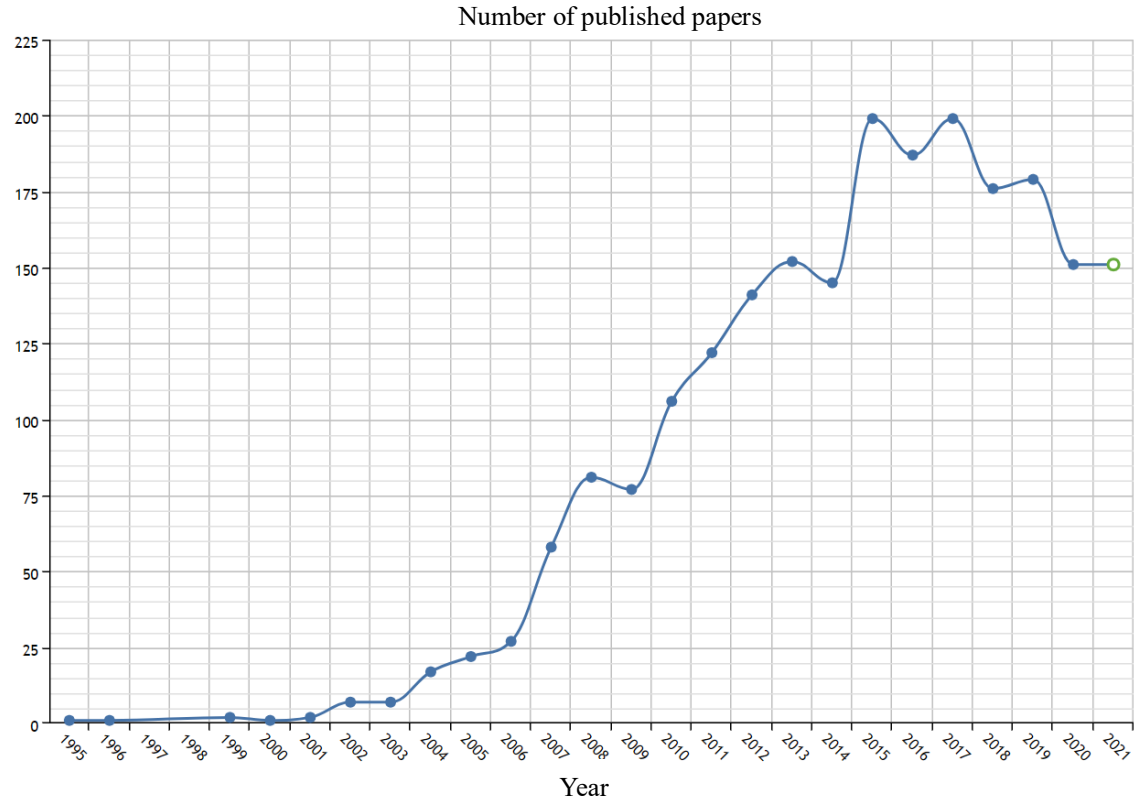

Figure 3.1 Annual number of published papers in CNKI search result (人文+医患关系) ("humanism + physician-patient relationship")

From Figure 3.1, we know that the first article was published in 1995. Between 1995 and 2001, the annual number of publications was very little: only one or two per year. Publication outputs started to increase since 2002 and reached the top from 2015 to 2017 (199 articles were retrieved during this period), which indicates that China's investigators have paid high attention on the research of humanism and physician-patient relationship since this period.

3.2.3.2 Analysis on high frequency keywords

We used CiteSpace to conduct a keywords co-occurrence analysis on CNKI's search result and got the high frequency keywords listed in Table 3.1. Except the word "医患关系" (physician-patient relationship) which is the search criteria itself, high frequency keywords with regard to physician-patient relationship include, "医患沟通" (physician-patient communication), "和谐医患关系" (harmonic physician-patient relationship), and "医疗纠纷" (medical dispute); the keywords related to "人文" (humanism) that most appeared include: "人文关怀" (humanistic care), "医学人文" (medical humanism), "人文素质" (humanistic qualities), "人文精神" (humanistic spirit), "人文素养" (humanistic accomplishment), "医学人文教育" (medical humanism education), "医学人文精神" (medical humanistic spirit), and "人文医学"

(humanistic medicine). The word "医学生" (medical student) has both high frequency and high betweenness centrality, which shows that the current research of medical humanism in China focuses more on medical students than on doctors.

Table 3.1 Distribution of high frequency keywords in CNKI search result (top 20)

Keywords in Chinese	Keywords in English	Count	Centrality	Year
医患关系	physician-patient relationship	674	0.75	2001
人文关怀	humanistic care	277	0.24	2002
医学生	medical student	249	0.14	2004
医患沟通	physician-patient communication	163	0.13	2003
医学人文	medical humanism	150	0.12	2001
人文素质	humanistic qualities	102	0.07	2006
人文精神	humanistic spirit	93	0.09	2002
人文素养	humanistic accomplishment	70	0.04	2006
医学人文精神	medical humanistic spirit	69	0.08	2001
医学教育	medical education	67	0.04	2004
医学人文教育	medical humanism education	66	0.06	2004
人文教育	humanism education	65	0.04	2003
医务人员	medical staff	55	0.07	2002
和谐医患关系	harmonious physician-patient relationship	51	0.04	2007
人文素质教育	humanistic qualities education	51	0.04	2008
叙事医学	narrative medicine	44	0.03	2011
《中国医学人文》	Chinese Medical Humanities	34	0	2015
医院文化	hospital culture	32	0.01	2004
医疗纠纷	medical dispute	32	0.01	2005
人文医学	humanistic medicine	31	0.02	2004

3.2.3.3 Analysis on clusters & network of co-occurring keywords

To find out the research hotspots in CNKI search result, we generated the keywords network diagram via CiteSpace (Figure 3.2). According to the analysis theory in social networks, the node with high betweenness centrality builds a bridge between the nodes or clusters that cannot be linked directly. Such nodes usually play an important role in the network (Zhang et al., 2011). The five keywords with betweenness centrality score higher than 0.1 in Table 3.1 are the nodes highlighted with a purple trim in Figure 3.2. And these keywords can be regarded as the basis in our current research.

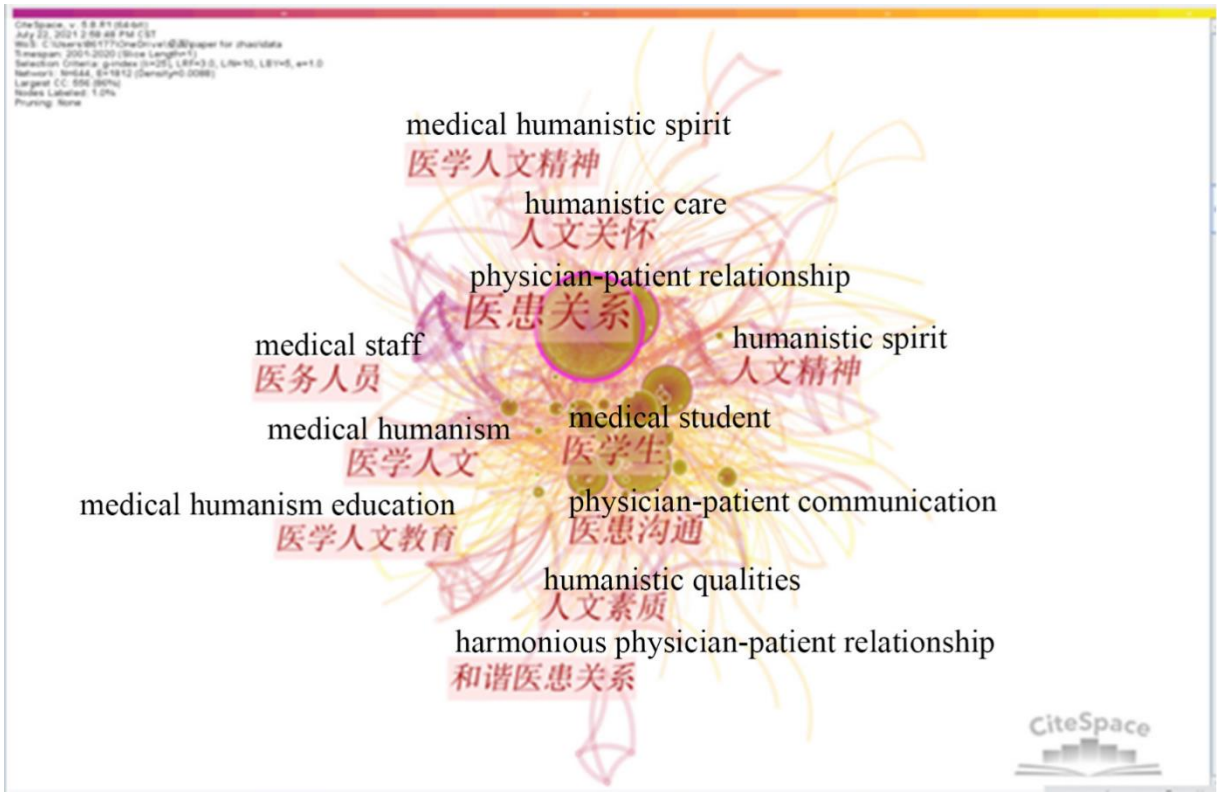

Figure 3.2 Network of co-occurring keywords in CNKI search result

Then we conducted an analysis on the clusters of co-occurring keywords. The following parameters in CiteSpace were used: “Time Slicing” =1, “Node Types” =Keyword, “TopN” =50, “Minimum Spanning Tree” enabled, and other parameters kept default settings. After we ran the CiteSpace software, the map of keyword clusters regarding “humanism and physician-patient relationship” within the time span from 2000 to 2020 was retrieved (Figure 3.3). This diagram shows a Q value =0.4781 and S value =0.7716 at the left upper corner, which means this network of clusters is reasonable and reliable. (Note: Q value represents the modularity score of clusters. If the Q value is > 0.3, it means the network is reasonably divided into loosely coupled clusters. And the S value (i.e. weighted mean silhouette score) suggests the homogeneity of clusters on average. Usually, if the S value is > 0.5, it indicates that the cluster is reasonable; if the S value is > 0.7, this cluster is reliable (Song & Chi, 2016). The results of cluster analysis of relevant literature on medical humanism and doctor-patient relationship in CNKI were significant (Chen, 2017).

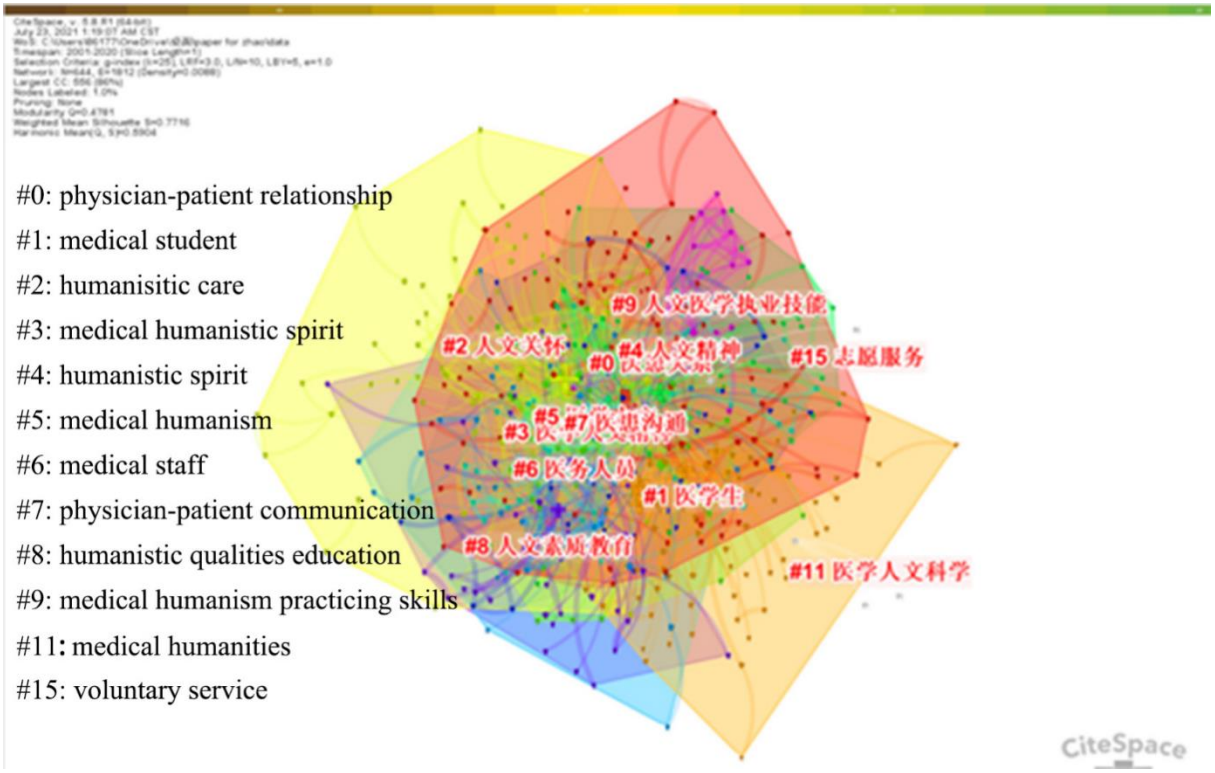

Figure 3.3 Clusters of co-occurring keywords in CNKI search result

Figure 3.3 shows that the network is divided into 12 clusters of research domain that covers the topics of medical humanism and physician-patient relationship: #0 医患关系 (physician-patient relationship), #1 医学生 (medical student), #2 人文关怀 (humanistic care), #3 医学人文精神 (medical humanistic spirit), #4 人文精神 (humanistic spirit), #5 医学人文 (medical humanism), #6 医务人员 (medical staff), #7 医患沟通 (physician-patient communication), #8 人文素质教育 (humanistic qualities education), #9 人文医学执业技能 (medical humanism practicing skills), #11 医学人文科学 (medical humanities), and #15 志愿服务 (voluntary service).

3.2.3.4 Analysis on burst keywords

In the visualization of literature, burst words usually disclose the development trends of a certain knowledge field. Burst word, means the terminologies that have rapidly increasing usage or have sudden rise of appearance frequency in a short time (Zhang et al., 2011). Capturing potential burst words has important realistic significance for both predicting research trends and digging out research hotspots (Hong et al., 2010). With the built-in burst detection algorithm of CiteSpace, the top 13 keywords with the strongest citation bursts are identified (Figure 3.4). The red segment indicates the timespan when the strongest citation burst took place. After analysis on Figure 3.4, the research trends on “humanism and physician-patient relationship”

in China can be summarized as the following: “人文精神” (humanistic spirit) occurred from 2003 that indicates the topic of humanistic spirit has attracted attention since that year; in 2007 the burst keywords changed to “和谐医患关系” (harmonic physician-patient relationship), “以人为本” (people-centred), “医疗纠纷” (medical dispute), and “人文医学执业技能” (medical humanism practicing skills); In 2009, the research trend was more practical when the burst word “人文护理” (humanistic care) appeared; In 2016 and 2017, the research focus was shifted to “住院医师” (residents), “住院医生规范化培训” (standardized training for residents), and “规范化培训” (standardized training), which suggests that more attention has been paid to the humanistic education of medical students; the research hotspots in 2018 to 2020 were “叙事医学” (narrative medicine) and “医学人文关怀” (medical humanistic care).

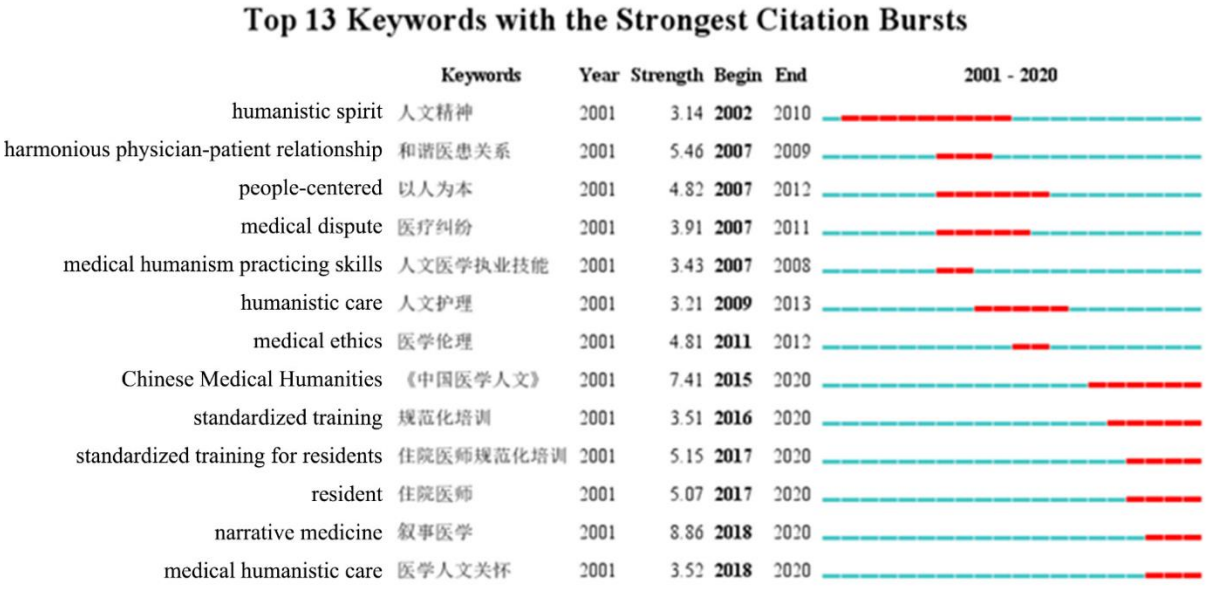

Figure 3.4 List of burst keywords in CNKI search result

3.3 Hotspots and trends on physician-patient relationship based on literature in PubMed via CiteSpace software

3.3.1 Data sources

All the literature data of the study in this part is from the PubMed database. The search was conducted in two steps.

Step 1: MeSH term “Physician-Patient Relations” was used as the search criteria on July 24, 2021 and 2,665 articles were retrieved in the result.

Step 2: Based on the search result of the first step and the analysis via CiteSpace, we chose

four high frequency keywords related with humanism: “communication”, “shared decision making”, “empathy”, and “patient-centred care”, to combine with the MeSH term “Physician-Patient Relations” and made the second search, which means the search criteria was “Physician-Patient Relations AND communication) OR (Physician-Patient Relations AND shared decision making) OR (Physician-Patient Relations AND empathy) OR (Physician-Patient Relations AND patient-centred care”. This search found 1,554 articles in total.

We have applied the following filters in PubMed for all search results: 1) article type: only “Clinical Trial”, “Meta-Analysis”, “Randomized Controlled Trial”, “Review”, and “Systematic Review” were selected. 2) species: only “Humans” was chosen; 3) publication date: from January 1, 2011 to December 31, 2020.

3.3.2 Research methods

Similar to the CNKI search result, we still employed CiteSpace (version 5.8.R1) to illustrate knowledge maps for the PubMed search result. To avoid potential misunderstanding, we have combined some similar keywords in CiteSpace analysis. For example, “physician-patient relationship”, “*doctor–patient relationship”, “physician-patient relation”, “patient-physician relationship”, “physician patient relation”, “doctor–patient relation”, and “*physician-patient relation” were merged into “doctor-patient relationship”.

3.3.3 Results

3.3.3.1 Search result of step 1

After the first-step search in the PubMed database, we conducted a detailed analysis of the retrieved data to identify trends and key topics in doctor-patient relationship research. Here are the findings.

1) **Analysis on annual number of published papers**: Through Figure 3.5, we observed the changes in the annual publication volume of relevant research on PubMed from 2011 to 2020. Notably, the publication output of relative research peaked in 2013 and then began to decline from 2018. The number of published articles in 2020 was significantly lower than past years. However, after reviewing the literature published in 2020, we found that most articles mentioned the influence of Corona Virus Disease 2019 (COVID-19) on their research. Thus, we can infer that the sudden drop in the number of published papers in that year was probably due to the disruptions caused by the COVID-19. Most research had to cancel or stop due to this worldwide epidemic, which does not mean that the attention to the physician-patient

relationship was reduced.

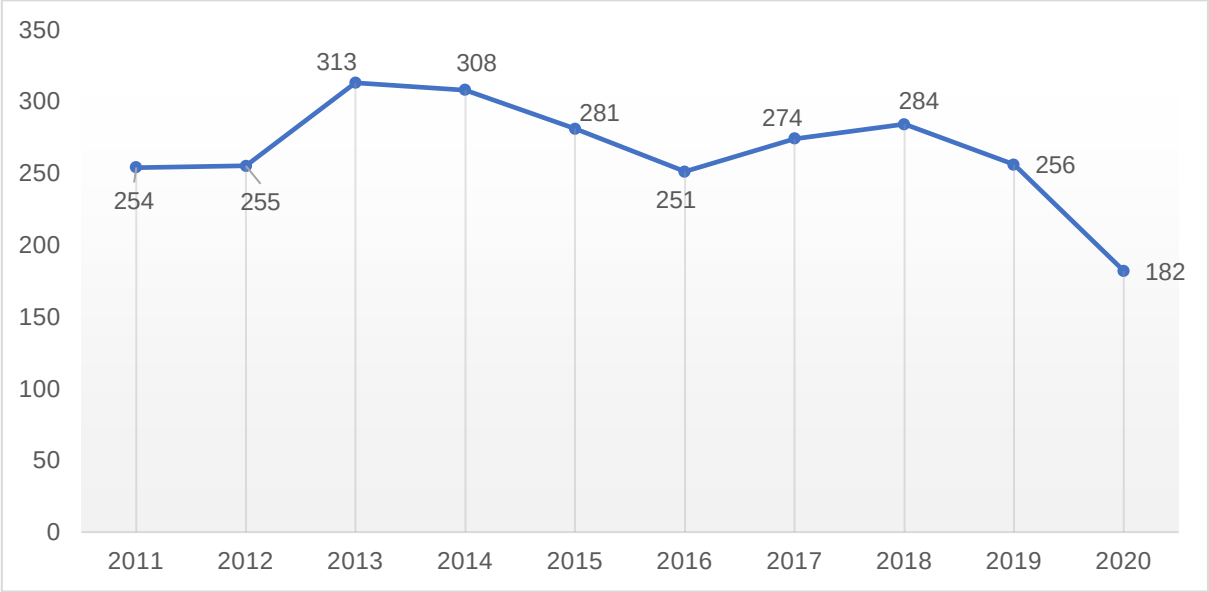

Figure 3.5 Annual number of published papers in the first-step PubMed search result

2) **Analysis on keywords**: Furthermore, we input the dataset based on the PubMed search result of first step into CiteSpace, using default parameter settings to generate a co-occurring keywords network (shown in Figure 3.6) and a list of high frequency keywords (shown in Table 3.2).

Table 3.2 Distribution of high frequency keywords in the first-step PubMed search result (top 20)

Keywords	Count	Centrality	Year
Communication	166	0.45	2012
shared decision making	85	0.19	2013
doctor-patient relationship	80	0.25	2012
primary care	64	0.25	2013
palliative care	51	0.17	2011
patient-centered care	48	0.12	2013
Cancer	47	0.06	2012
decision making	47	0.07	2013
systematic review	39	0.06	2013
Ethics	32	0.07	2013
patient satisfaction	30	0.02	2014
quality of life	28	0.04	2014
medical education	26	0.03	2013
informed consent	25	0.04	2013
general practice	24	0.04	2015
Empathy	24	0.07	2013
Physician	24	0.03	2014
Review	21	0.02	2014
Patient	21	0.04	2014
advance care planning	19	0.05	2013

In addition to “doctor-patient relationship” as the primary search term, we identified five keywords with a betweenness centrality score higher than 0.1, highlighted as nodes with purple rings in the network (Figure 3.6). We deduced that these five keywords—“communication”,

"shared decision making", "primary care", "palliative care", and "patient-centred care"—represent the hot topics in the research of physician-patient relationship.

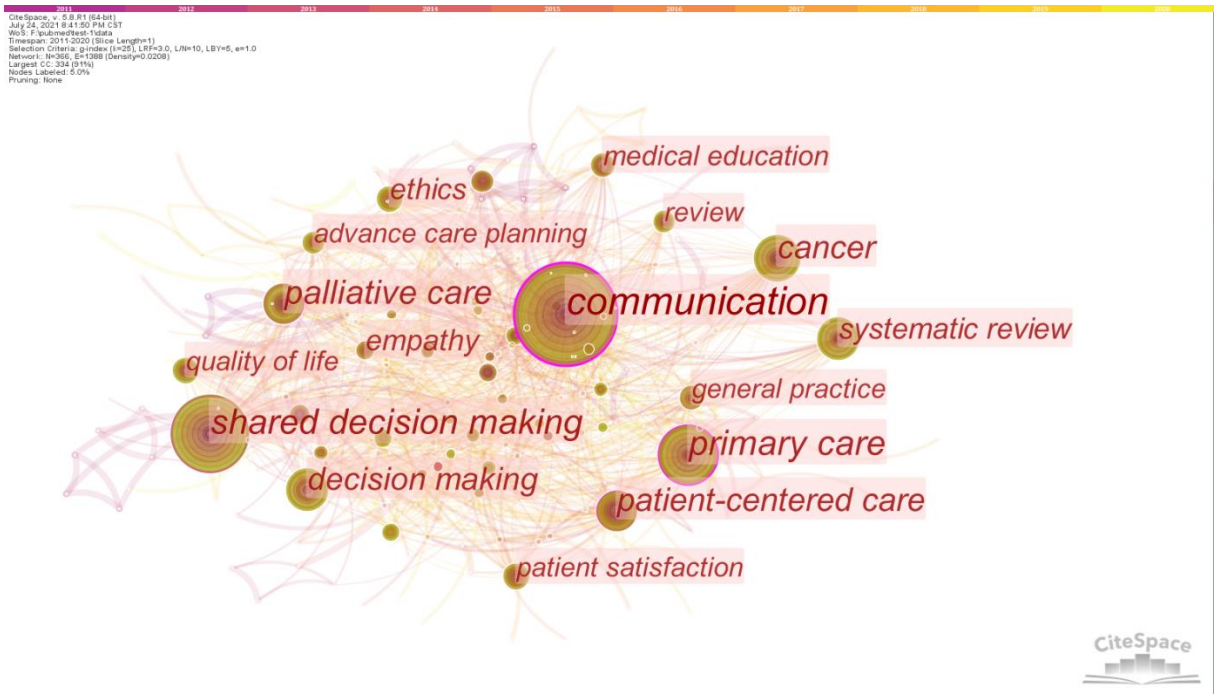

Figure 3.6 Network of co-occurring keywords in the first-step PubMed search result

Table 3.3 and Figure 3.7 illustrate the co-occurring keyword clustering, forming 10 clusters of research domain: #0 cardiovascular health education, #1 medical student, #2 multiple sclerosis, #3 provider perspective, # 4patient preference, #5 palliative care, #6 patient education, #7 breast colorectal, #8 systematic review, and #9 interpersonal forgiveness.

Table 3.3 Size and silhouette value of each cluster in the first-step PubMed search result

Cluster ID	Size	Silhouette	mean (Year)	Top Term
0	52	0.775	2015	cardiovascular health education
1	44	0.673	2015	medical student
2	41	0.742	2015	multiple sclerosis
3	39	0.745	2016	provider perspective
4	33	0.604	2015	patient preference
5	32	0.782	2015	palliative care
6	29	0.71	2016	patient education
7	26	0.708	2016	breast colorectal
8	25	0.766	2015	systematic review
9	13	0.881	2016	interpersonal forgiveness

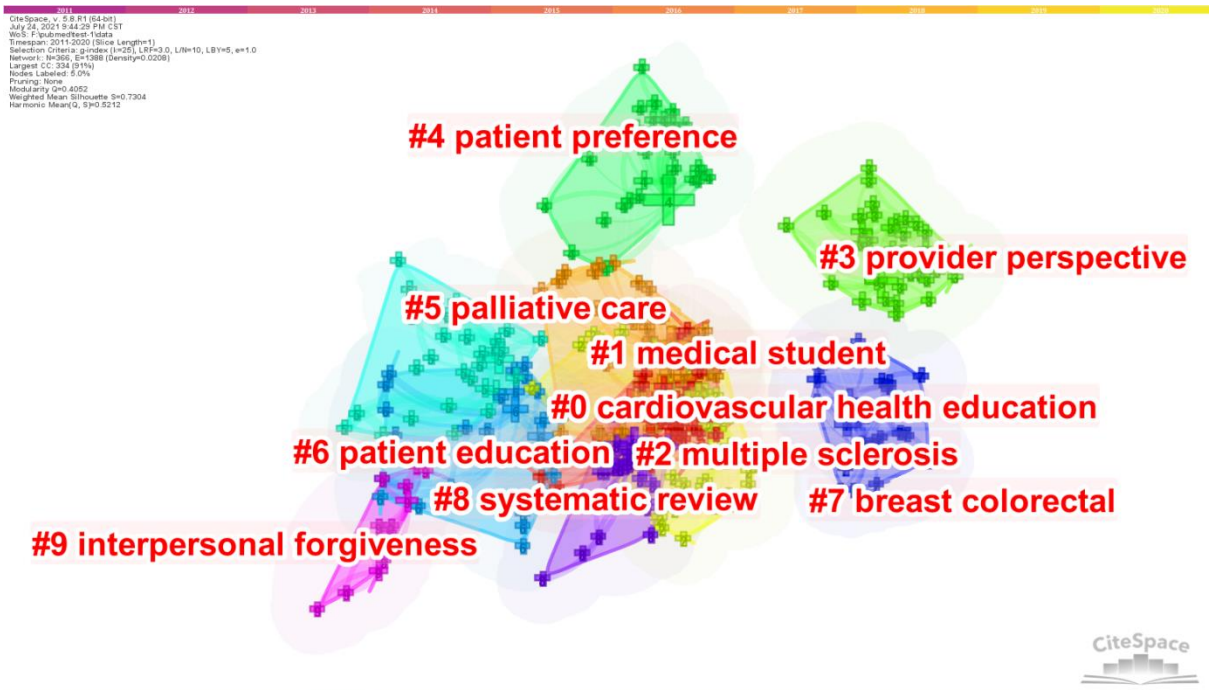

Figure 3.7 Clusters of co-occurring keywords in the first-step PubMed search result

And the CiteSpace software detected 17 burst keywords (Figure 3.8). In 2011, the keyword "palliative care" that is a kind of term related with a specific disease already appeared in the early stage of research on "physician-patient relationship". Then similar keyword "chronic disease" emerged in 2013. The emergence of "communication skills training" and "medical student" in 2017 may indicate that research on humanities training has begun to gain increased attention.

Top 17 Keywords with the Strongest Citation Bursts

Keywords	Year	Strength	Begin	End	2011 - 2020
palliative care	2011	1.63	**2011**	2012	
end of life	2011	2.15	**2012**	2014	
chronic disease	2011	3.03	**2013**	2014	
counseling	2011	2.71	**2014**	2015	
pediatrics	2011	1.44	**2014**	2015	
usa	2011	2.3	**2015**	2016	
treatment	2011	2.57	**2016**	2017	
communication skills training	2011	2.57	**2016**	2017	
medical student	2011	1.61	**2016**	2017	
placebo effect	2011	2.94	**2017**	2018	
disclosure	2011	2.94	**2017**	2018	
health disparity	2011	2.21	**2017**	2018	
*patient-reported outcome measure	2011	1.96	**2017**	2018	
*health communication	2011	3.58	**2018**	2020	
surgery	2011	2.62	**2018**	2020	
prevention	2011	2.04	**2018**	2020	
conversation analysis	2011	1.47	**2018**	2020	

Figure 3.8 List of burst keywords in the first-step PubMed search result

3.3.3.2 Search result of step 2

Following the method described in Section 3.3.1, we conducted the second search in the PubMed database, and the analysis of the results is as follows.

1) **Analysis on annual number of published papers**: When comparing the results of the second-step PubMed search with those from the first-step search (see Figure 3.9), it is observed that the publication growth trends from both searches aligned consistently. Notably, literature from the second-step search constituted over 50% of the total each year, indicating that research themes relative to humanities such as communication, shared decision, empathy and patient centred care dominate the field of doctor-patient relationship studies. The trend in the proportion of these keywords shows a gradual annual increase. While the growth trend is subtle, it may indicate a gradual increase in the focus on humanistic care within doctor-patient relationship research, an area that merits further exploration and attention.

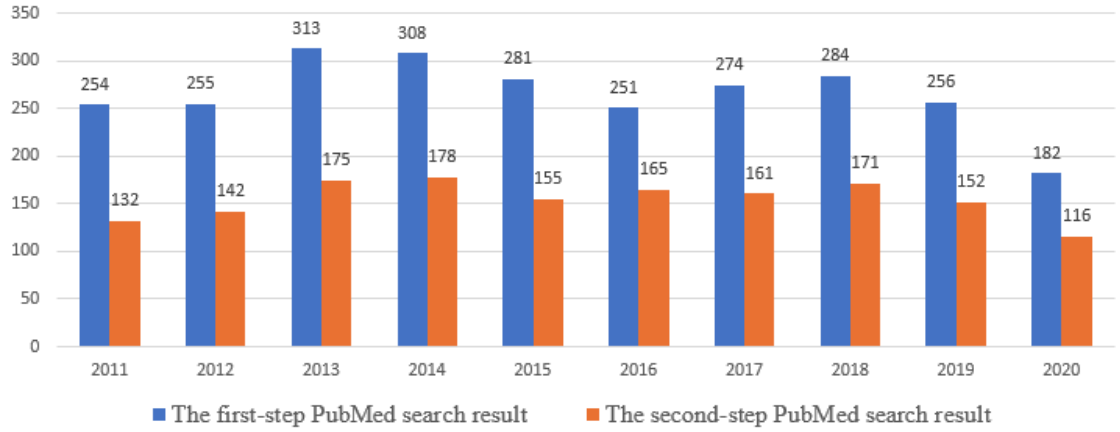

Figure 3.9 Comparison of annual number of published papers between two search results

2) **Analysis on keywords**: We adopted a similar method as in the first-step PubMed search and utilized CiteSpace to produce a high-frequency keyword list (presented in Table 3.4), a co-occurrence keyword network (see Figure 3.10), and a co-occurrence keyword clustering map (see Figure 3.11) from the data of second-step PubMed search.

The comparison between Table 3.4 and Table 3.2 shows that the distribution of high-frequency keywords in the second-step search closely mirrors that of the first step. Notably, since "empathy" was specifically included in the search criteria, its betweenness centrality is higher than that in Table 3.2. Additionally, keywords related to tumour, such as "cancer" and "palliative care" are frequently mentioned in the second-step search result. Particularly, "palliative care" had a betweenness centrality over 0.1 in both searches. The appearance of "oncology" in the second-step search highlights the strong focus on cancer in the field of medical humanities and doctor-patient relationship research.

Table 3.4 Distribution of high frequency keywords in the second-step PubMed search result (top 20)

Keywords	Count	Centrality	Year
Communication	166	0.62	2012
shared decision making	73	0.2	2013
primary care	45	0.18	2013
patient-centered care	45	0.19	2013
Cancer	39	0.08	2012
palliative care	38	0.11	2011
decision making	28	0.07	2013
systematic review	26	0.04	2013
Empathy	24	0.11	2013
patient satisfaction	21	0.03	2015
quality of life	19	0.03	2014
medical education	19	0.04	2013
Oncology	17	0.04	2013
general practice	15	0.02	2015
Review	15	0.02	2015
patient-provider communication	15	0.03	2014
breaking bad news	15	0.01	2013

Keywords	Count	Centrality	Year
advance care planning	14	0.03	2013
randomized controlled trial	13	0.03	2014
patient education	13	0.02	2016

While the top-ranking high-frequency words remain largely unchanged from the first-step search, several new keywords have surfaced, including “patient-provider communication”, “patient education”, and “breaking bad news”. However, these new keywords show relatively low frequency and betweenness centrality, and they are not featured in the list of burst words in the second-step search (Figure 3.12).

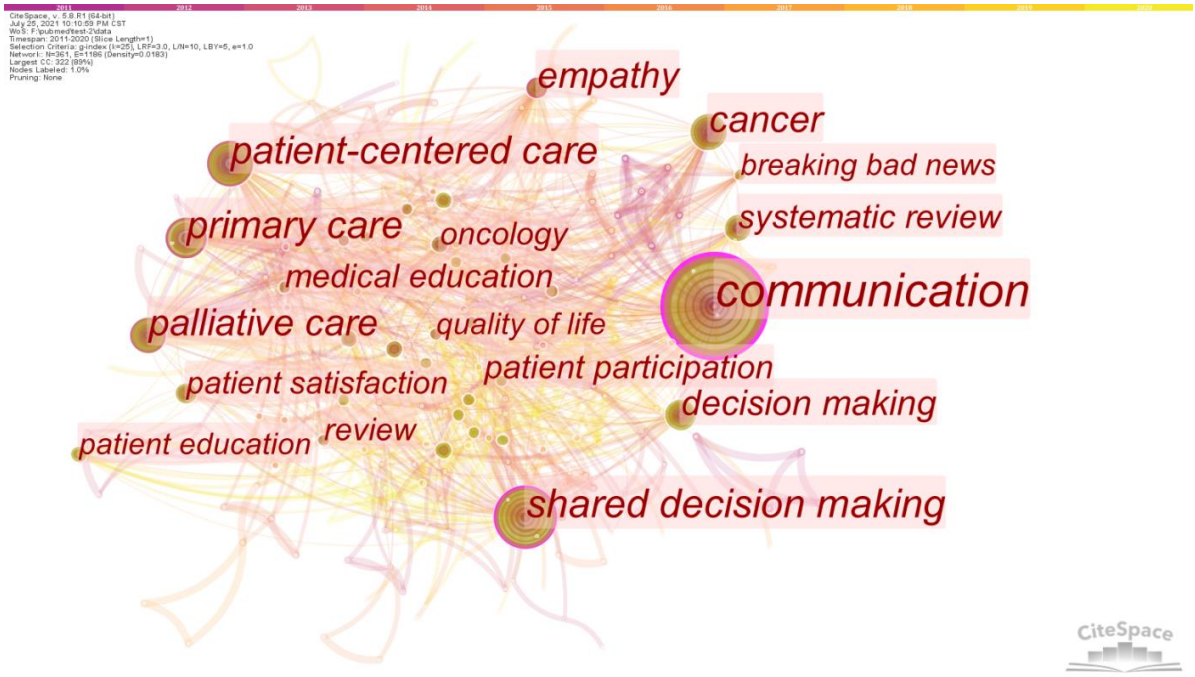

Figure 3.10 Network of co-occurring keywords in the second-step PubMed search result

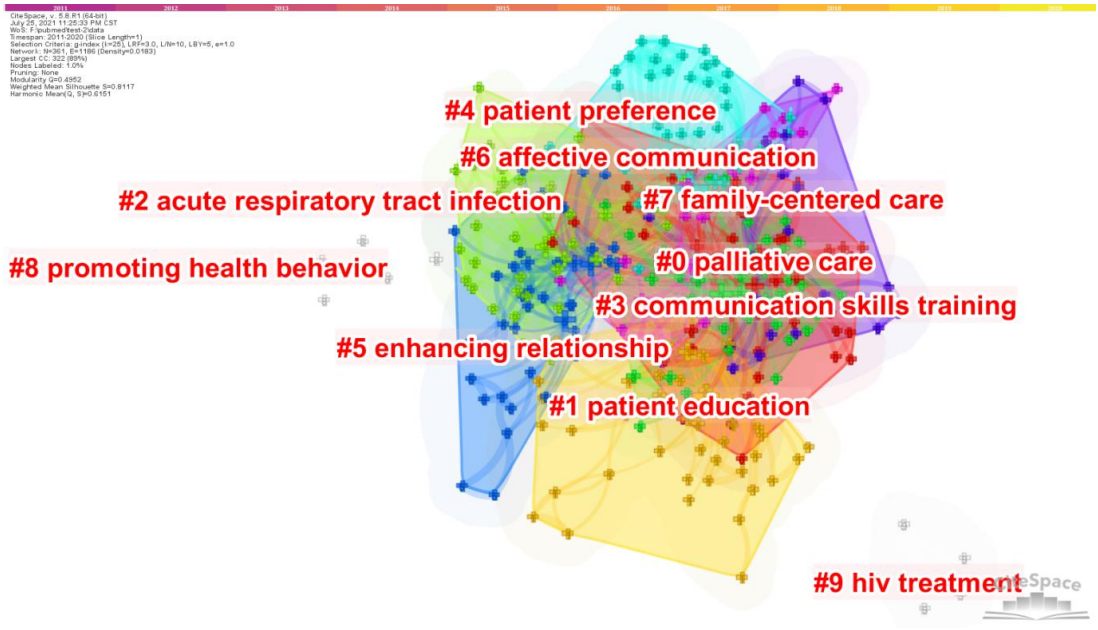

Figure 3.11 Clusters of co-occurring keywords in the second-step PubMed search result

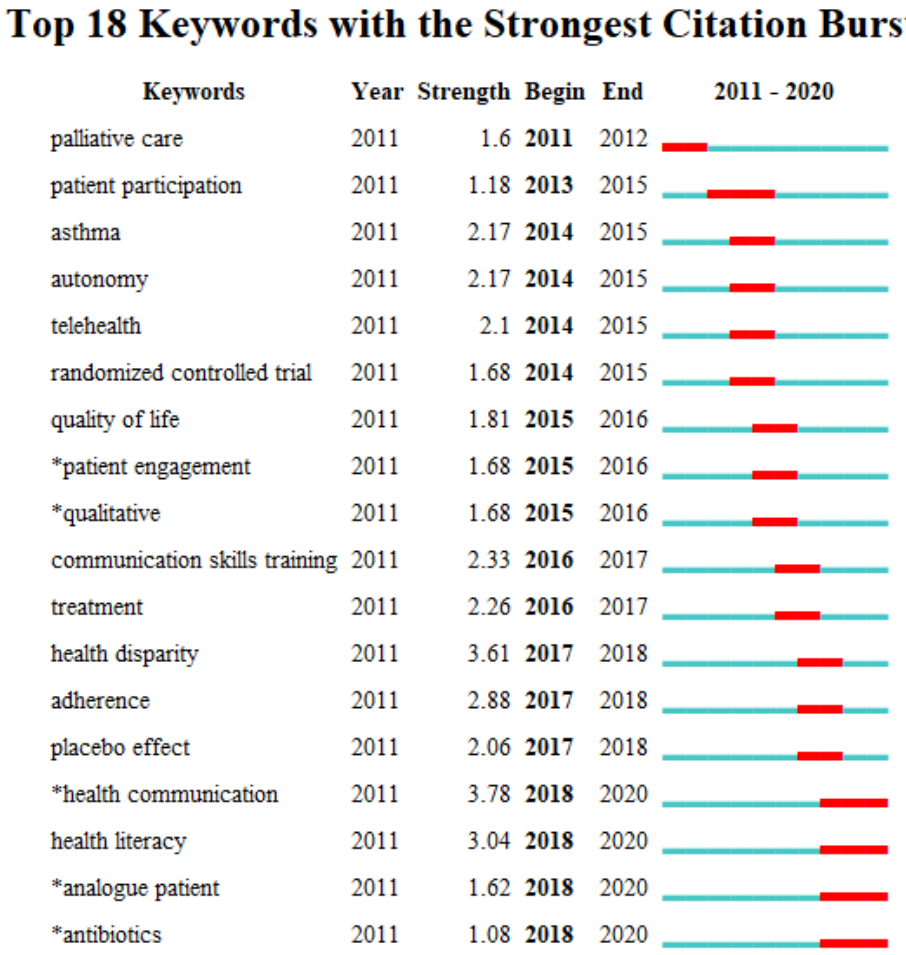

Figure 3.12 List of burst keywords in the second-step PubMed search result

Upon comparing the burst keyword results from both searches (see Figure 3.8 and 3.12), we identified several recurring keywords, including "palliative care" (2011–2012), "communication skills training" (2016–2017), "placebo effect" (2017–2018), "treatment" (2016–2017), and "health communication" (2018–2020). These results, paired with the keyword cluster analysis (Table 3.5), suggest that palliative care has consistently been a focal point in medical humanities research, marking an early start in this field. Over time, the scope of medical humanities has broadened to encompass communication skills, the dissemination of health knowledge, and the optimization of treatment processes.

Table 3.5 Clusters of keywords in the second-step PubMed search result

Cluster ID	Size	Silhouette	mean (Year)	Top Term
0	50	0.728	2015	palliative care
1	47	0.885	2016	patient education
2	46	0.876	2016	acute respiratory tract infection
3	43	0.734	2015	communication skills training
4	40	0.656	2015	patient preference
5	39	0.861	2016	enhancing relationship
6	23	0.892	2016	affective communication
7	23	0.88	2016	family-centered care

Cluster ID	Size	Silhouette	mean (Year)	Top Term
8	6	0.989	2014	promoting health behavior
9	5	0.998	2013	hiv treatment

At the same time, we also noticed that many keyword bursts differed between the two searches. This is understandable, as medical humanities is only one of the factors influencing the doctor-patient relationship.

3.4 Discussion

The analysis on CNKI search result via CiteSpace indicates that generally the published articles on physician-patient relationships remain active and the number exhibits an upward trend. After the keywords used for search (i.e. “人文” and “医患关系”) are filtered out, the high frequency keywords are still limited to conceptual terms like “人文关怀” (humanistic care) and “医学人文” (medical humanism). Other high frequency keywords include “医学生” (medical student) and “医患沟通” (physician-patient communication). There is no high frequency keywords related to diseases, which suggests that China’s existing studies on humanism and physician-patient relationship preferred theoretical research to empirical research. The study objects in empirical research were mainly limited to medical students and the research focus tended to the humanistic education of medical students, which also means such education began to receive attention. “医患沟通” (physician-patient communication) is the high frequency keyword with regard to humanistic research, but it does not appear in the list of top 13 burst keywords. We think that, though the research on this topic was concerned, it was not the trend or frontier in this domain, and the research perspective in this orientation is too narrow. This is consistent with the research results of Li et al. (2021). Besides, domestic researchers paid more attention to the study on physician-patient relationship in a broader sense, such as Tang and Kang (2021), who with an eye to humanistic spirit, analysed the reasons why medical staffs did not put much effort in humanistic care and the causes of medical disputes and then offered coping strategies from multiple facets like medical system, hospital management, and individual factors of doctors and nurses. Especially Feng et al. (2018) thought that, building a humanistic hospital probably merge the humanistic characteristics of social medicine and psychologic medicine into the modern hospital management. Thus, when handling physician-patient relationships, physicians can learn to apply humanistic care and achieve a more harmonic relationship with patients.

Based on the analysis on PubMed search result via CiteSpace, the number of published

literatures kept a flat trend in the past 10 years, which suggests that the oversea research on physician-patient relationship started earlier, but the number of relative articles did not present an increasing trend. From the list of high frequency keywords and clusters, the words that specifically embody humanistic spirit like “communication”, “shared decision making”, “empathy”, and “patient-centred care” appeared frequently in PubMed literatures, that shows the studies abroad emphasized on the empirical research related to these words. Another notable point is the high frequency keywords in relation to diseases, especially the words regarding cancer treatment, have high occurrence frequency. “Palliative care” is a representative word that has both high frequency and high betweenness centrality (0.11) (Table 3.4) and also appears in the list of burst words from 2011. It can be concluded that, some foreign research on medical humanism did not only stay theoretical, but have been combined with clinical practice already, and focused on a certain kind of disease, such as tumour and chronic diseases. However, we cannot find similar words among the top 20 high frequency keywords in CNKI search result. We need to state that, we have not excluded the articles issued by Chinese institutes in PubMed search result. Therefore, our analysis can only explain that the literature in two databases has different inclinations. Whether domestic study on medical humanism has less empirical research in relation to diseases, it still needs further investigation.

Based on the search result in PubMed database, we found that the research on physician-patient relationships mainly focused on communication, shared decision making, empathy, and patient-centred care. We will elaborate these facets respectively.

3.4.1 Communication

Physician-patient communication usually involves discussion or information exchange between doctors and patients regarding injury, diagnosis, treatment, and health care. It is an essential skill in doctor’s practice and plays an important role in establishing harmonic physician-patient relationship (Liang et al., 2021).

A good physician-patient communication can not only help to enhance mutual trust between doctors and patients, but also improve patient’s willingness to cooperate with the diagnosis and treatment, and positively promote the health outcomes of patients (Li et al., 2009; Zill et al., 2014). Furthermore, Lim et al. (2011) found that skilful and effective physician-patient communication can significantly reduce preoperative anxiety and patient dissatisfaction; doctor’s good interpersonal skills and the ability to anticipate what patients needed to know concerning their diagnosis and treatment can take notable effect. More recently, Liang et al. (2021) conducted a meta-analysis on 15 articles, which indicates that preoperative

communication between doctors and patients and psychological counselling can effectively improve postoperative speech function recovery, speed up the recovery of daily communication ability of patients, and also enhance postoperative quality of life.

Another study by Yao et al. (2021) conducted a systematic review of randomized controlled trials to find out whether communication skills training for health care professionals is effective in improving diabetes and/or hypertension care. They concluded that the communication skills training interventions did not improve glycosylated haemoglobin, blood pressure or other relevant outcomes in patients. And their analysis suggested that the training program with longer timespan, mixed with multiple training methods, and across a broader range of health systems is likely to have better effects, in comparison with short-term training. Further studies are needed to identify which methods of communication skills training can help both patients and health care professionals reach shared understanding to achieve the best outcomes for at-risk individuals and populations. Currently, China's domestic studies on physician-patient communication emphasized on evaluating communication skills and effects of medical staffs in different angles (Zhao et al., 2014; Zhu et al., 2014).

3.4.2 Shared decision making

Shared decision making (SDM) refers to a medical service model in which patients or their caregivers are invited to participate in all parts of medical decision-making, to fully discuss the pros and cons of a certain medical decision, and finally make a shared decision based on the patient's cultural background, education and economic level and other factors (Huang et al., 2017).

SDM is adopted in the USA to help patients take part in making medical decisions and conduct long-term interactive research between communication theories and clinical practices. After 1990s, SDM was employed in the UK and other countries in cancer decision-making treatment and statistical analysis of epidemic disease (Charles et al., 2003). And in 2006, the conceptual model of SDM was transformed into basic element of clinical behaviours (Makoul & Clayman, 2006). In 2010, Salzburg Statement on Shared Decision Making was produced to call for clinicians to recognize SDM as an ethical requirement, and help patients reach decisions through two-way interactive communication of accurate and tailored information (Slade, 2017).

Furthermore, Eggeling et al. (2021) thought that patient's narratives can potentially be useful for conveying the relevance between SDM and patient-centred values to medical students. They found that medical students who read patient testimonials were more positive to perceive SDM's importance than the participants who only read an information text, which may also be

reflected in longer period of time scheduled for medical consultation.

SDM has been widely applied in clinical practices.

3.4.2.1 The rationality of surgical treatment

In recent years, SDM has gained significant attention for its application in surgical and oncological operations. A meta-analysis by Niburski et al. (2020) highlighted that incorporating SDM in surgical procedures notably enhances patient satisfaction and value recognition, reduces conflicts and anxiety, and increases patient knowledge. Specifically, a study by Wu and Li (2022) found that implementing SDM prior to breast cancer surgery not only drastically improved patients' anxiety and depression levels but also positively influenced their ability to make clinical decisions, increased their readiness to make decisions, and improved their satisfaction with preoperative interventions.

Additional research indicates that patient decision aids (PDA) significantly improve decision-making capabilities and foster better communication between doctors and patients. An example of this is the application of PDA developed by Lee and Wu (2019) before bariatric surgery, which assists patients in clarifying their weight loss goals and facilitates discussions with surgeons about surgical treatment. The results demonstrate that patients are highly satisfied with such tools, experiencing considerable postoperative decision satisfaction and relatively low regret post-surgery.

However, multiple systematic reviews indicate that the implementation of SDM in surgical practices remains limited, and its effects are varied and complex (van der Sluis et al., 2021; Zheng et al., 2024). Future research should therefore concentrate on determining the optimal types, timing, and specific content of PDA (Wilson & Probe, 2020), and on enhancing the communication skills of health care providers (Zheng et al., 2024).

For example, Schaeffer et al. (2021) underscored the importance of SDM in preoperative consultations, noting that the statistical analysis on the outcomes of tendon transfers for ulnar nerve paralysis can assist in SDM with patients during preoperative counselling, and help surgeons appropriately inform patients of common risks and complications and setting realistic postoperative expectations. Similarly, a study by Eggeling et al. (2020) involving medical laypeople with assumed cruciate ligament ruptures showed that, while doctors' recommendations heavily influence treatment choices, they do not necessarily increase patients' confidence in their decisions. And there were no effects of doctor's reasoning style, no matter scientific evidence or personal experience. This highlights a need for further research to clarify in which situations and in what ways recommendations are appropriate for patients and help

them to consider their own preference into a true SDM encounter.

Additionally, a study by Taylor et al. (2017) in the United States demonstrated that using a "best case/worst case" framework can significantly improve communication by surgeons in high-risk surgical situations. This approach focuses discussions on treatment options and outcomes, helping surgeons to more effectively organize conversations in emergency settings and facilitate SDM.

3.4.2.2 Improve the treatment of chronic disease

The research of Chen et al. (2021) considered that, SDM can effectively release patient's negative emotions, promote patient's adherence, enhance patient's self-care knowledge, and effectually improve the treatment. Patient satisfaction can be used to predict patient adherence, medical malpractice litigation, and doctor replacement. A study on patients with multiple sclerosis indicated that, patient's satisfaction with the first diagnostic consultation can be enhanced by a conversation of more than 20 minutes covering many relevant topics, a clear communication regarding the diagnosis, the presence of significant family member or friend, and SDM (Kamm et al., 2020). In France, the OPTIMA© (MSD, Courbevoie, France) questionnaire was developed in collaboration with type 2 diabetes mellitus (T2DM) patients, general practitioners and diabetes specialists to enhance communication between doctors and patients on diabetes (Grimaldi et al., 2016). All management guidelines for T2DM recommend regular physical activity (PA). Consoli et al. (2020) certified that, the OPTIMA-PA questionnaire (the PA module of OPTIMA questionnaire) can effectively improve patient-physician relationship by increasing patient involvement therapeutic decision making, though this questionnaire did not directly promote setting up of SMART (Specific, Measurable, Acceptable, Realistic and Timely)-PA micro-objectives. Their study also highlights the value of physician empathy and their ability to develop patient-centred relationships for improving patient PA levels. It has been shown that patient participation in decision making improves patient outcomes in depression, cardiovascular disease, palliative care, and disability rehabilitation (Levack et al., 2015; Loh et al., 2007; Schoenthaler et al., 2014; Stewart, 1995). Furthermore, Wollny et al.'s (2018) findings suggested that general practitioners (GPs) perceive themselves as "experts" but describe some of their patients as in denial or refusing to follow advice. Given this gridlocked role pattern, GPs tended to give up hope for improvement and became resigned to the situation. The conflicting GPs experience between their sense of duty and feelings of futility may lead to perceptions such as personal defeat and insecurity. GPs and patients may benefit from adjusting the patient-doctor relationship with regard to shared

definitions of realistic and authentic goals (Wollny et al., 2018). A DEBATE trial (a cluster-randomized controlled trial conducted in German primary care) found that, compared to usual care, it was not able to confirm effectiveness of the intervention designed to foster patient-centred communication and SDM between GPs and patients with poorly controlled T2DM s in reducing glycosylated haemoglobin level. But in both the intervention and control group, patients were able to improve their blood glucose levels. This finding may encourage physicians to stay on task to regularly approach this vulnerable and hard-to-reach group of patients (Wollny et al., 2019).

3.4.2.3 Palliative cancer treatment

Treatment for advanced cancer offers uncertain and often small benefits, and the burden can be high. Hence, treatment decisions require SDM. Henselmans et al.'s (2018) randomized controlled trial proofed the assumption that SDM about palliative cancer treatment results in less aggressive treatment and more quality of life in the final period of life. Another research shows that training medical oncologists in SDM about palliative systemic treatment improves both observed and patient-reported SDM in clinical encounters (Henselmans et al., 2019). The Goal-directed health care (GDHC) framework proposed by Mold et al. (1991) provides an alternative to the problem-oriented approach for modern health care problems, including chronic incurable illnesses, health promotion and disease prevention, and normal life events, with greater emphasis on physician-patient collaboration. A study in the US designed to determine how to help patients and clinicians shift to a goal-directed approach from problem-oriented mindset, found that physicians were able to engage in quality-of-life (QOL) discussions with their patients, but did not translate that information to medical decision making. More research is needed to understand why clinicians opt not to use QOL information and how to make physician-patient communication more goal directed (Purkaple et al., 2020).

3.4.3 Empathy

Empathy is a core element in the doctor-patient relationship. The PubMed search results reveal that international medical communities highly prioritize empathy training for medical students and doctors. Numerous studies have investigated a range of training methods designed to enhance empathy skills, particularly in contexts where patients are being informed of significant disease diagnoses or are facing crucial surgical decisions. These training programs are crucial for preparing health care professionals to handle sensitive interactions effectively, ensuring they can provide supportive and understanding care during critical moments in patient care. A study

indicated that, the medical students participated in an empathy skills training showed significantly higher levels of empathy than the untrained students. This result underpins the value of empathy skills training in medical school study programs (Wundrich et al., 2017). And research found that, a brief (60-minute) training module of breaking bad news (BBN) incorporating the true stories from patients who shared their experiences specific to cancer as well as their preferences for communication with physicians is an effective method of improving BBN communication skills among medical students and residents (Gorniewicz et al., 2017). Another study demonstrates that a brief (10-hour) relational/communication skills (RCS) training program, integrating multiple training strategies (including lectures, practical exercises with standardized patients, and personal reflection facilitated by feedback from third parties), can significantly improve medical residents' ability in appropriately responding to patients' cues and concerns (Barbosa et al., 2019).

Incorporating special techniques such as interactive video simulations into medical student curricula has proven highly appealing for students and significantly enhances their patient-centred communication skills. According to a study by Kaltman et al. (2018), students trained with these methods tend to ask more open-ended questions and offer significantly more empathic responses. Similarly, a study of Carroll et al. (2018) proved that, clinicians can effectively learn patient-centred and empathetic communication techniques to counsel hypertensive patients and engage them with hypertension in their blood pressure self-management. Their training strategy involves adapting each step of the 5A model—Ask, Advise, Assess, Assist, and Arrange—integrating it with Self-Determination Theory (SDT). This training emphasizes four core communication skills: "Ask-Tell-Ask", "Focus on Strengths", "Tell Back" and "Supporting Small Steps through Frequent Follow-up" (Carroll et al., 2018, p. 2). This approach has the potential to be beneficial in other primary care counselling contexts as well.

Several studies have investigated methods by which doctors can enhance their empathy in clinical settings. For example, a randomized controlled study by Kratzke et al. (2021) found that transparent masks, which allow patients to see the facial expressions of surgeons, reduce perceived barriers during interactions. Patients reported finding it easier to hear and understand explanations, perceiving greater empathy, and having higher trust in decisions made by doctors wearing clear masks compared to those wearing traditional covered masks. Another randomized controlled trial shows that daily brief psychosocial intervention, BATHE (Background-Affect-Trouble-Handling-Empathy, a patient-centred brief intervention that invites patients to talk about what matters to them and prompts doctors to express empathy and elicit positive coping

measures), for inpatients makes patients more likely to perceive their doctors as friendly and feel that the doctors show "a genuine interest in me as a person" rather than just viewing patients as cases (Pace et al., 2017, p. 2). Thus, this intervention significantly improves patients' satisfaction with hospitalization experience and medical care. An experiment by Nazione et al. (2019) demonstrated that when doctors engage in appropriate self-disclosure—such as sharing personal challenges shown as desirable to patients (in this experiment, discussing their own struggles with healthy eating after informing patients of the need for a healthier diet)—it fosters open dialogue and can enhance patient trust, rapport, and satisfaction. Another survey conducted in Italy (Danzi et al., 2018) found that when doctors inform patients that cancer is incurable and need to switch to palliative care, using emotional statements to express support for patients (such as expressing full understanding of the patient's reluctance and promising to make the best decision together with the patient) helps patients perceive the doctor as more empathic. Heart rate variability detection results prove that this expression relieves patients' stress, further confirming that doctors' affect-oriented communication style can positively affect psychophysiological indicators. A similar study also points out that when helping patients face anxiety-inducing bad news like cancer diagnosis, using empathetic patient-centred communication (PCC) techniques, i.e., acknowledging patients' experiences, giving them encouragement, and promising continued care, significantly affects patients' psychological state and emotional reactions, reduces anxiety levels and negative emotions, and results in notably higher trust in doctors (Zwingmann et al., 2017).

Empathy demonstrated by health care professionals, such as doctors and nurses, also positively affects the health outcomes of patients with chronic conditions. A study analysing average 10-year follow-up data from general practice clinics in the UK revealed that patients with type 2 diabetes who had positive experiences of empathy shortly after their diagnosis showed improved long-term clinical outcomes. Specifically, the study found that these patients had a reduced risk of cardiovascular disease (CVD) and all-cause mortality. This suggests that empathy in health care can significantly influence the overall well-being and survival of patients with chronic illnesses (Dambha-Miller et al., 2019).

3.4.4 Patient-centred care

Patient-centred care is a health care approach that prioritizes respecting and addressing the unique needs, preferences, and values of patients. This model ensures that patients' values are the primary guide for all medical decisions. It advocates for treating patients as active partners in the health care process, rather than passive recipients of treatments. Patient-centred care

involves gaining a deep understanding of the patient's life context, maintaining open and transparent communication, and actively incorporating the patient's views and desires into medical decision-making. For many patients, the most common understanding is: "They gave me all the care I needed and wanted exactly when and how I needed and wanted it" (Berwick, 2009, p. w563).

Improving patient experience is not only a basic part of patient-centred nursing, but also one of the key strategies to improve medical quality, provide better medical care and improve nursing effect. In recent years, numerous studies and practical applications have demonstrated that patient-centred care can markedly enhance both patient satisfaction and health outcomes. A study by Berdahl et al. (2021) involved interviewing primary care physicians who were reporting under the Merit-based Incentive Payment System (MIPS) of the United States. Within this system, physicians' payment adjustment is influenced by their performance, with incentives or penalties applied based on their health care quality ratings, which range from exceptional, good, to poor. The physicians involved in the study described their understanding of health care quality as comprising two distinct components: 1) evidenced-based care that is safe, including routine health maintenance, chronic disease control, accurate diagnosis and guideline adherence; 2) patient-centred care that is responsive to individual patients' needs, including spending enough time with patients, responding to patients' concerns, and establishing a long-term relationship based on trust. These physicians considered patient-centred care to be necessary for the provision of exceptional quality in health care.

Beyond theoretical analysis, numerous studies have explored practical implementations of patient-centred care. For instance, an experiment conducted in Geneva validated recommendations from clinical communication experts on how to utilize Electronic Health Records (EHR) in a patient-centred manner. Findings indicate that, in biomedical or psychosocial focused consultations, patients prefer doctors to engage in intermittent typing rather than continuous typing or handwriting, which shows patients that their physician is giving importance to their words. Additionally, patients appreciate maintaining both visual and verbal contact rather than just visual contact while the doctor is typing. Most patients prefer when doctors explicitly indicate when they are using the EHR (known as signposting), compared to not doing so. Moreover, half of participants favours the "physician's bust towards the patient and hands away from the keyboard" position as it is the most patient-centred position, which enhances the personal interaction during consultations (Lanier et al., 2021, "A Good Spatial Organization" section).

Similarly, a real-world study by Gruß et al. (2019) conducted in-depth interviews with

American patients taking opioids for chronic pain treatment to understand their experiences with opioid therapy in the context of governmental aggressive effort to reduce opioid prescription and tighten regulations. The study revealed how policy changes directly affected patients and underscored the complexities in the doctor-patient relationship. Qualitative analysis of the interviews indicated that these patients not only endured significant physical and emotional distress during these changes but also found themselves in negotiations over prescription amounts with their doctors, which adversely impacted their relationships with their primary care providers. Consequently, the study concluded that, during the tapering and/or deprescribing processes of opioids, it is very important to utilize the communication approaches that are patient-centred and include shared decision-making, and to ensure alternative pain treatments are available to patients with chronic pain.

A German study developed the Heidelberg Milestones Communication Approach (MCA) to address the issue of discontinuous care for patients with a limited prognosis. This longitudinal communication approach emphasizes scheduled, structured dialogues at key milestones—critical turning points in the treatment process—across a patient's disease trajectory. The approach involves not only patients but also doctors, nurses, and caregivers, facilitating guideline-concordant early palliative care to ensure seamless interprofessional collaboration. The study implemented the MCA and assessed its effectiveness, finding that it can foster patient-centred communication with shared decision-making and the facilitation of advance care planning including end-of-life decisions, thus increase patient's quality of life and decrease aggressive medical care at the end of life (Siegle et al., 2018).

Using network analysis, we found that the research hotspot of doctors' humanistic qualities and physician-patient relationship, such as communication skills, shared decision-making, empathy and patient-centred care, play a significant role in influencing the outcomes of the doctor-patient relationship. These outcomes are evident in various medical contexts, including the setting of reasonable surgery expectations, the treatment effectiveness of chronic diseases, and the appropriate management of tumours. Moreover, these qualities, particularly empathy, can be enhanced through targeted training programs.

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Chapter 4: Theoretical Model and Hypotheses

The primary objective of this study is to develop a doctor-patient relationship evaluation system that integrates both doctors' and patients' perspectives while placing communication skills at its core. The study aims to explore the intrinsic connection between doctors' humanistic literacy and patient satisfaction. To accomplish this goal, as mentioned in Chapter 1, we concentrated on two primary research questions: firstly, identifying the potential factors that influence the evaluation of physicians' communication behaviours by both patients and doctors; secondly, examining whether there are differences in how patients and physicians perceive physicians' communication behaviours during medical consultations.

In exploring these questions, we reference the "Opinions on Strengthening the Performance Appraisal of Public Hospitals" issued by China's General Office of the State Council (2019), which prioritizes patient satisfaction as a key hospital evaluation criterion—an objective aligned with our study. Additionally, a study (Wang et al., 2019) on rural public clinics across China suggests that treatment outcomes are a significant predictor of patient satisfaction with primary care. Moreover, aspects of humanistic care, such as the dignity accorded to patients and the clarity of communication from health care providers, also exhibit a positive correlation with overall satisfaction. Given the lower educational levels of rural clinic doctors, residents often doubt their clinical capabilities, leading the study to recommend prioritizing treatment outcomes, followed by respect for patients and effective communication. However, in economically developed urban areas, patients expect both strong clinical competence and humanistic care.

Considering these differences, our study centres on doctors within the community health care system of Shenzhen, a city renowned for its economic development in China, with the aim to explore how humanistic aspects of health care influence patient satisfaction. Our network analysis of literature has concluded that research hotspots of doctor's humanism and physician-patient relationship encompass communication, shared decision-making, empathy and patient-centeredness. These concepts are interrelated and often inseparable, with communication serving as the fundamental medium through which the other aspects are expressed and realized. Given this interconnectedness, we have chosen to focus on communication as the primary entry point for assessing doctors' humanistic literacy. Thus, communication will be used as the key

indicator to evaluate the extent of humanistic qualities in medical professionals. To effectively study patient satisfaction, it is crucial to first identify the metrics for measuring patient satisfaction and to establish benchmarks for enhancing it. Recent research by Avancena et al. (2024) has highlighted that, to achieve successful care delivery, effective communication is the most crucial process attribute and patient satisfaction emerges as the most important outcome attribute. This finding further underscores the need to forge a connection between patient satisfaction and the assessment of doctor-patient communication effectiveness. By establishing robust and practical evaluation criteria and methodologies, we can better measure the impact of communication between doctor and patient, unearth the communication discrepancies between the two parties, and tailor the content and structure of communication to meet evolving patient needs effectively.

4.1 Theoretical Model

To systematically analyse these two research questions, it is essential to construct a comprehensive theoretical model. This model integrates key variables from existing studies on communication, patient-centred care, and patient satisfaction, establishing clear relationships between them. By providing a robust theoretical foundation for formulating research hypotheses, the model serves as a framework for evaluating and optimizing the effectiveness of doctor-patient communication. Specifically, (1) we consider physician characteristics as independent variables, with the expectation that enhancing these characteristics, particularly the recognition of communication skills among physicians, will lead to more effective doctor-patient interactions; and (2) we also incorporate patients' demographic data and their preferences for medical consultations as independent variables to better cater to different patient needs, thereby improving their healthcare experiences. Through the combined effects of (1) and (2), our goal is to enhance the consistency between doctors' self-evaluation of their communication behaviour and patients' evaluation of the same, thereby facilitating the development of more cohesive and harmonious doctor-patient relationships.

4.2 Hypotheses

After an in-depth review of research on doctor-patient communication, we have identified key elements that form the theoretical foundation for this study's hypotheses.

Firstly, research of Li et al. (2022) emphasized that patients, as the primary responsible

party for their own health and recovery, should actively assume corresponding responsibilities. Clearly defining patient obligations not only significantly enhances their enthusiasm for participating in disease management but also encourages them to play a more proactive role in medical decision-making, thereby providing more comprehensive protection for their health. Furthermore, it improves patients' medical literacy and fosters a better understanding of physicians' duties and obligations, which in turn enhances their trust in doctors and facilitates more effective doctor-patient communication.

Additionally, van Dam et al. (2003) found that rather than solely adjusting doctors' communication styles to make them more patient-centred, directly increasing patient engagement has a more significant impact on improving diabetes patients' self-care abilities and health outcomes. However, it is worth noting that most studies focus on enhancing physicians' communication skills (Carroll et al., 2018; Gorniewicz et al., 2017; Wundrich et al., 2017), with limited exploration into the role of patient communication in enriching medical consultations. This gap highlights the need to investigate how patient engagement and communication efficiency influence health care interactions. In fact, previous studies have demonstrated that efficient patient communication and active involvement in medical interactions can lead to improved disease management, heightened patient satisfaction, better physician communication practices, and a reduction in medical errors (Kaplan et al., 1996). To assess patients' self-efficacy in communication, Capone and Petrillo (2014) developed the Patient's Communication Perceived Self-efficacy Scale (PCSS), serving as a key reference for our hypotheses.

Secondly, studies in health education have indicated a connection between patients' health literacy levels and socio-demographic traits. For instance, research on the health literacy of pregnant women in the United Arab Emirates (Elbarazi et al., 2024), highlighted that health literacy varies across different socio-demographic groups, with significant correlations to education, employment status, and perceived social support. This finding further suggests that patients' sociodemographic characteristics may be an important factor influencing doctor-patient communication effectiveness.

Domestically within China, the majority of research on doctor-patient communication has concentrated on assessing the communication skills and effectiveness from the medical staff's perspective (Zhu et al., 2014). Conversely, international studies (Capone & Petrillo, 2014; Chipidza et al., 2015) have underscored the profound impact that patients' involvement in doctor-patient communication can have on the effectiveness of such interactions. Research by Zou and colleagues (2016) further supports this perspective. Using the "Life Attitude and Habit

Scale", their research in a Shanghai community revealed that individuals with higher life satisfaction, optimism, and better interpersonal relations tend to possess superior communication skills, thus exhibiting more confidence in their ability to communicate effectively with physicians during medical consultations. The study also highlighted the influence of patients' demographic information on their communication confidence. The findings of the study indicated that the education level significantly enhances PCCS scores. The authors contended that possessing a certain level of health literacy is both a prerequisite and a condition for effective doctor-patient communication of mutual participation model. Factors such as "life satisfaction", "interpersonal relationships", "life optimism", "acceptance of health-related information", and "awareness of health-related information" were all found to be positively associated with scores on the PCCS. "Acceptance of health-related information" refers to how much individuals are open to and accept health-related knowledge and information provided through various external channels. In contrast, "awareness of health-related information" pertains to an individual's eagerness to seek out health-related information (Basu & Dutta, 2008; Dutta-Bergman, 2004). Nowadays, from the Internet and various media, patients can conveniently access health-related information, learning about diseases, doctors, and hospitals. In fact, many patients indeed gain some understanding of their disease-related knowledge before seeking medical care and making choices about hospitals and doctors. These behaviours may boost their confidence in communicating with health care providers and enhancing the overall effectiveness of doctor-patient interactions.

The *question prompt sheet*, introduced by Butow et al. (1994), is a straightforward and practical tool designed to encourage patients to ask questions and engage more actively in doctor-patient communications. Numerous studies have demonstrated that question prompt sheets/lists significantly improve the efficiency of doctor-patient interactions (Arthur et al., 2023; Miller & Rogers, 2018; Smets et al., 2012). Despite their proven effectiveness, these sheets are seldom used in China. However, it is common for some patients to prepare a list of concerns or questions about their current health issues before a consultation. This observation raises an important question: whether these self-generated question lists, tailored to patients' specific needs, also contribute to more effective doctor-patient communication, similar to structured question prompt lists.

Based on these insights, we present the following hypotheses.

Hypothesis 1: The assessment of physicians' communicative behaviours by patients is influenced by patients' demographic characteristics and preference in medical consultation. Specifically, it is hypothesized that the following factors shape patients' evaluation:

1.a: Patients' evaluations of physicians' communication behaviours vary based on their gender, age, education level and occupation.

1.b: Patients who have higher concern about physicians' experience and qualifications during medical visits have higher evaluations of physicians' communication behaviours.

1.c: Patients' understanding level of medical knowledge related to their illness is positively correlated with their assessment of physicians' communication behaviours.

1.d: Patients who prefer to understand how their symptoms correspond to specific diseases before a consultation rate physicians' communication behaviour more favourably.

1.e: When there is a discrepancy between a doctor's diagnosis and treatment plan and patients' understanding, patients' preference for whom to trust influences their evaluation of doctors' communication behaviours.

1.f: Patients' varying preference for listing their concerns before consultations leads to different evaluations of doctors' communication behaviours.

1.g: Patients with different levels of tolerance for waiting time during a visit have differing evaluations of doctors' communication behaviours.

Research conducted by Sun et al. (2016) illustrated that various factors such as the age, educational background, and professional standing of medical staff can significantly impact their views on the doctor-patient relationship. It was found that medical professionals who are older, hold higher titles, possess greater experience, and exhibit more refined problem-solving skills tend to have a more favourable perception of doctor-patient interactions. This finding reflects the positive impact of accumulated wisdom and experience on their perception of doctor-patient relationships over the course of their careers. Additionally, the study further observed that the age and educational background of patients and their family members also significantly affect their evaluation of doctor-patient relationships. Specifically, the researchers believe that older patients or family members with lower educational levels may inherit a traditional respect and trust in the medical profession, leading to a more favourable evaluations of doctor-patient interactions. From these findings, we posit the next three hypotheses.

Hypothesis 2: The demographic characteristics of physicians play a role in shaping their self-assessment of communicative behaviours.

Specifically, the following factors are hypothesized to contribute to physicians' self-assessment:

2.a: Physicians' self-evaluation of communication behaviours varies between doctors of different genders.

2.b: Older physicians rate their communication behaviours more highly in self-evaluations.

2.c: Physicians with more years of working experience give higher self-evaluations of their communication behaviours.

2.d: Physicians' self-evaluations of their communication behaviours differ based on their income levels.

2.e: Physicians who hold administrative duties and those who do not show variations in their self-evaluations of communication behaviours.

2.f: Physicians' self-evaluation of their communication behaviours varies depending on their coverage of medical liability insurance.

Hypothesis 3: Physicians' demographic details, specifically including the following factors, influence their recognition of communication behaviours.

3.a: Physicians with different genders have variations in their recognition of communication behaviours.

3.b: Older physicians rate more highly in their recognition of communication behaviours.

3.c: Physicians with more years of working experience have higher recognition of their communication behaviours.

3.d: Physicians' recognition of communication behaviours varies with their income level.

3.e: Physicians with administrative duties and those without administrative duties show different recognition of their communication behaviours.

3.f: Physicians' recognition of their communication behaviours differs based on their medical liability insurance coverage.

Hypothesis 4: Physicians' recognition of communication behaviours is positively related to their self-evaluation of communication behaviours.

Existing literature indicated a divergence in perceptions between physicians and patients concerning the physicians' communicative skills (Kenny et al., 2010; Wang et al., 2019). And more research (Guo & Wang, 2021; Rottele et al., 2020) unearthed stark contrasts between how physicians their own communication competencies—often rating them as "good"—versus the more modest "passable" ratings given by patients.

Current research reveals discrepancies between how doctors self-assess their communication skills and how patients evaluate those same skills. Despite this known difference, there is a lack of studies that simultaneously explore both perspectives in depth. This gap means we lack detailed understanding of specific areas where perceptions of doctors' communication abilities diverge between patients and doctors themselves. Without this insight, it is challenging to fully grasp the impact of communication on health care outcomes or to identify the specific aspects of communication with which patients are dissatisfied. Identifying

and understanding these differences are crucial for improving doctor-patient interactions and enhancing overall patient satisfaction.

This gap in perceptions is further illustrated by research in Kenya (Sudhinaraset et al., 2019), in which the Person-Centred Maternity Care (PCMC) scale was used for survey among pregnant women, and subsequently among medical staff in adapted version, to assess the same aspects of care. When comparing the responses of the pregnant women to those of the medical staff, a pronounced inconsistency emerged. Specifically, the women reported experiencing lower levels of person-centred care, characterized by deficits in respectful and dignified treatment, effective communication, autonomy, and supportive care, in contrast to the more positive evaluations by health care providers. This indicated that due to the different perspectives of doctors and patients, evaluations of communication or nursing skills conducted solely from the medical side may not accurately represent patient needs. Studies exploring both viewpoints are scarce, underscoring the need for a more balanced approach. Thus, it is essential to assess doctors' communication skills by considering both the perspectives of doctors and patients, aligned with the actual clinical environment.

The divergence in the realms of knowledge and value systems between physicians and patients often leads to an underappreciation by physicians of the profound impact that illnesses have on patients' lives (Coates et al., 2021; Watanabe et al., 2022). From the perspective of physicians, the absence of trust and agreement with patients can lead to frustration and potentially compromise the quality of medical encounters. The alignment in the evaluation of medical communication by both doctors and patients is indicative of a successful establishment of mutual understanding during the consultation, which is positively associated with the resolution of problems and symptoms, patient satisfaction, and the trust and recognition of physicians' recommendations (Krupat et al., 2001). The congruence in ratings of medical communication between doctors and patients reflects the level of mutual understanding achieved (Rottele et al., 2020) and is linked to adherence to treatment plans (Kenny et al., 2010). It is imperative to delve into the divergent perceptions between patients and physicians to bridge these understanding gaps. Hence, the following hypothesis is proposed.

Hypothesis 5: Discrepancies exist in the evaluation of physicians' communicative behaviours when viewed from the perspectives of both physicians and patients.

In conclusion, the roadmap of our research is illustrated in Figure 4.1.

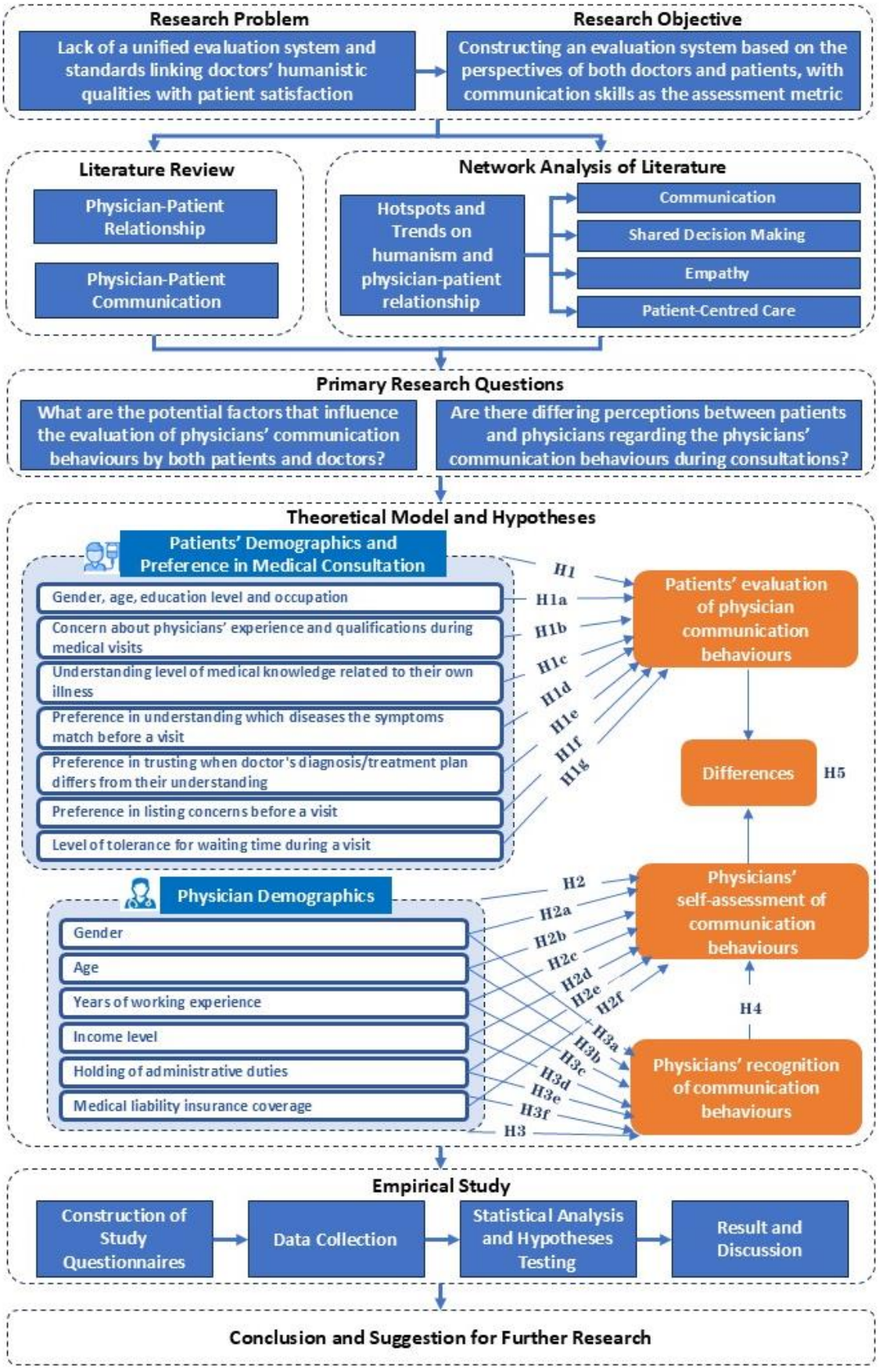

Figure 4.1 Research roadmap

Chapter 5: Methodology

The preceding network analysis of literature identified four hotspot concepts in research on physician's humanism and physician-patient relationship: communication, shared decision making, patient-centred care, and empathy. These concepts, while distinct, are interconnected and collectively embody the essence of humanistic medical practice. The cornerstone of contemporary health care, patient-centred care, serves as both a foundational philosophy and an ultimate objective. Within this framework, shared decision-making and empathy emerge as critical methodologies for actualizing patient-centred objectives, with effective communication acting as the conduit through which these ideals are manifested and realized.

In light of these considerations, the questionnaires used in this study prioritize the assessment of communication skills, inclusive of empathy demonstrations, aligning with the overarching theme of patient-centred care. The decision to exclude direct measures of shared decision-making participation from this study is informed by the findings in the pre-experiment stage, which indicated varied patient preferences regarding their involvement in medical decisions. Some patients prefer to play an active role in the decision-making process, while others believe that doctors should be responsible for all judgments. These findings suggest a complex relationship between decision-making participation and patient satisfaction, as evidenced by Wang et al.'s (2019) research, which points to a negative correlation between the two.

Our research leverages existing models for evaluating physician communication skills to formulate a comprehensive model for analysing the effectiveness of doctor-patient communication. Our evaluation framework will be established based on pertinent principles, assessing physicians' communication behaviours from both their own and their patients' viewpoints, identifying disparities and their underlying causes, and pinpointing areas for enhancing doctor-patient relationships.

To test our hypotheses in Chapter 4, this study plans to employ a questionnaire approach to gather demographic and other relevant factors that could affect both patients' and doctors' assessments of doctors' communication behaviours. Our study questionnaires synthesize the SEGUE framework with elements from the CAT and the Kalamazoo statement principles, offering a comprehensive evaluation of physician communication behaviours from dual

perspectives—those of the physician and the patient. Tailored to the actual diagnosis/treatment scenario in CHS centres, the questionnaires used in this study are designed to elicit insights from both parties using a uniform set of queries. The aim is to quantitatively capture the essence of patient-centred communication behaviours among physicians and to discover the difference, if any, between physicians' and patients' perceptions and assessments of these communication behaviours.

5.1 Construction of the study questionnaires

In this research, we employed two specialized questionnaires to assess doctor-patient communication: the "Physician Communication Behaviours Evaluation Scale" (PCBES) and the "Physician Communication Behaviours Recognition Questionnaire" (PCBRQ). The PCBES is designed for dual deployment, targeting both physicians and patients to garner insights into the effectiveness of physician communication from multiple perspectives. Conversely, the PCBRQ is exclusively directed at physicians, aiming to gauge their self-awareness and recognition of effective communication practices within their professional interactions.

5.1.1 Construction principles

Patient needs are dynamic. Understanding the gap between doctors' and patients' needs is key to continuously improving doctor-patient communication effects and increasing patient satisfaction. The fundamental step toward augmenting patient satisfaction involves a comprehensive understanding of patient needs and an objective assessment of the discrepancies between physicians' communicative actions and patients' expectations or requirements.

In Shenzhen China, the operation of CHS centres falls within the jurisdiction of hospitals. As the largest tertiary hospital in eastern Shenzhen, the institution being studied here oversees 29 CHS centres. In line with the directives of China's current community health care policies aimed at fostering a holistic approach to prevention and care, the doctors at these CHS centres undertake a dual role. Beyond diagnosing and treating illnesses, they also embrace the responsibilities typical of family physicians, such as disseminating health information and conducting follow-ups, particularly for individuals managing chronic conditions.

Considering these multifaceted responsibilities, the development of criteria to gauge the effectiveness of physicians' communication must extend beyond their clinical capabilities. It should also encompass parameters related to health education, patient follow-up, and the demonstration of empathy. The following principles have been established to guide the

formulation of evaluative indicators within the questionnaires used in this study.

5.1.1.1 Principle of patient-centeredness

The shift in clinical practice patterns towards a more patient-oriented approach underscores the importance of patient-centeredness in modern medicine. This concept has gained widespread attention in all health care discussions globally over recent decades (Stewart et al., 1999). Consequently, any measure designed to evaluate patient satisfaction must inherently embody this principle, prioritizing it above all. The patient's viewpoint is indispensable when evaluating a physician's communication behaviours, as effective and efficient doctor-patient communication forms a core dimension of patient-centeredness (Beach et al., 2011; Humphris & Kaney, 2001).

5.1.1.2 Principle of comparability

Comparability serves as the foundation for determining whether the indicators used by doctors and patients to evaluate doctors' communication behaviours can be compared in pairs in subsequent analyses. This comparability requires that the evaluation indicators must adhere to consistent standards, to ensure the authenticity, objectivity, and rationality of the results. Essentially, the comparability of indicators implies that these metrics can capture the commonalities in evaluation of the same pair of objects from diverse perspectives. Under the premise of homogenization, quantitative comparations can be employed to ascertain the quality difference and pinpoint discrepancies in the assessments made from various viewpoints.

5.1.1.3 Principle of feasibility

An indicator's applicability in real-world settings is determined by its feasibility. The goal of evaluating physician communication behaviours is to bridge the gap between the services provided by health care professionals and the needs of the patients. This demands that the data collected be both scientific and objective, while the evaluation framework should be straightforward and user-friendly (Hua et al., 2003; Huang, 2003). This ensures that the indicators not only serve as a benchmark for assessment but also as a roadmap for enhancing communication practices.

5.1.1.4 Principle of objectivity

To allow participants to provide objective feedback in the survey, the questionnaire items should be designed with a focus on descriptive statements, minimizing the influence of subjective interpretations.

5.1.1.5 Principle of practicality

The construction of the indicators should reflect the actual day-to-day operations within CHS centres, ensuring their relevance and applicability. This principle discourages the mere replication of existing questionnaires from other contexts, advocating for the development of tailored measures that align with the unique dynamics and requirements of CHS centre interactions.

5.1.2 Construction procedures

5.1.2.1 Creation of item pool for PCBES

The initial step involved an extensive review of both national and international literature on physician communication. This review included an analysis of established questionnaires such as the SEGUE framework (Makoul, 2001a), the Four Habits model (Frankel & Stein, 2001; Krupat et al., 2006), and the CAT (Makoul et al., 2007). Following this, a series of expert discussions within our research team chose some items from the aforesaid questionnaires and led to the formation of an item pool comprising 25 items aimed at assessing various facets of doctors' communication skills.

To avoid any potential biases arising from the phrasing of questions, the same questionnaire format was utilized for evaluations by both doctors and patients. This approach ensures consistency in the assessment of physicians' communication behaviours. Each item within the questionnaire was crafted as a declarative statement, designed to elicit clear and objective responses from participants.

5.1.2.2 Pre-experiment for PCBES

To optimize the wording of the questionnaire items and ensure that the content is clear and easy to understand for the target group, we conducted the following step-by-step pre-experiment process.

Step 1: Pre-experiment with patients. We engaged 34 patients from the CHS centres of the hospital studied in this research. After briefing them about the study's purpose, questionnaire completion methods, and important points, we guided the patients through the process of filling out the questionnaire. Upon completion, we asked the patients whether the content was clear and if there were better ways to express certain items. Based on their feedback, we revised, added, or deleted items that caused ambiguity or misunderstanding. Our aim was to eliminate abstract phrasing and ensure that all questions were more specific and relevant to the CHS

centre's clinical setting. Through this process, we distilled the questionnaire down to 21 items that were most applicable and clearly understandable to the patient population.

Step 2: Pre-experiment with doctors. We conducted a survey with 57 doctors using the revised PCBES questionnaire. The questionnaire utilized a 5-point Likert scale, where most items were scored as follows: 1 for "Never", 2 for "Occasionally", 3 for "Sometimes", 4 for "Mostly", and 5 for "All the time". Notably, Q15 was a reverse-coded item, with the scoring reversed compared to other items to better align with the wording of the question. After collecting the doctors' survey data, we performed a thorough analysis of the scale's reliability and validity. Based on this analysis, we selected 18 items that most accurately represented the scale's intent and could effectively measure physicians' communication behaviours. These items were retained in the final version of the PCBES.

5.1.2.3 Structuring the PCBES questionnaire into dimensions

Drawing inspiration from the SEGUE framework (Makoul, 2001a) and aligning with typical clinical consultation processes, the PCBES was organized into five distinct dimensions. These dimensions are designed to reflect key stages of patient-doctor interaction, ensuring a comprehensive assessment of communication behaviours. The dimensions include: "Set the stage" with two items, designed to capture the initial interaction and environment setting; "Elicit information" with six items, focusing on the physician's ability to gather patient information effectively; "Give information" with four items, assessing the clarity and effectiveness of the information provided by the physician; "Understand the patient's perspective" with four items, evaluating the physician's ability to grasp and empathize with the patient's views and feelings; and "End the encounter" with two items, reflecting on the conclusion of the visit and any follow-up arrangements.

5.1.2.4 Development of the PCBRQ

The PCBRQ was designed to answer by physicians, therefore it was crafted by adapting the PCBES with mere rephrasing. The adaptation involved shifting the narrative perspective from third person to first person, thereby changing "the doctor" to "I" in each item. This shift prompts physicians to self-reflect, assessing their own communication behaviours. For example:

Item Q2:

Description in PCBES: The patient's efforts, achievements, and difficulties in fighting against illness are acknowledged by the doctor.

Description in PCBRQ: I acknowledge the patient's efforts, achievements, difficulties to overcome illness.

Item Q3:

Description in PCBES: The doctor communicates with the patient about the range of out-of-pocket medical expenses and develops affordable treatment plans in line with his/her economic situation.

Description in PCBRQ: I communicate with the patient about the range of out-of-pocket medical expenses and develop affordable treatment plans in line with his/her economic situation.

Other items that have similar adaptations include: Q4, Q6, Q12, Q15, Q16, Q17, and Q18.

Additionally, the response options and rating scales were tailored to measure the degree of recognition, employing a Likert 5-level scoring method ranging from 1 to 5, where 1 point indicates “Do not recognize”, 2 points “Slightly recognize”, 3 points “Somewhat recognize”, 4 points “Recognize”, and 5 points “Strongly recognize”. This nuanced scale allows for a detailed assessment of how well physicians recognize and acknowledge the key aspects of effective communication behaviours outlined in the evaluation scale.

5.1.3 The structured measurement model

Following the steps outlined above, we have finalized the content of both the PCBES (detailed in Annex A) and the PCBRQ (see Annex B) questionnaires, each serving a unique purpose in assessing and understanding physician-patient communication within the clinical setting. Each questionnaire comprises five distinct dimensions and 18 carefully selected items, with further details provided in Table C.1 (see Annex C).

To effectively distinguish between the scores of PCBES and PCBRQ for the same items, we have assigned different item codes to each questionnaire, as shown in Table C.2 (see Annex C). Items beginning with “R” pertain to PCBRQ, while those starting with “S” are for PCBES, facilitating our analysis and comparison of data from the two questionnaires. When a direct comparison is unnecessary, the item codes uniformly begin with “Q”.

The PCBES serves as the indicator system for both primary care physicians’ self-assessment and patient evaluations of doctors' communication behaviours in this study. Meanwhile, the PCBRQ is the evaluation tools to assess physicians' perception and recognition of their own communication skills. The development of these two questionnaires adheres to the five key construction principles outlined earlier, ensuring their validity and reliability in evaluating doctor-patient communication effectiveness.

Principle of patient-centeredness:

The evaluation of doctors by medical educators or hospital administrators may reflect certain standards, but not fully capture the actual perceptions and feelings of patients. Since

improving doctor-patient relationships is the primary objective of our research, it is crucial to start from the patient's perspective, validate these existing standards, and more accurately understand patients' real experiences with doctors' communication behaviours.

Consequently, our questionnaire survey has shifted from solely assessing doctors' communication behaviours from their own perspective to incorporating patients' evaluations as well. The development of the PCBES questionnaire was influenced by tools such as the SEGUE framework (Makoul, 2001a), commonly used by medical educators and hospitals to assess medical students or train doctors. By having patients also use the PCBES questionnaire for their evaluations, our study not only adheres to the patient-centred principle, but also provides a more holistic view of the dynamics of doctor-patient communication by considering both doctors' and patients' perspectives.

Principle of comparability:

To ensure comparability between the assessments made by physicians and patients, we utilized the same PCBES for both groups. Items were fine-tuned to be applicable to both respondents, such as rephrasing the item "Avoid suggestive/commanding questions" to the more neutral "Does the doctor ask the patient suggestive or commanding questions?", to make it suitable for both parties to answer. This enables a direct comparison of perceptions from both sides.

Similarly, the PCBRQ mirrors the PCBES in content, differing only in response options. Instead of assessing the frequency of behaviours, this questionnaire shifts the focus to measuring the levels of recognition. Such a design maintains the comparability between PCBES and PCBRQ reply from the same group of physician participants. For example, within the "Set the stage" dimension, the item "The doctor greets the patient during the visit" is structured differently in the PCBES and PCBRQ questionnaires. The PCBES provides response options including "All the time", "Mostly", "Sometimes", "Occasionally", and "Never". Conversely, the PCBRQ offers choices as "Strongly recognize", "Recognize", "Somewhat recognize", "Slightly recognize", and "Do not recognize". Despite these minor differences in response options and nuances in the phrasing of some items—carefully adjusted to clarify the subject and prevent misunderstandings as mentioned in Section 5.1.2.4—the fundamental comparability of the scores between the two questionnaires remains intact.

Principle of feasibility:

Adhering to the principle of feasibility, the final set of 18 items in our questionnaires strikes a balance between comprehensive coverage and survey efficiency, taking into account the time constraints of respondents. The data revealed that the maximum time taken to complete the

survey was 13 minutes, with an average completion time of 220.08 seconds.

Considering Shenzhen's diverse population, characterized by migrants from varied dialect backgrounds and educational levels, we crafted our questionnaires to avoid complex terminology, to enhance clarity and ensure accessibility for all participants. For instance, the more abstract notion of "The doctor establishes a personal trust relationship" was simplified to "The doctor shows affability (e.g. appropriate self-introduction, chatting on topics other than the current illness)". This approach ensures that the questions are both understandable and relevant to the respondents' experiences, thereby improving the quality and reliability of the data collected.

During the questionnaire survey, we distributed a total of 510 questionnaires to patients and received 504 valid responses (valid response rate = 98.8%). This high response rate not only shows that most patients were able to successfully complete the questionnaire, but also affirms its strong feasibility and effectiveness.

Principle of objectivity:

Our questionnaire items are all intentionally descriptive, avoiding emotive language to maintain objectivity. For example, stating "The doctor greets the patient during the visit", instead of adding subjective qualifiers like "warmly". Similarly, in the "Elicit information" dimension, Item Q5 asks the participant to answer whether "the doctor listens attentively to the patient". Recognizing that "attentively" could be interpreted subjectively, we included description of specific behaviours "(e.g. facing the patient, positive words, non-verbal feedback)" after the question. This clarification helps anchor the question in real-life scenarios, mitigating the influence of personal interpretation.

To ensure the integrity of the survey results, the specific design of our survey was not disclosed to the participating doctors during the study. Initially, we administered the PCBES questionnaire, allowing doctors to self-assess their communication behaviours without knowing that a subsequent survey would evaluate their recognition of these behaviours. One week after the completion of the PCBES, we distributed the PCBRQ questionnaire. This staggered approach was designed to reduce any potential bias or influence between the two sets of responses as much as possible.

Principle of practicality:

Items in our questionnaire are closely aligned with the current medical practice and adhered to the principle of practicality. While we drew inspiration from established frameworks like SEGUE during the questionnaire design, we did not merely replicate existing questions. Instead, we crafted questions to suit our specific work scenarios innovatively. For example, we revised

the item “The doctor explains the theoretical basis for diagnostic procedures (such as physical examinations, laboratory inspections)” to “The doctor explains the disease to the patient with images, videos, WeChat official accounts, or online resources”. This adaptation not only aligns with the practical needs of CHS centres to utilize digital and media tools for health education, but also reflects the prevalent use of various media by doctors and patients. This modification aids in assessing doctors’ utilization and acceptance of internet and media tools, as well as gauging patients’ expectations.

Additionally, we specifically crafted items Q17 and Q18 to address real-world operational concerns. More specifically, Q17 asks whether the doctor proactively and clearly informs the next appointment time without patient inquiry, and Q18 queries whether the doctor proactively informs the patient about the issues that should be paid attention to during the recovery (e.g. dietary requirements, lifestyle adjustments, rehabilitation exercises) without patient inquiry. Both items are particularly relevant in CHS centres where regular follow-ups are necessary for many chronic disease patients. By emphasizing the physician’s initiative—namely, the doctor proactively informs the patient without patient inquiry—these questions are designed to reflect the practical dynamics of establishing and maintaining follow-up relationships between doctors and patients.

Furthermore, the questionnaires address critical socioeconomic considerations by including the items like “The doctor communicates with the patient about the range of out-of-pocket medical expenses and develops affordable treatment plans in line with his/her economic situation”. This approach acknowledges the diverse health care insurance landscapes in China, ensuring the questionnaires’ applicability and relevance to current medical practices.

5.2 Data collection

5.2.1 Patient survey

From November to December 2023, a questionnaire survey of outpatients was conducted at the community health service (CHS) centres affiliated with the hospital being studied here. All survey interviewers were thoroughly trained prior to briefing potential participants about the research and confirming their eligibility based on the following criteria: 1) seeking diagnosis and treatment rather than vaccinations or physical examinations at the aforesaid CHS centres; 2) minimum age of 18 years; 3) fluent in Mandarin. Eligible patients who agreed to participate were asked to sign a written informed consent form before completing the electronic survey on

tablet computers installed with the "WENJUANXING" (Questionnaire Star) application. Surveys were completed in the outpatient waiting areas.

Based on our research hypotheses mentioned in Chapter 4, the information gathered from patients included.

1) Demographic details, such as gender, age, education, occupation, and preference related to medical visits, such as their level of concern about physician's experience and qualification, understanding level of medical knowledge related to their own illness, preference in understanding which diseases the symptoms match before a visit, preference in trusting when doctor's diagnosis/treatment plan differs from their understanding, preference in listing concerns before a visit, and level of tolerance for waiting time during a visit.

2) Responses to the questionnaire PCBES (see Annex A).

All patients who participated in this survey did not receive any form of compensation for their involvement.

5.2.2 Physicians survey

During the same period mentioned previously (between November and December 2023), we also administered a similar survey involving all outpatient physicians at the aforesaid CHS centres. All the physicians and CHS centres agreed to participate in the survey and signed informed consent forms before the survey started. The heads of each CHS centre assisted the survey interviewers in distributing electronic questionnaires to the physicians. The physicians completed these questionnaires online via the "WENJUANXING" (Questionnaire Star) application.

According to the research hypotheses outlined in Chapter 4, the information collected from physicians included.

1) Demographic information, such as gender, age, years of working experience, monthly post-tax income, whether they hold administrative duties, and their awareness of medical liability insurance coverage.

2) Responses to the questionnaire PCBES (see Annex A).

3) Responses to the questionnaire PCBRQ (see Annex B).

No financial incentives were provided to the physicians involved in this survey.

5.2.3 Medical ethics approval

The ethical aspects of this research were thoroughly reviewed and approved by the medical

ethics committee of Shenzhen Longgang Central Hospital (under the ethical approval number 2023ECPJ020). The committee's endorsement confirms the study's adherence to ethical research standards, emphasizing integrity and transparency throughout the research process.

5.3 Statistical methods

For the statistical analysis in this study, we utilized SPSS software version 21 to build the database and analyse the data. We assessed the reliability of the survey scales through internal consistency testing using the Cronbach's α coefficient. To evaluate the validity of the scales, we conducted Kaiser-Meyer-Olkin (KMO) test and Bartlett's test of sphericity, focusing on construct validity.

In this study, two questionnaires were employed to assess physicians' communication behaviours: the PCBES, completed by both patients and physicians, and the PCBRQ, completed exclusively by physicians. Both questionnaires comprised 18 items categorized into five dimensions as detailed in Table C.1 (see Annex C). For statistical analyses, participants were grouped according to the study variables (including gender, age, education level, and medical preferences) as listed in Annex D. For detailed information on the item scoring methodology, please refer to Chapter 6 (specifically Sections 6.1.1, 6.2.1.1, and 6.2.1.2). For each participant, the total score for each dimension was calculated by summing the scores of all items belonging to that dimension. For each group, the mean and standard deviation of the dimension total scores across all participants belonging to that group were computed and reported as descriptive statistics.

We applied various tests, including independent samples *t*-tests, paired sample *t*-tests, chi-square tests, and one-way ANOVA, to examine differences among the variables across different survey items. Before conducting one-way ANOVA, Levene's test was applied to assess homogeneity of variance. For statistically significant differences, post hoc tests were performed for multiple comparisons. Specifically, when variances were equal, the Scheffé test was applied. When unequal variances were detected, the Games-Howell test was used. Correlations between different dimensions or items were examined using correlation coefficients. The threshold for statistical significance was set at $p < .05$.

5.4 Participants characteristics

Our questionnaire survey reached out to 510 patients, with 504 (98.8%) of the responses being

considered valid for analysis. The frequency analysis of the patients' demographic characteristics and their preference in medical consultations is detailed in Table D.1 and D.2, respectively (see Annex D).

Additionally, we distributed questionnaires to 200 doctors, receiving 189 (94.5%) valid responses through the online platform. The frequency analysis of the doctors' demographic characteristics can be found in Table D.3 (see Annex D).

5.5 Reliability and validity test

5.5.1 Reliability and validity analysis of PCBES

We conducted a reliability analysis using data from 693 valid questionnaires (504 from patients and 189 from doctors) for the PCBES questionnaire. The overall reliability coefficient (Cronbach's Alpha) for the questionnaire was found to be 0.911. With reliability coefficients ranging from 0 to 1, where values closer to 1 signify higher reliability, this indicates that the PCBES questionnaire possesses excellent reliability.

Furthermore, factor analysis via SPSS was performed, yielding a Kaiser-Meyer-Olkin (KMO) test coefficient of 0.933, which implies good validity since values closer to 1 suggest a higher suitability for factor analysis. The Bartlett's test of sphericity also confirmed the questionnaire's structural appropriateness for exploratory factor analysis, with an approximate chi-square of 6317.84, $df = 153$, and $p < .001$, indicating sufficient inter-variable correlation. Thus, the PCBES questionnaire is validated for effectively evaluating doctors' communication behaviours.

5.5.2 Reliability and validity analysis of PCBRQ

We performed a reliability analysis on the 189 PCBRQ questionnaires completed by doctors and found an overall reliability coefficient (Cronbach's Alpha) of 0.966, indicating a very high level of internal consistency among the questionnaire items. This demonstrates excellent reliability for assessing doctors' communication behaviours.

Additionally, the SPSS factor analysis results revealed a Kaiser-Meyer-Olkin (KMO) test coefficient of 0.942, which is very close to 1, signifying high suitability for factor analysis and excellent validity of the PCBRQ questionnaire. The results of Bartlett's test of sphericity also supported good validity of PCBRQ (approximate chi-square = 3534.02, $df = 153$, $p < .001$), confirming substantial correlation among the variables.

Chapter 6: Results and Discussion

This chapter aims to analyse and discuss the key findings of this study. By conducting statistical analysis on the evaluation data of doctor-patient communication behaviours, we tested several hypotheses outlined in Chapter 4. The structure of this chapter is as follows: 1) exploring the impact of patient characteristics on PCBES scores; 2) analysing the influence of doctor characteristics on PCBES and PCBRQ scores; 3) concluding the differences in PCBES scores between doctors and patients.

6.1 Influence of patient characteristics on PCBES scores.

6.1.1 Results

In this study, the 18 items in PCBES completed by patients are rated on a 5-point scale as "All the time" (5 points), "Often" (4 points), "Sometimes" (3 points), "Rarely" (2 points), and "Never" (1 point), with an exception for Item Q15, where the scoring is reversed: 1 point indicates "All the time", and 5 points denote "Never". These items are organized into five distinct dimensions, as outlined in Table C.1 in Annex C. The score for each dimension is calculated by summing the scores of its respective items. Consequently, a higher dimension score reflects a more favourable evaluation of the physician's communication behaviours by the patient.

To validate Hypothesis 1 presented in Chapter 4, which posits that the assessment of physicians' communicative behaviours by patients is influenced by patients' demographic characteristics and preference in medical consultation, we conducted a detailed analysis as follows. Due to space constraints, not all relevant tables are included in the following sections. For full disclosure, certain tables related to the analysis results are provided in Annex E for readers to consult and reference as supplementary material.

6.1.1.1 Patient gender

We conducted independent samples *t*-tests to assess the influence of gender on patient evaluations of specific items within the PCBES questionnaire (specific data not shown). The results indicated significant gender-based differences in the ratings of certain items. Specifically,

male patients rated item Q11, "There is eye contact between the doctor and the patient during the visit" (p = .039), and item Q18, "Without patient inquiry, the doctor proactively informs the patient about the issues that should be paid attention to during the recovery (e.g. dietary requirements, lifestyle adjustments, rehabilitation exercises)" (p = .026), significantly higher than female patients. The mean ratings for these items were 4.36 (Q11) and 4.42 (Q18) for males, and 4.18 (Q11) and 4.21 (Q18) for females, respectively.

Furthermore, additional independent samples t-tests were performed to explore gender differences across various dimensions of the PCBES scores. According to Table E.1 (in Annex E), all p-values associated with these dimensions were above .05, suggesting no statistically significant gender differences in patients' evaluations of doctor communication behaviours on all dimensions.

6.1.1.2 Patient age

We performed a one-way analysis of variance (ANOVA) to explore age-related differences in patients' evaluations across various dimensions of the PCBES scores. The results (detailed in Table E.2 in Annex E) indicated that the p-values are below .05 for all dimensions, indicating significant differences in patient evaluations based on age.

The age group with the highest number of participants was 30–39 years old (45.4%). Interestingly, this group consistently rated doctors' communication behaviours lower across the four dimensions of "Set the stage", "Elicit information", "Give information" and "End the encounter". Specially, the lowest ratings for the dimension "Understand the patient's perspective" were given by the youngest age group, those under 20 years old.

In terms of the highest ratings, the oldest age group, 60 years and above, generally provided the most positive feedback for physician communication in the three dimensions of "Elicit information", "Give information" and "Understand the patient's perspective". The 50–59 age group, however, rated the "End the encounter" dimension the highest.

Post-hoc tests were applied to compare the mean PCBES scores across six age groups. Notably, in the dimension of "Understand the patient's perspective", seven pairwise comparison showed significant differences in their scores—the highest discrepancy observed among all dimensions. This result underscores that patients' ages significantly influence their perceptions of doctors' abilities to understand their perspectives. Conversely, the "Elicit information" dimension demonstrated the least variability, with only one pair of comparison exhibiting significant differences, indicating a more uniform assessment of this communication skill among different age groups. Notably, when comparing the two highest scoring age groups,

those aged 50–59 and 60+, no significant differences were found in their ratings across all dimensions. This pattern suggests that older patients generally tend to evaluate doctors' communication behaviours more favourably.

6.1.1.3 Patient education level

Since there was only one patient with a doctoral degree or higher and one with a master's degree in our sample, the sample sizes for these two groups were too small to represent patients with corresponding educational levels. Therefore, we excluded these two groups from the analysis to more accurately examine the rating differences among patients with other educational levels.

A one-way ANOVA tested for variations in PCBES scores among patients with diverse educational backgrounds, revealing significant differences in evaluations of doctors' communication behaviours across all dimensions (refer to Table E.3 in Annex E for detailed results).

The largest participant group comprised patients with an associate degree (25.8%), followed closely by those with junior high school (25.2%) and senior high school education (23.4%). Notably, associate degree holders rated doctors' communication behaviours lowest in the "Give information" dimension.

Further analysis indicated that patients with primary school education rated highest in "Set the stage", "Elicit information", and "Give information", with significant differences compared to several other educational groups. In contrast, patients with junior high school education scored highest in "Understand the patient's perspective" and "End the encounter". Conversely, bachelor's degree holders rated lowest across four dimensions of "Set the stage", "Elicit information", "Understand the patient's perspective", and "End the encounter".

Post-hoc tests facilitated multiple comparisons across five educational groups. "Elicit information" and "Understand the patient's perspective" saw five pairs of significant differences, indicating pronounced variability in evaluations on physicians' communication behaviours based on patients' education level for these two dimensions. Conversely, "Give information" and "End the encounter" showed fewer notable differences, each with only two pairs differing significantly, suggesting that patients' education level influences evaluations less in these dimensions.

6.1.1.4 Patient occupation

We utilized a one-way ANOVA to examine the influence of patients' occupations on their PCBES scores across different dimensions. The findings (detailed in Table E.4 in Annex E) revealed significant occupational-based differences only in the dimension of "Understand the

patient's perspective", while other dimensions showed no notable disparities. In this dimension, retired personnel rated doctors' communication behaviours highest, whereas civil servants rated them the lowest.

To refine our analysis, we conducted post-hoc tests on PCBES scores across eight occupational groups. The multiple comparison results in the dimension of "Understand the patient's perspective" revealed six significant intergroup differences. Five of these indicated that the "Teacher/educator" group scored relatively lower. However, the difference between this group and the "Civil servant" group, which had the lowest scores, was not statistically significant. Among the surveyed patients, those who selected the "Others" occupational category accounted for the highest proportion, reaching 31.3%, followed by "Corporate employee" at 28.9%. These two groups did not show a significant difference in their scores in the "Understand the patient's perspective" dimension.

6.1.1.5 Patients' level of concern about physicians' experience and qualification

We applied one-way ANOVA to assess how patients' concerns about doctors' experience and qualifications influenced their PCBES scores. The analysis (referenced in Table E.5 in Annex E) revealed significant differences in patients' evaluations across all dimensions based on their levels of concern.

To further analyse these variations, we divided patients into five categories based on their concern levels about doctors' experience and qualifications and conducted post-hoc tests for detailed comparisons. The tests revealed significant differences in six pairwise comparisons, particularly in the dimensions of "Set the stage", "Elicit information", and "Understand the patient's perspective". A common finding in these three dimensions was that the two largest groups, the "Extremely concerned" group (33.5%) and the "Mostly concerned" group (34.3%), both provided mid-range scores for doctors' communication behaviour, with a significant difference observed between the two groups. But no significant differences were noted between the "Extremely concerned" group, "Slightly concerned" group, and "Not at all concerned" group. In the "End the encounter" dimension, the multiple comparisons did not yield significant results, merely indicating the presence of differences without detailing specific group distinctions.

Notably, patients indicating "Not at all concerned" generally gave the highest ratings across all dimensions, although these were not statistically significant when compared to the "Extremely concerned" group. Conversely, the "Moderately concerned" group rated doctors the lowest across all dimensions.

These outcomes suggest that while there are noteworthy differences in how patients rate doctors' communication based on their concerns about physicians' experience and qualifications, the variations do not exhibit a clear trend relative to the level of concern, highlighting that patient evaluations vary according to distinct expectations and needs. This complexity in ratings underscores the need for further studies to unravel the underlying factors influencing these perceptions, especially since similar studies are lacking in the existing literature.

6.1.1.6 Patients' understanding level of medical knowledge related to their own illness

We conducted a one-way ANOVA to evaluate how patients' understanding of medical knowledge related to their conditions influenced their PCBES scores across different dimensions. The results, detailed in Table E.6 (see Annex E), demonstrated significant differences ($p < .05$) in the dimensions of "Set the stage", "Give information", "Understanding the patient's perspective", and "End the encounter", confirming that patients' understanding levels of medical knowledge significantly affected their ratings of doctors' communication behaviours.

We segmented the patients into five groups based on their medical knowledge levels related to their own illness and conducted post-hoc tests to analyse their PCBES scores further. These analyses indicated that, except for the "Elicit information" dimension, the "Extremely understand" group consistently gave higher scores across all dimensions compared to other groups, though not all these differences reached statistical significance. For the "Understand the patient's perspective" and "End the encounter" dimensions, the lowest scores were given by those who indicated "Do not understand very well" and "Do not understand at all", with no significant difference found between these two groups. Conversely, the "Completely understand" group rated these two dimensions significantly higher than all other groups.

Among the participated patients, the largest group was "Somewhat understand" (37.3%), closely followed by "Mostly understand" (29.2%). Notably, Patients who indicated "Somewhat understand" provided the lowest scores in the "Set the stage" and "Give information" dimensions, with significant differences compared to several other groups.

6.1.1.7 Patients' preference in understanding which diseases the symptoms match before a visit

We conducted a one-way ANOVA to assess how patients' preferences for researching potential diseases based on their symptoms before a consultation affected their PCBES scores across various dimensions. The analysis (see Table E.7 in Annex E) highlighted that the *p*-values for

all dimensions fell below .05, suggesting the presence of significant differences across all dimensions in relation to how often patients researched their symptoms prior to a visit.

Patients were categorized into five groups based on how frequently they researched diseases related to their symptoms before consultations. Post-hoc tests was used to perform multiple comparisons of their mean PCBES scores. In particular, the dimensions of "Set the stage" and "Elicit information" showed significant disparities in seven pairwise comparisons. And in these two dimensions, the "Always" group consistently scored higher than the "Often", "Sometimes", and "Rarely" groups, though the scores of the "Always" group did not differ significantly from those who "Never" researched symptoms.

The most populous patient group was identified as "Sometimes" (25%), with the "Always" and "Often" groups following closely, comprising 114 (22.6%) and 113 (22.4%) patients, respectively. The "Sometimes" group consistently awarded the lowest ratings for physician communication behaviours across the dimensions of "Set the stage", "Elicit information", "Give information", and "End the encounter", with significant discrepancies noted in the "Set the stage" dimension compared to other groups.

Interestingly, patients who "Always" or "Never" researched their symptoms prior to consultations did not show significant differences in their ratings for the dimensions of "Set the stage", "Elicit information", and "Give information". This pattern mirrors the findings related to patients' concerns about doctors' experience and qualifications, where significant group differences were observed but did not show a clear trend relative to the frequency of symptom research. Specifically, those who "Always" or "Never" researched symptoms tended to rate doctors' communication behaviours higher, while those who "Sometimes" did research provided the lowest ratings. This suggests a need for further exploration into whether neutral responses from patients correlate with higher expectations or specific communication preferences.

6.1.1.8 Patients' preference in trusting when doctor's diagnosis/treatment plan differs from their understanding

We employed a one-way ANOVA to explore how patients' trust choices impact their evaluations of doctors' communication behaviours when there is a disagreement between the doctor's diagnosis and the patient's understanding. The results, outlined in Table E.8 (see Annex E), indicated significant differences in the dimensions of "Set the stage", "Elicit information", and "Give information" ($p < .05$), suggesting that trust source choices influence these evaluations.

A large majority of the patients (91.6%) indicated a preference for trusting the doctor's

judgment over their own in such situations.

Patients were categorized into three groups based on whom they trusted when their understanding conflicted with the doctor's diagnosis: those trusting the doctor, those relying on their own judgment, and those uncertain. Post-hoc tests comparing these groups revealed that patients who chose to trust the doctor rated the doctor's communication behaviours highest in the dimensions of "Set the stage", "Elicit information", and "Give information". Conversely, those who preferred to trust themselves ("Patient himself/herself") assigned the lowest ratings across these dimensions. Notably, there were no significant differences in ratings between the "Patient himself/herself" group and those who were "Not sure" about whom to trust in such situations across any of these dimensions.

6.1.1.9 Patients' preference in listing concerns before a visit

We utilized a one-way ANOVA to assess how patients' preferences for listing their concerns before consultations influence their evaluations of doctors' communication behaviours across various dimensions. As detailed in Table E.9 (see Annex E), all dimensions yielded significance test results (*p*-values) below .05, demonstrating that patients' preferences for listing concerns impact their perceptions of communication behaviours distinctly across all dimensions.

We divided patients into five groups based on their preference for listing concerns before a consultation and used post-hoc tests to compare mean PCBES scores among these groups. Notably, the dimension of "Understanding the patient's perspective" showed the most significant disparities, with eight pairwise comparisons indicating substantial differences. Conversely, the "Give information" dimension exhibited the fewest significant differences, with only four pairwise comparisons yielding notable distinctions.

Among the surveyed patients, those who "Always" list their concerns before a consultation made up the largest group, with 140 individuals (27.8%). Patients who "Often" and "Sometimes" do so comprised 111 patients (22.0%) and 104 patients (20.6%), respectively. The "Always" group rated doctors' communication behaviours highest across all dimensions, with significant differences compared to other groups in every dimension. In contrast, those who "Sometimes" list their concerns offered the lowest ratings in dimensions such as "Set the stage", "Elicit information", "Give information", and "End the encounter". However, there were no significant differences between this group and the other groups across any of these dimensions.

6.1.1.10 Patients' level of tolerance for waiting time during a visit

We used a one-way ANOVA to explore how patients' tolerance for waiting time during a visit influenced their PCBES scores across various communication dimensions. Results from Table

E.10 (see Annex E) showed that the *p*-values for the dimensions "Set the stage", "Elicit information", and "Understand the patient's perspective" are below .05. This indicates that variations exist within these dimensions based on patients' acceptable wait times before seeing a doctor.

A significant portion of the participated patients (46.2%) indicated a maximum tolerable wait time of "Up to 30 minutes", with their evaluations of physicians' communication behaviours falling in the median range across all dimensions. A smaller group of only 12 patients indicated a tolerable wait time of "More than 1 hour", and intriguingly, this group awarded the highest ratings across all dimensions. For the three dimensions with significant differences, it was the patients comfortable with waiting "Up to 40 minutes" who provided the lowest evaluations.

Patients were categorized into five groups based on their waiting time tolerance, and post-hoc tests were conducted to analyse the mean PCBES scores across these groups. While "Give information" and "End the encounter" dimensions showed no significant differences between groups, "Elicit information" and "Understanding the patient's perspective" revealed seven significant pairwise differences. Notably, there were no significant rating differences between the "Up to 15 minutes" and "More than 1 hour" groups in any dimension.

In summary, Table 6.1 presents an overview of how various patient demographics and preferences during medical consultations influence their evaluations on PCBES.

Table 6.1 Influence of patient characteristics and medical consultation preference on PCBES scores

	Five dimensions				
	Set the stage	Elicit information	Give information	Understand the patient's perspective	End the encounter
Gender	/	/	/	/	/
Age (years)					
H	60 and above	60 and above	60 and above	60 and above	50–59
L	30–39	30–39	30–39	Under 20	30–39
Education level					
H	Primary school	Primary school	Primary school	Junior high school	Junior high school
L	Bachelor's degree	Bachelor's degree	Associate degree	Bachelor's degree	Bachelor's degree
Occupation					
H	/	/	/	Retired	/
L	/	/	/	Civil servant	/
Level of concern about physician's experience and qualification					
H	Not at all concerned	Not at all concerned	Not at all concerned	Not at all concerned	Not at all concerned
L	Moderately concerned	Moderately concerned	Moderately concerned	Moderately concerned	Moderately concerned
Level of understanding of medical knowledge related to my own illness					
H	Completely understand	/	Completely understand	Completely understand*	Completely understand*
L	Somewhat understand	/	Somewhat understand	Do not understand very well	Do not understand at all
Preference in understanding which diseases the symptoms match before a visit					
H	Always	Always	Always	Always*	Always*
L	Sometimes*	Sometimes	Sometimes	Rarely	Sometimes
Preference in trusting when doctor's diagnosis/treatment plan differs from my understanding					
H	The doctor	The doctor	The doctor	/	/
L	Patient himself/herself	Patient himself/herself	Patient himself/herself	/	/
Preference in listing concerns before a visit					
H	Always*	Always*	Always*	Always*	Always*
L	Sometimes	Sometimes	Sometimes	Rarely	Sometimes
Level of tolerance for waiting time during a visit					
H	More than 1 hour	More than 1 hour	/	More than 1 hour	/
L	Up to 40 minutes	Up to 40 minutes*	/	Up to 40 minutes	/

Note. "H" and "L" denote the group that awarded the highest and lowest PCBES scores respectively. "/" indicates that no significant result found. "*" indicates that this group shows a significant difference compared to all other groups in the multiple comparison.

From Table 6.1 the following observations can be made.

1) The age, educational level, level of concern about physician's experience and qualification, understanding level of medical knowledge related to their own illness, and preference in listing concerns before a visit all show significant disparities in how patients rated physicians' communication behaviours across every dimension.

2) The gender of the patient does not present any significant difference in ratings across all dimensions.

3) Other patient characteristics exhibit significant differences in ratings across certain dimensions.

6.1.2 Discussion

The overall PCBES evaluation score rate by patients (refer to Table 6.9) stands at 78.4%, with individual dimension scores as follows: 78.9% for "Set the stage", 74.5% for "Elicit information", 72.0% for "Give information", 75.2% for "Understand the patient's perspective", and 73.8% for "End the encounter". This performance surpasses the findings from Zhou et al. (2020), which focused on primary health care providers in China's rural and economically less developed areas. In contrast, our study involves participants from Shenzhen, a city known for its economic prosperity. This discrepancy in findings could be attributed to the distinct geographical locations of the studies. According to Guo and Wang (2021), the communication proficiency of doctors in higher-tier hospitals surpasses that of those in primary health care facilities, with patient evaluations reflecting superior communication skills among doctors in tertiary hospitals compared to those in secondary and primary institutions. This disparity is believed to stem from the more frequent opportunities for communication skills training available to doctors in tertiary hospitals. Although our study's participants are from primary health care settings, these facilities are affiliated with a tertiary hospital, offering a unique context compared to other CHS centres.

6.1.2.1 Patient gender

The evaluation of communication across different dimensions does not significantly vary between male and female patients (as shown in Table E.1 in Annex E), aligning with findings from Guo and Wang (2021).

6.1.2.2 Patient age

The most frequent visitors to the CHS centres of the hospital being studied here fall within the

30–39 age bracket (see Table E.2 in Annex E), reflecting Shenzhen's youthful demographic profile. This group scores the lowest across dimensions such as "Set the stage", "Elicit information", "Give information", and "End the encounter", with these differences being statistically significant when compared to other age groups. This indicates that the 30–39 age group, being the predominant demographic of patients, rates doctors' communication less favourably, warranting further investigation into the underlying reasons. Addressing the needs of this patient cohort is crucial for enhancing doctor-patient communication effectiveness. Older age groups, specifically 50–59 and 60+, tend to rate doctors' communication more favourably (Table E.2 in Annex E), a finding that aligns with Wang et al. (2019).

6.1.2.3 Patient education level

The study reveals that most patients visiting the studied CHS centres have secondary education, with a significant portion holding an associate degree, followed closely by those with junior and senior high school education. The analysis (Table E.3 in Annex E) shows that patients with elementary and junior high education tend to give higher scores, whereas those with a bachelor's degree, though less prevalent among the patient population, provide the lowest ratings across four dimensions. Particularly in the dimensions of "Set the stage", "Elicit information", and "Give information", the highest evaluations come from patients with elementary education. Generally, patients with higher educational backgrounds tend to be more critical of doctors' communication practices compared to those with less education. Sudhinaraset et al. (2019) noted that, unlike health care providers, women patients were less likely to report instances of physical or verbal abuse, possibly perceiving such behaviour as normal. This raises the question of whether lower educational groups, due to potentially lower expectations of medical services, tend to provide more positive feedback, a hypothesis that merits further exploration.

The conclusions drawn by Guo and Wang (2021), which found no significant differences in patients' evaluations of doctors' communication skills based on age or education, diverge from our findings. This discrepancy could be attributed to the different target populations of the two studies, with Guo and Wang's (2021) research encompassing a broader, more representative sample, whereas our study focuses on a more specific patient demographic.

6.1.2.4 Patient occupation

Data from Table E.4 (in Annex E) reveals that the predominant groups visiting the CHS centres of the hospital being studied here are corporate employees and individuals from various other professions. Across four dimensions, no significant differences in evaluations were noted based

on occupation, except within the "Understand the patient's perspective" dimension, where teachers/educators differed significantly from other occupational groups. Given the limited size of the teacher/educator cohort, further research is needed to validate these findings. Additionally, this group may intersect with those holding higher educational qualifications. The retired segment, also small in number, likely coincides with the "60 years and above" or "50–59 years" age categories. This study does not delve into whether age or occupation drives these differences, warranting more detailed investigation in future studies.

6.1.2.5 Patients' level of concern about physicians' experience and qualifications

Among the participated patients, the majority are those mostly concerned and extremely concerned about the doctor's experience and qualifications. The "Extremely concerned" group has higher scores in four dimensions compared to the "Mostly concerned" group (see Table E.5 in Annex E). The group with the lowest scores is the "Moderately concerned" group, giving the lowest scores in each dimension, and the multiple comparison differences in the dimension of "End the encounter" are not significant. These results indicate that patients with different levels of concern for the doctor's experience and qualifications have different evaluation scores for the doctor's communication behaviours. However, these differences do not show a consistent trend with the level of concern. The "Extremely concerned" group (33.5%) and the "Not at all concerned" group (5%) gave similar scores, and the differences between the two are not significant, which may have different reasons. In all dimensions, a higher proportion of patients who are concerned about the doctor's experience and qualifications gave higher scores for the doctor's communication behaviours. This may be because these patients selected more experienced doctors before the visit and obtained better medical experience. As to why the "Moderately concerned" group gave the lowest scores instead of the "Not at all concerned" group, we consider that possible reasons are that the "Not at all concerned" patients are more casual in personality and show more tolerance, or they might have straightforward medical conditions with minimal needs.

6.1.2.6 Patients' understanding level of medical knowledge related to their own illness

A total of 221 patients (43.8%) reported either "Completely understand" or "Mostly understand" their medical condition, a proportion that aligns with our clinical observations. Patients who rated themselves as mostly understanding the medical knowledge tend to rate higher across all dimensions, though not always significantly when compared to certain groups (see Table E.6 in Annex E). In contrast, those with lower understanding levels tended to give lower ratings for physician communication, suggesting that patients with greater medical knowledge related to

their illness generally report more satisfactory medical interactions than those with less understanding. There are two possible explanations for this trend. First, patients with more knowledge about their condition may possess a more positive psychological outlook and thus rate physicians more favourably. Second, communication between these patients and doctors may be more effective, potentially due to their stronger sense of self-efficacy, which allows them to engage more confidently in medical discussions.

6.1.2.7 Patients' preference in understanding which diseases the symptoms match before a visit

A notable number of patients opted for "Sometimes", nearly equal to those selecting "Often" or "Always", both cumulatively making up 45.0% of the cohort (227 patients) (see Table E.7 in Annex E). In today's digital age, it is increasingly common for patients to research their symptoms before consulting a doctor, aligning with many physicians' clinical experiences. These patients will often discuss with the physicians their understanding of relative knowledge. This pre-visit research by patients—whether it reflects a shift in trust towards doctors or fosters better doctor-patient rapport—is a subject of our investigation. Our findings indicate that patients who "Always" engage in this practice tend to offer more favourable assessments of doctors' communication behaviours. This suggests that patients who arrive with some pre-existing knowledge about their condition may feel more fulfilled and experience smoother interaction with their doctors, potentially due to reasons akin to those previously discussed in Section 6.1.2.6.

6.1.2.8 Patients' preference in trusting when doctor's diagnosis/treatment plan differs from their understanding

The findings suggest that prior symptom research by patients, even when it leads to initial expectations that diverge from the doctor's diagnosis or treatment plan, does not necessarily erode trust in the physician. A significant 91.6% of patients expressed their trust in the doctor's expertise (refer to Table E.8 in Annex E), addressing our concern raised earlier.

When considered alongside the preceding section (Section 6.4.2.7), it is evident that patients who pre-emptively align their symptoms with potential diagnoses yet defer to the doctor's expertise when discrepancies arise also rate the doctor's communication behaviours more highly. Isolating this finding makes it challenging to ascertain whether it is the doctor's communicative approach or the patient's trust that is more influential. However, when combined with prior observations, it appears more likely that patients' proactive engagement in understanding their symptoms encourages doctors to communicate more effectively.

Similarly, Capone and Petrillo's (2014) study underscores the significant impact of patients' contributions to doctor-patient dialogues. Educating patients in psychosocial aspects about their conditions, including strategies for stress management, coping mechanisms, and building support networks, can enhance their ability to navigate health challenges and improve overall well-being.

When synthesizing insights from the preceding discussions (see Section 6.1.2.6 and 6.1.2.7), it becomes apparent that patients possessing prior knowledge about their condition tend to engage more effectively with physicians and express higher satisfaction with the communication experienced during consultations. This observation indicates that enhancing patient education on common medical conditions through accessible and reliable information sources could significantly foster harmonious doctor-patient relationships.

6.1.2.9 Patients' preference in listing concerns before a visit

One hundred and forty people (27.8%) chose "Always", which is the highest percentage among all options. Moreover, it is worth noting that these people's evaluations of doctors' communication behaviours in every dimension are the highest, and the differences with the other groups are significant (see Table E.9 in Annex E). A comprehensive analysis of the aforesaid analysis shows that patients who actively participate in managing their conditions tend to experience more effective communication with healthcare providers. This observation strongly supports our hypothesis and highlights the potential benefits of using question prompt lists. Although such lists are not widely implemented in China, our findings indicate that a substantial number of patients already prepare their concerns before consultations, which has positively impacted doctor-patient communication and enhanced patient satisfaction. Considering the high workload faced by doctors in China, encouraging patients to come prepared with a list of their concerns could significantly improve consultation efficiency and further boost patient satisfaction. This strategy merits additional exploration and could be promoted more broadly.

Like the analysis of "Patients' preference in understanding which diseases the symptoms match before a visit" and "Patients' understanding level of medical knowledge related to their own illness", it is observed that the lowest evaluations of physicians' communication practices do not come from patients who "Never" engage in these behaviours or "Do not understand at all". Instead, it is the patients who "Sometimes" engage in these behaviours tend to rate doctors' communication efforts the lowest. It is worth exploring why patients who express ambiguity regarding their behavioural preferences tend to give lower ratings to doctors' communication

behaviour. Similar issues have not been widely reported in literature. This may involve complex psychological factors on the part of the patients, suggesting that this issue requires further in-depth research.

6.1.2.10 Patients' level of tolerance for waiting time during a visit

Interestingly, the group reporting the lowest satisfaction was not those with the least wait time tolerance ("Up to 15 minutes"), but those willing to wait "Up to 40 minutes" (Table E.10 in Annex E). This particular group rated doctors' communication the lowest across all dimensions, though not every difference reached statistical significance, especially in the "Give information" and "End the encounter" dimensions. While existing research suggests that immediate doctor availability does not directly correlate with overall satisfaction (Wang et al., 2019), our findings indicate that patient tolerance for waiting time, although varied, does not straightforwardly correlate with their perceptions of communication effectiveness; nonetheless, the marked discrepancy observed in the group willing to wait "Up to 40 minutes" compared to others calls for a deeper exploration to understand the underlying reasons.

In conclusion, differing demographic backgrounds among patients lead to varied evaluations of doctors' communication; patients' preferences during medical consultations significantly affect their post-interaction satisfaction. Particularly, patients inclined to research their symptoms pre-visit and those who list their concerns tend to provide more positive feedback across all dimensions. Offering patients targeted health education and fostering a deeper understanding of conditions can enhance the alignment between patient and physician evaluations of communication, thereby improving the doctor-patient relationship.

6.2 Influence analysis of physician characteristics on PCBES and PCBRQ scores

6.2.1 Results

6.2.1.1 Physician demographics and PCBES scores

In this study, we scored doctors' self-evaluations on the PCBES questionnaire with the same rating scale as that for the PCBES filled out by patients, where 1 to 5 represent "Never" to "All the time". Similarly, Item Q15 was also an exception, where the scoring is reversed: 1 point indicates "All the time" and 5 points denote "Never". These items are also organized into five distinct dimensions, as shown in Table C.1 in Annex C. The dimension scores were calculated

as the sum of the corresponding item scores, with higher scores indicating a more positive self-evaluation of communication behaviour by the doctor.

To test Hypothesis 2 proposed in Chapter 4, which states that the demographic characteristics of physicians play a role in shaping their self-assessment of communicative behaviours., we conducted the following analysis. Due to space limitations, some tables related to the analysis results are included in Annex E for detailed reference.

1) Physician gender: We performed an independent samples *t*-test to determine the influence of gender on doctors' self-evaluations within various dimensions of the PCBES questionnaire. The results, detailed in Table E.11 (see Annex E), revealed statistically significant gender differences in the dimensions of "Elicit information", "Understand the patient's perspective" and "End the encounter", with *p*-values less than .05 in each. The sample consisted of 47.1% male and 52.9% female doctors. In the dimensions mentioned above, female doctors consistently rated their communication behaviours more favourably than their male counterparts, with scores of 26.66 ± 2.43 vs. 25.82 ± 3.03 in "Elicit information", 17.26 ± 2.04 vs. 16.57 ± 2.40 in "Understand the patient's perspective", and 8.47 ± 1.23 vs. 8.08 ± 1.44 in "End the encounter".

2) Physician age: We utilized a one-way ANOVA to evaluate differences in doctors' self-assessments within specific dimensions of the PCBES questionnaire, correlating these differences with their age. The results, as detailed in Table E.12 (see Annex E), indicated statistically significant age-related variations in the dimensions of "Elicit information", "Give information", and "End the encounter", with *p*-values all falling below .05. Most doctors surveyed (61.4%) fell within the 31–40 age range and their self-assessments in the dimensions with significant differences tended to cluster in the middle range. Doctors were categorized into three age groups for further analysis. Post-hoc tests conducted on their mean PCBES scores revealed that for the dimensions of "Elicit information", "Give information", and "End the encounter", which exhibited significant differences, doctors aged between 41–50 years tend to have higher scores compared to their younger counterparts aged 31–40 years.

3) Physician working experience: We conducted a one-way ANOVA to evaluate the impact of doctors' years of working experience on their self-assessments within the PCBES questionnaire. The results, outlined in Table E.13 (see Annex E), demonstrated significant differences ($p < .05$) in the "Give information" dimension only, suggesting variations in how doctors of different experience levels perceive their communication skills. Most doctors in the study (133, representing 70.4% of the sample) possessed 6–10 years of experience. Doctors were categorized into four groups based on their years of experience for a detailed comparison

using post-hoc tests on their mean PCBES scores. The findings indicated that doctors with 6–10 years of experience provided significantly lower self-assessments in the "Give information" dimension compared to their counterparts with 11–15 years and 16–20 years of experience.

4) Physicians' average monthly post tax income: We performed a one-way ANOVA to analyse variations in doctors' self-assessments across the PCBES questionnaire dimensions, correlating these with their average post-tax monthly income. The findings, as detailed in Table E.14 (see Annex E), showed no significant differences ($p > .05$) in doctors' self-assessments across all dimensions, suggesting that their income levels do not influence how they rate their communication behaviours.

5) Physicians' holding of administrative duties: We utilized an independent samples *t*-test to determine if holding an administrative position influences doctors' self-assessment in the PCBES questionnaire dimensions. The findings, presented in Table E.15 (see Annex E), show a significant difference ($p < .05$) only in the "End the encounter" dimension, signifying a meaningful statistical difference between doctors who hold administrative duties and those who do not only in this dimension. The average scores reveal that doctors with administrative duties tend to rate themselves higher in the "End the encounter" dimension than those without such duties.

6) Physicians' medical liability insurance coverage: We conducted a one-way ANOVA to investigate how doctors' self-assessments in the PCBES questionnaire vary according to their medical liability insurance coverage. Analysis, detailed in Table E.16 (see Annex E), revealed significant differences ($p < .05$) in the "Give information" and "Understand the patient's perspective" dimensions, suggesting that insurance coverage influences self-assessments only in these areas. Notably, 45.0% of doctors reported having medical liability insurance, slightly outnumbering those uncertain of their coverage status (38.1%). Subsequent post-hoc tests across three groups—"With coverage", "Without coverage", and "Not sure"—highlighted that the doctors with medical liability insurance score themselves higher in "Understand the patient's perspective" compared to those without insurance or those uncertain of their insurance status. Similarly, in the "Give information" dimension, doctors with insurance score higher than those uncertain of their insurance coverage.

In conclusion, our analysis indicates that factors such as doctors' gender, age, years of experience, administrative roles, and medical liability insurance coverage all have a certain degree of influence on their self-evaluation of communication behaviours. These findings provide important insights into how demographic characteristics of doctors impact their self-assessment. Detailed results are summarized in Table 6.2.

Table 6.2 Influence of physician demographic characteristics on PCBES scores

	Five dimensions				
	Set the stage	Elicit information	Give information	Understand the patient's perspective	End the encounter
Gender					
H	/	Female	/	Female	Female
L	/	Male	/	Male	Male
Age (years)					
H	/	41–50	41–50*	/	41–50*
L	/	31–40	30 years or below	/	30–39
Working experience (years)					
H	/	/	16–20	/	/
L	/	/	6–10*	/	/
Average monthly post-tax income	/	/	/	/	/
Holding of administrative duties					
H	/	/	/	/	With administrative duties
L	/	/	/	/	Without administrative duties
Medical liability insurance coverage					
H	/	/	With coverage	With coverage*	/
L	/	/	Not sure	Without coverage	/

Note. "H" and "L" denote the group that awarded the highest and lowest PCBES scores respectively. "/" indicates that no significant result found. "*" indicates that this group shows a significant difference compared to all other groups in the multiple comparison.

6.2.1.2 Physician demographics and PCBRQ scores

In this study, we scored doctors' responses to the 18 items in the PCBRQ questionnaire using a 5-point scale as "Strongly recognize" (5 points), "Recognize" (4 points), "Somewhat recognize" (3 points), "Slightly recognize" (2 points), and "Do not recognize" (1 point). These items are categorized into five distinct dimensions (the specific classifications can be found in Table C.1 in Annex C). Each dimension's score is derived from the sum of its item scores. Consequently, a higher dimension score indicates a stronger self-recognition of communication behaviours by the physicians.

To test Hypothesis 3 proposed in Chapter 4, which suggests that doctors' demographic information affects their self-recognition of communication behaviour, we conducted a series of analyses. Below is a summary of our analysis of different demographic characteristics of doctors and the results obtained (due to space limitations, the tables related to the analysis results have been included in Annex E for reference).

1) Physicians gender: We performed an independent samples *t*-test to determine if gender

impacts doctors' self-assessments across different dimensions of the PCBRQ questionnaire. Analysis results, summarized in Table E.17 (see Annex E), reveal differences across several dimensions when analysed by gender. Notably, the dimensions "Elicit information", "Give information", "Understand the patient's perspective", and "End the encounter" have *p*-values less than .05, which suggests significant differences in how male and female doctors perceive these aspects of communication. The mean scores indicate that female doctors show a marginally higher acknowledgment in the four dimensions of "Elicit information", "Give information", "Understand the patient's perspective", and "End the encounter" compared to their male counterparts.

2) Physicians age: The one-way ANOVA findings presented in Table E.18 (see Annex E) show that the significance test results (*p*-values) for all dimensions exceed .05, signifying a lack of significant disparities in doctors' recognition of their communication skills across all dimensions when considering their age.

3) Physician working experience: Similarly, the one-way ANOVA outcomes in Table E.19 (see Annex E) indicate that there are no significant differences in doctors' self-assessment on the PCBRQ across all dimensions in relation to their years of working experience ($p > .05$).

4) Physicians' average monthly post tax income: According to the one-way ANOVA results shown in Table E.20 (see Annex E), there are no notable differences in doctors' self-assessments on the PCBRQ across all dimensions based on their net monthly earnings ($p > .05$).

5) Physicians' holding of administrative duties: The independent sample *t*-test outcomes in Table E.21 (see Annex E) reveal that there is a statistically significant difference ($p < .05$) only in the "Understand the patient's perspective" dimension between doctors with and without administrative positions. The mean scores show that doctors holding administrative roles demonstrated slightly higher recognition of their ability to understand patients' perspectives compared to those without such roles.

6) Physicians' medical liability insurance coverage: The one-way ANOVA findings in Table E.22 (see Annex E) underscore significant differences in the "Understand the patient's perspective" dimension concerning doctors' awareness of their medical liability insurance coverage. Of the doctors surveyed, 85 (45.0%) were aware of having medical liability insurance generally displayed higher recognition of their communication skills in understanding patients' perspectives compared to those who were unsure of their insurance status.

In conclusion, our research findings reveal that factors like gender, administrative positions, and medical liability insurance significantly influence doctors' recognition of their own communication behaviours. Conversely, age, years of experience, and income level do not

significantly affect their self-assessments. These insights are crucial for understanding how various demographic characteristics impact doctors' evaluations of their communication skills. For detailed results, please refer to Table 6.3.

Table 6.3 Influence of physician demographic characteristics on PCBRQ scores

	Five dimensions				
	Set the stage	Elicit information	Give information	Understand the patient's perspective	End the encounter
Gender					
H	/	Female	Female	Female	Female
L	/	Male	Male	Male	Male
Age	/	/	/	/	/
Working experience	/	/	/	/	/
Average monthly post-tax income	/	/	/	/	/
Holding of administrative duties					
H	/	/	/	With administrative duties	/
L	/	/	/	Without administrative duties	/
Medical liability insurance coverage					
H	/	/	/	With coverage	/
L	/	/	/	Without coverage	/

Note. "H" and "L" denote the group that awarded the highest and lowest PCBES scores respectively. "/" indicates that no significant result found.

6.2.1.3 Physicians' scores on PCBES and PCBRQ

We used Fisher's exact test to examine the consistency in the frequency distribution of physicians' scores between PCBES and PCBRQ for each item. According to Table 6.4, with the exceptions of Q8 and Q10, the *p*-values for all other items are below .05. This suggests that while the frequency distributions of doctors' self-evaluated scores on PCBES and PCBRQ are consistent for items Q8 and Q10, there are significant inconsistencies for the other items. Given the equal number of physicians' responses for both the PCBES and PCBRQ, a direct comparison of frequencies is feasible. Notably, for the items exhibiting significant inconsistencies in frequency distribution, except Q11 and Q18, the frequencies of scoring 4 and 5 points are more prevalent in the PCBRQ than in the PCBES.

Table 6.4 Item-wise frequency distribution comparison between PCBES and PCBRQ scores as rated by physicians

Items	Frequency [a]					Fisher's exact test value	*p*	Frequency of 4 and 5 points	Difference [b] (PCBRQ – PCBES)
	1 point	2 points	3 points	4 points	5 points				
Q1: The doctor discusses with the patient the impact of the current illness on his/her life (e.g. quality of life, mental state)	3 (1)	9 (1)	40 (7)	86 (63)	51 (117)	62.40	< .001	137 (180)	43
Q2: The patient's efforts, achievements, and difficulties in fighting against illness are acknowledged by the doctor	0 (1)	2 (0)	28 (9)	90 (54)	69 (125)	37.86	< .001	159 (179)	20
Q3: The doctor communicates with the patient about the range of out-of-pocket medical expenses and develops affordable treatment plans in line with his/her economic situation	0 (1)	3 (0)	20 (8)	67 (53)	99 (127)	13.77	.003	166 (180)	14
Q4: At the end of the visit, the doctor proactively asks if there are any other issues to discuss	0 (1)	3 (0)	32 (12)	82 (58)	72 (118)	28.06	< .001	154 (176)	22
Q5: The doctor listens attentively to the patient (e.g. facing the patient, positive words, non-verbal feedback)	0 (1)	1 (0)	9 (5)	69 (43)	110 (140)	12.62	.005	179 (183)	4
Q6: The doctor comforts and encourages the patient during the visit	0 (0)	0 (1)	14 (7)	78 (41)	97 (140)	22.64	< .001	175 (181)	6
Q7: The doctor explains appropriately adapting to the patient's understanding level (e.g. by adjusting speech speed/volume, avoiding/explaining jargon)	0 (1)	0 (0)	10 (7)	79 (46)	100 (135)	15.43	.001	179 (181)	2
Q8: The doctor provides the patient with detailed information of examination results, abnormal findings, or diagnosis results	0 (1)	0 (0)	2 (4)	54 (41)	133 (143)	3.73	.242	187 (184)	-3
Q9: The doctor discusses with the patient his/her previous treatments (e.g. self-care measures, recent medical visits, other medical services received)	0 (1)	1 (0)	21 (8)	75 (54)	92 (126)	16.42	.001	167 (180)	13
Q10: The doctor greets the patient during the visit	0 (0)	2 (0)	11 (8)	60 (43)	116 (138)	6.80	.056	176 (181)	5
Q11: There is eye contact between the doctor and the patient during the visit	0 (1)	0 (1)	5 (7)	62 (36)	122 (144)	10.95	.011	184 (180)	-4

Items	Frequency [a]					Fisher's exact test value	*p*	Frequency of 4 and 5 points	Difference [b] (PCBRQ – PCBES)
	1 point	2 points	3 points	4 points	5 points				
Q12: The doctor shows affability (e.g. appropriate self-introduction, chatting on topics other than the current illness)	1 (0)	4 (3)	46 (25)	65 (55)	73 (106)	14.27	.003	138 (161)	23
Q13: The doctor gives the patient time and opportunity to speak during the visit (e.g. without interrupting the patient's speech)	0 (1)	1 (0)	9 (7)	85 (63)	94 (118)	8.11	.045	179 (181)	2
Q14: The doctor verifies his/her understanding of the information gathered from the patient (e.g. by retelling, elaborating, requestioning)	1 (0)	0 (1)	13 (7)	79 (48)	96 (133)	17.20	< .001	175 (181)	6
Q15: Does the doctor ask the patient suggestive or commanding questions?	20 (3)	6 (4)	28 (7)	55 (52)	80 (123)	36.05	< .001	135 (175)	40
Q16: The doctor explains the disease to the patient with images, videos, WeChat official accounts, or online resources	5 (1)	24 (1)	78 (19)	40 (51)	42 (117)	103.00	< .001	82 (168)	86
Q17: Without patient inquiry, the doctor proactively and clearly informs the next appointment time	2 (4)	4 (4)	32 (14)	85 (54)	66 (113)	27.15	< .001	151 (167)	16
Q18: Without patient inquiry, the doctor proactively informs the patient about the issues that should be paid attention to during the recovery (e.g. dietary requirements, lifestyle adjustments, rehabilitation exercises)	0 (6)	0 (2)	6 (5)	74 (51)	109 (125)	13.15	.005	183 (176)	-7

[a] Data is shown as frequency of PCBES scores (frequency of PCBRQ scores).
[b] The "Difference" column shows the differences in the frequency of high scores (4 and 5 points) between PCBES and PCBRQ.

The paired sample *t*-test analysis in Table 6.5 demonstrates distinct differences across all dimensions between physicians' PCBES and PCBRQ scores, with all dimensions showing *p*-values under .05, indicating significant discrepancies. The mean scores reveal that across every dimension, physicians' PCBRQ scores are uniformly higher than those of the PCBES. When evaluating the difference rate based on mean scores, the overall discrepancy between PCBRQ and PCBES stands at 5.9%. The "Understand the patient's perspective" dimension shows the most significant gap at 7.6%, while the "Set the stage" dimension presents the smallest difference at 4.7%.

Table 6.5 Comparison between physicians' PCBES and PCBRQ scores across dimensions

Five dimensions	Number of items (total scores) in every dimension	Total scores (mean ± standard deviation)		two-tailed *p*	Score rate (%)		
		PCBES	PCBRQ		PCBES	PCBRQ	Difference (PCBRQ – PCBES)
Set the stage	2 (10)	8.62 ± 1.29	9.09 ± 1.19	< .001	86.2	90.9	4.7
Elicit information	6 (30)	26.27 ± 2.76	27.76 ± 3.20	< .001	87.6	92.5	4.9
Give information	4 (20)	17.19 ± 0.12	18.39 ± 0.12	< .001	86.0	92.0	6.0
Understand the patient's perspective	4 (20)	16.94 ± 2.24	18.46 ± 2.20	< .001	84.7	92.3	7.6
End the encounter	2 (10)	8.29 ± 1.34	8.96 ± 1.34	< .001	82.9	89.6	6.7
Total	18 (90)				85.9	91.8	5.9

The paired samples *t*-test outcomes in Table 6.6 reveal differences across individual items in physicians' PCBES scores versus PCBRQ scores. Apart from Q8, Q11, and Q18, all other items showed *p*-values below .05, suggesting notable disparities. The mean values indicate that, in items with significant differences, physicians tend to rate their communication skills recognition slightly higher than their self-evaluation of communication behaviours.

Table 6.6 Item-wise comparison of physicians' PCBES and PCBRQ scores

Items	PCBES Scores [a]	PCBRQ scores [a]	two-tailed *p*	Difference between Means (PCBRQ – PCBES)
Q1: The doctor discusses with the patient the impact of the current illness on his/her life (e.g. quality of life, mental state)	3.92 ± 0.90	4.56 ± 0.65	< .001	0.64
Q2: The patient's efforts, achievements, and difficulties in fighting against illness are acknowledged by the doctor	4.20 ± 0.72	4.60 ± 0.63	< .001	0.40
Q3: The doctor communicates with the patient about the range of out-of-pocket medical expenses and develops affordable treatment plans in line with his/her economic situation	4.39 ± 0.74	4.61 ± 0.62	.001	0.22
Q4: At the end of the visit, the doctor proactively asks if there are any other issues to discuss	4.18 ± 0.77	4.55 ± 0.66	< .001	0.37
Q5: The doctor listens attentively to the patient (e.g. facing the patient, positive words, non-verbal feedback)	4.52 ± 0.62	4.70 ± 0.57	.005	0.18
Q6: The doctor comforts and encourages the patient during the visit	4.44 ± 0.63	4.69 ± 0.57	< .001	0.25
Q7: The doctor explains appropriately adapting to the patient's understanding level (e.g. by adjusting speech speed/volume, avoiding/explaining jargon)	4.48 ± 0.60	4.66 ± 0.60	.003	0.18

Items	PCBES Scores [a]	PCBRQ scores [a]	two-tailed *p*	Difference between Means (PCBRQ – PCBES)
Q8: The doctor provides the patient with detailed information of examination results, abnormal findings, or diagnosis results	4.69 ± 0.49	4.72 ± 0.56	.622	0.03
Q9: The doctor discusses with the patient his/her previous treatments (e.g. self-care measures, recent medical visits, other medical services received)	4.37 ± 0.70	4.61 ± 0.62	< .001	0.24
Q10: The doctor greets the patient during the visit	4.53 ± 0.66	4.69 ± 0.55	.014	0.16
Q11: There is eye contact between the doctor and the patient during the visit	4.62 ± 0.54	4.70 ± 0.62	.184	0.08
Q12: The doctor shows affability (e.g. appropriate self-introduction, chatting on topics other than the current illness)	4.09 ± 0.87	4.40 ± 0.78	< .001	0.31
Q13: The doctor gives the patient time and opportunity to speak during the visit (e.g. without interrupting the patient's speech)	4.44 ± 0.61	4.57 ± 0.62	.038	0.13
Q14: The doctor verifies his/her understanding of the information gathered from the patient (e.g. by retelling, elaborating, requestioning)	4.42 ± 0.67	4.66 ± 0.58	< .001	0.24
Q15: Does the doctor ask the patient suggestive or commanding questions?	3.89 ± 1.28	4.52 ± 0.80	< .001	0.63
Q16: The doctor explains the disease to the patient with images, videos, WeChat official accounts, or online resources	3.48 ± 1.06	4.49 ± 0.74	< .001	1.01
Q17: Without patient inquiry, the doctor proactively and clearly informs the next appointment time	4.11 ± 0.83	4.42 ± 0.88	< .001	0.31
Q18: Without patient inquiry, the doctor proactively informs the patient about the issues that should be paid attention to during the recovery (e.g. dietary requirements, lifestyle adjustments, rehabilitation exercises)	4.55 ± 0.56	4.52 ± 0.87	.725	-0.03

[a] Scores are shown as mean ± standard deviation. N=189.

To assess Hypothesis 4, outlined in Chapter 4, which posits that doctors' recognition of communication behaviour is positively correlated with their self-evaluation of communication behaviour, we analysed the correlations between doctors' self-evaluation scores on the PCBES and PCBRQ. This involved examining the relationships across individual items and dimensions to determine the strength and direction of these correlations.

Item-by-item correlation analysis requires comparing the same items from PCBES and PCBRQ. To facilitate this, Table 6.7 uses distinct item codes to differentiate between the items in these two questionnaires: items starting with "R" correspond to PCBRQ, while those beginning with "S" are associated with PCBES, as mentioned in Section 5.3. According to Table 6.7, apart from R15-S15, all other pairs of items denote a significant positive correlation between physicians' PCBES and PCBRQ scores. The correlation coefficient, ranging from [-1, 1], reflects the

strength of the correlation, with a larger absolute value denoting a stronger correlation. R9-S9 exhibit the strongest correlation, while R18-S18 show the weakest.

Table 6.7 Item-wise correlation between physicians' PCBES and PCBRQ scores

Items ("R" for PCBRQ and "S" for PCBES)	Correlation
R1-S1: The doctor discusses with the patient the impact of the current illness on his/her life (e.g. quality of life, mental state)	.40*
R2-S2: The patient's efforts, achievements, and difficulties in fighting against illness are acknowledged by the doctor	.42*
R3-S3: The doctor communicates with the patient about the range of out-of-pocket medical expenses and develops affordable treatment plans in line with his/her economic situation	.33*
R4-S4: At the end of the visit, the doctor proactively asks if there are any other issues to discuss	.45*
R5-S5: The doctor listens attentively to the patient (e.g. facing the patient, positive words, non-verbal feedback)	.39*
R6-S6: The doctor comforts and encourages the patient during the visit	.25*
R7-S7: The doctor explains appropriately adapting to the patient's understanding level (e.g. by adjusting speech speed/volume, avoiding/explaining jargon)	.30*
R8-S8: The doctor provides the patient with detailed information of examination results, abnormal findings, or diagnosis results	.29*
R9-S9: The doctor discusses with the patient his/her previous treatments (e.g. self-care measures, recent medical visits, other medical services received)	.46*
R10-S10: The doctor greets the patient during the visit	.44*
R11-S11: There is eye contact between the doctor and the patient during the visit	.23*
R12-S12: The doctor shows affability (e.g. appropriate self-introduction, chatting on topics other than the current illness)	.37*
R13-S13: The doctor gives the patient time and opportunity to speak during the visit (e.g. without interrupting the patient's speech)	.33*
R14-S14: The doctor verifies his/her understanding of the information gathered from the patient (e.g. by retelling, elaborating, requestioning)	.39*
R15-S15: Does the doctor ask the patient suggestive or commanding questions?	-.03
R16-S16: The doctor explains the disease to the patient with images, videos, WeChat official accounts, or online resources	.37*
R17-S17: Without patient inquiry, the doctor proactively and clearly informs the next appointment time	.33*
R18-S18: Without patient inquiry, the doctor proactively informs the patient about the issues that should be paid attention to during the recovery (e.g. dietary requirements, lifestyle adjustments, rehabilitation exercises)	.17*

*$p < .05$

Table 6.8 reveals that a significant positive correlation across all the five dimensions between physicians' PCBES and PCBRQ scores. The "Understand the patient's perspective" dimension exhibits the strongest correlation, whereas the "Give information" dimension displays the weakest.

Table 6.8 Dimension-wise correlation between physicians' PCBES and PCBRQ scores

Dimensions	PCBRQ - Set the stage	PCBRQ - Elicit information	PCBRQ - Give information	PCBRQ - Understand the patient's perspective	PCBRQ - End the encounter
PCBES - Set the stage	.43*				
PCBES - Elicit information		.43*			
PCBES - Give information			.36*		
PCBES - Understand the patient's perspective				.48*	
PCBES - End the encounter					.45*

*$p < .05$

6.2.2 Discussion

6.2.2.1 Physician characteristics and PCBES scores

Gender: Female doctors rated themselves slightly higher than male doctors in the dimensions of "Elicit information", "Understand the patient's perspective", and "End the encounter" compared to their male counterparts, as indicated in Table E.11 (see Annex E). This observation aligns with findings from Guo and Wang (2021), which suggest that female doctors typically display greater empathy than male doctors. This greater empathetic capacity enables female doctors to better empathize with patients, facilitating more effective communication, understanding, and patient-centred interactions. These factors likely contribute to the observed differences in self-assessments between female and male doctors in our study.

Age: The surveyed physicians ranged in age from 27 to 48 years, with a majority (116, 61.4%) falling within the 31–40 age bracket, and a smaller group (29, 15.3%) being under 30 years old. Physicians aged 41–50 years consistently reported the highest self-evaluations in the "Elicit information", "Give information", and "End the encounter" dimensions, as per Table E.12 (see Annex E). The distribution of doctors across age groups was uneven, with most concentrated in the 31–40 age range, and no doctors over 50 years old. This age structure mirrors the rapid development phase of the CHS centre involved in the study and may not accurately reflect the broader national age distribution of CHS centre doctors. The results suggest that doctors over 41 tend to rate their communication behaviours more favourably in several key dimensions, although this trend does not apply universally across all dimensions. However, due to the absence of doctors over the age of 50 in this study, we are unable to determine whether there is a correlation between age and doctors' self-assessments on PCBES.

Other factors: Doctors' self-assessment scores in the "Give information" dimension varied significantly by years of working experience, with those having 6–10 years of experience scoring notably lower than their counterparts with 11–15 and 16–20 years, as shown in Table E.13 (see Annex E). In China's medical education system, those with 6–10 years of experience are typically under 40 years old, while those with longer tenure, especially 16–20 years, often exceed 41 years. This demographic distinction suggests a potential overlap of age and experience in influencing self-assessment outcomes. Contrary to Guo and Wang's (2021) findings, which propose that communication skills may not necessarily improve with increased experience due to the higher emphasis on clinical rather than communication training in China, our results indicate a trend where increased experience correlates with higher self-assessment

scores in communication. This disparity between studies could stem from differences in sample populations or research methodologies. Our results highlight that both age and years of experience influence doctors' perceptions of their communication abilities, possibly because of accruing practical communication skills over time aimed at reducing doctor-patient conflicts. Additionally, in Shenzhen, as a region known for its economic prosperity, there is likely a greater focus on enhancing humanistic qualities in medical professionals through targeted training initiatives.

Furthermore, factors such as doctors' income, administrative roles, and medical liability insurance showed minimal influence on their self-assessment scores across all examined dimensions (referenced in Tables E.14, E.15, and E.16 in Annex E). And we could not find related studies that specifically address these aspects.

All surveyed physicians held at least a bachelor's degree, with the highest educational attainment being a master's degree. Given the homogeneous educational background, it is challenging to assess the impact of varying educational levels on physicians' self-perceptions. Additionally, it is noteworthy that in Shenzhen, a region known for its economic prosperity, the educational standards for primary care physicians are considerably higher than those observed in rural primary health care settings within China, as discussed by Guo and Wang (2021).

6.2.2.2 Physician characteristics and PCBRQ scores

The mean scores of PCBRQ shown in Table E.17 (see Annex E) reveals that female doctors consistently rated themselves higher than their male counterparts in the dimensions of "Elicit information", "Give information", "Understand the patient's perspective", and "End the encounter". This trend was also observed in doctors' self-assessments on PCBES, where female doctors generally gave higher ratings than male doctors. However, among doctors with various administrative roles and medical liability insurance statuses, only minor differences in self-assessments were noted in the "Understanding the patient's perspective" dimension (Tables E.21 and E.22 in Annex E). Other factors such as doctors' age, years of experience, and income showed no significant influence on their self-assessment scores (Tables E.18, E.19, and E.20 in Annex E).

In general, regarding doctors' recognition of communication skills, gender appears to be the only demographic characteristic that shows some differences, while other demographic factors have little impact. Compared to previous analyses (see Section 6.2.2.1), while doctors' age and years of experience affected their PCBES scores, these factors did not lead to significant differences in PCBRQ scores. This may suggest that improving doctors' communication

behaviour requires sufficient practical experience. As mentioned earlier, existing research has predominantly focused on evaluating doctors' communication behaviours, with less attention given to doctors' recognition of these skills.

6.2.2.3 Physicians' scores on PCBES and PCBRQ

Within our study at the CHS centres affiliated with the hospital being studied here, it is observed that physicians generally have high scores on the PCBRQ, indicating a strong recognition of ideal communication practices. However, a notable discrepancy between acknowledged attitudes and actual behaviours persists across different aspects of communication. Within the framework of the KAP model, recognition is akin to attitude, highlighting an essential area for investigation: identifying the roots or key factors contributing to the mismatch between attitudes and behaviours and bolstering positive communicative actions among physicians.

Aside from the "End the encounter" dimension, where physicians' PCBRQ score rate is somewhat lower at 89.6%, the score rates for all other dimensions exceed 90% (Table 6.5). Consistent with observations made by Guo and Wang (2021), the prevailing medical training environment in China tends to prioritize clinical skills over communication training, often leading physicians to undervalue the development of their communication skills. The evidence gathered in our study indicates that while the surveyed physicians recognize the importance of communication, there exists a notable gap between this acknowledgment and the actual implementation of communicative practices, pinpointing a vital area for potential improvement.

Further analysis shows that physicians' PCBRQ scores exceed the PCBES scores across both individual dimensions (Table 6.5) and item-wise evaluations (Table 6.6). An examination of the frequency of high scores on both scales reveals that for 16 items, more physicians rated themselves higher on the PCBRQ than on the PCBES, pointing to a significant disparity between the acknowledgment of communication skills and their application in practice. The chi-square and paired sample *t*-tests indicate that Item Q8, focusing on the provision of detailed diagnostic information to patients, is the only item without a significant difference between the PCBRQ and PCBES scores. This could be attributed to the integral role of this behaviour in the diagnostic process, making it an area where knowledge and practice are more closely aligned.

The **"Understand the patient's perspective"** dimension showcases the most substantial discrepancy in score rates (7.6%) between physicians' PCBRQ and PCBES scores (Table 6.5). Within this dimension, the PCBRQ scores for the four associated items (Q1, Q2, Q3, and Q6) are all notably high (with means exceeding 4.5, Table 6.6), displaying significant differences from the PCBES scores. Specifically, Item Q1, which focuses on discussions regarding the

illness's impact on the patient's life, exhibits the greatest divergence between PCBRQ and PCBES scores in the "Understand the patient's perspective" dimension, both in terms of frequency of high scores (difference = 43, Table 6.4) and mean scores (difference = 0.64, Table 6.6). This highlights a particular area of inconsistency between physicians' cognitive understanding and their practical application of this understanding for this dimension (especially Item Q1).

The **"End the encounter"** dimension follows with the second-largest gap between physicians' PCBRQ and PCBES scores, marked by a difference of 6.7% (Table 6.5). This dimension encompasses items Q4 ("At the end of visit, the doctor proactively asks if there are any other issues to discuss") and Q17 ("Without patient inquiry, the doctor proactively and clearly informs the next appointment time"), which emphasize the physician's proactive engagement at the consultation's end. This proactive behaviour is crucial not only for ensuring the completion of the necessary medical communication but also for addressing patients' emotional needs, thereby enhancing their overall satisfaction. Despite not having the largest gap across all dimensions, the score rate of PCBRQ and PCBES for "End the encounter" are the lowest (Table 6.5), indicating a need for heightened focus on this aspect of the consultation process.

In the **"Give information"** dimension, the discrepancy between physicians' PCBRQ and PCBES scores is relatively smaller at 6% (Table 6.5). Specifically, Item Q16, which involves explaining diseases using visual aids or online resources, exhibits the most significant disparity among all items, both in the frequency of high scores (difference = 86, Table 6.4) and in the mean scores (difference = 1.01, Table 6.6). This pronounced discrepancy underscores a substantial incongruence between what physicians acknowledge as ideal practice and what they implement, pinpointing a key area in need of attention and enhancement. In contrast, other items within the same dimension (Q7, Q8, and Q18) show either minimal differences or no significant discrepancies in high score frequencies (2, -3, -7, Table 6.4) or mean scores (0.18, 0.03, -0.03, Table 6.6), all maintaining relatively high averages (all above 4.5 except Q7 which has an average of 4.48), indicating less concern. The marked inconsistency observed in Q16, however, highlights the necessity to bolster the integration of digital and visual educational tools into clinical interactions, an area that merits further exploration to identify and overcome existing hurdles to their effective utilization.

In the **"Elicit information"** dimension, the disparity between physicians' PCBRQ and PCBES stands at 4.9%, falling below the overall score rate difference of 5.9% (Table 6.5). Although this difference is the second smallest among the five dimensions, Item Q15, which

probes whether the doctor employs suggestive or commanding questions, exhibits a notable gap of 40 in the frequency of high scores between PCBRQ and PCBES (Table 6.4). The other five items within this dimension (Q5, Q9, Q11, Q13, and Q14) present a maximum difference of 13 in the frequency of high scores (Table 6.4), mirroring the trend in mean score differences (Table 6.6). Interestingly, Q15 is the sole item within this dimension where PCBRQ and PCBES scores lack correlation (Table 6.7), necessitating further analysis to understand the underlying factors.

The **"Set the stage"** dimension displays the smallest discrepancy in score rates between physicians' PCBRQ and PCBES at 4.7% (Table 6.5). Within the dimension that includes just two items, Q10 and Q12, it is Item Q12—centred on the doctor's affability, like appropriate self-introduction or small talk unrelated to the medical issue at hand—that presents lower PCBRQ scores in comparison to Item Q15 and Q16 (Table 6.6). Despite this, the PCBES scores for Item Q12 are relatively higher, which is potentially attributed to the regular patient-doctor interactions facilitated by the accessible nature of CHS centres, which encourage a more familiar and comfortable rapport between physicians and patients, aligning with insights from existing research (Zhou et al., 2020). The high frequency of patient visits to the CHS centres of the hospital being studied here further indicates that this positive outcome is not the result of lighter doctors' workloads.

Among the 18 evaluated items, 17 demonstrate a significant positive correlation between physicians' PCBRQ and PCBES scores (Table 6.7). Across all the five dimensions, this positive correlation persists (Table 6.8).

In summary, the self-ratings of doctors on PCBRQ and PCBES can be characterized as follows: 1) Physicians' characteristics factors exert a comparatively minor influence on their PCBES scores relative to their PCBRQ scores; 2) PCBRQ scores surpass PCBES scores for physicians, with significant differences across all dimensions, highlighting a discernible gap between their communicative behaviours in practice and their internal recognition of communication skills; 3) There is a positive correlation between doctors' self-ratings on PCBRQ and PCBES, suggesting that enhancing doctors' recognition of the importance of communication skills is an effective approach to improving their communication behaviour.

6.3 Discrepancies in PCBES scores by physicians and patients

6.3.1 Results

To assess Hypothesis 5, outlined in Chapter 4, which posits that discrepancies exist in the

evaluation of physicians' communicative behaviours when viewed from the perspectives of both physicians and patients, we conducted the following analyses on the PCBES scores rated by physicians and patients.

6.3.1.1 Dimension-wise comparison of PCBES scores and score rate between physicians and patients

The independent sample *t*-test detailed in Table 6.9 reveals variations across dimensions between physicians and patients. Except for the "Elicit information" dimension, where the significance level exceeds .05, all other dimensions demonstrate significant differences, as indicated by *p*-values less than .05.

Table 6.9 Dimension-wise comparison of PCBES scores by physicians and patients

Five dimensions	Number of items (total scores)	Total scores (mean ± standard deviation)		two-tailed *p*	Score rate (%)		
		Patients	Physicians		Patients	Physicians	Difference (Physicians-Patients)
Set the stage	2 (10)	7.90 ± 1.87	8.62 ± 1.29	< .001	78.9	86.2	7.3
Elicit information	6 (30)	25.88 ± 3.90	26.27 ± 2.76	.145	74.5	81.6	7.1
Give information	4 (20)	14.39 ± 2.58	17.19 ± 2.06	< .001	72.0	86.0	14.0
Understand the patient's perspective	4 (20)	15.04 ± 3.64	16.94 ± 2.24	< .001	75.2	84.7	9.5
End the encounter	2 (10)	7.38 ± 2.16	8.29 ± 1.34	< .001	73.8	82.9	9.1
Total	18 (90)				78.4	85.9	7.5

The mean scores indicate that in dimensions showing significant discrepancies, physicians' PCBES evaluations are consistently higher than those of patients, with an overall difference in scoring rate of 7.5%. The dimensions "Give information", "Understand the patient's perspective", and "End the encounter" exhibit disparities greater than this overall rate, whereas "Set the stage" and "Elicit information" show lesser differences.

6.3.1.2 Item-wise comparison of frequency distribution of PCBES scores between physicians and patients

We used the chi-square test to assess the consistency of the frequency distribution of PCBES scores as rated by both physicians and patients for each item.

Original hypothesis: Consistency exists in the frequency distribution of PCBES scores as rated by physicians and patients.

Alternative hypothesis: Discrepancies exist in the frequency distribution of PCBES scores as rated by physicians and patients.

Table 6.10 indicates that with *p*-values less than .05 for all items, there is a significant inconsistency across all PCBES items between the scores rated by physicians and patients.

Table 6.10 Item-wise frequency distribution comparison of PCBES score between physicians and patients

Items	Frequency [a]					Chi-square test value	*p*
	1 point	2 points	3 points	4 points	5 points		
Q1: The doctor discusses with the patient the impact of the current illness on his/her life (e.g. quality of life, mental state)	47 (3)	44 (9)	131 (40)	134 (86)	148 (51)	31.30	< .001
Q2: The patient's efforts, achievements, and difficulties in fighting against illness are acknowledged by the doctor	41 (0)	35 (2)	130 (28)	170 (90)	128 (69)	44.60	< .001
Q3: The doctor communicates with the patient about the range of out-of-pocket medical expenses and develops affordable treatment plans in line with his/her economic situation	39 (0)	45 (3)	108 (20)	119 (67)	193 (99)	47.73	< .001
Q4: At the end of the visit, the doctor proactively asks if there are any other issues to discuss	56 (0)	66 (3)	109 (32)	107 (82)	166 (72)	66.58	< .001
Q5: The doctor listens attentively to the patient (e.g. facing the patient, positive words, non-verbal feedback)	4 (0)	13 (1)	69 (9)	179 (69)	239 (110)	17.31	.002
Q6: The doctor comforts and encourages the patient during the visit	12 (0)	25 (0)	80 (14)	174 (78)	213 (97)	25.38	< .001
Q7: The doctor explains appropriately adapting to the patient's understanding level (e.g. by adjusting speech speed/volume, avoiding/explaining jargon)	4 (0)	22 (0)	68 (10)	164 (79)	246 (100)	21.79	< .001
Q8: The doctor provides the patient with detailed information of examination results, abnormal findings, or diagnosis results	2 (0)	20 (0)	48 (2)	184 (54)	250 (133)	35.15	< .001
Q9: The doctor discusses with the patient his/her previous treatments (e.g. self-care measures, recent medical visits, other medical services received)	18 (0)	22 (1)	69 (21)	153 (75)	242 (92)	17.19	.002
Q10: The doctor greets the patient during the visit	17 (0)	29 (2)	111 (11)	166 (60)	181 (116)	54.51	< .001
Q11: There is eye contact between the doctor and the patient during the visit	8 (0)	15 (0)	62 (5)	179 (62)	240 (122)	29.72	< .001
Q12: The doctor shows affability (e.g. appropriate self-introduction, chatting on topics other than the current illness)	18 (1)	32 (4)	95 (46)	160 (65)	199 (73)	11.74	.019
Q13: The doctor gives the patient time and opportunity to speak during the visit (e.g. without interrupting the patient's speech)	13 (0)	21 (1)	58 (9)	158 (85)	254 (94)	24.36	< .001
Q14: The doctor verifies his/her understanding of the information gathered from the patient (e.g. by retelling, elaborating, requestioning)	8 (1)	16 (0)	72 (13)	167 (79)	241 (96)	16.49	.002
Q15: Does the doctor ask the patient suggestive or commanding questions?	9 (20)	8 (6)	19 (28)	19 (55)	449 (80)	159.97	< .001

Items	Frequency [a]					Chi-square test value	*p*
	1 point	2 points	3 points	4 points	5 points		
Q16: The doctor explains the disease to the patient with images, videos, WeChat official accounts, or online resources	394 (5)	25 (24)	30 (78)	28 (40)	27 (42)	331.24	< .001
Q17: Without patient inquiry, the doctor proactively and clearly informs the next appointment time	55 (2)	33 (4)	66 (32)	125 (85)	225 (66)	44.27	< .001
Q18: Without patient inquiry, the doctor proactively informs the patient about the issues that should be paid attention to during the recovery (e.g. dietary requirements, lifestyle adjustments, rehabilitation exercises)	21 (0)	19 (0)	49 (6)	120 (74)	295 (109)	34.00	< .001

[a] Data is shown as frequency of patients (frequency of physicians).

6.3.1.3 Item-wise comparison of PCBES scores' percentage distribution between physicians and patients

Table 6.11 illustrates that, apart from Item Q15 where a lower percentage of physicians scored 4 and 5 points compared to patients, the percentage frequency of high scores is predominantly higher among physicians for the remainder of the items. The items with the most significant disparities in the percentage frequency of high scores are Q16 (32.48%), Q4 (27.31%), and Q3 (25.93%), whereas the smallest differences are observed in Q9 (9.99%), Q17 (10.45%), and Q14 (11.64%).

Table 6.11 Item-wise percentage distribution comparison of PCBES score of physicians and patients

Items	Percentage Frequency [a]						
	1 point	2 points	3 points	4 points	5 points	4 and 5 points	Difference (Physicians-Patients) [b]
Q1: The doctor discusses with the patient the impact of the current illness on his/her life (e.g. quality of life, mental state)	9.33% (1.59%)	8.73% (4.76%)	25.99% (21.16%)	26.59% (45.50%)	29.37% (26.98%)	55.95% (72.49%)	16.54%
Q2: The patient's efforts, achievements, and difficulties in fighting against illness are acknowledged by the doctor	8.13% (0.00%)	6.94% (1.06%)	25.79% (14.81%)	33.73% (47.62%)	25.40% (36.51%)	59.13% (84.13%)	25.00%
Q3: The doctor communicates with the patient about the range of out-of-pocket medical expenses and develops affordable treatment plans in line with his/her economic situation	7.74% (0.00%)	8.93% (1.59%)	21.43% (10.58%)	23.61% (35.45%)	38.29% (52.38%)	61.90% (87.83%)	25.93%
Q4: At the end of the visit, the doctor proactively asks if there are any other issues to discuss	11.11% (0.00%)	13.10% (1.59%)	21.63% (16.93%)	21.23% (43.39%)	32.94% (38.10%)	54.17% (81.48%)	27.31%

Items	Percentage Frequency [a]						
	1 point	2 points	3 points	4 points	5 points	4 and 5 points	Difference (Physicians-Patients) [b]
Q5: The doctor listens attentively to the patient (e.g. facing the patient, positive words, non-verbal feedback)	0.79% (0.00%)	2.58% (0.53%)	13.69% (4.76%)	35.52% (36.51%)	47.42% (58.20%)	82.94% (94.71%)	11.77%
Q6: The doctor comforts and encourages the patient during the visit	2.38% (0.00%)	4.96% (0.00%)	15.87% (7.41%)	34.52% (41.27%)	42.26% (51.32%)	76.79% (92.59%)	15.80%
Q7: The doctor explains appropriately adapting to the patient's understanding level (e.g. by adjusting speech speed/volume, avoiding/explaining jargon)	0.79% (0.00%)	4.37% (0.00%)	13.49% (5.29%)	32.54% (41.80%)	48.81% (52.91%)	81.35% (94.71%)	13.36%
Q8: The doctor provides the patient with detailed information of examination results, abnormal findings, or diagnosis results	0.40% (0.00%)	3.97% (0.00%)	9.52% (1.06%)	36.51% (28.57%)	49.60% (70.37%)	86.11% (98.94%)	12.83%
Q9: The doctor discusses with the patient his/her previous treatments (e.g. self-care measures, recent medical visits, other medical services received)	3.57% (0.00%)	4.37% (0.53%)	13.69% (11.11%)	30.36% (39.68%)	48.02% (48.68%)	78.37% (88.36%)	9.99%
Q10: The doctor greets the patient during the visit	3.37% (0.00%)	5.75% (1.06%)	22.02% (5.82%)	32.94% (31.75%)	35.91% (61.38%)	68.85% (93.12%)	24.27%
Q11: There is eye contact between the doctor and the patient during the visit	1.59% (0.00%)	2.98% (0.00%)	12.30% (2.65%)	35.52% (32.80%)	47.62% (64.55%)	83.13% (97.35%)	14.22%
Q12: The doctor shows affability (e.g. appropriate self-introduction, chatting on topics other than the current illness)	3.57% (0.53%)	6.35% (2.12%)	18.85% (24.34%)	31.75% (34.39%)	39.48% (38.62%)	71.23% (73.02%)	1.79%
Q13: The doctor gives the patient time and opportunity to speak during the visit (e.g. without interrupting the patient's speech)	2.58% (0.00%)	4.17% (0.53%)	11.51% (4.76%)	31.35% (44.97%)	50.40% (49.74%)	81.75% (94.71%)	12.96%
Q14: The doctor verifies his/her understanding of the information gathered from the patient (e.g. by retelling, elaborating, requestioning)	1.59% (0.53%)	3.17% (0.00%)	14.29% (6.88%)	33.13% (41.80%)	47.82% (50.79%)	80.95% (92.59%)	11.64%
Q15: Does the doctor ask the patient suggestive or commanding questions?	1.79% (10.58%)	1.59% (3.17%)	3.77% (14.81%)	3.77% (29.10%)	89.09% (42.33%)	92.86% (71.43%)	-21.43%
Q16: The doctor explains the disease to the patient with images, videos, WeChat official accounts, or online resources	78.17% (2.65%)	4.96% (12.70%)	5.95% (41.27%)	5.56% (21.16%)	5.36% (22.22%)	10.91% (43.39%)	32.48%
Q17: Without patient inquiry, the doctor proactively and clearly informs the next appointment time	10.91% (1.06%)	6.55% (2.12%)	13.10% (16.93%)	24.80% (44.97%)	44.64% (34.92%)	69.44% (79.89%)	10.45%

Items	Percentage Frequency [a]						
	1 point	2 points	3 points	4 points	5 points	4 and 5 points	Difference (Physicians-Patients) [b]
Q18: Without patient inquiry, the doctor proactively informs the patient about the issues that should be paid attention to during the recovery (e.g. dietary requirements, lifestyle adjustments, rehabilitation exercises)	4.17% (0.00%)	3.77% (0.00%)	9.72% (3.17%)	23.81% (39.15%)	58.53% (57.67%)	82.34% (96.83%)	14.49%

[a] Data is shown as percentage frequency for patients (percentage frequency for physicians).
[b] The "Difference" column shows the difference in the percentage frequency of high scores (4 and 5 points) between physicians' and patients' PCBES evaluations.

6.3.1.4 Item-wise PCBES scores comparison between physicians and patients

According to the independent sample *t*-test results in Table 6.12, differences are noted across individual items between physicians and patients. With the sole exception of Item Q12, all other items show *p*-values less than .05, highlighting substantial disparities. The mean scores reveal that, among the items with differences, only Item Q15 has physicians scoring lower than patients (-0.88), whereas for all other items, physicians' PCBES evaluations surpass those of patients.

Table 6.12 Comparison of PCBES scores between physicians and patients across items

Items	PCBES scores [a]		two-tailed *p*	Difference between Means (Physicians-Patients)
	Patients (N=504)	Physicians (N=189)		
Q1: The doctor discusses with the patient the impact of the current illness on his/her life (e.g. quality of life, mental state)	3.58 ± 1.25	3.92 ± 0.90	< .001	0.34
Q2: The patient's efforts, achievements, and difficulties in fighting against illness are acknowledged by the doctor	3.61 ± 1.17	4.20 ± 0.72	< .001	0.59
Q3: The doctor communicates with the patient about the range of out-of-pocket medical expenses and develops affordable treatment plans in line with his/her economic situation	3.76 ± 1.26	4.39 ± 0.74	< .001	0.63
Q4: At the end of the visit, the doctor proactively asks if there are any other issues to discuss	3.52 ± 1.36	4.18 ± 0.76	< .001	0.66
Q5: The doctor listens attentively to the patient (e.g. facing the patient, positive words, non-verbal feedback)	4.26 ± 0.85	4.52 ± 0.62	< .001	0.26
Q6: The doctor comforts and encourages the patient during the visit	4.09 ± 0.99	4.44 ± 0.63	< .001	0.35
Q7: The doctor explains appropriately adapting to the patient's understanding level (e.g. by adjusting speech speed/volume, avoiding/explaining jargon)	4.24 ± 0.90	4.48 ± 0.60	< .001	0.24

Items	PCBES scores [a]		two-tailed *p*	Difference between Means (Physicians-Patients)
	Patients (N=504)	Physicians (N=189)		
Q8: The doctor provides the patient with detailed information of examination results, abnormal findings, or diagnosis results	4.31 ± 0.83	4.69 ± 0.48	< .001	0.38
Q9: The doctor discusses with the patient his/her previous treatments (e.g. self-care measures, recent medical visits, other medical services received)	4.15 ± 1.05	4.37 ± 0.70	.002	0.22
Q10: The doctor greets the patient during the visit	3.92 ± 1.05	4.53 ± 0.66	< .001	0.61
Q11: There is eye contact between the doctor and the patient during the visit	4.25 ± 0.90	4.62 ± 0.54	< .001	0.37
Q12: The doctor shows affability (e.g. appropriate self-introduction, chatting on topics other than the current illness)	3.97 ± 1.08	4.09 ± 0.87	.158	0.12
Q13: The doctor gives the patient time and opportunity to speak during the visit (e.g. without interrupting the patient's speech)	4.23 ± 0.98	4.44 ± 0.61	.001	0.21
Q14: The doctor verifies his/her understanding of the information gathered from the patient (e.g. by retelling, elaborating, requestioning)	4.22 ± 0.92	4.42 ± 0.67	.002	0.20
Q15: Does the doctor ask the patient suggestive or commanding questions?	4.77 ± 0.75	3.89 ± 1.28	< .001	-0.88
Q16: The doctor explains the disease to the patient with images, videos, WeChat official accounts, or online resources	1.55 ± 1.16	3.48 ± 1.05	< .001	1.93
Q17: Without patient inquiry, the doctor proactively and clearly informs the next appointment time	3.86 ± 1.34	4.11 ± 0.83	.004	0.25
Q18: Without patient inquiry, the doctor proactively informs the patient about the issues that should be paid attention to during the recovery (e.g. dietary requirements, lifestyle adjustments, rehabilitation exercises)	4.29 ± 1.06	4.55 ± 0.56	< .001	0.26

[a] Scores are shown as mean ± standard deviation.

6.3.2 Discussion

In comparing the PCBES evaluations between physicians and patients across various dimensions, the overall score rate for physicians' self-assessments stands at 85.9%, which is higher than the patients' score rate of 78.4% (Table 6.9). The independent sample *t*-test results indicate that physicians' PCBES scores surpass patients' evaluations in all dimensions except for "Elicit information", where the significance test result exceeds .05, suggesting no significant difference (Table 6.9). Apart from Item Q12, significant discrepancies in PCBES scores between physicians and patients are noted for all other items. Moreover, physicians' PCBES scores exceed patients' evaluations for all items except for Q15 (Table 6.11), underscoring a general trend where physicians rate their communication behaviours more favourably than patients do.

The "Give information" dimension showcases the most pronounced disparity, with a 14% difference in PCBES score rates between physicians and patients (Table 6.9). This dimension encompasses items Q7, Q8, Q16, and Q18, with Chi-square tests for each item (Table 6.12) revealing significant inconsistencies in scores ($p < .05$). Notably, Q16 ("The doctor explains the disease to the patient with images, videos, WeChat official accounts, or online resources") exhibits the largest gap, with mean scores of 3.48±1.05 for physicians versus 1.55±1.16 for patients, and the greatest mean difference of 1.93 across the questionnaire (Table 6.12). The difference in the frequency of high scores (above 4 points) is also the most substantial at 32.48% (Table 6.11). Considering that 45% of patients indicated they "Always" or "Often" seek information about their symptoms before a visit (Table E.7 in Annex E), it is evident that a significant portion of patients are already engaging with online and media resources for health information. Furthermore, the considerable gap between physicians' PCBES and PCBRQ scores for Q16 (Table 6.6), the biggest among all items, suggests that physicians recognize the importance of utilizing online resources for patient education but fall short in practice, with patients reflecting this through lower evaluations for this item. This discrepancy highlights the need to address this issue by understanding potential challenges physicians face in using online or media resources and enhancing doctor-patient communication by overcoming these obstacles.

The inclusion of Q16 is rooted in current diagnostic and treatment practices, where the integration of online and media resources into patient education is relatively nascent, with limited experience and scholarly documentation available. The substantial difference between physicians' awareness and actual application in this context warrants further investigation. Medical institutions might need to assist physicians in accessing or creating more effective

online media resources, facilitating their use in conveying health-related information to patients.

The dimension "Understand the patient's perspective" represents another area with a notable discrepancy between physician self-evaluations and patient assessments, with physicians' PCBES scores being 9.5% higher than patients' ratings (Table 6.9). This dimension encompasses items Q1, Q2, Q3, and Q6, which delve into the broader impact of the illness on the patient's life and psychological well-being, rather than the specifics of the disease itself (Table C.1 in Annex C). Such understanding forms the basis for empathizing with patients, a crucial aspect both from the standpoint of general practice responsibilities and patient-centred care. The high mean scores (> 4.5) assigned by physicians to these items (Table 6.6) suggest that they recognize the importance of these four items. Yet, significant score disparities between physicians and patients on each item highlight a gap between physicians' self-perceptions and patients' experiences in this realm. Particularly, items Q2 (The patient's efforts, achievements, and difficulties in fighting against illness are acknowledged by the doctor) and Q6 (The doctor comforts and encourages the patient during the visit), which extend beyond mere understanding to express empathy, underscore the need for general practitioners to deepen their empathy and understanding toward patients. Despite the fact that a large portion of the physicians (70.37%) have 6–10 years of work experience (Table D.3 in Annex D), the analysis reveals no significant differences in PCBES and PCBRQ scores among physicians with varying years of experience (Table E.13 and E.19 in Annex E). This suggests that the observed deficiencies are not due to a lack of awareness but rather a challenge in translating this recognition into practice. Furthermore, similar discrepancies between physician and patient perspectives were noted in a study by Sudhinaraset et al. (2019), which pointed out contrasting opinions on patients sharing their perspectives. In their findings, medical practitioners indicated a willingness to respond if patients posed questions. Yet, a perceived deficit in patients' health literacy, which ostensibly hindered them from asking relevant questions, was cited as a barrier to providing adequate explanations and assistance. Conversely, female participants in their study attributed their hesitancy to inquire to the perceived attitudes of the medical staff, suggesting that these attitudes discouraged question-asking. This divergence in perceptions underscores the need for further investigation in our study to understand the underlying causes of these differing viewpoints and to identify ways to bridge this communication gap.

The "End the encounter" dimension emerges as the third area with significant evaluation discrepancies, presenting a 9.1% higher score rate in physicians' PCBES compared to patient assessments (Table 6.9). Item Q4, which concerns the physician's proactive inquiry about any additional patient concerns at the visit's end, is particularly notable for its substantial impact on

this dimension's overall evaluation difference. This item has the second biggest gap in the entire PCBES questionnaire and the largest difference in this dimension, for both the percentage frequency of high PCBES scores (with physicians outpacing patients by 27.31%, Table 6.11) and the mean score (0.66, Table 6.12) between physicians and patients. Such findings underscore Item Q4 as a pivotal contributor to the observed discrepancies in the "End the encounter" dimension. Despite patients' evaluations of Item Q4 averaging at 3.52, physicians rate themselves higher with an average score of 4.18 (Table 6.12). Delving deeper into physicians' perceptions of this item is essential to comprehend the basis of this divergence. Although Item Q4 does not exhibit the widest gap between physicians' PCBRQ and PCBES scores (Table 6.6), its scores are relatively low among all dimensions (4.55 ± 0.66 for PCBRQ and 4.18 ± 0.77 for PCBES, Table 6.6), coupled with a high correlation coefficient of .45 (Table 6.7). These aspects highlight the need for increased physicians' recognition on this dimension, particularly Item Q4, and suggest the necessity of investigating whether the observed low recognition is linked to physicians' cognition.

The "Set the stage" dimension exhibits a low difference in PCBES score rates between doctors and patients, marked at 7.3% (Table 6.9). This dimension encompasses just two items: Q10, which pertains to the doctor's greeting during the visit, and Q12, which involves the doctor's display of friendliness, such as proper self-introduction or engaging in non-medical conversation. Notably, Q12 stands out as the only item within the whole questionnaire that does not show a discrepancy in evaluations between physicians and patients (Table 6.12). In contrast, Item Q10 showcases substantial disparities in the percentage frequency of high PCBES scores between physicians and patients, with a notable difference where physicians' percentage frequency exceeds patients' by 24.27% (Table 6.11). Additionally, the comparison of mean scores between physicians and patients for this item reveals a significant gap of 0.61 (Table 6.12), further highlighting the considerable difference in physicians' and patients' evaluations of communication behaviour for physicians' greeting during the visit. Moreover, the relatively minor difference between the mean scores of PCBES and PCBRQ for Item Q10 (0.16, Table 6.6) coupled with a correlation coefficient of .44 (Table 6.7), which is higher compared to many other items, suggests that physicians may not fully recognize the significance of this aspect of patient interaction. This insight points towards the potential for targeted training to underscore the importance of initial greetings and enhance this aspect of physician-patient communication.

In comparison to other dimensions, the "Elicit information" dimension exhibits the smallest discrepancy in evaluations of doctors' communication practices between physicians and patients. Notably, Item Q15, which inquires whether the doctor poses suggestive or directive

questions to the patient, stands out as the sole item where patients' PCBES mean scores surpass those of the physicians, with a difference of -0.88 (Table 6.12). This particular item is also distinguished by the lack of correlation between PCBRQ and PCBES scores (Table 6.7). Given that this item does not display significant differences or associations with physicians' demographic attributes or their acknowledgment of communication skills, the underlying reasons for this outcome remain unclear based on the current dataset. This suggests the possibility of additional external factors, not yet considered, that may be influencing the dynamics of doctor-patient communication. In many conventional studies, tools like the SEGUE scale and other scales for evaluating physician communication skills are predominantly utilized by medical educators or administrators to assess doctors' communicative behaviours, often focusing on medical students (Makoul, 2001a; Tate et al., 1999). There is, however, a scarcity of research exploring the perspectives of direct participants in medical consultations—namely, the doctors and patients themselves—on physician communication. This study employs a uniform scale for evaluating physician communication behaviours to enable a comparative analysis of doctors' self-assessments and patient evaluations, offering insights into both groups' perceptions of specific communicative actions. By employing quantitative methods, we assess the disparities in patient-centred communication behaviours as rated by both groups and examine the relationship between physicians' acknowledgment of their communication skills and their self-evaluated communication behaviours to determine if deficiencies in communication are linked to a lack of skill recognition.

Our study reveals notable disparities between physicians' self-assessments and patients' evaluations of physicians' communication practices. Interestingly, patients' backgrounds, including demographic factors and preferences during medical consultations, significantly impact their ratings of physicians' communication behaviours. Specifically, patients who come to consultations with better preparation—armed with relevant disease knowledge and organized questions—tend to rate physicians' communication more favourably. This insight suggests that enhancing patient education about common and pertinent health issues through various channels could significantly improve patient experiences and foster smoother doctor-patient interactions. On the physician side, the gap between the actual application of communication skills and meeting patient expectations seems minimally influenced by physicians' demographic factors. Instead, it appears more closely linked to their awareness and acknowledgment of essential communication skills. The observed discrepancy between physicians' understanding of these skills and their practical application points to a lack of unity of knowledge and action.

Chapter 7: Conclusion

This thesis includes two studies: network analysis of literature and questionnaire survey. We began by systematically reviewing literature on physician humanism and doctor-patient relationships, using literature network analysis to highlight communication as the core research focus. Following this, we utilized validated scales, PCBES and PCBRQ, to conduct surveys with primary care physicians and patients, aiming to quantitatively evaluate perceived physicians' communication skills from both perspectives. This chapter consolidates the findings from these research methods by incorporating the analyses from Chapters 3 and 6, addressing the research questions outlined in Chapter 1. We explore the theoretical contributions and practical implications of these findings in health care management, reflect on the study's limitations, and propose suggestions and directions for future research.

7.1 Summary of research findings

In the network analysis of literature, using CiteSpace software to analyse publications from 2011 to 2020 in the CNKI and PubMed databases, we identified the key research hotspots in physician's humanism and physician-patient relationship, including communication, shared decision-making, empathy, and patient-centred care. These qualities significantly influence the outcomes of doctor-patient relationships.

Based on these insights, we conducted a questionnaire survey among patients and physicians at the CHS centres associated with the studied hospital, leading to the following conclusions:

Regarding how patient characteristics affect their PCBES scores (evaluation of physician communication behaviours): 1) Factors such as patients' age, educational background, attention to physicians' experience and qualifications, and their level of information preparation before consultations significantly influenced their evaluations. Specifically, patients who were inclined to understand symptom-disease correlations and prepared questions beforehand rated physicians more favourably across all dimensions. 2) Patent gender did not significantly affect ratings across any dimensions. 3) Other patient characteristics had significant effects on ratings in certain dimensions.

Concerning the influence of physician characteristics on their self-evaluations: 1) Physician

characteristics had less impact on their PCBES self-ratings (self-evaluation of communication behaviors) compared to their PCBRQ self-ratings (recognition of communication skills importance). 2) Notably, physicians' PCBRQ self-ratings were generally higher than their PCBES scores, with a positive correlation between the two.

Additionally, when comparing physicians' PCBES self-ratings with patients' PCBES ratings: There were significant differences in all items except for Q12 (physician's affability). In these differing items, physicians rated themselves higher than patients did, except for Q15 (physician's use of directive questions).

7.2 Answers to the research questions

Our questionnaire survey study addressed the two primary research questions mentioned in Chapter 1.

First, in examining the factors influencing doctors' and patients' evaluations of doctors' communication behaviours, we found that: from the patients' standpoint, demographic characteristics play a role in how they assess doctors' communication skills, while their health care preferences also shape their experiences during medical consultations; from the doctors' perspective, the reasons their communication skills may not fully meet patient needs are complex and multifaceted. Rather than demographic factors being the primary influence, their recognition of communication skills is a key determinant. A significant gap exists between doctors' awareness of communication skills and their actual behaviours, highlighting a misalignment between knowledge and practice.

Second, regarding whether doctors and patients perceive doctors' communication behaviours differently during medical consultations, our findings indicate that doctors and patients across all CHS centres in the hospital studied hold significantly different views. Doctors consistently rated their own communication behaviours more favourably than patients did.

The study's key conclusions emphasize several important findings. 1) There are significant discrepancies between how doctors and patients evaluate doctors' communication skills. 2) Beyond demographic factors, patients' preferences in medical treatment also shape their evaluations of doctors' communication abilities. 3) Doctors' recognition of the importance of humanistic qualities correlates positively with their communication skill ratings. 4) A distinct knowledge-behaviour gap exists in doctors' communication practices, reflecting a misalignment between their awareness and actual behaviours.

7.3 Theoretical and managerial implications

Our study systematically compared doctor-patient perspectives to uncover the underlying mechanisms behind differences in communication behaviour evaluations, making significant contributions to both theoretical development and practical implications. Specifically, the literature network analysis confirmed the central role of communication in doctor-patient relationships and humanistic literacy, reinforcing its importance as a research focus. In China, studies in this field are largely theoretical, with limited empirical research, most of which focuses on medical students. In contrast, international studies increasingly integrate clinical practice and explore doctor-patient interactions in the context of specific diseases. Future research should expand its scope to examine how doctor-patient communication varies across different medical conditions, providing a more comprehensive and in-depth understanding. Our questionnaire survey also addressed two key gaps in literature. First, previous studies have rarely compared how patients and doctors perceive doctors' communication skills. Second, limited research has explored doctors' attitudes toward patient-centred communication. This study identified significant differences in doctors' and patients' evaluations of communication behaviours and offered preliminary explanations for these discrepancies, providing clear guidance for improving patient satisfaction. More importantly, this study overcame the limitations of traditional single-perspective approaches by systematically comparing doctor and patient evaluations of the same communication behaviours for the first time. It revealed the gap between doctors' self-perception and patients' actual experience, offering a measurement model that deepens the understanding of doctor-patient relationships and contributes to theoretical development in the field.

From a practical management perspective, addressing the discrepancy between doctors' knowledge and behaviour highlighted in the questionnaire study requires strengthening communication skills training. Scenario-based simulation training with real-time feedback, including role-playing exercises in a controlled environment, can help doctors recognize and correct cognitive-behavioural gaps. To further enhance communication quality, health care institutions could incorporate patient evaluation data into training assessments, regularly providing doctors with anonymous patient feedback on their communication behaviours and integrating these evaluations into performance reviews. This can help doctors transition from self-awareness to a deeper understanding of patient needs. Additionally, medical education should integrate communication behaviour training using a cyclical theory-case-practice-reflection approach. Special emphasis should be placed on areas where this study identified low

recognition levels in communication skills, ensuring comprehensive development of students' abilities in these key areas. Given that patient demographics influence communication evaluations, health care institutions could implement differentiated communication modules, such as specialized strategies for elderly patients with chronic diseases and guidance on digital health tools for younger patients, to improve adaptability in diverse clinical settings. Recognizing that patients' health care preferences shape their communication experiences, hospitals could use display screens in waiting areas or hospitals' WeChat official accounts to provide educational materials, such as animated videos on how to effectively communicate with doctors and explanations of common diseases. Encouraging patients to prepare a list of concerns before consultations could further improve diagnostic efficiency and enhance patient satisfaction.

7.4 Limitations

Although our research provides empirical evidence in the field of doctor-patient communication, it has certain limitations that require further refinement and expansion in future research.

1) The literature network analysis was conducted in 2021, meaning that research findings from the past four years (2021–2024) were not included. As a result, this study does not account for key events such as the COVID-19 pandemic and the emergence of AI-driven communication tools like ChatGPT; and may underestimate the impact by the widespread adoption of telemedicine, the public health crises on doctor-patient relationships, and AI-driven transformations in communication models. Future research should update the literature review to incorporate the latest studies and ensure the relevance and applicability of the conclusions.

2) The questionnaire survey was confined to the CHS centres of a single hospital in Shenzhen, resulting in a narrow sample population and limited data sources. This restricted sample cannot fully represent doctor-patient communication dynamics in Shenzhen or across China. Additionally, variations in health care environments, policy frameworks, economic development levels, and sociocultural backgrounds may influence the generalizability of the findings. Future studies should expand the sample scope by including different levels of medical institutions and hospitals across various regions, thereby improving the external validity and applicability of the research conclusions.

3) The presence of social desirability effects may have influenced respondents' answers, as they could have felt psychological pressure to align their responses with socially accepted norms rather than their genuine experiences. Although the informed consent form explicitly

stated that survey results would not be used to evaluate doctors' performance, participating doctors may still have been influenced by social expectations, leading them to provide answers that reflect idealized perceptions rather than their actual work experiences and emotions. Similarly, patients might have adjusted their responses based on perceived social expectations, potentially affecting the objectivity of their feedback on doctor-patient communication. Future research could incorporate interviews and behavioural observations to diversify data sources and mitigate the impact of social desirability bias on findings.

4) To enhance response efficiency and completion rates, this study simplified the investigation of patients' medical preferences. Consequently, it did not comprehensively cover all key factors influencing health care decisions. When selecting a hospital or doctor, patients may consider elements such as a doctor's professional background, a hospital's reputation, medical costs, geographical location, and service quality. However, these aspects were not thoroughly examined in the questionnaire, which may limit the comprehensiveness of the findings. Future studies could employ more detailed survey instruments and incorporate qualitative methods such as interviews and focus groups to gain deeper insights into the factors shaping patients' health care choices.

5) This study primarily relied on questionnaire surveys for data collection and did not include in-depth interviews, limiting its ability to provide deeper explanations of specific doctor-patient communication issues. While surveys generate quantitative data, they are constrained by question design and response options, making it difficult to fully capture the complexity of doctor-patient interactions. Elements such as emotions, verbal expressions, and non-verbal behaviours during face-to-face communication cannot be adequately reflected through questionnaire data alone. Future research could adopt a mixed-methods approach, incorporating semi-structured interviews and focus group discussions to integrate both quantitative and qualitative data for a more comprehensive analysis of doctor-patient communication dynamics.

7.5 Suggestions for further research

Building on the findings and limitations of this study, future research should prioritize the following areas.

1) It is important to recognize that different patients will have different evaluations of doctors' behaviours and to understand the varied needs of these patient groups. Research should conduct more thorough discussions through interviews on specific issues, to identify the

primary factors influencing patient satisfaction from both medical and patient perspectives and explore ways to enhance patient satisfaction.

2) Future research should delve into the underlying causes of the divergence between physicians' recognition of communication practices and their actual behaviours. This investigation should encompass three primary areas: a) Investigating specific communication behaviours that physicians recognize less and exploring ways to enhance their understanding and application of these skills; b) Physicians may encounter obstacles that hinder the effective practice of communication skills. It is essential to explore these barriers to understand why some physicians struggle to apply their communication skills in ways that meet patient expectations; c) Moving beyond traditional conceptual training to explore more effective training methodologies that promote the alignment of doctors' knowledge and actions regarding communication skills.

3) Future studies should further analyse the factors affecting physicians' communication practices and investigate more effective training techniques for communication skills.

The essence of doctor-patient communication lies in the reflection of medical humanism in clinical practice. When doctors' understanding of communication skills does not translate into observable behaviours, even excellent medical expertise may not yield positive patient feedback due to poor communication. To address the cognitive-behavioural discrepancy, greater emphasis must be placed on patient experiences in medical quality assessments. Communication skills training should be closely aligned with real-world scenarios, moving beyond the mere teaching of standardized knowledge. We expect these efforts to promote a more harmonious doctor-patient relationship and enhance the overall quality of health care services.

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Annex A: Physician Communication Behaviours Evaluation Scale (PCBES)

Item code	Questionnaire item	Options				
S1	The doctor discusses with the patient the impact of the current illness on his/her life (e.g. quality of life, mental state).	All the time	Mostly	Sometimes	Occasionally	Never
S2	The patient's efforts, achievements, and difficulties in fighting against illness are acknowledged by the doctor.	All the time	Mostly	Sometimes	Occasionally	Never
S3	The doctor communicates with the patient about the range of out-of-pocket medical expenses and develops affordable treatment plans in line with his/her economic situation.	All the time	Mostly	Sometimes	Occasionally	Never
S4	At the end of the visit, the doctor proactively asks if there are any other issues to discuss.	All the time	Mostly	Sometimes	Occasionally	Never
S5	The doctor listens attentively to the patient (e.g. facing the patient, positive words, non-verbal feedback).	All the time	Mostly	Sometimes	Occasionally	Never
S6	The doctor comforts and encourages the patient during the visit.	All the time	Mostly	Sometimes	Occasionally	Never
S7	The doctor explains appropriately adapting to the patient's understanding level (e.g. by adjusting speech speed/volume, avoiding/explaining jargon).	All the time	Mostly	Sometimes	Occasionally	Never
S8	The doctor provides the patient with detailed information of examination results, abnormal findings, or diagnosis results.	All the time	Mostly	Sometimes	Occasionally	Never
S9	The doctor discusses with the patient his/her previous treatments (e.g. self-care measures, recent medical visits, other medical services received).	All the time	Mostly	Sometimes	Occasionally	Never
S10	The doctor greets the patient during the visit.	All the time	Mostly	Sometimes	Occasionally	Never
S11	There is eye contact between the doctor and the patient during the visit.	All the time	Mostly	Sometimes	Occasionally	Never
S12	The doctor shows affability (e.g. appropriate self-introduction, chatting on topics other than the current illness).	All the time	Mostly	Sometimes	Occasionally	Never
S13	The doctor gives the patient time and opportunity to speak during the visit (e.g. without interrupting the patient's speech).	All the time	Mostly	Sometimes	Occasionally	Never

Item code	Questionnaire item	Options				
S14	The doctor verifies his/her understanding of the information gathered from the patient (e.g. by retelling, elaborating, requestioning).	All the time	Mostly	Sometimes	Occasionally	Never
S15	Does the doctor ask the patient suggestive or commanding questions?	All the time	Mostly	Sometimes	Occasionally	Never
S16	The doctor explains the disease to the patient with images, videos, WeChat official accounts, or online resources.	All the time	Mostly	Sometimes	Occasionally	Never
S17	Without patient inquiry, the doctor proactively and clearly informs the next appointment time.	All the time	Mostly	Sometimes	Occasionally	Never
S18	Without patient inquiry, the doctor proactively informs the patient about the issues that should be paid attention to during the recovery (e.g. dietary requirements, lifestyle adjustments, rehabilitation exercises).	All the time	Mostly	Sometimes	Occasionally	Never

Annex B: Physician Communication Behaviours Recognition Questionnaire (PCBRQ)

Item code	Questionnaire item	Options				
R1	I discuss with the patient the impact of the current illness on his/her life (e.g. quality of life, mental state).	Strongly recognize	Recognize	Somewhat recognize	Slightly recognize	Do not recognize
R2	I acknowledge the patient's efforts, achievements, difficulties to overcome illness.	Strongly recognize	Recognize	Somewhat recognize	Slightly recognize	Do not recognize
R3	I communicate with the patient about the range of out-of-pocket medical expenses and develop affordable treatment plans in line with his/her economic situation.	Strongly recognize	Recognize	Somewhat recognize	Slightly recognize	Do not recognize
R4	At the end of the visit, I proactively ask if there are any other issues to discuss.	Strongly recognize	Recognize	Somewhat recognize	Slightly recognize	Do not recognize
R5	I listen attentively to the patient (e.g. facing the patient, positive words, non-verbal feedback).	Strongly recognize	Recognize	Somewhat recognize	Slightly recognize	Do not recognize
R6	I comfort and encourage the patient during the visit.	Strongly recognize	Recognize	Somewhat recognize	Slightly recognize	Do not recognize
R7	I explain appropriately adapting to the patient's understanding level (e.g. by adjusting speech speed/volume, avoiding/explaining jargon).	Strongly recognize	Recognize	Somewhat recognize	Slightly recognize	Do not recognize
R8	I provide the patient with detailed information of examination results, abnormal findings, or diagnosis results.	Strongly recognize	Recognize	Somewhat recognize	Slightly recognize	Do not recognize
R9	I discuss with the patient his/her previous treatments (e.g. self-care measures, recent medical visits, other medical services received).	Strongly recognize	Recognize	Somewhat recognize	Slightly recognize	Do not recognize
R10	I greet the patient during the visit.	Strongly recognize	Recognize	Somewhat recognize	Slightly recognize	Do not recognize
R11	There is eye contact between me and the patient during the visit.	Strongly recognize	Recognize	Somewhat recognize	Slightly recognize	Do not recognize
R12	I show affability (e.g. appropriate self-introduction, chatting on topics other than the current illness).	Strongly recognize	Recognize	Somewhat recognize	Slightly recognize	Do not recognize
R13	I give the patient time and opportunity to speak during the visit (e.g. without interrupting the patient's speech).	Strongly recognize	Recognize	Somewhat recognize	Slightly recognize	Do not recognize

Item code	Questionnaire item	Options				
R14	I verify my understanding of the information gathered from the patient (e.g. by retelling, elaborating, requestioning).	Strongly recognize	Recognize	Somewhat recognize	Slightly recognize	Do not recognize
R15	I avoid asking the patient suggestive or commanding questions.	Strongly recognize	Recognize	Somewhat recognize	Slightly recognize	Do not recognize
R16	I explain the disease to the patient with images, videos, WeChat official accounts, or online resources.	Strongly recognize	Recognize	Somewhat recognize	Slightly recognize	Do not recognize
R17	Without patient inquiry, I proactively and clearly inform the next appointment time.	Strongly recognize	Recognize	Somewhat recognize	Slightly recognize	Do not recognize
R18	Without patient inquiry, I proactively inform the patient about the issues that should be paid attention to during the recovery (e.g. dietary requirements, lifestyle adjustments, rehabilitation exercises).	Strongly recognize	Recognize	Somewhat recognize	Slightly recognize	Do not recognize

Annex C: Dimensions and Item Comparison between PCBES and PCBRQ

Table C.1 Dimensions and corresponding items of PCBES and PCBRQ

Dimension	Item code	Questionnaire item
Set the stage	Q10	The doctor greets the patient during the visit.
	Q12	The doctor shows affability (e.g. appropriate self-introduction, chatting on topics other than the current illness).
Elicit information	Q5	The doctor listens attentively to the patient (e.g. facing the patient, positive words, non-verbal feedback).
	Q9	The doctor discusses with the patient his/her previous treatments (e.g. self-care measures, recent medical visits, other medical services received).
	Q11	There is eye contact between the doctor and the patient during the visit.
	Q13	The doctor gives the patient time and opportunity to speak during the visit (e.g. without interrupting the patient's speech).
	Q14	The doctor verifies his/her understanding of the information gathered from the patient (e.g. by retelling, elaborating, requestioning).
	Q15	Does the doctor ask the patient suggestive or commanding questions?
Give information	Q7	The doctor explains appropriately adapting to the patient's understanding level (e.g. by adjusting speech speed/volume, avoiding/explaining jargon).
	Q8	The doctor provides the patient with detailed information of examination results, abnormal findings, or diagnosis results.
	Q16	The doctor explains the disease to the patient with images, videos, WeChat official accounts, or online resources.
	Q18	Without patient inquiry, the doctor proactively informs the patient about the issues that should be paid attention to during the recovery (e.g. dietary requirements, lifestyle adjustments, rehabilitation exercises).
Understand the patient's perspective	Q1	The doctor discusses with the patient the impact of the current illness on his/her life (e.g. quality of life, mental state).
	Q2	The patient's efforts, achievements, and difficulties in fighting against illness are acknowledged by the doctor.
	Q3	The doctor communicates with the patient about the range of out-of-pocket medical expenses and develops affordable treatment plans in line with his/her economic situation.
	Q6	The doctor comforts and encourages the patient during the visit.
End the encounter	Q4	At the end of the visit, the doctor proactively asks if there are any other issues to discuss.
	Q17	Without patient inquiry, the doctor proactively and clearly informs the next appointment time.

Note. A direct item-by-item comparison between PCBES and PCBRQ is not necessary for this table, therefore, a standardized item code prefixed with "Q" is utilized.

Table C.2 Comparison of items between PCBES and PCBRQ

Item code	Questionnaire item
R1	I discuss with the patient the impact of the current illness on his/her life (e.g. quality of life, mental state).
S1	The doctor discusses with the patient the impact of the current illness on his/her life (e.g. quality of life, mental state).
R2	I acknowledge the patient's efforts, achievements, difficulties to overcome illness
S2	The patient's efforts, achievements, and difficulties in fighting against illness are acknowledged by the doctor.
R3	I communicate with the patient about the range of out-of-pocket medical expenses and develop affordable treatment plans in line with his/her economic situation.
S3	The doctor communicates with the patient about the range of out-of-pocket medical expenses and develops affordable treatment plans in line with his/her economic situation.
R4	At the end of the visit, I proactively ask if there are any other issues to discuss.
S4	At the end of the visit, the doctor proactively asks if there are any other issues to discuss.
R5	I listen attentively to the patient (e.g. facing the patient, positive words, non-verbal feedback).
S5	The doctor listens attentively to the patient (e.g. facing the patient, positive words, non-verbal feedback).
R6	I comfort and encourage the patient during the visit.
S6	The doctor comforts and encourages the patient during the visit.
R7	I explain appropriately adapting to the patient's understanding level (e.g. by adjusting speech speed/volume, avoiding/explaining jargon).
S7	The doctor explains appropriately adapting to the patient's understanding level (e.g. by adjusting speech speed/volume, avoiding/explaining jargon).
R8	I provide the patient with detailed information of examination results, abnormal findings, or diagnosis results.
S8	The doctor provides the patient with detailed information of examination results, abnormal findings, or diagnosis results.
R9	I discuss with the patient his/her previous treatments (e.g. self-care measures, recent medical visits, other medical services received).
S9	The doctor discusses with the patient his/her previous treatments (e.g. self-care measures, recent medical visits, other medical services received).
R10	I greet the patient during the visit.
S10	The doctor greets the patient during the visit.
R11	There is eye contact between me and the patient during the visit.
S11	There is eye contact between the doctor and the patient during the visit.
R12	I show affability (e.g. appropriate self-introduction, chatting on topics other than the current illness).
S12	The doctor shows affability (e.g. appropriate self-introduction, chatting on topics other than the current illness).
R13	I give the patient time and opportunity to speak during the visit (e.g. without interrupting the patient's speech).
S13	The doctor gives the patient time and opportunity to speak during the visit (e.g. without interrupting the patient's speech).
R14	I verify my understanding of the information gathered from the patient (e.g. by retelling, elaborating, requestioning).
S14	The doctor verifies his/her understanding of the information gathered from the patient (e.g. by retelling, elaborating, requestioning).
R15	I avoid asking the patient suggestive or commanding questions.

Item code	Questionnaire item
S15	Does the doctor ask the patient suggestive or commanding questions?
R16	I explain the disease to the patient with images, videos, WeChat official accounts, or online resources.
S16	The doctor explains the disease to the patient with images, videos, WeChat official accounts, or online resources.
R17	Without patient inquiry, I proactively and clearly inform the next appointment time.
S17	Without patient inquiry, the doctor proactively and clearly informs the next appointment time.
R18	Without patient inquiry, I proactively inform the patient about the issues that should be paid attention to during the recovery (e.g. dietary requirements, lifestyle adjustments, rehabilitation exercises).
S18	Without patient inquiry, the doctor proactively informs the patient about the issues that should be paid attention to during the recovery (e.g. dietary requirements, lifestyle adjustments, rehabilitation exercises).

Annex D: Characteristics of Participants

Table D.1 Frequency analysis of patient demographic characteristics

Patient demographic characteristics	Frequency (N=504)	Percentage
Gender:		
Male	183	36.31%
Female	321	63.69%
Age:		
Under 20 years	39	7.74%
20–29 years	88	17.46%
30–39 years	229	45.44%
40–49 years	92	18.25%
50–59 years	41	8.13%
60 years and above	15	2.98%
Education Level:		
Primary school	42	8.33%
Junior high school	127	25.20%
Senior high school / secondary specialized/technical school	118	23.41%
Associate degree	130	25.79%
Bachelor's degree	85	16.87%
Master's degree	1	0.20%
Doctoral degree and above	1	0.20%
Occupation:		
Student	33	6.55%
Corporate employee	146	28.97%
Teacher / educator	15	2.98%
Doctor / nurse / health care worker	10	1.98%
Civil servant (not in education or health care system)	3	0.60%
Self-employed	127	25.20%
Retired	12	2.38%
Others	158	31.35%

Table D.2 Frequency analysis of patients' preference in medical consultation

Patients' preference in medical consultation	Frequency (N=504)	Percentage
Concern about physician's experience and qualification:		
Extremely concerned	169	33.53%
Mostly concerned	173	34.33%
Moderately concerned	66	13.10%
Slightly concern ed	71	14.09%
Not at all concerned	25	4.96%
Understanding of medical knowledge related to my own illness:		
Completely understand	74	14.68%
Mostly understand	147	29.17%
Somewhat understand	188	37.30%
Do not understand very well	74	14.68%
Do not understand at all	21	4.17%
Understanding which diseases the symptoms match before a visit:		
Always	114	22.62%

Patients' preference in medical consultation	Frequency (N=504)	Percentage
Often	113	22.42%
Sometimes	126	25.00%
Rarely	82	16.27%
Never	69	13.69%
When doctor's diagnosis/treatment plan differs from my understanding, I trust:		
The doctor	208	91.63%
Myself	11	4.85%
Not sure	8	3.52%
Listing concerns before a visit:		
Always	140	27.78%
Often	111	22.02%
Sometimes	104	20.63%
Rarely	55	10.91%
Never	94	18.65%
Tolerance for waiting time during a visit:		
Up to 15 minutes	152	30.16%
Up to 30 minutes	233	46.23%
Up to 40 minutes	49	9.72%
Up to 1 hour	58	11.51%
More than 1 hour	12	2.38%

Table D.3 Frequency analysis of physician demographic characteristics

Physician demographic characteristics	Frequency (N=189)	Percentage
Gender:		
Male	89	47.09%
Female	100	52.91%
Age:		
30 years or below	29	15.34%
31–40 years	116	61.38%
41–50 years	44	23.28%
51–60 years	0	0.00%
Above 60 years	0	0.00%
Working experience:		
6–10 years	133	70.37%
11–15 years	20	10.58%
16–20 years	19	10.05%
21–25 years	13	6.88%
Over 25 years	4	2.12%
Average monthly post-tax income:		
5,000 RMB or less	3	1.59%
5,000–10,000 RMB	53	28.04%
10,000–20,000 RMB	122	64.55%
More than 20,000 RMB	11	5.82%
With administrative duties:		
Yes	16	8.47%
No	173	91.53%
Medical liability insurance coverage:		
Yes	85	44.97%
No	32	16.93%
Not sure	72	38.10%

Annex E: Relevant Tables/Figures

Table E.1 Patient gender and PCBES scores

	n	Five dimensions				
		Set the stage	Elicit information	Give information	Understand the patient's perspective	End the encounter
Male	183	8.01 ± 1.88	25.90 ± 4.13	14.60 ± 2.39	15.11 ± 3.59	7.56 ± 2.15
Female	321	7.83 ± 1.86	25.86 ± 3.77	14.27 ± 2.67	15.01 ± 3.67	7.27 ± 2.16
two-tailed *p*		.293	.915	.161	.760	.153

Note. For each group, PCBES scores for each dimension are presented as the mean ± standard deviation of the total scores rated by the participating patients on the items belonging to that dimension.

Table E.2 Patient age and PCBES scores

	Group code	*n*	Five dimensions				
			Set the stage	Elicit information	Give information	Understand the patient's perspective	End the encounter
Under 20 years	1	39	8.39 ± 1.68	25.74 ± 4.60	15.13 ± 2.95	13.85 ± 4.06	7.33 ± 2.23
20–29 years	2	88	7.89 ± 1.73	25.69 ± 3.57	14.24 ± 2.70	15.02 ± 3.49	7.30 ± 1.98
30–39 years	3	229	7.62 ± 1.89	25.48 ± 3.87	14.04 ± 2.60	14.52 ± 3.50	7.10 ± 2.11
40–49 years	4	92	7.95 ± 2.00	26.21 ± 4.12	14.47 ± 2.20	15.80 ± 3.82	7.66 ± 2.31
50–59 years	5	41	8.63 ± 1.77	27.29 ± 3.36	15.32 ± 2.35	16.78 ± 3.05	8.27 ± 2.11
60 years and above	6	15	8.60 ± 1.40	27.53 ± 3.23	15.67 ± 2.13	16.93 ± 2.89	7.93 ± 2.40
p			.005	.043	.005	< .001	.019
Multiple comparisons [a]			3<1, 2<5, 3<5, 3<6, 4<5	3<5	1>3, 2<5, 2<6, 3<5, 3<6	1<4, 1<5, 1<6, 2<5, 3<4, 3<5, 3<6	2<5, 3<4, 3<5

Note. For each group, PCBES scores for each dimension are presented as the mean ± standard deviation of the total scores rated by the participating patients on the items belonging to that dimension.

[a] For all the multiple comparisons in this thesis, the Scheffé test (when variances were equal) or Games-Howell test (when unequal variances were detected) was used to verify if the differences were significant with the significance level of the differences of .05.

Table E.3 Patient education level and PCBES scores

	Group code	*n*	Five dimensions				
			Set the stage	Elicit information	Give information	Understand the patient's perspective	End the encounter
Primary school	1	42	8.74 ± 1.48	26.88 ± 4.05	15.12 ± 2.05	14.79 ± 4.03	7.57 ± 2.25
Junior high school	2	127	8.19 ± 1.64	26.75 ± 3.93	14.80 ± 2.17	16.23 ± 3.30	8.02 ± 2.03
Senior high school/secondary specialized/technical school	3	118	7.92 ± 1.81	26.09 ± 3.79	14.57 ± 2.77	15.53 ± 3.36	7.38 ± 2.20
Associate degree	4	130	7.64 ± 1.89	25.37 ± 3.66	13.79 ± 2.50	14.29 ± 3.73	6.99 ± 2.13
Bachelor's degree	5	85	7.40 ± 2.19	24.54 ± 3.90	14.08 ± 3.01	13.95 ± 3.59	6.88 ± 2.10
p			< .001	< .001	.003	< .001	< .001
Multiple comparisons			1>3, 1>4, 1>5	1>4, 1>5, 2>4, 2>5, 3>5	1>4, 2>4	2>1, 2>4, 2>5, 3>4, 3>5	2>4, 2>5

Note. For each group, PCBES scores for each dimension are presented as the mean ± standard deviation of the total scores rated by the participating patients on the items belonging to that dimension.

Table E.4 Patient occupation and PCBES scores

	Group code	*n*	Five dimensions				
			Set the stage	Elicit information	Give information	Understand the patient's perspective	End the encounter
Student	1	33	8.30 ± 1.78	25.82 ± 4.67	14.94 ± 2.98	14.03 ± 4.33	7.33 ± 2.23
Corporate employee	2	146	7.84 ± 1.81	25.97 ± 3.53	14.19 ± 2.41	15.36 ± 3.58	7.43 ± 2.16
Teacher/educator	3	15	7.20 ± 2.46	24.47 ± 3.85	13.53 ± 2.50	12.47 ± 3.25	6.20 ± 1.86
Doctor/nurse/health care worker	4	10	8.80 ± 1.32	27.50 ± 2.27	15.50 ± 3.06	15.50 ± 3.31	7.30 ± 2.16
Civil servant (not in education or health care system)	5	3	7.33 ± 2.08	22.67 ± 2.31	14.33 ± 2.08	12.33 ± 0.58	5.33 ± 1.53
Self-employed	6	127	7.89 ± 1.88	25.99 ± 3.76	14.52 ± 2.80	14.99 ± 3.49	7.39 ± 2.19
Retired	7	12	8.83 ± 1.34	27.75 ± 3.28	15.33 ± 1.97	16.67 ± 3.70	7.75 ± 2.60
Others	8	158	7.82 ± 1.91	25.66 ± 4.25	14.30 ± 2.46	15.15 ± 3.62	7.45 ± 2.12
p			.204	.238	.327	.028	.353
Multiple comparisons			/	/	/	1<7, 8>3, 2>3, 6>3, 4>3, 7>3	/

Note. For each group, PCBES scores for each dimension are presented as the mean ± standard deviation of the total scores rated by the participating patients on the items belonging to that dimension.

Table E.5 Patients' level of concern about physicians' experience/qualification and PCBES scores

	Group code	*n*	Five dimensions				
			Set the stage	Elicit information	Give information	Understand the patient's perspective	End the encounter
Extremely concerned	1	169	8.21 ± 1.86	26.50 ± 3.85	14.85 ± 2.52	15.94 ± 3.64	7.62 ± 2.23
Mostly concerned	2	173	7.55 ± 1.84	25.05 ± 3.62	14.03 ± 2.54	14.61 ± 3.19	7.22 ± 1.89
Moderately concerned	3	66	7.46 ± 2.02	24.77 ± 4.53	13.76 ± 3.23	13.24 ± 3.80	6.79 ± 2.34
Slightly concerned	4	71	8.16 ± 1.68	26.79 ± 3.61	14.49 ± 2.24	15.24 ± 3.93	7.56 ± 2.30
Not at all concerned	5	25	8.60 ± 1.55	27.76 ± 3.23	15.16 ± 1.25	16.24 ± 3.13	7.84 ± 2.32
p			.001	< .001	.004	< .001	.048
Multiple comparisons			1>2, 1>3, 2<4, 2<5, 3<4, 3<5	1>2, 1>3, 2<4, 2<5, 3<4, 3<5	1>2, 5>2, 5>3	1>2, 1>3, 2>3, 2<5, 3<4, 3<5	/

Note. For each group, PCBES scores for each dimension are presented as the mean ± standard deviation of the total scores rated by the participating patients on the items belonging to that dimension. "/" represents no significant result found.

Table E.6 Patients' understanding level of medical knowledge related to their own illness and PCBES scores

	Group code	*n*	Five dimensions				
			Set the stage	Elicit information	Give information	Understand the patient's perspective	End the encounter
Completely understand	1	74	8.60 ± 1.77	26.95 ± 3.58	15.42 ± 2.60	17.16 ± 3.39	8.23 ± 2.20
Mostly understand	2	147	7.88 ± 1.79	25.93 ± 3.57	14.57 ± 2.28	15.09 ± 3.39	7.37 ± 2.04
Somewhat understand	3	188	7.60 ± 1.88	25.52 ± 4.05	13.92 ± 2.60	14.60 ± 3.45	7.17 ± 2.15
Do not understand very well	4	74	7.92 ± 1.93	25.53 ± 4.23	14.18 ± 2.87	13.95 ± 3.93	7.23 ± 2.19
Do not understand at all	5	21	8.05 ± 1.94	26.19 ± 4.24	14.52 ± 2.18	15.14 ± 4.00	6.76 ± 2.23
p			.004	.096	.001	< .001	.004
Multiple comparisons			1>2, 1>3, 1>4	/	1>2, 1>3, 1>4, 2>3	1>2, 1>3, 1>4, 1>5, 2>4	1>2, 1>3, 1>4, 1>5

Note. For each group, PCBES scores for each dimension are presented as the mean ± standard deviation of the total scores rated by the participating patients on the items belonging to that dimension. "/" represents no significant result found.

Table E.7 Patients' preference in understanding which diseases the symptoms match and PCBES scores

	Group code	*n*	Five dimensions				
			Set the stage	Elicit information	Give information	Understand the patient's perspective	End the encounter
Always	1	114	8.60 ± 1.68	27.84 ± 2.86	15.54 ± 1.96	17.67 ± 2.87	8.46 ± 1.82
Often	2	113	7.62 ± 1.75	25.40 ± 3.51	14.30 ± 2.51	14.63 ± 3.08	7.27 ± 1.98
Sometimes	3	126	7.24 ± 2.03	23.98 ± 3.99	13.52 ± 2.75	13.70 ± 3.36	6.67 ± 1.98
Rarely	4	82	7.96 ± 1.79	25.44 ± 4.20	14.07 ± 2.72	13.52 ± 3.78	7.13 ± 2.27
Never	5	69	8.30 ± 1.67	27.39 ± 3.51	14.59 ± 2.41	15.65 ± 3.50	7.33 ± 2.49
p			< .001	< .001	< .001	< .001	< .001
Multiple comparisons			1>2, 1>3, 1>4, 2>3, 2<5, 3<4, 3<5	1>2, 1>3, 1>4, 2>3, 2<5, 4<5, 3<5	1>2, 1>3, 1>4, 2>3	1>2, 1>3, 1>4, 1>5, 3<5, 4<5	1>2, 1>3, 1>4, 1>5

Note. For each group, PCBES scores for each dimension are presented as the mean ± standard deviation of the total scores rated by the participating patients on the items belonging to that dimension.

Table E.8 Patients' preference in trusting when doctor's diagnosis/treatment plan differs from their understanding and PCBES scores

	Group code	*n*	Five dimensions				
			Set the stage	Elicit information	Give information	Understand the patient's perspective	End the encounter
The doctor	1	208	8.19 ± 1.75	26.86 ± 3.27	15.08 ± 2.26	16.24 ± 3.36	7.93 ± 1.98
Patient himself/herself	2	11	6.91 ± 1.92	23.91 ± 4.06	12.73 ± 2.80	14.00 ± 3.32	7.09 ± 1.81
Not sure	3	8	7.63 ± 1.85	24.38 ± 4.24	14.00 ± 2.20	17.00 ± 1.60	7.38 ± 2.39
p			.048	.003	.002	.073	.308
Multiple comparisons			1>2	1>2, 1>3	1>2	/	/

Note. For each group, PCBES scores for each dimension are presented as the mean ± standard deviation of the total scores rated by the participating patients on the items belonging to that dimension.

Table E.9 Patients' preference in listing concerns before a visit and PCBES scores

	Group code	*n*	Five dimensions				
			Set the stage	Elicit information	Give information	Understand the patient's perspective	End the encounter
Always	1	140	8.79 ± 1.66	28.00 ± 2.97	15.56 ± 2.25	17.35 ± 3.23	8.26 ± 2.08
Often	2	111	7.46 ± 1.82	24.96 ± 3.39	13.97 ± 2.59	14.82 ± 3.18	7.16 ± 2.03
Sometimes	3	104	7.16 ± 2.00	23.86 ± 3.98	13.63 ± 2.50	13.40 ± 2.97	6.66 ± 1.87
Rarely	4	55	7.69 ± 1.89	24.62 ± 4.74	13.67 ± 2.93	12.71 ± 3.75	6.71 ± 2.21
Never	5	94	8.00 ± 1.52	26.77 ± 3.28	14.40 ± 2.31	15.05 ± 3.42	7.49 ± 2.26
p			< .001	< .001	< .001	< .001	< .001
Multiple comparisons			1>2, 1>3, 1>4, 1>5, 3<5	1>2, 1>3, 1>4, 1>5, 2<5, 3<5, 4<5	1>2, 1>3, 1>4, 1>5	1>2, 1>3, 1>4, 1>5, 2>3, 2>4, 3<5, 4<5	1>2, 1>3, 1>4, 1>5, 3<5, 4<5

Note. For each group, PCBES scores for each dimension are presented as the mean ± standard deviation of the total scores rated by the participating patients on the items belonging to that dimension.

Table E.10 Patients' level of tolerance for waiting time during a visit and PCBES scores

	Group code	*n*	Five dimensions				
			Set the stage	Elicit information	Give information	Understand the patient's perspective	End the encounter
Up to 15 minutes	1	152	8.33 ± 1.79	26.66 ± 3.62	14.66 ± 2.50	16.44 ± 3.48	7.51 ± 2.27
Up to 30 minutes	2	233	7.66 ± 1.90	25.63 ± 3.92	14.34 ± 2.57	14.56 ± 3.59	7.32 ± 2.14
Up to 40 minutes	3	49	7.47 ± 1.89	24.06 ± 4.33	13.63 ± 2.56	13.37 ± 3.35	6.90 ± 1.93
Up to 1 hour	4	58	7.88 ± 1.71	25.81 ± 3.71	14.38 ± 2.72	14.4 ± 3.16	7.50 ± 1.94
More than 1 hour	5	12	8.75 ± 1.91	28.42 ± 2.61	15.08 ± 2.75	16.67 ± 3.98	8.08 ± 2.94
p			.002	< .001	.145	< .001	.324
Multiple comparisons			1>2, 1>3, 2<5, 3<5	1>2, 1>3, 2>3, 2<5, 3<4, 3<5, 4<5	/	1>2, 1>3, 1>4, 2>3, 2<5, 3<5, 4<5	/

Note. For each group, PCBES scores for each dimension are presented as the mean ± standard deviation of the total scores rated by the participating patients on the items belonging to that dimension. "/" represents no significant result found.

Table E.11 Physician gender and PCBES scores

	n	Five dimensions				
		Set the stage	Elicit information	Give information	Understand the patient's perspective	End the encounter
Male	89	8.57 ± 1.34	25.82 ± 3.03	16.90 ± 2.11	16.57 ± 2.40	8.08 ± 1.44
Female	100	8.66 ± 1.25	26.66 ± 2.43	17.45 ± 1.99	17.26 ± 2.04	8.47 ± 1.23
two-tailed *p*		.645	.036	.066	.035	.045

Note. For each group, PCBES scores for each dimension are presented as the mean ± standard deviation of the total scores rated by the participating physicians on the items belonging to that dimension.

Table E.12 Physician age and PCBES scores

	Group code	*n*	Five dimensions				
			Set the stage	Elicit information	Give information	Understand the patient's perspective	End the encounter
30 years or below	1	29	8.52 ± 1.43	26.10 ± 2.74	16.90 ± 1.86	16.76 ± 2.42	8.00 ± 1.69
31–40 years	2	116	8.54 ± 1.20	25.94 ± 2.66	16.95 ± 2.01	16.84 ± 2.06	8.19 ± 1.24
41–50 years	3	44	8.89 ± 1.40	27.23 ± 2.84	18.02 ± 2.13	17.32 ± 2.55	8.73 ± 1.28
p			.292	.028	.009	.430	.035
Multiple comparisons			/	3>2	3>2, 3>1	/	3>2, 3>1

Note. For each group, PCBES scores for each dimension are presented as the mean ± standard deviation of the total scores rated by the participating physicians on the items belonging to that dimension. "/" represents no significant result found.

Table E.13 Physician working experience and PCBES scores

	Group Code	*n*	Five dimensions				
			Set the stage	Elicit information	Give information	Understand the patient's perspective	End the encounter
6–10 years	1	133	8.54 ± 1.25	26.04 ± 2.78	16.86 ± 2.00	16.81 ± 2.21	8.11 ± 1.34
11–15 years	2	20	8.85 ± 1.23	26.30 ± 2.54	18.10 ± 1.89	17.65 ± 2.01	8.85 ± 1.31
16–20 years	3	19	8.79 ± 1.36	27.11 ± 2.13	18.11 ± 1.66	17.63 ± 2.17	8.58 ± 1.22
21–25 years	4	13	9.15 ± 1.52	27.15 ± 3.53	18.00 ± 2.71	16.46 ± 2.88	8.77 ± 1.42
Over 25 years	5	4	7.50 ± 1.29	26.75 ± 2.63	16.50 ± 1.73	15.75 ± 1.26	8.25 ± 0.96
p			.152	.389	.008	.200	.078
Multiple comparisons			/	/	1<2, 1<3	/	/

Note. For each group, PCBES scores for each dimension are presented as the mean ± standard deviation of the total scores rated by the participating physicians on the items belonging to that dimension. "/" represents no significant result found.

Table E.14 Physicians' average monthly post-tax income and PCBES scores

	Group code	*n*	Five dimensions				
			Set the stage	Elicit information	Give information	Understand the patient's perspective	End the encounter
5,000 RMB or less	1	3	8.67 ± 1.16	25.00 ± 2.65	17.00 ± 2.65	17.00 ± 3.00	9.00 ± 1.00
5,000–10,000 RMB	2	53	8.91 ± 1.06	26.87 ± 2.19	17.72 ± 2.25	17.17 ± 2.16	8.45 ± 1.42
10,000–20,000 RMB	3	122	8.51 ± 1.36	26.07 ± 2.98	16.97 ± 1.93	16.79 ± 2.25	8.19 ± 1.31
More than 20,000 RMB	4	11	8.45 ± 1.44	25.91 ± 2.39	17.18 ± 2.23	17.45 ± 2.46	8.36 ± 1.43
p			.297	.264	.177	.637	.506
Multiple comparisons			/	/	/	/	/

Note. For each group, PCBES scores for each dimension are presented as the mean ± standard deviation of the total scores rated by the participating physicians on the items belonging to that dimension. "/" represents no significant result found.

Table E.15 Physicians' holding of administrative duties and PCBES scores

	n	Five dimensions				
		Set the stage	Elicit information	Give information	Understand the patient's perspective	End the encounter
With administrative duties	16	8.88 ± 1.46	26.38 ± 2.73	18.13 ± 2.00	17.56 ± 1.79	9.00 ± 1.16
Without administrative duties	173	8.60 ± 1.28	26.25 ± 2.77	17.10 ± 2.05	16.88 ± 2.27	8.22 ± 1.34
two-tailed *p*		.408	.867	.058	.243	.026

Note. For each group, PCBES scores for each dimension are presented as the mean ± standard deviation of the total scores rated by the participating physicians on the items belonging to that dimension.

Table E.16 Physicians' medical liability insurance coverage and PCBES scores

	Group code	*n*	Five dimensions				
			Set the stage	Elicit information	Give information	Understand the patient's perspective	End the encounter
With coverage	1	85	8.75 ± 1.28	26.64 ± 2.75	17.69 ± 2.03	17.55 ± 2.00	8.49 ± 1.36
Without coverage	2	32	8.59 ± 1.32	26.00 ± 2.93	16.81 ± 1.91	16.31 ± 2.07	8.13 ± 1.01
Not sure	3	72	8.47 ± 1.29	25.94 ± 2.67	16.76 ± 2.05	16.49 ± 2.41	8.11 ± 1.43
p			.396	.247	.009	.002	.155
Multiple comparisons			/	/	1>3	1>2, 1>3	/

Note. For each group, PCBES scores for each dimension are presented as the mean ± standard deviation of the total scores rated by the participating physicians on the items belonging to that dimension. "/" represents no significant result found.

Table E.17 Physician gender and PCBRQ scores

	n	Five dimensions				
		Set the stage	Elicit information	Give information	Understand the patient's perspective	End the encounter
Male	89	8.98 ± 1.25	27.15 ± 3.70	17.94 ± 2.56	18.04 ± 2.52	8.63 ± 1.47
Female	100	9.18 ± 1.12	28.30 ± 2.58	18.79 ± 1.86	18.83 ± 1.80	9.26 ± 1.14
two-tailed *p*		.243	.015	.011	.016	.001

Note. For each group, PCBRQ scores for each dimension are presented as the mean ± standard deviation of the total scores rated by the participating physicians on the items belonging to that dimension.

Table E.18 Physician age and PCBRQ scores

	Group code	*n*	Five dimensions				
			Set the stage	Elicit information	Give information	Understand the patient's perspective	End the encounter
30 years or below	1	29	8.66 ± 1.50	27.45 ± 3.17	18.48 ± 2.15	18.34 ± 2.02	9.10 ± 1.24
31–40 years	2	116	9.14 ± 1.12	27.74 ± 3.45	18.34 ± 2.37	18.42 ± 2.40	8.90 ± 1.37
41–50 years	3	44	9.23 ± 1.10	28.00 ± 2.52	18.45 ± 2.02	18.64 ± 1.75	9.05 ± 1.36
p			.096	.771	.937	.822	.683
Multiple comparisons			/	/	/	/	/

Note. For each group, PCBRQ scores for each dimension are presented as the mean ± standard deviation of the total scores rated by the participating physicians on the items belonging to that dimension. "/" represents no significant result found.

Table E.19 Physician working experience and PCBRQ scores

	Group code	*n*	Five dimensions				
			Set the stage	Elicit information	Give information	Understand the patient's perspective	End the encounter
6–10 years	1	133	9.00 ± 1.23	27.56 ± 3.49	18.26 ± 2.41	18.29 ± 2.40	8.89 ± 1.37
11–15 years	2	20	9.65 ± 0.67	29.00 ± 1.65	19.35 ± 1.18	19.15 ± 1.42	9.45 ± 0.95
16–20 years	3	19	8.95 ± 1.18	27.42 ± 2.63	18.26 ± 1.94	18.79 ± 1.72	8.79 ± 1.48
21–25 years	4	13	9.54 ± 0.88	28.85 ± 2.12	18.62 ± 2.18	19.08 ± 1.38	9.38 ± 1.26
Over 25 years	5	4	8.25 ± 1.71	26.25 ± 2.87	17.75 ± 2.06	17.25 ± 1.89	8.50 ± 1.29
p			.051	.189	.335	.244	.275
Multiple comparisons			/	/	/	/	/

Note. For each group, PCBRQ scores for each dimension are presented as the mean ± standard deviation of the total scores rated by the participating physicians on the items belonging to that dimension. "/" represents no significant result found.

Table E.20 Physicians' average monthly post-tax income and PCBRQ scores

	Group code	*n*	Five dimensions				
			Set the stage	Elicit information	Give information	Understand the patient's perspective	End the encounter
5,000 RMB or less	1	3	8.67 ± 1.16	26.33 ± 3.22	17.00 ± 2.65	17.67 ± 2.08	8.67 ± 1.16
5,000–10,000 RMB	2	53	9.25 ± 1.07	28.32 ± 2.82	18.92 ± 1.97	18.66 ± 2.15	9.25 ± 1.09
10,000–20,000 RMB	3	122	9.00 ± 1.25	27.52 ± 3.39	18.20 ± 2.32	18.34 ± 2.28	8.87 ± 1.41
More than 20,000 RMB	4	11	9.36 ± 1.03	28.09 ± 2.66	18.27 ± 2.41	19.09 ± 1.51	8.73 ± 1.68
p			.465	.387	.172	.551	.332
Multiple comparisons			/	/	/	/	/

Note. For each group, PCBRQ scores for each dimension are presented as the mean ± standard deviation of the total scores rated by the participating physicians on the items belonging to that dimension. "/" represents no significant result found.

Table E.21 Physicians' holding of administrative duties and PCBRQ scores

	n	Five dimensions				
		Set the stage	Elicit information	Give information	Understand the patient's perspective	End the encounter
With administrative duties	16	9.38 ± 0.96	28.56 ± 2.39	19.06 ± 1.77	19.25 ± 1.44	9.44 ± 1.15
Without administrative duties	173	9.06 ± 1.20	27.68 ± 3.26	18.33 ± 2.28	18.39 ± 2.25	8.92 ± 1.35
two-tailed *p*		.308	.294	.213	.041	.140

Note. For each group, PCBRQ scores for each dimension are presented as the mean ± standard deviation of the total scores rated by the participating physicians on the items belonging to that dimension.

Table E.22 Physicians' medical liability insurance coverage and PCBRQ scores

	Group code	*n*	Five dimensions				
			Set the stage	Elicit information	Give information	Understand the patient's perspective	End the encounter
With coverage	1	85	9.25 ± 1.07	28.32 ± 2.51	18.76 ± 1.77	18.95 ± 1.78	9.14 ± 1.24
Without coverage	2	32	8.88 ± 1.13	26.97 ± 4.43	17.84 ± 3.11	17.91 ± 2.83	8.88 ± 1.48
Not sure	3	72	8.99 ± 1.33	27.44 ± 3.22	18.19 ± 2.26	18.13 ± 2.25	8.79 ± 1.39
p			.214	.072	.091	.018	.247
Multiple comparisons			/	/	/	1>3	/

Note. For each group, PCBRQ scores for each dimension are presented as the mean ± standard deviation of the total scores rated by the participating physicians on the items belonging to that dimension. "/" represents no significant result found.