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Achieving medical service quality through best management practices: The role of team citizenship behavior

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ACHIEVING MEDICAL SERVICE QUALITY THROUGH BEST MANAGEMENT PRACTICES: THE ROLE OF TEAM CITIZENSHIP BEHAVIOR

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Abstract

Improving the quality of medical service is an issue that should be a concern for any hospital, whether in normal times or in face of crises, such as the current pandemic. Hospitals needed to adopt a range of best management practices to address the challenges posed by COVID-19 in order to assure and improve the quality of their care. On the other hand, team mutual help (as an expression of organizational citizenship behavior) also plays a role on the medical service quality. This paper examines best hospital management practices (BHMP) during the pandemic, while focusing on team mutual help as a non-tangible resource that mediates the relation between these practices and medical service quality. By analyzing data collected from 410 healthcare workers in public hospitals in China with Process Macro, the results of the study showed a positive relationship between all BHMP and medical service quality via higher team mutual help. The findings suggest that team mutual help is a useful construct to explain why BHMP were effective into leveraging medical service quality.

Keywords: Medical service quality, Best Hospital Management Practice, Mutual help, Crisis

JEL Classification: M10, M12, I10

Resumo

A melhoria da qualidade do serviço médico é uma questão que deve preocupar qualquer hospital, seja em tempos normais ou em tempos de crise, tais como a atual pandemia. Os hospitais precisam de adoptar uma série de melhores práticas de gestão para enfrentar os desafios colocados pela COVID-19, a fim de assegurar e melhorar a qualidade dos seus cuidados. Por outro lado, a ajuda mútua da equipa (como expressão do comportamento de cidadania organizacional) também desempenha um papel na qualidade do serviço médico. Este documento examina as melhores práticas de gestão hospitalar (BHMP) durante a pandemia, ao mesmo tempo que se concentra na ajuda mútua da equipa como um recurso não tangível que medeia a relação entre estas práticas e a qualidade do serviço médico. Ao analisar os dados recolhidos de 410 trabalhadores de saúde em hospitais públicos na China com a Macro Process, os resultados do estudo mostraram uma relação positiva entre todas as BHMP e a qualidade dos serviços médicos através da ajuda mútua de equipas. Os resultados sugerem que a ajuda mútua da equipa é um constructo útil para explicar porque motivo a BHMP é eficaz na alavancagem da qualidade dos serviços médicos.

Palavras Chave: Qualidade de serviço médico, Boas Práticas de Gestão Hospitalar, Ajuda mútua, Crise

Classificação JEL: M10, M12, I10

摘要

提高医疗服务质量是任何一家医院都应该关注的问题，无论是在正常时期还是在面对危机时，如当前的大流行病。医院需要采用一系列的最佳管理方法来应对 COVID-19 带来的挑战，以保证和提高医疗质量。另一方面，团队互助（作为组织公民行为的一种表现）也对医疗服务质量起到了一定的作用。本文研究了大流行期间的最佳医院管理实践（BHMP），同时关注团队互助作为一种非物质资源，在这些实践和医疗服务质量之间起着的中介作用。通过对中国公立医院 410 名医护人员的数据进行分析，研究结果显示，所有 BHMP 与医疗服务质量之间通过较高的团队互助存在正相关。研究结果表明，团队互助是一个有用的结构，可以解释为什么 BHMP 能有效地提高医疗服务质量。

关键词： 医疗服务质量，最佳医院管理实践，相互帮助，危机

JEL 分类：M10, M12, I10

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1. Introduction

Since the end of 2019, a raging COVID-19 pandemic had swept through nearly every country and regions in the world in a matter of months. According to the latest statistics from Johns Hopkins University, the cumulative number of confirmed cases worldwide to date was over 400 million and the cumulative number of deaths was approximately 5.7 million. The speed and severity of the spread of COVID-19 is of great concern. In the face of this unprecedented challenge, hospitals, as the main force in the response to this pandemic, have assumed a vital role and responsibility.

In a pandemic environment, hospitals were severely challenged by this crisis. Many hospitals faced extreme difficulties, such as shortage of manpower, lack of medical supplies, high work intensity, physical and mental exhaustion of staff, sharp decrease in income, and frequent in-hospital infections. In addition, there is a lack of understanding about the structure, clinical symptoms, diagnosis and treatment of this virus. These problems may lead to the inability of hospitals to provide patients with a quality of service that satisfies them. However, medical service quality has always been the lifeline of hospital development, and improving the service quality is also one of the most important elements of hospital management.

Under this pressure, all available resources had to be used effectively to cope with this complex threat in order to ensure medical service quality. In the process of adjusting to the threat and learning the exact nature of the clinical challenge, hospitals set in place news measures to mobilize all the resources in all domains of management. In China, this crisis was well managed and previous lessons learned from the 2003 SARS crisis as well as effective measures hospitals set in place in early stages of the threat might be explaining this success.

These best hospital management practices (BHMP) can be studied to understand their nature, analyze the measures that were helpful in improving medical service quality, and use them to manage similar crises in the future. We can also identify those practices that are ineffective or counterproductive to improving medical service quality, so that subsequent hospitals and administrators do not waste more resources on them. In addition, we want to understand the full scope of the impact of these BHMP, not only at the clinical diagnosis level, but also at the hospital management level.

In this sense, this research will focus on non-tangible resources, namely organizational citizenship behaviors, from a team management perspective. Among organizational citizenship behaviors, mutual support behaviors in the team and the role they can play in the face of emergency situations

are critical. These are important assets for the HR department and can be additional resources for handling crises.

Therefore, this study will first review previous scholarly research on topics focusing on medical service quality, best hospital management practices and team mutual help, describe the relationships that exist between them. These links will then be used to formulate the hypotheses that are desired to be studied and to construct a theoretical model. Next, sample data from the healthcare field are collected, described and analyzed, to test a set of hypotheses and discuss the results obtained. Finally, conclusions are gained and limitations are presented as well as directions for future research.

2. Literature review

The literature review develops in three parts, which are medical service quality, hospital management practices, and team mutual help. The first part explores the definitions of service quality, that are the basis of medical service quality. It also discusses the dimensions of medical service quality and its importance for healthcare management. Afterwards, it illustrates the different models used to explain medical service quality. The second part reviews the definition of management practices by scholars and its applications in healthcare to explore the management practice behaviors adopted by healthcare organizations in different countries and regions in the face of COVID-19 pandemic, highlighting the experience of China in dealing with SARS and the measures taken in the face of COVID-19. Finally, the review points out the importance of teams in improving medical service quality and hospital development, as well as the centrality of team mutual help (as an expression of organizational citizenship behavior) in the medical process and in the face of emergencies. This frames the motivation for the hypotheses and the corresponding conceptual model.

2.1. Medical service quality

Since the 1980s, service quality started to be widely studied by scholars, but the definitions of service quality are mostly different due to their fields and contexts (Silvestri et al., 2017). In early 1980s Lewis and Booms (1983) had already noticed that the common denominator among these definitions is that they mostly focus on how to provide services that meet the expectations of consumers' minds but as they evolved, authors split into two main categories (Karatepe et al., 2005). One category follows the original idea of Gronroos (1984) that it concerns a two-dimensional model comprising technical and functional quality, which means that the pros and cons of service quality is assessed through two dimensions - service content (outcome) and service approach (process). The other category is based on the five-dimensional SERVQUAL model proposed by Parasuraman et al. (1988), which focuses on perceived tangibles, reliability, responsiveness, assurance and empathy aspects of services. Therefore, they defined service quality as "an overall judgment or attitude related to the superiority of a service" (Parasuraman et al., 1988, p. 16).

Service quality is particularly important in the healthcare industry because healthcare is the ‘’world’s largest service’’ (Kenagy et al., 1999). Medical service quality is a concept influenced by multiple factors, which is related to patient satisfaction (Choi et al., 2005), loyalty (Boshoff & Gray, 2004) and productivity and profitability of the healthcare organizations (Alexander et al., 2006). Mosadeghrad

(2013, p. 215) defines medical service quality as "consistently delighting the patient by providing efficacious, effective and efficient healthcare services according to the latest clinical guidelines and standards, which meet the patient‟s needs and satisfies providers”.

2.2. What dimensions does it have?

As mentioned, Parasuraman et al. (1988) identified five dimensions of service quality, which are responsiveness, assurance, tangibility, empathy, and reliability. These dimensions can be applied in several domains including the healthcare industry (Altuntas et al., 2012).

However, the dimensions of medical service quality (MSQ) are context specific (Ladhari, 2008). In England, medical service quality is considered as having three dimensions: patient safety, clinical effectiveness, and patient experience (compassion, dignity and respect) (Black et al., 2014). In addition, the dimensions of medical service quality can be divided into medical and non-medical aspects. The medical level includes three dimensions, which are technical, outcome and interpersonal (Upadhyai et al., 2019). The technical dimension includes the level of knowledge and expertise of health care workers as well as sophisticated medical facilities (Baltussen et al., 2002). The outcome dimension contains safety, effectiveness, timeliness and patient-centered (Donabedian, 1988). The interpersonal level consists of the exchange of medical information and technology, as well as cooperation among healthcare institutions (Baltussen et al., 2002). The non-medical dimension includes three aspects, namely external environment, accessibility, and responsiveness (Upadhyai et al., 2019). The external environment includes the basic facilities and physical environment of the medical institutions (Gronroos, 1984). Accessibility includes the location of the healthcare facility, the waiting time required to access medical services and the patient's ability to pay (WHO, 2000). Responsiveness refers to the degree to which patients expect medical care, which involves patient dignity and autonomy, as well as confidentiality of the medical process (De Silva & Valentine, 2000).

In other contexts, for example in China, scholars conceive medical service quality as comprising the five dimensions stated in SERVQUAL (e.g. Fan et al., 2017; Hu et al., 2010) as well as variations of these, including three dimensions, namely response, reliability and assurance (e.g. Chang et al., 2013). In one situation authors have adopted a very short measure covering the dimensions of outcome, environmental quality, and interaction (e.g. 3 items meeting the clinical needs of the patient, skills and expertise of workers, and attitudes and behaviors of workers, created by Du et al., 2020).

2.3. Importance of MSQ for healthcare management

Medical service quality is becoming increasingly important for hospitals as evidenced by Fitriati (2012) that claimed that quality improvement leverages competitive advantage by means of a positive reputation that leads to more sustained profitability. Medical service quality is significant to hospitals for many reasons. First, the object of medical services is the life and health of patients, which is different from the object of services in all industries. While ordinary products that fail can be rebuilt, if medical quality goes wrong, patients' life will be damaged or even lost. In this sense, it is important to improve the quality of medical services to reduce and even avoid medical accidents as well as maintaining the safety of patients' lives (Waring, 2005). Secondly, medical service quality closely relates to the accreditation of hospital grades. For example, in China, hospital grades are divided into three levels of ten, with different levels of hospitals evidencing their quality of medical services. If a lower-level hospital wants to become a higher-level hospital, then medical service quality will be one of the important factors in the accreditation process (Tao et al., 2013). Furthermore, good medical service quality is becoming increasingly important to meet patients' needs and enhance their satisfaction (Alhashem et al., 2011). Medical service quality was found to increase patients' trust in the reliability and integrity of medical service which, in turn, increase patients' satisfaction with the overall experience (Chang et al., 2013). With increased satisfaction, patients will visit the same hospital as long-lasting customers (Arasli et al., 2008), which means that patients may remain loyal to that hospital (Kessler & Mylod, 2011) and are likely to be willing to refer that hospital to other needy customer groups (Zeithaml et al., 1996) especially if the empathy dimension was experienced positively (Chaniotakis & Lymperopoulos, 2009). As a result, more and more of patients will come to that referred hospital for healthcare. Finally, as the core of medical management, good medical service quality favors a positive hospital brand, expanding hospital reputation, increasing staff cohesion and attracting more outstanding talents, then fundamentally enhancing its core competitiveness among other competitors (Kang et al., 2015).

2.4. Explanatory models of medical service quality

There are three main models that have gained traction in literature, all dating from the 1980s, namely the one proposed by Gronroos (1982), another by Parasuraman, Zeithaml and Berry (1984) which served as the basis for the most popular one, SERVQUAL, by Parasuraman et al. (1988). This section will explain these models.

Gronroos (1982) argued that perceived service quality consists of functional quality, technical quality and company image, and this classification distinguishes service quality from the essence of tangible

products. By furthering research, Gronroos (1984) argued that corporate image plays a filtering function between technical quality and functional quality, and that service quality includes both functional and technical quality dimensions. Therefore, he developed a model of perceived service quality based on this, as shown in the Figure 2.1 below.

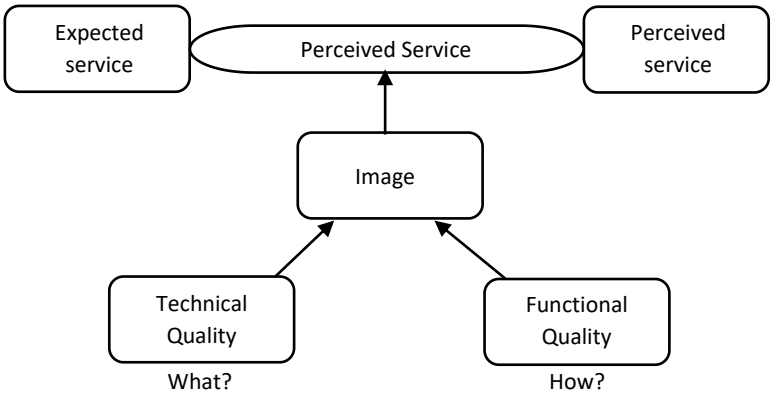


Figure 2.1: The Gronroos model

Based on Gronroos' model, Parasuraman et al. (1985) proposed a service quality model by measuring the gap between perceived and expected services, as shown in the Figure 2.2.

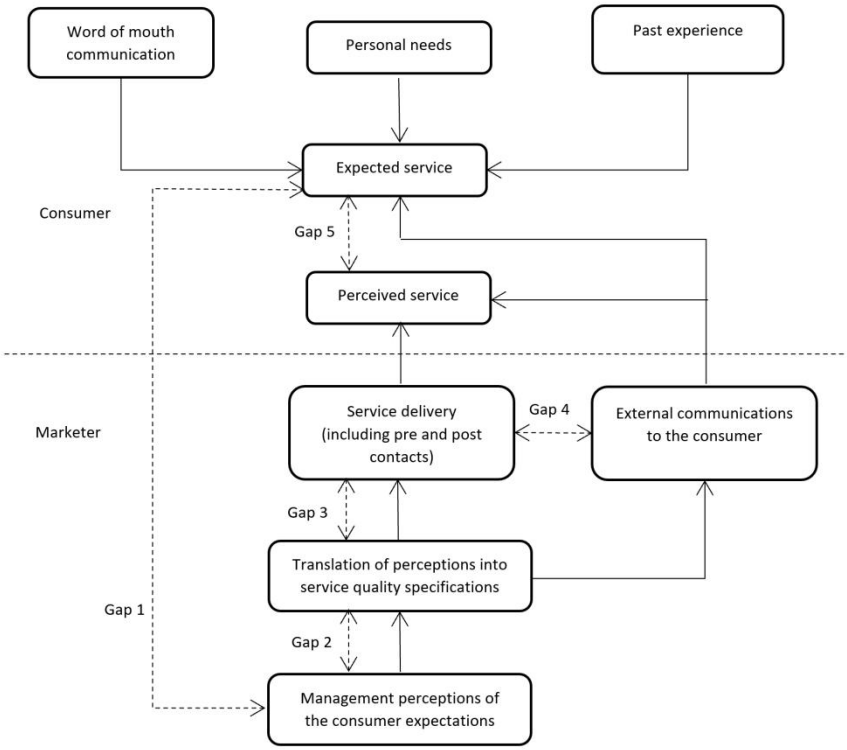


Figure 2.2: Service quality gap model (Parasuraman et al., 1985)

Their model is built also on the idea that high service quality implies small gaps between expected and perceived service, and propose five main gaps: 1) Gap in managers' perceptions, referring to the lack of clarity in the manager's perception of the desired quality; 2) Quality standard gap, referring to the inconsistency between service quality standards and managers' perceptions of quality expectations; 3) Service transaction gap, that concerns the behavior of employees during service production and transaction that does not meet quality standards; 4) Marketing communication gap, referring to the inconsistency between the promises made by marketing communication behaviors and the actual services provided, and 5) Perceived Service Quality Gap, referring to the service perceived or experienced is not the same as the service expected. This last gap (gap 5) is the core of the gap model. To close this gap, the remaining four gaps have to be closed, which is Gap 5 = f (Gap 1, Gap 2, Gap 3, Gap 4).

This model preceded the SERVQUAL model that was proposed by Parasuraman et al. (1988) in the service industry based on Total Quality Management (TQM) theory. Customers' expectation is a prerequisite for quality service, and the key to providing quality service is to exceed customers' expectation. The model is: Servqual score = Actual perception score - Expectation score. SERVQUAL divides service quality into five dimensions: reliability, responsiveness, assurance, tangibles, and empathy. Additionally, each dimension is subdivided into several questions, and users are asked to rate their expectations, actual feelings, and minimum acceptable values for each question by means of a questionnaire. The service quality score is then derived from the questionnaire, customer scoring and a comprehensive calculation. Since its publishing more than three decades ago, this model has been widely accepted and adopted by managers and scholars in several industries and fields. Such is evidence by the original paper counting now more than 24 thousand citations as shown in Scopus site presently.

2.5. SERVQUAL model in healthcare sector

In recent years, Yang et al. (2015) proposed a new and more detailed model targeting the dimensions that can explain patient satisfaction but that is also suitable for assessing medical service quality based on SERVQUAL model. This model fully integrated the characteristics of Chinese healthcare industry and possesses three levels of indicators. The first level of indicators relies on tangibles, security, responsiveness, reliability and credibility to determine the level of medical service quality in general. The second level of indicators refines the first level through 11 key factors. They are: hospital facilities, health environment, medical technology, service specification, waiting time,

medical procedures, medical process, service attitude, privacy protection, charging price, and hospital catering, as Figure 2.3 shows.

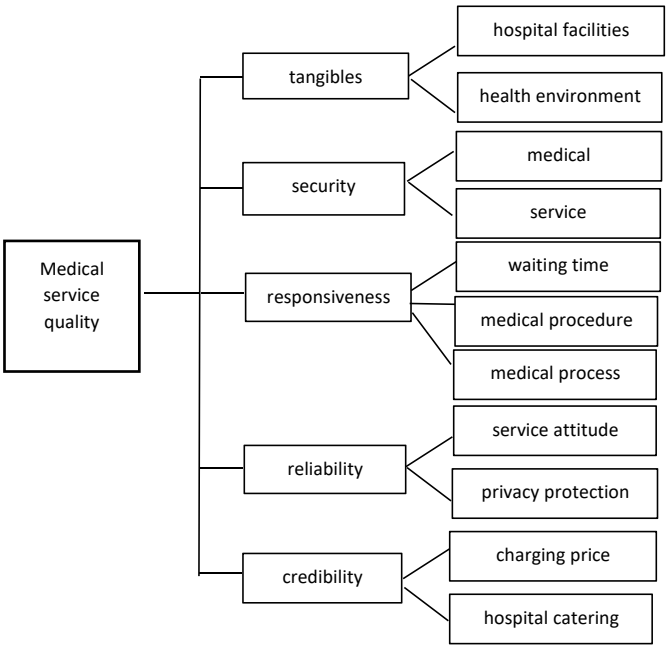


Figure 2.3: Healthcare Servqual Model (adjusted from Yang et al., 2015: 1456)

The third level of indicators further elaborates on the key factors mentioned in the second level of indicators by specifying what should be assessed. Each of the key factors is important per se, and so, how they come together to provide a high or low medical quality service in hospitals will be subsumed in the three key aspects of service: response, reliability and assurance (Chen et al., 2013). A patient will be expecting a high-quality hospital to provide response via a good feedback system and allowing questions to be made by the patient, but also to build a record system that is reliable without registration or administrative mistakes, and mostly to fulfil their promises and being overall a service that gains the trust of patients. Table 2.1 shows the crossing of Yang et al. (2015) model with Chen et al. (2013) major dimensions in medical service quality.

Table 2.1: Healthcare Servqual Model (adapted from crossing Yang et al., 2015 and Chang et al., 2013)

	Response ⇩	**Reliability** ⇩	**Assurance** ⇩
Secondary indicators	**Yang et al. (2015) third level indicators**		
Hospital facilities	Parking spaces; wheelchairs; seats in the corridor; separate toilets in the wards; hot water; showers; television.		
Health environment	Medical areas: contaminated, semi-polluted and clean areas. Non-medical areas: public environment, bathroom and elevator room.		
Medical technology	Doctors' skills; nurses' skills; medical facilities.		
Service specification	Latest medical guidelines.		
Waiting time	Registration; outpatient consultation; examination; medication collection; hospitalization; surgery.		
Medical process	Patient's subjective feelings: satisfaction, average, dissatisfaction or complaints.		
Medical procedure	Registration; paying fees; taking medication; doing examinations; hospitalization; discharge.		
Service attitude	Explanation of the disease; communication in the daily care process; polite language.		
Privacy protection	No disclosing to others; no selling it for profit.		
Hospital catering	Type of food; price; taste; nutritional content, convenience		
Charging price	Open and transparent; reasonable; consistent.		

2.6. Hospital management practices

The practice of management is a universal function at the heart of the execution of leadership, direction and decision-making in social institutions, especially in business and industry. It is a term that cannot be ignored in the business world. Managers need to guide the direction of the organizations they manage and need to think deeply about the purpose of these practices, set goals for them, and achieve the desired results (Nedelko & Potocan, 2013). Previous discussions in the literature involving business management practices include mostly market orientation (Kohli et al., 1993), quality management (Cole, 1998), strategic management (Grant, 2003), benchmarking or outsourcing (Rigby, 2001). Management practices are “a set of concepts, processes, exercises, and analytical frameworks” (Ribgy, 2001, p.139) that are deployed by managers to solve problem or

achieve goals. In the following 10 years, scholars such as Sutherland and Canwell (2004) or Van Assen et al. (2009) contributed to the definition of management practice as "an entity of analytical tools used to support managers at work as something to implement selected management concepts" (Nedelko & Potocan, 2013, p.4).

Such tools are applied in many fields, for example, nature world, agriculture and livestock, as well as the medical industry. Management practices are regarded as one of the most important ways for organizations to improve their competitiveness and their performance (Potocan & Dabic, 2012).

In healthcare, the amount of information available about management practices has exploded in the last two decades. A scholar google search for papers focusing on management practices in healthcare showed 16700 in the 1980 to 2000 period and 22200 in 2001-2021 period, which suggests a stable and persisting interest in this topic. If the search falls upon one of the management practices (e.g. benchmarking) in healthcare the numbers show a steeped rise in interest (3830 papers in 1980-2000 but 72700 in 2001-2021) which is visible also in other focused search like e.g. outsourcing in healthcare (2330 papers in 1980-2000 but 46600 in 2001-2021) both with a 20 fold growth.

This indicates that there is a growing awareness in healthcare organizations, especially public hospitals, not only that professional skills is needed, but also appropriate management practice behaviors to make the function of hospitals - which is providing medical services mainly, to get better play. This goes in line with people's living standards improvement, as people’s needs and abilities for protecting themselves also grow as well. This requires hospitals to fundamentally improve the quality of their services and continuously enrich the reputation of their services, thereby increasing patient satisfaction with them.

Many aspects of hospital management and resources have been highlighted in literature concerning this topic of improving service quality. Scott and George (2014) stress the importance of “hardware” claiming that medical facilities and other infrastructures are the material basis for improving the quality of services in hospitals. They state that hospitals should invest their funds in upgrading medical equipment. With the development of science and technology, more and more disease diagnosis and testing equipment has been introduced, which is conducive to making accurate judgments on the condition easily and quickly and avoiding delays in treatment. Thus, hospitals must continuously strengthen and update their hardware so that they can improve the quality of services.

Hoog et al. (2016) opt to focus on the follow-up of patients’ function. They recommend hospitals to establish an efficient and fast-tracking service system offer patients timely health guidance services even when they are away from the hospital. So, adding to the traditional face-to-face communication, they state contacts should also be allowed through telephone, fax, internet and family members.

Through this service system, hospitals are able to keep track of which patients need to be served in a timely and accurate manner every day, thus changing the work of hospitals from passive to active, from waiting for patients to call for consultation to hospitals taking the initiative to establish health records for patients and actively communicating with them to provide quality health care.

Bobocea et al. (2016) focus on the awareness hospitals must have about the service they provide. Only when hospitals themselves realize the importance of strengthening services, will they be able to meet the needs of patients, gain their trust, improve their satisfaction, increase their value as a hospital, and thus, increase their competitiveness. This requires a hospital to be patient-centered and implementing a system that constantly strengthen everyone's consciousness about how good they are serving the patients.

Management itself plays a critical role in guaranteeing high medical service quality. However, managing a hospital requires the continuous attention to many different issues and sensitivity and knowledge also about the clinical issues that should be taken into consideration when making a decision. According to Salamone (2017) hospital managers should be divided into professional administrative managers and professional medical technology managers. The former is mainly responsible for the management of the internal logistics and administrative affairs of medical institutions, while the latter is mainly responsible for the level and direction of medical technology development of medical institutions, and to do a good job in the clinical treatment.

If indeed the hospital is made for patients and not so much made for healthcare professionals or managers, then patients must be given a central place in hospitals. According to Scott and George (2014) hospitals should put pressure into providing information on medical service quality management to patients, so that patients can have the opportunity to participate in hospital service quality management. Patients, as the "experiencers" of hospital service quality, are the ones that have a better knowledge about the problems in hospital service management.

Kennedy et al. (2011) highlighted the importance of promoting inspection of service quality by health administration or drug supervisory authorities and health management departments. This inspection should have proactive action in listening to patients' opinions and offering hospitals instruction to correct detected problems within a clear deadline.

Lastly, the concept of health, as established in the preamble of the constitution of the World Health Organization affirms that health is "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (WHO, 2021). This means that health comprehends not only the physical body but also the psychological dimension as well as social well-being. Therefore, according to a more recent publication by Kennedy et al. (2014), when serving patients,

hospitals should not focus only on their physiological discomfort, but also proactively pay attention to these dimensions of well-being. For example, promoting a civilized language when communicating with patients or accepting that more patience has to be needed when treating some type of patients, e.g. elderly patients.

2.7. Hospital management practices facing pandemic

At the end of 2019, countries and regions around the world experienced an unprecedented challenge - the outbreak of COVID-19 (Ciotti et al., 2019). SARS-CoV-2 (the official name of COVID-19) was a new strain of coronaviruses that had never been found in humans before and is highly infectious, insidious and highly mutable. In the early stages of the outbreak of COVID-19, the lack of effective empirical references due to the inadequate of professional knowledge about the viral sequence, symptoms of infection, transmission routes, susceptible populations, diagnostic criteria, treatment guidelines and protection methods of this microorganism led to the lack of preparedness of health care workers to deal with COVID-19, many people's health and even lives suffered as a result (Peiffer-Smadja et al., 2020). In this battle, it is no wonder that hospitals were at the forefront as the main force in the prevention and control of the epidemic (McCullough, 2020).

Many difficulties were reported. For example, Thomas et al. (2020) reported on a tertiary hospital affiliated with a university from South Africa as having difficulties in coping with COVID-19. Namely due to 1) hierarchical care not being effectively implemented. When dealing with patients with COVID-19, some patients with mild cases could be treated at a primary or secondary care facility, but the lack of an effective referral system resulted in large number of patients coming to this hospital. 2) Lack of on-site rapid test kits. During the initial outbreak of COVID-19, all test samples needed to be sent to a national-level laboratory for testing, and the hospital was unable to obtain test results quickly, which could lead to a lag in the judgment and treatment of patients. 3) Delays in non-COVID-19 patients. As a result of the overall skewing of hospital resources toward this virus after the COVID-19 outbreak, non-COVID-19 patients may not receive timely treatment for their condition. In addition, these patients may refuse to go to the hospital for treatment out of fear of being infected and 4) lack of personal protective equipment (PPE) and interpersonal relationships between employees. Under-stocking of PPE, overuse or waste, and substandard quality were reported. In addition, doctors, nurses, and other staff performing medical-related tasks were given priority in the use of PPE, which leads to dissatisfaction held by another segment of hospital staff (e.g., cleaners, plumbers).

Also in Japan, Ohta et al. (2021) found that in suburban or rural areas of Japan, that had fewer outbreaks of pandemic infectious diseases, health care workers lacked experience in responding to

such emergency practices. Additionally, the insufficient information led to a certain lag in accessing the latest viral information and treatment guidelines for medical personnel. Also, the imbalance in the distribution of medical resources between rural and urban areas, the lack of attention to COVID-19 among people in rural areas, made it more difficult for health care providers in rural areas to respond to COVID-19.

Reporting on Bichat-Claude Bernard Hospital, a 1,000-bed university hospital in Paris, Peiffer-Smadja et al. (2020) showed difficulties arising from 1) The flow of COVID-19 patients within hospitals. For patients who have been diagnosed with COVID-19, the risk of transmission of the virus from their movement within the hospital is a significant problem. Patients may move throughout the hospital for tests to be performed, to be operated on or for other necessary reasons, and if full protection is not achieved during this process, this may result in the spread of the virus. 2) Handling of medical waste associated with COVID-19. SARS-CoV-2 is not only transmitted through the respiratory tract, it can likewise attach itself to objects for up to several hours. The risk of infection exists when people accidentally come into contact with these virus-bearing objects and come into contact with the mouth, eyes or exposed wounds. The chances of coming into contact with items with viruses present in a healthcare facility are greatly increased, so how these medical wastes are handled is an important matter for hospitals. 3) Mental health of health care workers. The onslaught of COVID-19 had not only had an impact on the lives of the general population, but has also caused some bad feelings among healthcare workers. Many healthcare providers were required to work many days in a row, wear heavy protective clothing and masks, perform never-ending work in highly dangerous environments, endure the loneliness of not being able to reunite with family and friends, and even the frustration of having a patient passing away, all of which can cause them to suffer both physical and mental anguish. Effective adjustment of the physical and mental state of medical staff is an important aspect in the fight against COVID-19.

Anwar et al. (2020) presented the challenges faced by Bangladesh in the fight with COVID-19 pandemic. Bangladesh is one of the least developed countries in the world, with a weak economic base and a national economy largely dependent on agriculture. At the same time, it is also a relatively densely populated country. The main dilemmas that Bangladesh has encountered in resisting COVID-19 were 1) difficulties in prevention measures due to overcrowding and the inability to keep social distancing, in poor education and income, and the inability into keeping good hygiene habits (e.g. washing hands) or buying protective consumables (e.g. disinfectant and masks). 2) difficulties in achieving effective lockdowns as most population in living at the subsistence level and they do not enough savings and supplies, and it is impossible to have no jobs if production does not resume in time. Therefore, a long period of lockdown is unacceptable for the people of Bangladesh.

China is an interesting case because of its experience with previous epidemic and how it mobilized its knowledge to build a fast reaction adjustment to COVID-19.

2.8. China's Hospital Measures facing COVID-19

Back in 2002, the SARS event (referring to severe acute respiratory syndrome) was a widespread epidemic that started in Guangdong, China, and spread to Southeast Asia and around the world until it was gradually eradicated in mid-2003 (Lam et al., 2003).

It is generally believed that the SARS outbreak originated in December of 2002. At that time, a migrant worker from Guangdong, China, felt ill, similar to a cold, and then his condition worsened with symptoms of respiratory distress, and he was successively transferred to a tertiary hospital for treatment. He was later confirmed as the first reported case of SARS in China (Zhang et al., 2013). By early February 2003, according to data later released by the Guangdong Provincial Department of Health, 305 SARS cases were identified in Guangdong Province, including 105 cases among medical workers (Liu et al., 2003). During that time, there were rumors that white vinegar, a remedy that kills microorganisms, was effective against the SARS virus, causing its price to soar tenfold. However, because the epidemic was not fully demonstrated, the Chinese government did not inform the WHO of the situation in Guangdong until February 10, and the preliminary data provided listed only cases in Guangdong Province. At that time, a WHO investigation team visiting Beijing was also unable to access Guangdong for investigation (Wang et al., 2008).

Beijing reported its first SARS case in early March and increased to 339 cases on April 19. Two days later, Beijing identified the first six SARS-designated hospitals. Also, on this day, Beijing decided to establish the world's largest level 1 infectious disease hospital, the Xiaotangshan SARS Designated Hospital. This became a turning point in Beijing's anti-SARS campaign from reactive to proactive. In the 10 days leading up to May 1, the infection rate among medical workers in Beijing remained high, averaging 15.8 directly diagnosed patients per day. after May 1, that number dropped to four per day in just one week. by the end of May, the number of new cases had dropped to single digits (Chan & Chan, 2013).

In early June, for the first time, Beijing's outbreak statistics recorded three zeros: zero new confirmed cases, zero suspected confirmed cases, and zero deaths. SARS was brought under control. On June 24, 2003, the World Health Organization announced the lifting of the travel advisory for Beijing and the exclusion of Beijing from the SARS infected area, signaling the success of SARS prevention and control efforts in China (Rabaan et al., 2020).

The lessons learned from SARS epidemic in China were valuable to deal promptly with the COVID-19 emergence. When COVID-19 was declared in December 2019, medical personnel were made to be actively involved into this fighting. On the one hand, many excellent medical and technical teams assisted in the epidemic-stricken areas, providing medical treatment, epidemic prevention and control as well as other support work for patients. On the other hand, COVID-19 has brought new changes to the overall operation and management of hospitals.

According to Barnett et al. (2020) the impact of COVID-19 on a hospital can be significant. For example, during the pandemic, the workload of hospital's respiratory, fever, and other COVID-19-related departments increased dramatically, accompanied by a significant increase in prevention supplies and consumables. The workload of other departments, such as internal medicine, pediatrics, and gynecology, decreased significantly. In China, the treatment for COVID-19 was made available free of charge, and the result of all this is that the hospital's medical income drops significantly (Barnett et al., 2020). In addition, hospital's beds are a scarce resource in emergency situations (Wang et al., 2020). Moreover, due to the infectious nature of this virus, excessive foot traffic in hospitals poses a potential risk of nosocomial infections (Gu et al., 2020).

One of the focal points of research made in this period concerned how hospitals faced the major impact caused by the sudden pandemic and what measures they took to restore the order of treatment as soon as possible, minimizing the impact of the epidemic and guaranteeing the return to normal operations (Wu et al., 2020). Some measures taken in China have been found to be effective as managerial practices for hospitals to respond the COVID-19 (Stennett et al., 2021) but many authors contributed with a specific focus on the following operations management measures:

1. Adjust operational thinking, re-examine and rationalize the types of diseases that hospitals can receive, prioritize the restoration of normal operations in departments less affected by COVID-19, and organize the entire hospital staff to learn the latest information about the virus, increase their ability to resist the risk of emergencies, summarize their experiences and shortcomings in their daily work, and gradually restore the overall operation of the hospital, ultimately increasing medical revenue (Shen et al., 2020).

2. Broaden the number of material suppliers, organize the whole hospital staff to learn the correct and effective ways to use medical resources and avoid waste. At the same time, donations from the government and social organizations can be appropriately sought to upgrade the stock of materials and other consumables (Zhang et al., 2020).

3. Stratified and graded management of beds and internal flow of cases according to the severity of the disease, so as to quickly admit and treat patients, isolate the source of infection, and focus

medical resources on treating the seriously ill (Cao et al., 2020). In addition, the use of large, ventilated spaces such as gymnasiums or sports fields to build Fangcang shelter hospitals to admit patients with minor illnesses to reduce the pressure on beds is a measure adopted by China in response to the pandemic (Wang et al., 2020).

4. Strengthen the online treatment process. Guiding patients to complete the consultation process through online operations, such as making appointments and viewing test results online, so to minimize patients' stay in the hospital (Gu et al., 2020).

Stennett et al. (2021) made a systematic analysis of a range of management practices adopted by Chinese hospitals in response to COVID-19. Their article explored how hospitals recovered from the stresses and difficulties experienced in the pandemic, examined the literature on COVID-19 published in WHO and CNKI, and used the "effect-strategy-impact" theoretical framework to explore three areas that influence hospital flexibility: human resources, management and communication, and security, hygiene and planning. They summarized 10 strategies which comprehend 33 specific management practices.

A summary from Stennett et al. (2021) list of the strategies, hospitals have adopted to address COVID-19 are:

1) *Reinforcements* – emergencies always entail higher need of staff to answer the peak demand for services and therefore hospitals in the most affected area were reinforced with new health professionals (mostly clinical staff) while at the same time standardizing nursing procedures, creating back-up teams and new support teams, and clarify the responsibilities of each team.
2) *E-health, telemedicine and use of technology* – the use of digital channels to communicate was an effective answer to both the need to reduce physical contact (so to contain infection spreading) and continue providing clinical care (both medical and psychological due to lock down), while monitoring and screening patients before they arrive to hospitals. This was made through providing psychological services to the population, developing online screening to patients, monitoring covid-19 patients home, and using onsite IT apps (e.g. robots and QR codes) to improve hospital services.
3) *Organization of work and Healthcare worker well-being* – working conditions in hospitals during a pandemic are harsher and therefore the normal working hours schedules should be revised. In this way hospitals have rescheduled the normal work shift cutting down work period to 4h-6h, increasing schedule flexibility, while providing material and psychological support to staff.

4) *Training, communication and information* – In an emergency continuous situation, communication and learning are vital to the effectiveness of operations. Therefore, hospitals implemented PDCA cycles (from quality management, to foster learning), regular online and face-to-face training to get familiar with the place, learn protective behaviors, protocols, do daily staff meetings, promoting the use of communication tools such as wechat, and using visual materials to convey information.
5) *Protection protocols* – The contagious nature of the infection implied a radical change in the normal protocols and therefore, hospitals implemented strict patient admission (controlling for body temperature and mask wearing), routine disinfection, encouraging the right use of protocol according to staff situation, and restricting patient family visits.
6) *Personal protective equipment (PPE)* – protective equipment is essential to create a physical barrier to the virus, but its availability has to be secured. Hospitals took measures to make an updated inventory of PPE, to avoid over-consumption and waste of such materials, and adjusted the need of PPE in less exposed to covid-19 hospital areas, so to keep the materials available for those more exposed.
7) *Reorganization of services strengthening* – The normal infrastructure of hospitals is designed to comply with the normal demand but in a time of crisis, the demand changes, rising abruptly in some clinical areas (ICU, emergency room, pneumonology) which means extra room has to be allocated. So, hospitals converted some areas into specialized covid-19 rooms, implemented fever tents, unidirectional paths for patients, make double patient room into single patient rooms, and increasing distance between beds whenever more than one patient had to be in the same room.

The list of practices is comprehensive as they will all contribute to tackle a specific emerging need focused on preventing infection and dealing with the illness whenever it is found. These strategies and practices represented a huge effort from hospitals and staff so to preserve the quality of service not only to covid-19 patients but also to the other patients affected by non-covid-19 diseases. Therefore, we hypothesize that:

H1 - Best hospital management practices are positively associated to the medical service quality (direct effect)

2.9. Teamwork in healthcare

Team is a community of people at the grassroots and management levels that makes rational use of each member's knowledge and skills to work collaboratively and solve problems in order to

achieve a common goal (Oser et al., 1989). In healthcare organizations, good teams facilitate quality improvement of healthcare services and reduce the occurrence of adverse medical events (Rosen et al., 2018). According to Lindeke and Sieckert (2005) teamwork is important to ensure patients safety and quality of care, as there is a clear correlation between teamwork and patient prognosis. So, the closer the health care collaboration, the lower the risk of preventable negative events for patients. Meanwhile, the more complex a situation is, the more multidisciplinary teamwork is needed. Multidisciplinary team (MDT) refers to the guiding idea of establishing a patient-centered view of diagnosis and treatment, based on multidisciplinary common diagnosis and treatment procedures, and systematically applying the diagnosis and treatment procedures to clinical diagnosis and treatment (Ovretveit, 1996). By strengthening interdisciplinary teamwork and communication, high quality and safe medical services can be effectively provided to patients (Sehgal et al., 2008).

According to Kim et al. (2010) the application of MDT was well demonstrated in the Intensive Care Unit (ICU), a special place that focuses on critical care patients with characteristics such as variable and complex disease types and susceptibility to in-hospital infections. They said that efficient team and multidisciplinary collaboration has unique advantages in preventing, detecting, and resolving in-hospital infections. This is because in a collaborative team model, medical members can communicate, cooperate, monitor and remind with each other, and jointly perform sensory control management measures, thus reducing the incidence of in-hospital infections (Kim et al., 2010).

Stennett et al. (2021) strategies are mostly assuming there is effective team working as teams are the fundamental unit of healthcare effectiveness. This is especially true for contagious air-borne diseases such as COVID-19, because if one of the team members fails to comply with the protocol, all the team environments might be compromised e.g. with the introduction of the virus into common used space. Also, workload peaks can affect more some members of the team and therefore, it is important that team members are attentive to each other’s needs and provide due support whenever needed.

Additionally, teamwork is conducive to improving the professional staff's competencies. By discussing the existing and potential doubts and difficulties in the treatment process found during the check-ups, and propose problems and solutions that should be paid attention to from the professional perspective, doctors and nurses will improve their knowledge and skills. This is an opportunity for team members to learn from each other while getting the most beneficial treatment plan for patients (Cypress, 2011).

An excellent team is important for creating a working atmosphere of unity and assistance, enhancing collective cohesion, building hospital culture, and promoting sustainable hospital development (Huang et al., 2010).

As a major aspect of teamwork, team mutual help will foster a full utilization of the skills and expertise of each team member, which can not only enhance the efficiency of the team, but also increase team cohesion and maintain team dynamics (Zaccaro et al., 2001). Therefore, as a manifestation of organizational citizenship behavior (OCB), helping behavior has become an increasingly important topic of scholarly interest (Ocampo et al., 2018).

Initially, the concept of helping behavior began with altruistic behavior, which was seen as an act of giving help to others without expecting anything in return (Barnard, 1938). Although scholars have different conceptual understandings and definitions of helping behavior, according to Graham (1991), there is a general consensus on three aspects: 1) Voluntariness, in which helpers provide assistance to helpers in a voluntary manner; 2) Extra-role behaviors, in which the helper provides help that is not part of his or her job but outside of the job tasks and responsibilities; and 3) Job support, in which the purpose of the helper's behavior is to meet the helper's job needs and support him or her in solving work-related problems in order to successfully complete the helper's job tasks. Later, Bateman and Organ (1983) coined the term “organizational citizenship behavior” which was defined as a conscious individual behavior from employees, that is neither explicitly and directly rewarded by the normal compensation system nor defined in the job description”. Podsakoff et al. (2000) considered helping behavior as one of the seven typical behaviors of organizational citizenship behavior, namely: helping behavior, sportsmanship, organizational loyalty, organizational compliance, individual initiative, civic virtue, and self-development. Regarding to the definitions of helping behavior, Podsakoff et al., (2000) consider helping behavior to be the act of voluntarily helping others to prevent or solve problems, and Choi (2009), considers team-level helping behavior to be the very same behavior but operating at the team level. Team mutual help refers to the “Ability to anticipate other team member's needs through accurate knowledge about their responsibilities” (Baker et al., 2006, pp. 1581) and is an indication that the team is effective (Grubaugh & Flynn, 2018).

2.10. Centrality of helping behavior in healthcare and emergency

In some emergency situations, the application of OCB appears to be more important to the development of organizations than only applying for helping behavior (Ehrhart & Naumann, 2004). For example, with the COVID-19 pandemic, hospitals are facing greater pressure on physical and non-physical resources that may not be adequately addressed by team mutual help alone. These

difficulties that cannot be addressed by helping behavior include: staff strikes or resignations (due to the physical and emotional impact of the overload or the inability to provide the career development they want); staff complaints (undesirable work environment); negative slacking (unreasonable reward and punishment system) (Mattila et al., 2021). These problems require the hospital to fully mobilize employees' OCB, at the individual level, encourage them to help each other, maintain a positive mindset even in the face of a difficult working environment, actively engage and participate in various organizational activities, and make suggestions for organizational development (Basu et al., 2017). At the team level, improve team consciousness of employees, form good team norms and reward and punishment systems, create a harmonious team atmosphere, increase team cohesion, and enhance team performance (Demirkiran et al., 2016). Weller et al. (2010) structure of teamwork behaviors suggests most of these relate to team cohesiveness and mutual help (also called "Backup behaviors").

Overall, the interdependent nature of healthcare teams implies their cohesiveness is important for the quality of the services they provide which is supported by many studies (e.g. Baker et al., 2006; Baxter & Brumfitt, 2008; Deeter-Schmelz & Kennedy, 2003). Based on this, we hypothesize that:

H2: Team mutual help is positively associated to the medical service quality

Stennett et al. (2021) list of strategies and practices target on the one hand the efficient use of resources and adjustments to the operational procedures, and on the other hand, the healthcare staff needs. This second emphasis relates to their need to keep their ability to work by not being overly fatigued (reinforcement of teams, backup teams, and reduced continuous work schedule), their need to remain healthy by not being exposed to the infection (training and communication, PPE), and their psychological needs relating to the loneliness or the exceptional pressure (healthcare staff well-being). Judging by the literature cited on team cohesiveness, it seems to be assumed that these teams operate as a unit, i.e. that team members are expected to align with all their colleagues interests so to provide whatever support is needed. Therefore, we hypothesize that:

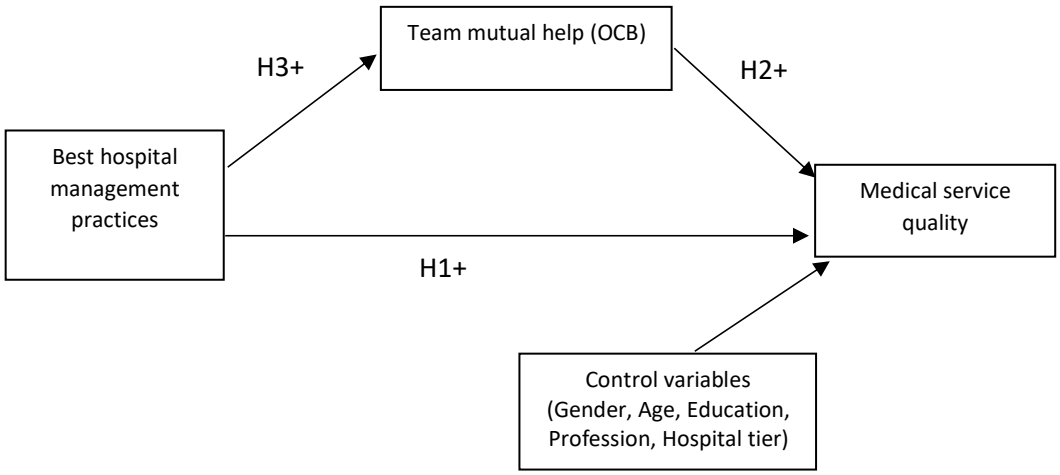
H3: Best hospital management practices are positively associated to team mutual help

Because of the previous couple hypotheses, team mutual help seems to play a central role in providing high medical service quality in these circumstances. Therefore, we hypothesize that:

H4: Team mutual help mediates the positive relation between best hospital management practices and medical service quality (indirect effect)

The conceptual model that integrates all the hypotheses is depicted in Figure 2.4.

Figure 2.4 - Conceptual model



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3. Methods

3.1. Data analysis strategy

We firstly screened the database to look for cases that suggested the replies were given without due attention to the questions or that contained too many missing values. Then, we tested the psychometric quality of the measures so to be able to run valid hypotheses testing. Psychometric quality was tested for validity and reliability. Construct validity of the new scale (on Hospital practices) was tested firstly with confirmatory factor analysis (CFA) which adopted Hair et al. (2019) thresholds to judge on the model fit indices acceptability. These were CMIN below 3, Comparative Fit Index (CFI) and Tucker-Lewis Index (TLI) both at least .92 or above, Residual Mean Squared Error of Approximation (RMSEA) and Standardized Residual Mean Root (SRMR) below .08. In case the CFA indicates the model fit is not acceptable, we use Lagrange Multipliers and ran an Principal Component analysis (PCA) considering KMO of at least .70 with a significant ($p<.001$) Bartlett's statistic, and all communalities above .50. Factor extraction is made by retaining factors with an eigenvalue of at least, and after applying a Varimax rotation the solution is checked for cross-loading cases and also to consider how much variance is explained (we target 60% minimum). All other constructs' validity were tested with PCA mostly because they are already proved in literature. Reliability is tested with Cronbach alpha which should attain a value of .70 to be taken as good.

Once the measures are taken as sufficiently valid and reliable, we can use them for hypotheses testing. This was done by using Process Macro (Hayes, 2018) running model number 4 and adopting the recommendations from this author, namely, by running 5000 bootstrapping extractions, and using a confidence interval of 95% to judge on the significance of the direct and indirect effects.

3.2. Procedure (data collection)

Data collection was made via a questionnaire that was made available online. The questionnaire was pre-tested for quality checking and time requests (to fill in) and an explanation letter written to explain the study and giving all information required. This was sent to department directors in Hospitals from three provinces in China: Xi'an, Inner Mongolia and Guangdong. These three provinces were chosen as they represent a vertical cross-section of Chinese habitats: coastal south, central highlands, and northern border with distinct life experiences. At the same time, it was sent to healthcare professionals from the personal network in wechat inviting for participation. After due authorization was given, each hospital deployed internally the questionnaire spreading the

online link, to which anyone working in the hospital was free to participate or not without any risk as the entire process was anonymous and all data confidential.

3.3. Sample

The original number of answers received was 447 but many were found either with monotonous responses (all answers falling in the same value across too many items), inconsistent responses (contradictory answers, whenever opposing items were signaled with the same extreme value, e.g. answering maximum value for an item stating “If you make a mistake on this hospital, it is often held against you” versus “It is safe to take a risk on this hospital”) or too many missing values. Removing these cases to improve the data quality left a valid sample comprising 410 individuals working in hospitals as doctors (37.1%), nurses (36.3), administrative staff (24.4%) or other (2.2%). The sample covers most age groups (Table 3.1) and are mostly female (59.8%), the vast majority with a Bachelor degree (81.4%) or a master (17.6%) with a marginal proportion with high school or equivalent (1%) and working on the respective hospital on 9.9 years (SD=5.69) ranging from less than one year to 30 years. Most participants (91%) work in 2nd tier (regional) and 3rd tier (central) hospitals.

Table 3.1 – Age distribution

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18-24	7	1.7	1.7	1.7
	25-34	158	38.5	38.5	40.2
	35-44	108	26.3	26.3	66.6
	45-54	87	21.2	21.2	87.8
	55+	50	12.2	12.2	100.0
	Total	410	100.0	100.0	

3.4. Measures

All variables were measured with a 7-point Likert scale where 1 = Strongly disagree, and 7 = Strongly agree.

Best hospital management practices implemented during the pandemic were measured with a novel scale based on Stennett et al. (2021) systematic literature review. It originally comprehended 33 practices, taken as strategies, inductively organized around seven categories: human resources, digitalization, work organization and healthcare worker well-being, communication and information, protection protocols, PPE, and reorganization of services. A confirmatory factor analysis with our sample showed poor fit indices ($X^2(474)=2988.729$, $p<.001$; CFI=.807; TLI=.785; RMSEA=.114 CI90 [.110; .118] Pclose=.000) and therefore we ran an exploratory factor analysis. From applying the criteria stated in the data analysis strategy section items were sequentially removed due to poor communalities or crossloadings, which ended in a valid factor solution (KMO=.953, Bartlett's X^2 (171)=6626.351, $p<.001$) comprising three factors explaining 71.5% total variance after rotation (Varimax) preserving 19 items: Norms/Information focus (9 items, e.g. "Standardized nursing procedures", "Used app-based QR codes to share information with the patients.", with strong reliability, Cronbach alpha=.947), Team focus (6 items, e.g. "Reinforced teams with external healthcare professionals.", "Increased the number of staff during the high peak period of patient admissions.", with strong reliability, Cronbach alpha=.893) and an Infection focus (4 items, "Redirected patients with a temperature over 37.5ºC and/or showing respiratory symptoms to the ambulatory service dedicated to fever patients or to the emergency department.", "Applied strict measures regarding the disinfection of medical instruments (such as stethoscopes, thermometers, etc.)", Cronbach alpha=.892). Table 3.2 shows the rotated matrix.

Service quality was measured with Chang et al. (2013) three dimensions taken from SERVQUAL (Parasuraman et al., 1985; Berry et al., 2002), namely: a) Service response (3 items, e.g. "The entire service process can complete service in a short period of time), b) Service reliability (3 items, e.g. "The entire service process has no error"), and c) Service assurance (3 items, e.g. "The entire service process can fulfill its promise to customers"). The exploratory factor analysis showed the 9 items aggregated on a single dimension with a valid solution (KMO=.898, Bartlett's X^2=3550.286, 36 df, $p<.001$) accounting for 70.1% of explained variance. This solution was also found to be reliable (Cronbach alpha=.946). It is worth pointing out that although the dimensions were taken from SERVQUAL, Chang et al. (2013) measures focused on perceived quality only as the expectation measure has received much critique and most research relies on performance-only measures of quality (e.g. Brady et al., 2002).

Team mutual help was measured with four items from Van Dyne and Le Pine (1998) scale intended to measure a dimension of OCB named interpersonal help, e.g. "get involved to help their team and the organization", and "volunteer to do tasks for the teams and the organization". The

exploratory factor analysis showed the four items aggregated on a single dimension with a valid solution (KMO=.761, Bartlett's X^2=957.745, 6 df, p<.001) accounting for 73.4% of explained variance. This solution was also found to be reliable (Cronbach alpha=.878).

Control variables were used to account for possible effects due to: time related variables (age 1=18 to 24 years old, 2=25-34, 3=35-44, 4=45 to 54, 5=55 or more; organizational tenure 1=up to 5 years, 2=6 to 10, 3=11 to 15, 4=16 or more; professional tenure 1=up to 5 years, 2=6 to 10, 3=11 to 15, 4=16 or more), to gender (1=male, 2=female), to organizational context (nature of hospital, 1=specialized, 2=general, 3=community, 4=other and hospital level, 1=3rd tier, 2=2nd tier, 3=1st tier, 4=other), professional variables (profession, 1=doctor, 2=nurse, 3=administrative staff, 4=other; category, 1=professor, 2=associate professor, 3=lecturer, 4=assistant professor) and education (1=up to bachelor, 2=bachelor, 3=master, 4=doctorate).

Common method bias is a concern in cross-sectional research designs, i.e. whenever self-reported data is collected simultaneously for all the variables in the conceptual model, and from the same source. This means that there is a strong possibility that due to personal sense of consistency, the variance is inflated in the model (Podsakoff et al., 2003). A recommended data analysis technique to gauge the degree in which findings may suffer from common method bias is Harman's test. This test consists of an exploratory factorial analysis where two criteria must be met to show such problem occurred: 1) the factor solution based on Kaiser criterion extraction generates a single factor or more than one factor where the first factor accounts for more than 50% of total variance accounted by the factor analysis, and 2) the first factor is a mix of items from at least two constructs connected in the conceptual model. Such analysis showed the three constructs fell in three distinct factors without crossloadings, thus ruling out such concern. Additionally, we conducted a single factor CFA which showed poor fit indices (X^2(462)=6005.768, p<.001; CFI=.502; TLI=.465; RMSEA=.170 CI90 [.166; .174] Pclose=.000). Lastly, we conducted a CFA testing for a latent common factor which showed estimated non-significant coefficients with a low magnitude (B=0.16; p=.017). Thus, we trust results were not biased by common method variance.

Table 3.2 – Rotated matrix for best hospital management practices

	1 Norms/Information focus	**2 Team focus**	**3 Infection focus**
3. Standardized nursing procedures.	**.789**	.395	.162
30. Created "three zones" system that included a contaminated zone, potentially contaminated zone, and a clean zone.	**.778**	.161	.385
4. Clarified the responsibilities of each staff member.	**.764**	.315	.316

12. Allowed the staff to collect data to use in the improvement of in-hospital treatment.	**.706**	.388	.297
13. Used app-based QR codes to share information with the patients.	**.688**	.338	.362
5. Created a nursing technical support team comprising the head nurses of all departments.	**.680**	.235	.424
11. Provided online support to patients who are struggling with diseases and monitor covid-19 patients doing quarantine at home.	**.618**	.403	.264
21. Placed physical signs such as multicolored arrows indicating the different hospital zones and posters of protection protocols displayed in different zones.	**.616**	.358	.420
31. Separated passageways for medical staff and patients.	**.557**	.359	.446
1. Reinforced teams with external healthcare professionals.	.294	**.790**	.070
16. Increased the number of staff during the high peak period of patient admissions.	.282	**.754**	.210
2.Created back-up teams (extra team to replace missing professionals or to be deployed in case of a surge of demand).	.445	**.668**	.245
17. Provided nutritional meals.	.342	**.652**	.353
15. Reduced to a 4- to 6- hour schedule for health care workers who have direct contact with COVID-19 patients.	.435	**.611**	.326
28. Transformed many non-COVID-19 hospital areas into a specialized COVID-19 ward (with negative pressure chambers).	.055	**.605**	.586
22. Redirected patients with a temperature over 37.5ºC and/or showing respiratory symptoms to the ambulatory service dedicated to fever patients or to the emergency department.	.375	.142	**.795**
23. Applied strict measures regarding the disinfection of medical instruments (such as stethoscopes, thermometers, etc.	.399	.183	**.775**
7. Established a clear staffing structure and the shift handover modes, and verifying that the procedures are being followed.	.313	.256	**.734**
6. Created a team to collect new information about the virus and readjusted emergency plan.	.385	.331	**.646**
Cronbach alpha	.947	.893	.892

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 8 iterations.

Because the data analysis showed the best hospital management practices comprehend three factors, we further detailed the hypotheses into the respective sub-hypotheses as follows:

H1: Best hospital management practices are positively associated to the medical service quality (direct effect)

H1a: Norming practices are positively associated to the medical service quality

H1b: Team strengthening practices are positively associated to the medical service quality

H1c: Infection prevention practices are positively associated to the medical service quality

H2: Team mutual help is positively associated to the medical service quality

H3: Best hospital management practices are positively associated to team mutual help

H3a: Norming practices are positively associated to team mutual help

H3b: Team strengthening practices are positively associated to team mutual help

H3c: Infection prevention practices are positively associated to team mutual help

H4: Team mutual help mediates the positive relation between best hospital management practices and medical service quality (indirect effect)

H4a: Team mutual help mediates the positive relation between norming practices and medical service quality (indirect effect)

H4b: Team mutual help mediates the positive relation between team strengthening practices and medical service quality (indirect effect)

H4c: Team mutual help mediates the positive relation between infection prevention practices and medical service quality (indirect effect)

4. Results

Results are presented so to offer a general understanding of means and correlations. Following, we will show the findings pertaining to the test of hypotheses.

4.1. Descriptive and bivariate statistics

The overall perception of the variables in the conceptual model shows a moderate to high perceived level with service quality being the highest (M=5.39, SD=1.17). Closer to the highest value is team mutual help (M=5.30, SD=1.16) followed by the three best practice factors that are all in the vicinity of 5 and with very similar standard-deviation, meaning that these practices were mostly perceived has having been implemented (5 in a 7-point scale).

The sociodemographic variables have no significant correlation with any of the variables in the conceptual model. The bivariate correlations between the variables in the conceptual model show, to the exception of the intra-construct correlations of the best hospital management practices, a modest magnitude albeit all positive in valence. The most noticeable case is the recurring positive correlations between all best hospital management practices and team mutual help (r ranges from .144 to .187 all significant at $p<.01$) as well as with service quality (r ranges from .098 to .167 all significant at $p<.01$). Still, they have a modest magnitude. Team mutual help is also positively correlated with service quality (r=-125, $p<.05$). The whole of the correlations encourages the conceptual model.

Table 4.1 - Bivariate statistics

	Range	Mean	SD	1	2	3	4	5	6	7	8	9	11
1. Age	1-5	3.03	1.07	-									
2. Gender	1-2	59%F	.49	-.079	-								
3. Profession	1-4	1.91	.83	.085	-.010	-							
4. Education	1-3	2.16	.39	-.294**	-.045	-.062	-						
5. Hospital tier	1-3	2.38	.64	-.066	-.154**	-.072	.053	-					
6. Organizational tenure	1-30	9.90	5.69	.766**	.010	.101*	-.335**	-.135**	-				
7. Best Hospital Mng Pract - Norms/Info	1.33-7	5.09	1.32	.020	-.095	-.042	-.052	.034	.054	-			
8. Best Hospital Mng Pract - Team	1.17-7	4.99	1.31	.052	-.055	.009	-.039	-.020	.089	.794**	-		
9. Best Hospital Mng Pract - Infection	1.25-7	5.07	1.34	-.017	-.002	-.032	-.054	.033	.030	.787**	.693**	-	
10. Team mutual help	2.00-7	5.30	1.16	-.040	-.001	-.045	-.055	-.005	.039	.187**	.148**	.144**	-
11. Service Quality	1.33-7	5.39	1.17	-.020	.016	.020	.026	-.005	.010	.138**	.098*	.167**	.125*

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

4.2. Hypotheses testing

The findings from applying the Process Macro (Hayes, 2015) are shown in three tables, one per dimension of Best Hospital Management Practices (Tables 4.2 to 4.4).

Table 4.2 - Hypotheses testing for Norms / Information

IV		Med		DV	*B*	BootSe	*p* value	CI95 LB	CI95 UB	Hypothesis
$BHMP_{Norms/Info}$		->		MedSerQual	.1249	.0446	.0134	.0231	.1987	H1a OK
		TMH	->	MedSerQual	.1052	.0506	.0365	.0067	.2056	H2 OK
$BHMP_{Norms/Info}$	->	TMH			.1845	.0432	.0002	.0774	.2473	H3a OK
$BHMP_{Norms/Info}$	->	TMH	->	MedSerQual	.0194	.0111		.0006	.0440	H4aOK

Legend: IV=$BHMP_{Norms/Information}$; Med=Mediator; DV=Dependent variable

The direct effect between BHMP Norms/Innovation and Medical Service Quality is significant (*B*=.1249, SE=.0446, *p*=.0134, CI95 [.0231; .1987]) which supports Hypothesis H1a. Likewise, the direct effects between Team Mutual Help and Medical Service Quality as well as between BHMP Norms/Innovation and Team Mutual Help are both significant, which supports both H2 and H3a and encourages the mediation hypothesis. This indirect effect, although of small size, was indeed observed (*B*=.0194, SE=.0111, CI95 [.0006; .0440]) which supports Hypothesis H4a.

Table 4.3 - Hypotheses testing for Team

IV		Med		DV	*B*	BootSe	*p* value	CI95 LB	CI95 UB	Hypothesis
$BHMP_{TeamFocus}$		->		MedSerQual	.0835	.0447	.0954	-.0132	.1627	H1b n.s
		TMH	->	MedSerQual	.1156	.0505	.0214	.0174	.2160	H2 OK
$BHMP_{TeamFocus}$	->	TMH			.1491	.0436	.0026	.0464	.2149	H3b OK
$BHMP_{TeamFocus}$	->	TMH	->	MedSerQual	.0172	.0101		.0017	.0403	H4b OK

Legend: IV=$BHMP_{TeamFocus}$; Med=Mediator; DV=Dependent variable

The direct effect between BHMP Team and Medical Service Quality is significant (*B*=.0835, SE=.0447, *p*=.0954, CI95 [-.0132; .1627]) which does not support Hypothesis H1b. Similarly, the direct effects between Team Mutual Help and Medical Service Quality (*B*=.1156, SE=.0505, *p*=.0214, CI95 [.0174; .2160]) as well as between BHMP Team and Team Mutual Help (*B*=.1491, SE=.0436, *p*=.0026, CI95 [.0464; .2149]) are both significant, which supports both H2 and H3b. The indirect effect is also significant (*B*=.0172, SE=.0101, CI95 [.0017; .0403]) which supports Hypothesis H4b.

Table 4.4 - Hypotheses testing for Infection Prevention

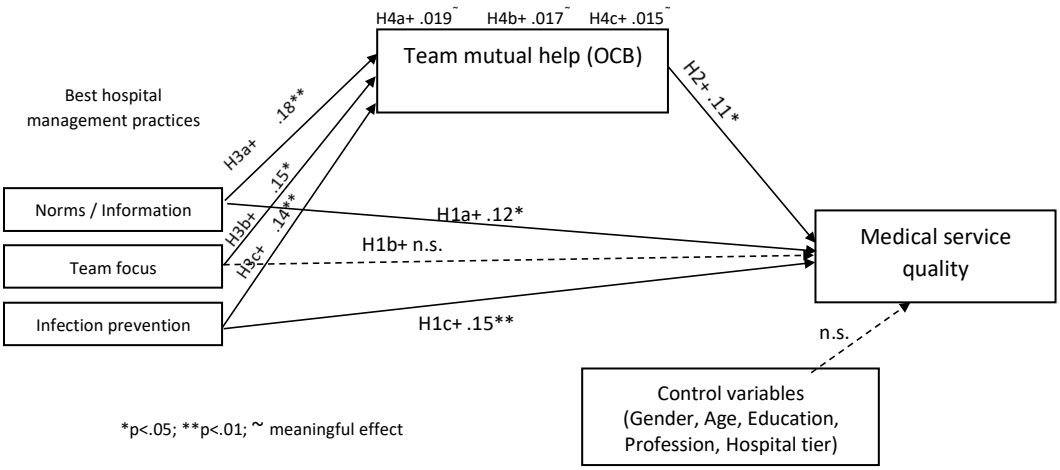
IV	Med	DV	*B*	BootSe	*p* value	CI95 LB	CI95 UB	Hypothesis
$BHMP_{InfectPrev}$	->	MedSerQual	.1548	.0432	.0019	.0502	.2199	H1c OK
	TMH ->	MedSerQual	.1066	.0500	.0320	.0093	.2059	H2 OK
$BHMP_{InfectPrev}$ ->	TMH		.1386	.0426	.0051	.0361	.2035	H3c OK
$BHMP_{InfectPrev}$ ->	TMH ->	MedSerQual	.0148	.0092		.0007	.0366	H4c OK

Legend: IV=$BHMP_{InfectionPrevention}$; Med=Mediator; DV=Dependent variable

The direct effect between BHMP Infection Prevention and Medical Service Quality is significant (*B*=.1548, SE=.0432, *p*=.0019, CI95 [.0502; .2199]) which supports Hypothesis H1c. Additionally, the direct effects between Team Mutual Help and Medical Service Quality (*B*=.1066, SE=.0500, *p*=.0320, CI95 [.0093; .2059]) as well as between BHMP Infection Prevention and Team Mutual Help (*B*=.1386, SE=.0426, *p*=.0051, CI95 [.0361; .2035]) are both significant which supports both H2 and H3c. The indirect effect is significant as well (*B*=.0148, SE=.0092, CI95 [.0007; .0366]) and supports hypothesis H4c.

To sum up, all hypothesis, to the exception of the one that stated the direct effect between BMHP team focus and medical service, quality are supported. The empirical tested model is depicted in figure 5.

Figure 4.1 - Conceptual model results˜



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5. Discussion and Conclusion

This study was designed to understand how much best hospital management practices deployed in China effectively promote higher medical service quality by leveraging mutual help behaviors within clinical organizations. This conceptual model was devised within the larger context of a pandemic, which makes it more critical as this is a crisis situation. All crisis situations require extra resources, and mutual help can be considered an extra-role behavior, i.e., an expression of an organizational citizenship behavior, which complies with the idea that extra-demands are answered by mobilizing extra-resources.

For such purpose, the study relied on a quantitative survey-based method that targeted a large sample of healthcare professionals (i.e. clinical and non-clinical staff working in hospitals (both regional and central). The conceptual model was tested considering the division into three sub-hypotheses due to the composite nature of BHMP (norms/information; team focused; and infection prevention).

Although it was not an objective of this study to identify a structure behind the practices implemented, the factor analysis was successful into showing such components. This means practices follow a logical grouping that suggests distinct, but complementary, focuses. The first focus is placed upon norms and providing information. It comprehends the standardization of nursing procedures, separating zones according to contamination status, clarification of each staff member responsibility, and using digital channels to facilitate staff-staff and staff-patient communication. The second focus is placed upon the teams, which comprehends reinforcing team workforce, creating team backup workforce, support team members' needs, such as meals or work schedule and breaks. Lastly, the third complementary focus upon prevention infection which comprehends strict disinfection measures, strict patient triage with possible infection symptoms to a dedicated ambulatory service, guaranteeing shift handover and a clear staffing structure, as well as a team dedicated to gather information about the virus and readjust the emergency plan.

Overall, the conceptual model that tested the hypotheses considering these three components of BHMP, received support from empirical testing as almost all hypotheses and sub-hypotheses were supported.

As to the first hypothesis, only H1b was not supported. Support given to H1a and H1c indicates that practices deployed to set norms and information as well as practices focusing on infection prevention

were directly effective into improving medical service quality. The account of the BHMP by Stennet et al. (2021) does mention that quality of health care is one of the motivators for the deployment of such practices. This was indeed observed for these two components. Therefore, we can state that focusing on norms/information and on infection prevention is directly contributing to the improvement of medical service quality. This was not observed in the team focus component of BHMP. This can be attributed to the inclusion of the team mutual help variable in the model. By observing the correlation table, team focus is indeed positively correlated with medical service quality (r=.098, p<.05) but this is not matched by findings from the path analysis which includes the team mutual help. Thus, we must conclude that the variance shared between team focus and medical service quality was absorbed by the team mutual help. At a first glance the correlation shows the team focus practices have a positive relationship with medical service quality but the absence of a direct effect means that the explanation for such impact is not straightforward. Still, overall, H1 indicates the BHMP were effective into promoting higher (or at least to protect the already existing level of) medical service quality in hospitals.

As to the second hypothesis, that states team mutual help fosters higher service quality in hospitals, the largely available literature that advocates team cohesiveness (Deeter-Schmelz & Kennedy, 2003; Baker et al., 2006; Baxter & Brumfitt, 2008) as a critical feature of healthcare quality gains another empirical support with this study. Not only is team cohesion important, as an explanatory mechanism inside teams, as mutual help is part of the larger category of "backup behaviors" (Weller et al., 2010). These behaviors are critical when facing emergency situations that put enormous pressure upon physical and non-physical resources such as those reported by COVID crisis (Barnett et al., 2020). If there is scarcity of available hospital beds (Wang et al., 2020), and healthcare professionals can be unavailable if they are infected due to the high infection risks these professions take (Gu et al., 2020), hospital managers must find ways of multiplying existing resources without multiplying costs. Team mutual help, as a feature of highly performing teams in healthcare (Rosen et al., 2018) is a suitable response to this need.

Although both BHMP (two components) and team mutual help are predictors of medical service quality, the rational presiding to the conceptual model requires team mutual help to be also explained by BHMP. This was stated in hypothesis 3 and findings did support it. By looking in detail to the BHMP one can infer they are tackling important challenges to healthcare teams facing an emergency crisis. The first issue that can conflict with the individual intention to help his or her team members relates to the work overload in case the respective team get smaller due to the unavailability of some colleagues (e.g. if they got infected). If one is on the breaking point due to

work overload, that person simply does not have the time to help colleagues. Preventing such overload implies the harsh working conditions due to the use of PPE must be mitigated by acknowledging the faster fatigue created under such conditions (Martin-Rodriguez et al., 2020). If one is overly fatigued, he or she will not have the psychological or physical stamina to help others. Likewise, organization and information are critical in circumstances where professionals have not established a routine, especially because the crisis demands individuals and teams to break away from previously established routines (Liu et al., 2021). Therefore, by clarifying role, responsibilities, how communications flow, and offer training, hospitals are preventing many coordination problems that would require even more resources for problem solving. Thus, by preventing such inefficiencies, these BHMP are releasing personal resources to focus on own pending work or even to focus on one's colleagues pending work. All these logics seem to have been effective as BHMP are all positively related to team mutual help.

Lastly, the whole of the conceptual model conflates into testing the mediation role team mutual help plays in explaining how BHMP favor medical service quality. This mediator effect was found for all of the three possible paths thus indicating it is a central variable into explaining the mechanism. Still, the fact that direct effects were observed (H1a, and H1c) means that BHMP are sufficiently strong to enact better medical service quality. However, in the case of team focus practices (H1b), the absence of the direct effect implies we are witnessing a full mediation effect, i.e. that all of the variance linking BHMP with medical service quality goes through team mutual help (Meule, 2019). This is the key-variable that explains why team focused BHMP are effective into improving service quality. This goes in line with previous reports as Zaccaro et al. (2001) claimed team mutual help fosters the maximum use of skills and expertise within teams, increasing its efficiency but also its cohesion. The multidisciplinary nature of these teams makes this mutual help even more critical because each professional will be able to approach any clinical (or non-clinical) situation according to his or her own capacity and expert point of view. No one will be able to approach any problem from all requires angles. So, team interdependence is high and without the willingness to help others in tasks that might be shared or in pending work that can be complemented, the team will stop flowing efficiently, which will necessarily translate into lower medical service safety and quality (Sehgal et al., 2008).

To conclude, BHMP were effective in pursuing the important objective of providing high medical service quality. At this stage it is important to highlight that the medical service quality mean for this study is considerably high (5.4 out of a 7 scale), which suggests the model is explaining high levels of medical service quality.

These findings and conclusions must take into consideration also the limitations that the study has. The first is that findings have been interpreted as explaining how BHMP foster high level of medical service quality. However, we do not have data about the previous mean medical service quality, which implies we cannot ascertain whether quality has drop or not, and likewise, we cannot ascertain if this model should be interpreted as explaining how BHMP foster high medical service quality or if it should be used to explain how BHMP prevent medical service quality degradation.

The second limitation concerns the fact that the samples were all collected via a non-randomized process and from only three provinces in China, which implies findings cannot be safely generalized to the entire healthcare industry. Still, we see no reasons to think of this sample as being fundamentally distinct from the overall healthcare professionals in similar functions. Also, to mitigate eventual errors from non-randomized sampling, the statistical tests were based on bootstrapping.

Another limitation is that our model only includes team mutual help in organizational citizenship behavior, while other manifestations such as sportsmanship, organizational loyalty, and self-development are not discussed.

The last limitation is that the sample data were collected over the same time period, and the main weakness of cross-sectional studies is that it is intrinsically impossible to determine causality (Spector, 2019).

These limitations can be seen also as opportunities to developed future research. In future studies, researchers could try to collect samples from hospitals at all levels through China, which could be selected randomly. A longitudinal design may be helpful into ascertaining not only causality but mostly, how the effects from BHMP develop across time. This would be of much help to conclude if BHMP do have an incremental effect on top of the previously established level of medical service quality. Finally, researchers can pay more attention to other aspects of organizational citizenship behavior, use other components of it to construct similar models and fully explore its mediation role in this process.

References

Alexander, J.A., Weiner, B.J., & Griffith, J. (2006). Quality improvement and hospital financial performance. *Journal of Organizational Behaviour, 27*(7), 1003-1029. https://doi.org/10.1002/job.401

Alhashem, A. M., Alquraini, H., & Chowdhury, R. I. (2011). Factors influencing patient satisfaction in primary healthcare clinics in Kuwait. *International journal of health care quality assurance, 24*(3), 249-262. https://doi.org/10.1108/09526861111116688

Altuntas, S., Dereli, T., & Yilmaz, M. K. (2012). Multi-criteria decision making methods based weighted SERVQUAL scales to measure perceived service quality in hospitals: A case study from Turkey. *Total Quality Management & Business Excellence, 23*(11-12), 1379-1395. https://doi.org/10.1080/14783363.2012.661136

Anwar, S., Nasrullah, M., & Hosen, M. J. (2020). COVID-19 and Bangladesh: challenges and how to address them. *Frontiers in public health, 8,* 154. https://doi.org/10.3389/fpubh.2020.00154

Arasli, H., Ekiz, E. H., & Katircioglu, S. T. (2008). Gearing service quality into public and private hospitals in small islands: empirical evidence from Cyprus. *International journal of health care quality assurance,* 21(1), 8-23. https://doi.org/10.1108/09526860810841129

Baker, D. P., Day, R., & Salas, E. (2006). Teamwork as an essential component of high - reliability organizations. *Health services research, 41,* 1576-1598. https://doi.org/10.1111/j.1475-6773.2006.00566.x

Baltussen, R. M. P. M., Yé, Y., Haddad, S., & Sauerborn, R. S. (2002). Perceived quality of care of primary health care services in Burkina Faso. *Health policy and planning, 17*(1), 42-48. https://doi.org/10.1093/heapol/17.1.42

Bamberger, P. (2009). Employee help-seeking: Antecedents, consequences and new insights for future research. *In Research in personnel and human resources management, 28,* 49-98. https://doi.org/10.1108/S0742-7301(2009)0000028005

Barnard, C. (1938). The Functions of the Executive Harvard University Press Cambridge. *MA Google Scholar, 17*(1). https://doi.org/10.5465/amle.2017.0420

Barnett, M. L., Mehrotra, A., & Landon, B. E. (2020). Covid-19 and the upcoming financial crisis in health care. *NEJM Catalyst Innovations in Care Delivery, 1*(2). https://doi.org/10.1056/cat.20.0153

Basu, E., Pradhan, R. K., & Tewari, H. R. (2017). Impact of organizational citizenship behavior on job performance in Indian healthcare industries: The mediating role of social capital. *International Journal of Productivity and Performance Management, 66*(6), 780-796. https://doi.org/10.1108/IJPPM-02-2016-0048

Baxter, S. K., & Brumfitt, S. M. (2008). Benefits and losses: a qualitative study exploring healthcare staff perceptions of teamworking. *BMJ Quality & Safety, 17*(2), 127-130. http://dx.doi.org/10.1136/qshc.2007.022277

Black, N., Varaganum, M., & Hutchings, A. (2014). Relationship between patient reported experience (PREMs) and patient reported outcomes (PROMs) in elective surgery. *BMJ Quality & Safety, 23*(7), 534–542. http://dx.doi.org/10.1136/bmjqs-2013-002707

Bobocea, L., Gheorghe, I. R., Spiridon, S., Gheorghe, C. M., & Purcarea, V. L. (2016). The management of health care service quality. *A physician perspective. Journal of medicine and life, 9*(2), 149-152.

Boshoff, C., & Gray, B. (2004). The relationships between service quality, customer satisfaction and buying intentions in the private hospital industry. *South African journal of business management, 35*(4), 27-37. https://hdl.handle.net/10520/EJC22267

Brady, M., Cronin, J., & Brand, R. (2002). Performance-Only Measurement of Service Quality: A replication and extension, *Journal of Business Research*, 55(1), 17-31. https://doi.org/10.1016/S0148-2963(00)00171-5

Cao, Y., Li, Q., Chen, J., Guo, X., Miao, C., Yang, H., ... & Li, L. (2020). Hospital emergency management plan during the COVID - 19 epidemic. *Academic Emergency Medicine, 27*(4), 309-311. https://doi.org/10.1111/acem.13951

Chan, P. K., & Chan, M. C. (2013). Tracing the SARS-coronavirus. *Journal of thoracic disease, 5*(2), 118-121. https://doi.org/10.3978/j.issn.2072-1439.2013.06.19

Chang, C. S., Chen, S. Y., & Lan, Y. T. (2013). Service quality, trust, and patient satisfaction in interpersonal-based medical service encounters. *BMC health services research, 13*(1), 1-11. https://doi.org/10.1186/1472-6963-13-22

Chaniotakis, I. E., & Lymperopoulos, C. (2009). Service quality effect on satisfaction and word of mouth in the health care industry. *Managing Service Quality: An International Journal, 19*(2), 229-242. https://doi.org/10.1108/09604520910943206

Choi, J. N. (2009). Collective dynamics of citizenship behaviour: What group characteristics promote group - level helping?. *Journal of Management Studies, 46*(8), 1396-1420. https://doi.org/10.1111/j.1467-6486.2009.00851.x

Choi, K., Lee, H,. Kim, C., and Lee, S. (2005). The service quality dimensions and patient satisfaction relationships in South Korea: comparisons across gender, age and types of service. *Journal of Services Marketing, 19*(3), 140-149. https://doi.org/10.1108/08876040510596812

Ciotti, M., Angeletti, S., Minieri, M., Giovannetti, M., Benvenuto, D., Pascarella, S., ... & Ciccozzi, M. (2019). COVID-19 outbreak: an overview. *Chemotherapy, 64*(5-6), 215-223. https://doi.org/10.1159/000507423

Cypress, B. S. (2011). Exploring the concept of nurse-physician communication within the context of health care outcomes using the evolutionary method of concept analysis. *Dimensions of Critical Care Nursing, 30*(1), 28-38. https://doi.org/10.1097/DCC.0b013e3181fd02e1

De Silva, A., & Valentine, N. (2000). *A framework for measuring responsiveness*. Geneva: World Health Organization.

Deeter-Schmelz, D. R., & Kennedy, K. N. (2003). Patient care teams and customer satisfaction: the role of team cohesion. *Journal of services marketing, 17*(7), 666-684. https://doi.org/10.1108/08876040310501232

Demirkiran, M., Taskaya, S., & Dinc, M. (2016). A study on the relationship between organizational justice and organizational citizenship behavior in hospitals. *Int. J. Bus. Manage. Econ. Res, 7,* 547-554.

Donabedian, A. (1988). The quality of care: how can it be assessed?. *Jama, 260*(12), 1743-1748. https://doi.org/10.1001/jama.1988.03410120089033

Du, L., Xu, J., Chen, X., Zhu, X., Zhang, Y., Wu, R., ... & Zhou, L. (2020). Rebuild doctor-patient trust in medical service delivery in China. *Scientific Reports, 10*(1), 1-11. https://doi.org/10.1038/s41598-020-78921-y

Ehrhart, M. G., & Naumann, S. E. (2004). Organizational citizenship behavior in work groups: a group norms approach. *Journal of Applied Psychology, 89*(6), 960-974. https://doi.org/10.1037/0021-9010.89.6.960

Fan, L. H., Gao, L., Liu, X., Zhao, S. H., Mu, H. T., Li, Z., ... & Lou, F. G. (2017). Patients' perceptions of service quality in China: An investigation using the SERVQUAL model. *PloS one, 12*(12). https://doi.org/10.1371/journal.pone.0190123

Fitriati, R., & Rahmayanti, K. P. (2012). Government support in Triple Helix Collaboration to provide health service delivery: case study government hospital in Bengkulu Hospital. *Procedia-Social and Behavioral Sciences, 52,* 160-167. https://doi.org/10.1016/j.sbspro.2012.09.452

Graham, J. W. (1991). An essay on organizational citizenship behavior. *Employee responsibilities and rights journal, 4*(4), 249-270. https://doi.org/10.1007/BF01385031

Gronroos, C. (1982). *Strategic management and marketing in the service sector. Helsinkis, Swedish School of Economics* (Vol. 8). Research report 0357-5764.

Gronroos, C. (1984). A service Quality model and its marketing implications. *European Journal of Marketing, 18*(4), 36-44. https://doi.org/10.1108/EUM0000000004784

Grubaugh, M. L., & Flynn, L. (2018). Relationships among nurse manager leadership skills, conflict management, and unit teamwork. *JONA: The Journal of Nursing Administration, 48*(7/8), 383-388. https://doi.org/10.1097/NNA.0000000000000633

Gu, X. X., Chen, K., Yu, H., Liang, G. Y., Chen, H., & Shen, Y. (2020). How to prevent in-hospital COVID-19 infection and reassure women about the safety of pregnancy: experience from an obstetric center in China. *Journal of International Medical Research, 48*(7). https://doi.org/10.1177/0300060520939337

Hoog, E., Lysholm, J., Garvare, R., Weinehall, L., & Nyström, M. E. (2016). Quality Improvement in large healthcare organizations: Searching for system-wide and coherent monitoring and follow-up strategies. *Journal of health organization and management, 30*(1), 133-153. https://doi.org/10.1108/JHOM-10-2013-0209

Hu, H. Y., Lee, Y. C., & Yen, T. M. (2010). Service quality gaps analysis based on Fuzzy linguistic SERVQUAL with a case study in hospital out-patient services. *The TQM Journal, 22*(5), 499-515. https://doi.org/10.1108/17542731011072847

Huang, D. T., Clermont, G., Kong, L., Weissfeld, L. A., Sexton, J. B., Rowan, K. M., & Angus, D. C. (2010). Intensive care unit safety culture and outcomes: a US multi-center study. *International Journal for Quality in Health Care, 22*(3), 151-161. https://doi.org/10.1093/intqhc/mzq017

Kang, H. S., Rhee, M., & Hyun, S. J. (2015). A Study on the Interrelationship Among Healthcare Service Quality, Customer Satisfaction, Hospital Loyalty and the Mediation Role of Medical Service Value and Hospital Reputation. *Korea Journal of Hospital Management, 20*(4), 1-13.

Karatepe, O. M., Yavas, U., & Babakus, E. (2005). Measuring service quality of banks: Scale development and validation. *Journal of Retailing and Consumer Services, 12*(5), 373-383. https://doi.org/10.1016/j.jretconser.2005.01.001

Kenagy, J. W., Berwick, D. M., & Shore, M. F. (1999). Service quality in health care. *Jama, 281*(7), 661-665. https://doi.org/10.1001/jama.281.7.661

Kennedy MBA, D. M., Fasolino MD, J. P., & Gullen MD, D. J. (2014). Improving the patient experience through provider communication skills building. *Patient Experience Journal, 1*(1), 56-60. https://doi.org/10.35680/2372-0247.1009.

Kennedy, D. M., Caselli, R. J., & Berry, L. L. (2011). A roadmap for improving healthcare service quality. *Journal of Healthcare Management, 56*(6), 385-402.

Kessler, D. P., & Mylod, D. (2011). Does patient satisfaction affect patient loyalty?. *International journal of health care quality assurance, 24*(4), 266-273. https://doi.org/10.1108/09526861111125570

Kim, M. M., Barnato, A. E., Angus, D. C., Fleisher, L. F., & Kahn, J. M. (2010). The effect of multidisciplinary care teams on intensive care unit mortality. *Archives of internal medicine, 170*(4), 369-376. https://doi.org/10.1001/archinternmed.2009.521

Ladhari, R. (2008). Alternative measures of service quality: a review. *Managing Service Quality: An International Journal, 18*(1), 65-86. https://doi.org/10.1108/09604520810842849

Lam, W. K., Zhong, N. S., & Tan, W. C. (2003). Overview on SARS in Asia and the world. *Respirology, 8,* S2-S5. https://doi.org/10.1046/j.1440-1843.2003.00516.x

Lewis, R. C., & Booms, B. H. (1983). The marketing aspects of service quality. *Emerging perspectives on services marketing, 65*(4), 99-107.

Lindeke, L. L., & Sieckert, A. M. (2005). Nurse-physician workplace collaboration. *Online Journal of Issues in Nursing, 10*(1), 5. 10.3912/OJIN.Vol10No01Man04

Liu, C. (2003). The battle against SARS: a Chinese story. *Australian Health Review, 26*(3), 3-13. https://doi.org/10.1071/AH030003

Liu, J., Liu, S., Zheng, T., & Bi, Y. (2021). Physicians' Perspectives of Telemedicine During the COVID-19 Pandemic in China: Qualitative Survey Study. *JMIR medical informatics*, *9*(6). https://doi.org/10.2196/26463

Mattila, E., Peltokoski, J., Neva, M. H., Kaunonen, M., Helminen, M., & Parkkila, A. K. (2021). COVID-19: anxiety among hospital staff and associated factors. *Annals of Medicine, 53*(1), 237-246. https://doi.org/10.1080/07853890.2020.1862905

Martín-Rodríguez, F., Sanz-García, A., López-Izquierdo, R., Benito, J. F. D., Martín-Conty, J. L., Villamor, M. A. C., & Ortega, G. J. (2020). Predicting Health Care Workers' Tolerance of Personal Protective Equipment: An Observational Simulation Study. *Clinical Simulation in Nursing,* 47, 65-72. https://doi.org/10.1016/j.ecns.2020.07.005

McCullough, L. B. (2020). In response to COVID-19 pandemic physicians already know what to do. *The American Journal of Bioethics, 20*(7), 9-12. https://doi.org/10.1080/15265161.2020.1754100

Meule, A. (2019). Contemporary understanding of mediation testing. *Meta-Psychology*, 3, 1-7. https://doi.org/10.15626/MP.2018.870

Mosadeghrad, A. M. (2013). Healthcare service quality: Towards a broad definition. *International Journal of Health Care Quality Assurance, 26*(3), 203-219. https://doi.org/10.1108/09526861311311409

Ocampo, L., Acedillo, V., Bacunador, A. M., Balo, C. C., Lagdameo, Y. J., & Tupa, N. S. (2018). A historical review of the development of organizational citizenship behavior (OCB) and its implications for the twenty-first century. *Personnel Review, 47*(4), 821-862. https://doi.org/10.1108/PR-04-2017-0136

Ohta, R., Matsuzaki, Y., & Itamochi, S. (2021). Overcoming the challenge of COVID‐19: A grounded theory approach to rural nurses' experiences. *Journal of General and Family Medicine, 22*(3), 134-140. https://doi.org/10.1002/jgf2.410

Oser, R. L., McCallum, G. A., Salas, E., & Morgan Jr, B. B. (1989). *Toward a definition of teamwork: An analysis of critical team behaviors.* Orlando: Naval Training Systems Center.

Ovretveit, J. (1996). Five ways to describe a multidisciplinary team. *Journal of interprofessional care, 10*(2), 163-171. https://doi.org/10.3109/13561829609034099

Parasuraman, A., Zeithaml, V. A., & Berry, L. L. (1985). A Conceptual Model of Service Quality and Its Implications for Future Research. *Journal of Marketing, 49*(4), 41-50. https://doi.org/10.1177/002224298504900403

Parasuraman, A., Zeithaml, V. A., & Berry, L. L. (1988.) SERVQUAL: A multiple item scale for measuring consumer perceptions of service quality. *Journal of Retailing, 64*(1), 12-40.

Peiffer-Smadja, N., Lucet, J. C., Bendjelloul, G., Bouadma, L., Gerard, S., Choquet, C., ... & Lescure, F. X. (2020). Challenges and issues about organizing a hospital to respond to the COVID-19 outbreak: experience from a French reference centre. *Clinical Microbiology and Infection, 26*(6), 669-672. https://doi.org/10.1016/j.cmi.2020.04.002

Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: a critical review of the literature and recommended remedies. *Journal of applied psychology, 88*(5), 879-903. https://doi.org/10.1037/0021-9010.88.5.879

Podsakoff, P. M., MacKenzie, S. B., Paine, J. B., & Bachrach, D. G. (2000). Organizational citizenship behaviors: A critical review of the theoretical and empirical literature and suggestions for future research. *Journal of management, 26*(3), 513-563. https://doi.org/10.1016/S0149-2063(00)00047-7

Rabaan, A., Al-Ahmed, S., Haque, S., Sah, R., Tiwari, R., Malik, Y. S., ... & Rodriguez-Morales, A. (2020). SARS-CoV-2, SARS-CoV, and MERS-COV: a comparative overview. *Infez Med, 28*(2), 174-184.

Rosen, M. A., DiazGranados, D., Dietz, A. S., Benishek, L. E., Thompson, D., Pronovost, P. J., & Weaver, S. J. (2018). Teamwork in healthcare: Key discoveries enabling safer, high-quality care. *American Psychologist, 73*(4), 433-450. https://doi.org/10.1037/amp0000298

Salamone, D. M. (2017). *Health Care Leaders' Leadership Styles Based on Health Care Reform*. Doctoral dissertation, Keiser University, Florida, USA.

Scott, R. A., & George, B. T. (2014). Evaluating healthcare process improvement for patient callbacks. *International Journal of Services and Standards, 9*(1), 51-66. https://doi.org/10.1504/IJSS.2014.061060

Sehgal, N. L., Fox, M., Vidyarthi, A. R., Sharpe, B. A., Gearhart, S., Bookwalter, T., ... & Triad for Optimal Patient Safety (TOPS) Project. (2008). A multidisciplinary teamwork training program: the Triad for Optimal Patient Safety (TOPS) experience. *Journal of general internal medicine, 23*(12), 2053-2057. https://doi.org/10.1007/s11606-008-0793-8

Shen, Y., Cui, Y., Li, N., Tian, C., Chen, M., Zhang, Y. W., ... & Teng, G. J. (2020). Emergency responses to Covid-19 outbreak: experiences and lessons from a general hospital in Nanjing, China. *Cardiovascular and interventional radiology, 43*(6), 810-819. https://doi.org/10.1007/s00270-020-02474-w

Silvestri, C., Aquilani, B., & Ruggieri, A. (2017). Service quality and customer satisfaction in thermal tourism. *The TQM Journal, 29*(1), 55-81. https://doi.org/10.1108/TQM-06-2015-0089

Smith, C., Organ, D., & Near, J. (1983). Organizational citizenship behavior: Its nature and antecedents. *Journal of Applied Psychology, 68*(4), 653-663. https://doi.org/10.1037/0021-9010.68.4.653

Spector, P. E. (2019). Do not cross me: Optimizing the use of cross-sectional designs. *Journal of Business and Psychology,* 34(2), 125-137. https://doi.org/10.1007/s10869-018-09613-8

Stennett, J., Hou, R., Traverson, L., Ridde, V., Zinszer, K., & Chabrol, F. (2021). Lessons learned from the resilience of Chinese hospitals to the COVID-19 pandemic: a scoping review. *medRxiv.* https://doi.org/10.1101/2021.03.15.21253509

Tao, Q., Feng, R., & Fang, Q. (2013). Grade Assessment Method in General Hospital of China [in Chinese]. *Chinese Health Quality Management,* 03. https://doi.org/10.13912/j.cnki.chqm.2013.03.015

Thomas, T., Laher, A. E., Mahomed, A., Stacey, S., Motara, F., & Mer, M. (2020). Challenges around COVID-19 at a tertiary-level healthcare facility in South Africa and strategies implemented for improvement. *SAMJ: South African Medical Journal, 110*(9), https://dx.doi.org/10.7196/samj.2020.v110i10.15143

Upadhyai, R., Jain, A. K., Roy, H., & Pant, V. (2019). A review of healthcare service quality dimensions and their measurement. *Journal of Health Management, 21*(1), 102-127. https://doi.org/10.1177/0972063418822583

Wang, K. W., Gao, J., Song, X. X., Huang, J., Wang, H., Wu, X. L., ... & Cheng, Y. (2020). Fangcang shelter hospitals are a One Health approach for responding to the COVID-19 outbreak in Wuhan, China. *One Health, 10.* https://doi.org/10.1016/j.onehlt.2020.100167

Wang, L., Wang, Y., Jin, S., Wu, Z., Chin, D. P., Koplan, J. P., & Wilson, M. E. (2008). Emergence and control of infectious diseases in China. *The Lancet, 372*(9649), 1598-1605. https://doi.org/10.1016/S0140-6736(08)61365-3

Waring, J. J. (2005). Patient safety: new directions in the management of health service quality. *Policy & Politics, 33*(4), 675-692. https://doi.org/10.1332/030557305774329145

Weller, J., Thwaites, J., Bhoopatkar, H., & Hazell, W. (2010). Are doctors team players, and do they need to be. *The New Zealand Medical Journal, 123*(1310), 109-117.

WHO (2021). *Constitution of the World Health Organization.* Accessed 4 Nov 2021. https://www.who.int/governance/eb/who_constitution_en.pdf

Wu, Y. C., Chen, C. S., & Chan, Y. J. (2020). The outbreak of COVID-19: An overview. *Journal of the Chinese medical association, 83*(3), 217-220. https://doi.org/10.1097/JCMA.0000000000000270

Yang, J., Yang, H., & Chen, X. (2015). Evaluation Model for Hospital Service Quality. *In International Conference on Logistics Engineering,* 1455-1458.

Zaccaro, S. J., Rittman, A. L., & Marks, M. A. (2001). Team leadership. *The leadership quarterly, 12*(4), 451-483. https://doi.org/10.1016/S1048-9843(01)00093-5

Zeithaml, V. A., Berry, L. L., & Parasuraman, A. (1996). The behavioral consequences of service quality. *Journal of marketing, 60*(2), 31-46. https://doi.org/10.1177/002224299606000203

Zhang, Y., Sun, Z., Latour, J. M., Hu, B., & Qian, J. (2020). Hospital response to the COVID-19 outbreak: The experience in Shanghai, China. *Journal of advanced nursing*, *76*(7), 1483–1485. https://doi.org/10.1111/jan.14364

Zhang, Y., Yu, Y. S., Tang, Z. H., Chen, X. H., & Zang, G. Q. (2013). 10th anniversary of SARS: China is better prepared for the H7N9 avian influenza outbreak. *The Journal of Infection in Developing Countries, 7*(10), 761-762. https://doi.org/10.3855/jidc.3850

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Appendix A - Questionnaire

关于疫情期间的医院服务质量的问卷调查

亲爱的女士/先生，您好！我们是里斯本大学学院ISCTE的学生，正在做一个提高医院服务质量相关的课题研究，希望您能花5分钟左右的宝贵时间帮助我们填写以下问卷，全程问卷不记名，数据仅作研究之用并会保密。非常感谢您的支持与帮助！

* **请考虑您所在的医院，在去年的新冠肺炎疫情危机期间，您认为以下做法在多大程度上描述了您所在的医院所发生的事情？（1为非常不同意，2为不同意，3为稍微不同意，4为中立，5为稍微同意，6为同意，7为非常同意）：**

	非常不同意	不同意	稍微不同意	中立	稍微同意	同意	非常同意
1.用外部的医疗专业人员加强团队的力量。	○	○	○	○	○	○	○
2.建立了后备团队（额外的团队来替换缺失的专业医护人员或在需求激增的情况下被部署）。	○	○	○	○	○	○	○
3.标准化了护理程序。	○	○	○	○	○	○	○
4.明确了每个工作人员的职责。	○	○	○	○	○	○	○
5.建立了一个由所有科室护士长组成的护理技术支持小组。	○	○	○	○	○	○	○
6.成立了一个小组，收集关于病毒的新信息，重新调整了应急计划。	○	○	○	○	○	○	○
7.建立了明确的人员配置结构和交接班模式，并核实程序是否得到遵守。	○	○	○	○	○	○	○
8.提供了关于服务和环境特点、空间规划和重组、消毒措施和防护方案知识、工作程序和医疗设备使用的培训。	○	○	○	○	○	○	○
9.通过在线媒体、免费热线咨询和在线视频心理干预，向民众提供了心理支持服务。	○	○	○	○	○	○	○
	非常不同意	不同意	稍微不同意	中立	稍微同意	同意	非常同意
10.提供了基于网络的医疗咨询、预约、处方服务和药品配送。	○	○	○	○	○	○	○
11.为与疾病作斗争的患者提供了在线支持，并监测着居家隔离的新冠肺炎患者。	○	○	○	○	○	○	○
12.允许了工作人员收集数据，用于院内治疗的进步。	○	○	○	○	○	○	○
13.使用了基于应用程序的二维码与病人分享信息。	○	○	○	○	○	○	○
14.使用了机器人完成某些任务，避免人与人之间的接触。	○	○	○	○	○	○	○
15.将与新冠肺炎患者有直接接触的医护人员的工作时间表减少到了4至6小时。	○	○	○	○	○	○	○
16.在病人入院的高峰期增加了工作人员的数量。	○	○	○	○	○	○	○

17.提供了营养餐。	○	○	○	○	○	○	○
18.通过微信群和在线平台为医护人员和全体员工提供了心理支持 。	○	○	○	○	○	○	○
19.通过日常会议促进了畅通的沟通渠道。	○	○	○	○	○	○	○
	非常不同意	不同意	稍微不同意	中立	稍微同意	同意	非常同意
20.利用了沟通平台，通常是微信群，偶尔也有电话交流，并建立了日常护理信息系统。	○	○	○	○	○	○	○
21.放置了实物标志，如表示医院不同区域的多色箭头，以及在不同区域展示的防护方案的海报。	○	○	○	○	○	○	○
22.将体温超过37.5°C和/或有呼吸道症状的患者转到了专为发热患者提供的门诊服务或急诊科。	○	○	○	○	○	○	○
23.对医疗器具（如听诊器、温度计等）采取了严格的消毒措施。	○	○	○	○	○	○	○
24.实施了视频访问系统，以促进患者和他们的家人之间的交流。	○	○	○	○	○	○	○
25.实时记录了设备的使用情况，严格的控制了医院内物资的接收和分配。	○	○	○	○	○	○	○
26.确保了护理人员正确的穿戴个人防护用品，禁止不同有效期的物资混合使用，确保不同物资从最旧的到最新的被使用。	○	○	○	○	○	○	○
27.使全身保护性防护服的强制使用只针对于新冠肺炎重症监护室的工作人员。	○	○	○	○	○	○	○
28.将许多非新冠肺炎医院区域改造成了专门的新冠肺炎病房（有负压室）。	○	○	○	○	○	○	○
29.安置了发热帐篷，改造了病房，为患者建立了单向通道，并减少了患者在整个医院内的流动。	○	○	○	○	○	○	○
30.创建了 "三区 "系统，包括污染区、潜在污染区和清洁区。	○	○	○	○	○	○	○
31.分开了医务人员和患者的通道。	○	○	○	○	○	○	○
32.将双人病房改为了单人病房。	○	○	○	○	○	○	○
33.为那些需要住在同一病房的患者保留了一米以上的床位间距。	○	○	○	○	○	○	○

* 下面是有关医疗流程质量的描述，请选择与个人实际情况相符合的程度（1为完全不符合，2为不符合，3为有点不符合，4为中立，5为有点符合，6为符合，7为完全符合 ）：

	完全不符合	不符合	有点不符合	中立	有点符合	符合	完全符合

1. 整个医疗流程具有良好的反馈系统和管理。	○	○	○	○	○	○	○
2. 整个医疗流程中，患者的问题可以便捷的得到解答。	○	○	○	○	○	○	○
3. 整个医疗流程可以在短时间内完成。	○	○	○	○	○	○	○
4.整个医疗流程都有完整的医疗操作记录。	○	○	○	○	○	○	○
5.整个医疗流程能够正确完成开具的医疗项目。	○	○	○	○	○	○	○
6.整个医疗流程没有错误。	○	○	○	○	○	○	○
7.整个医疗流程可以兑现对患者的承诺。	○	○	○	○	○	○	○
8.整个医疗流程具有良好的安全机制。	○	○	○	○	○	○	○
9.整个医疗流程是被患者信赖的。	○	○	○	○	○	○	○

* 下面是有关员工行为在医院中的描述，请选择与个人实际情况相符合的程度（1为完全不符合，2为不符合，3为有点不符合，4为中立，5为有点符合，6为符合，7为完全符合）：

	完全不符合	不符合	有点不符合	中立	有点符合	符合	完全符合
1.履行职能时牢记团队和组织的利益。	○	○	○	○	○	○	○
2.主动为团队和组织完成工作任务。	○	○	○	○	○	○	○
3.参与并且帮助团队和组织。	○	○	○	○	○	○	○
4.与他人分享有关工作的知识。	○	○	○	○	○	○	○

* 下面是有关社会人口学特征的描述，请选择与个人实际情况相符合的选项

1.您的年龄是?

- A.18-24岁
- B.25-34岁
- C.35-44岁
- D.45-54岁
- E.55及以上

* 2.您的性别是?

- A.男
- B.女

* 3.您的职业是? 【Multiple】

- A.医生
- B.护士
- C.行政人员
- D.其它

* 4.您的受教育程度是?

- A.高中同等学历
- B.本科或同等学历
- C.硕士
- D.博士

* 5.您所在医院的级别是?

- A.一级
- B.二级
- C.三级
- D.其它

* 6.您在所在医院的工作年限是多少年？（如果少于1年，请写0）

Appendix B - Run MATRIX procedure

```
Run MATRIX procedure:

***************** PROCESS Procedure for SPSS Version 3.5 *****************

        Written by Andrew F. Hayes, Ph.D.      www.afhayes.com
   Documentation available in Hayes (2018). www.guilford.com/p/hayes3

**************************************************************************
Model  : 4
   Y  : SQ_9it
   X  : BHMP3_4i
   M  : TMH4it

Covariates:
 profess  edu     Hpttier  gender   age

Sample
Size:  410

**************************************************************************
OUTCOME VARIABLE:
 TMH4it

Model Summary
         R      R-sq       MSE         F       df1       df2         p
     ,1668     ,0278    1,3349    1,9226    6,0000   403,0000     ,0760

Model
            coeff       se         t         p      LLCI      ULCI
constant    5,5188     ,6026    9,1578     ,0000    4,3341    6,7035
BHMP3_4i     ,1198     ,0426    2,8140     ,0051     ,0361     ,2035
profess     -,0577     ,0689    -,8379     ,4026    -,1932     ,0777
edu         -,1946     ,1511   -1,2875     ,1986    -,4917     ,1025
Hpttier     -,0259     ,0899    -,2881     ,7734    -,2026     ,1508
gender      -,0266     ,1185    -,2246     ,8224    -,2596     ,2064
age         -,0600     ,0562   -1,0683     ,2860    -,1704     ,0504

Standardized coefficients
            coeff
BHMP3_4i     ,1386
profess     -,0414
edu         -,0665
Hpttier     -,0144
gender      -,0112
age         -,0554

**************************************************************************
OUTCOME VARIABLE:
 SQ_9it

Model Summary
         R      R-sq       MSE         F       df1       df2         p
     ,2031     ,0412    1,3450    2,4702    7,0000   402,0000     ,0172

Model
            coeff       se         t         p      LLCI      ULCI
constant    3,7554     ,6649    5,6482     ,0000    2,4483    5,0625
BHMP3_4i     ,1351     ,0432    3,1296     ,0019     ,0502     ,2199
TMH4it       ,1076     ,0500    2,1515     ,0320     ,0093     ,2059
profess      ,0452     ,0692     ,6530     ,5141    -,0909     ,1813
edu          ,1248     ,1520     ,8210     ,4121    -,1740     ,4236
Hpttier     -,0137     ,0902    -,1522     ,8791    -,1911     ,1637
gender       ,0408     ,1190     ,3430     ,7318    -,1931     ,2747
age         -,0033     ,0564    -,0586     ,9533    -,1143     ,1077

Standardized coefficients
            coeff
BHMP3_4i     ,1548
TMH4it       ,1066
profess      ,0321
edu          ,0423
Hpttier     -,0076
```

```
gender       ,0171
age         -,0030

Test(s) of X by M interaction:
         F       df1       df2         p
    6,6176    1,0000   401,0000     ,0105

************************ TOTAL EFFECT MODEL ****************************
OUTCOME VARIABLE:
 SQ_9it

Model Summary
         R      R-sq       MSE         F       df1       df2         p
     ,1738     ,0302    1,3571    2,0916    6,0000   403,0000     ,0532

Model
            coeff         se         t         p      LLCI      ULCI
constant    4,3491     ,6076    7,1575     ,0000    3,1546    5,5437
BHMP3_4i     ,1480     ,0429    3,4463     ,0006     ,0636     ,2324
profess      ,0390     ,0695     ,5612     ,5749    -,0976     ,1756
edu          ,1039     ,1524     ,6816     ,4959    -,1957     ,4034
Hpttier     -,0165     ,0906    -,1823     ,8555    -,1947     ,1616
gender       ,0379     ,1195     ,3176     ,7510    -,1970     ,2729
age         -,0098     ,0566    -,1724     ,8632    -,1211     ,1015

Standardized coefficients
            coeff
BHMP3_4i     ,1696
profess      ,0277
edu          ,0352
Hpttier     -,0091
gender       ,0159
age         -,0089

************** TOTAL, DIRECT, AND INDIRECT EFFECTS OF X ON Y **************

Total effect of X on Y
    Effect         se         t         p      LLCI      ULCI      c_ps      c_cs
     ,1480     ,0429    3,4463     ,0006     ,0636     ,2324     ,1260     ,1696

Direct effect of X on Y
    Effect         se         t         p      LLCI      ULCI     c'_ps     c'_cs
     ,1351     ,0432    3,1296     ,0019     ,0502     ,2199     ,1150     ,1548

Indirect effect(s) of X on Y:
          Effect    BootSE   BootLLCI   BootULCI
TMH4it     ,0129     ,0080     ,0006     ,0312

Partially standardized indirect effect(s) of X on Y:
          Effect    BootSE   BootLLCI   BootULCI
TMH4it     ,0110     ,0068     ,0005     ,0271

Completely standardized indirect effect(s) of X on Y:
          Effect    BootSE   BootLLCI   BootULCI
TMH4it     ,0148     ,0092     ,0007     ,0366

********************** ANALYSIS NOTES AND ERRORS ************************

Level of confidence for all confidence intervals in output:
  95,0000

Number of bootstrap samples for percentile bootstrap confidence intervals:
  5000

------ END MATRIX -----
```