Functions, advantages and challenges facing private healthcare organisations in China’s healthcare system: a qualitative analysis through open-ended questionnaires

Meijiao Wang,¹ Xiaotong Chen,² Yu Sun,²,³ Qi Wang,¹ Gordon Liu²,³

ABSTRACT

Objectives The medical reform in 2009 stimulated the growth of private healthcare organisations in China, but there is still room for their further development in the healthcare market. The objectives of the study were to provide more information about the healthcare market in China and to explore the challenges private healthcare organisations faced.

Design Qualitative descriptive study using a web-based open-ended questionnaire and thematic content analysis. Data were collected between 12 February and 20 February 2020.

Setting This study was conducted in China.

Participants 124 respondents from private healthcare organisations across 20 provinces in China.

Results Our content analysis identified three themes: (1) functioning and positioning of the healthcare institutions: current private healthcare organisations generally serve as a supplement to public hospitals and focus more on specialised medical and high-end services; (2) institutions’ advantages: private healthcare organisations can flexibly respond to market demands, formulate effective strategies, introduce advanced management concepts and methods, provide personalised and diversified services, and introduce new technologies which can stimulate market vitality and promote healthy competition; and (3) institutions’ challenges: private healthcare organisations face difficulties in professional development and talent cultivation, brand building and establishing a reputation, and the policies for institution establishment, tax and medical insurance pose drawbacks to their development.

Conclusion This study illustrates that private healthcare organisations need more government support for further development, such as providing a fairer insurance strategy and taxation policy, affording ground for a more equitable scientific research environment and promotion opportunities, and evaluating reputation score for healthcare institutions.

INTRODUCTION

Considering China’s rapidly growing ageing population and the improvements in living standards, medical and health demands are expanding on a large scale. Over the years, public hospitals have dominated the medical service system, but their existence alone is no longer sufficient to cope with the drastic growth and changes in medical demand. The public has also criticised the disadvantages of the monopoly of public hospitals¹ ² and expressed dissatisfaction with the problem of ‘difficult to see a doctor and expensive to see a doctor’.³ On the other hand, China has a large population. While the total number of medical institutions is large, the per capita medical service volume is insufficient.⁴ Moreover, the distribution of medical and health resources in China is imbalanced. Large-scale and high-quality medical institutions are primarily distributed in the central, eastern, and coastal regions, with higher concentration in cities, making it challenging to meet the needs of the general public.⁵⁻⁷

Healthcare services provided by private healthcare organisations have been identified as an important way of improving accessibility, quality and efficiency of the healthcare industry.⁸ First, private healthcare organisations have been proven to play an essential role in the clinical healthcare system in
many countries, increasing the accessibility of healthcare services.\textsuperscript{9,10} Although a few studies have raised concerns about the health equity of private healthcare providers, claiming that they primarily serve higher socioeconomic classes,\textsuperscript{11–14} it can also be viewed as an important way to reduce disparities in medical service access by creating more room and opportunities for the lower-income population to access public healthcare organisations and resources.\textsuperscript{15} In addition, providers at private facilities do deliver a significant portion of healthcare services, especially in low-income and middle-income countries, including in both rural and urban areas and for different ethnicities and socioeconomic groups,\textsuperscript{16} thus increasing the accessibility of medical services to all residents.\textsuperscript{17} The increase in accessibility and market expansion allows patients with milder conditions to be treated earlier, resulting in early prevention of disease progression and an overall decrease in disease severity.\textsuperscript{18} Second, the development of private healthcare organisations can introduce a ‘catfish effect’ in the entire medical service industry, thereby improving the efficiency and service quality.\textsuperscript{20–22} On the other hand, several other studies have reached opposing conclusions that privatisation may cause medical inequality, increase cost for patients and potentially increase revenue by dropping unprofitable but valuable services.\textsuperscript{23} However, such problems are closely related to the government’s management capabilities, industry regulations and the market share of private healthcare organisations. In addition, public–private partnerships in healthcare, a particular form of development of private healthcare organisations, can enable the government to improve its healthcare system and address deficiencies infrastructural and clinical aspects such as diagnosis, care and treatment.\textsuperscript{24} Therefore, expanding private healthcare organisations to provide more healthcare services for patients to meet their complex needs has the potential to increase the accessibility of services and may be an effective way to ensure the scarce resources in the hospital sector are used more efficiently.\textsuperscript{25}

In order to solve the issues in the current medical system, China announced a series of policies to encourage the development of private healthcare organisations after 2009 to provide adequate medical services (online supplemental appendix table 1). These policies aim to improve the current healthcare system’s capacity and supply the public with higher quality, more affordable and comprehensive medical services.\textsuperscript{26} As a result, the proportion of private healthcare organisations in the market rose from 17.22% to 63.55% between 2005 and 2018, showing rapid growth of private healthcare organisations.\textsuperscript{27,28} Among them, the proportion of general hospitals increased from 30.98% to 61.67%; specialised hospitals increased from 55.33% to 77.91%; and nursing homes increased from 55.10% to 90.57% from 2010 to 2018 (online supplemental appendix table 2). However, there were still considerable gaps in the number of beds and healthcare professionals between public and private healthcare organisations in 2018,\textsuperscript{29} indicating that the size of private healthcare organisations is generally smaller than that of public hospitals. In addition, private healthcare organisations only account for a very small part of the market. It is difficult for private healthcare organisations to gain sufficient public recognition for health services in China. Many people have a negative opinion of the private sector. They believe that it is poorly controlled, money-driven and permeated by less qualified doctors or even ‘fake doctors’ and ‘fake pharmaceuticals’.\textsuperscript{30–33} Moreover, many private healthcare organisations are not covered by social health insurance policies, resulting in patients preferring public providers.\textsuperscript{34} Therefore, patients are more willing to go to public medical institutions for treatment, and visits to private healthcare organisations account for only 14.7% of the total healthcare market,\textsuperscript{29} suggesting there is still room for development for private healthcare organisations.

Given the benefits mentioned previously of private healthcare organisations, it is necessary to explore the external factors (ie, social environments and policies) that prevented private healthcare organisations from achieving enough success in China. Existing studies on this topic in China focus on the perspectives of policy creators, regulators and consumers. There are limited studies on the perspective of managers and administrators of private healthcare organisations. Therefore, this study aims to understand the problems that still exist in China’s healthcare market and to explore the difficulties and challenges private healthcare organisations face from the perspective of private healthcare organisations’ administrators. We used qualitative data gathered from key stakeholders and respondents from the private sector to provide more information about the healthcare market in China and explore the developmental dilemmas encountered in the development of hospitals.

METHODS

Study design and setting

This cross-sectional study used an open-ended questionnaire to evaluate the perspectives of department managers of private healthcare organisations on the functions, advantages and challenges of the private healthcare organisations in China.

Respondents

The respondents were recruited by the Chinese Non-government Medical Institutions Association (CNMIA), which is a national independent non-profit association established voluntarily by private healthcare organisations, social groups, and other relevant organisations and individuals. These respondents are institution-level or department-level managers familiar with the operation, administration and macro-organisation of their healthcare institutions.

Data collection and questionnaire

The questionnaire was distributed by the CNMIA to their members who are likely to respond between 12 February
and 20 February 2020 using an online system named Wenjuanxing in WeChat. The CNMIA helped us advertise the questionnaire to their members and deliver the invitation letter and questionnaire link to potential volunteer respondents. Since the questionnaire was as an advertisement, we used voluntary response sampling method. A total of 128 questionnaires were recovered, of which 124 across 20 provinces in China were valid questionnaires.

The questionnaire was initially formulated by two investigators. We sent the questionnaire to five experts outside the research group and discussed the reasonableness of the questionnaire through an expert discussion meeting. Before the formally distributing the questionnaire, we conducted a pretest involving several hospital directors for further improvements. The final questionnaire comprised 4 major sections and 19 open-ended questions regarding private healthcare organisations. The four sections included (1) the role of private healthcare organisations’ services, (2) barriers and facilitators of private healthcare organisations, (3) career development for health professionals in private healthcare organisations and (4) perspectives on the improvement of the healthcare system. In addition, the respondents were inquired about the characteristics of their workplaces and demographics, education level and job positions.

Data management and analysis
Responses to the open-ended questionnaire were electronically exported into excel documents. One investigator reviewed all responses and deleted duplicate or ineffective data (due to improper operation of the online survey) to ensure the quality of all responses. This investigator continued to identify all questionable responses, and another investigator checked these responses with the original submission.

We used conventional content analysis to code themes in the open-ended responses. Two research fellows at the China Centre for Health Economics Research performed coding of the questionnaire responses to generate an initial codebook using NVivo V.12 software. Two principal investigators then reviewed the data and the codebook to validate the coding and ensure no relevant information was overlooked. All the researchers attended discussions to reflect on the codebook edits, the collection of codes into themes and the significance of the identified themes and ultimately reached a consensus on the final version.

Patient and public involvement
No patient was involved in the study.

RESULTS
Descriptive statistics
The total number of effective respondents was 124, and their demographic and work-related characteristics are summarised in table 1. Of the 124 respondents, 79 were male and 23 were female. A majority of the respondents were over the age of 50, and most respondents had attained a bachelor’s degree. Our respondents held various positions in their institutions, from administrative officers to clinical professionals. Most of them held high-level positions such as president, vice president and department chair.

The characteristics of the private healthcare organisations where our respondents work are summarised in table 2. These private healthcare organisations are distributed in 24 of China’s 34 provincial-level administrative regions, covering the eastern, central and western regions of the country (online supplemental appendix table 3). Most organisations are general or specialty hospitals, with a few community medical and health centres. Healthcare organisations are also classified based on the three-tier system, which designates these organisations into primary (21.1%), secondary (39.4%) or tertiary (12.8%) categories. With regard to the number of hospital beds by the end of 2018, most organisations had between 1 and 500 beds, while a small number had either no beds or more than 1000 beds.

Table 1  Respondents’ demographic and work-related characteristics (N=124)
<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>Frequency (%)</th>
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<tr>
<td>Sex</td>
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<tr>
<td>Male</td>
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<td>21.0</td>
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<td>8.9</td>
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<td>3.2</td>
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<td>2.4</td>
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<tr>
<td>Doctor</td>
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<td>2.4</td>
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and small-scale hospitals, and they can help improve medical service capabilities, especially in regions with inadequate public healthcare services and insufficient medical resources.

Thirty-eight respondents believed private healthcare organisations should focus on specialty services and provide convenient medical care. Thirty-eight other respondents stated that private healthcare organisations should aim to provide high-end services, orient towards the middle-income and upper-income classes to provide personalised and refined health services, and develop continuity of services according to the specific needs of different people. According to the characteristics of the healthcare organisations the respondents belong to, respondents from medium-sized and large-sized private hospitals aim to provide comprehensive, high-quality and integrated services. In contrast, those from small private hospitals aim to supply unique and personalised services.

Private healthcare organisations are a supplement to the provision of various high-end medical services and primary medical care.

Private healthcare organisations should aim to establish the continuity of medical services based on the primary medical care and essential public health services of public hospitals.

… specialty hospital with particular subset of skills to serve the corresponding populations.

… specialty services with their own unique characteristics.

Private healthcare organizations are oriented toward the middle and upper-income class populations, mainly providing non-basic medical and health services.

Make up for the shortcomings of public medical institutions and develop continuity of medical services according to the needs of different people, such as high-end medical services, rehabilitation, long-term care, elderly care, etc.

Enrich and complement public health care with personalized medical service features.

From providing simple medical services to integrated services such as medical treatment, prevention and health care, we prioritize the need to provide comprehensive and high-quality services.

When answering questions about their own institutions’ positioning, 56 respondents stated that the various medical specialties are the primary type of service their institutions provide, such as cosmetology, dentistry, ophthalmology, dermatology, rehabilitation and community medical care, and medical testing. Another seven respondents noted that the key service direction of their hospital is general medicine. Forty-seven respondents expressed that they wished to maintain the current positioning and asserted that their organisations had accumulated several advantages over the years. On the other hand, 60 respondents declared possible future adjustments because of the monopolisation of public hospitals in primary medical care and disease treatment, leaving limited space and opportunity for private healthcare organisations. Therefore, they will adjust their services towards other areas, such as preventive medicine and disease management. In general, respondents from small organisations are more likely to strengthen their specialties without adjusting direction. In contrast, those from large and medium-sized organisations tend to add rehabilitation services, combine medical and elderly care, establish telemedicine and construct integrated regional medical centres. In addition, given China’s vast ageing population, seven respondents said they should pay greater attention to the elderly’s health, particularly

The block quote is the original words of the respondents. We just translated the Chinese answers into English.
in traditional care, chronic illness management, mental health services, and related health and wellness services.

Instead of adjusting, we will continue to improve under the current positioning of the institution to ensure high quality of service.

Since the government is too monopolistic towards basic medical services and their policies are unstable, only the big health sector has room for extensive development.

...we plan to improve the service capacity and adjust to the high-end direction accordingly.

There are planned adjustments to expand into the chronic disease management market.

...we plan to expand rehabilitation medical services in addition to specialized medical services in psychiatric medical institutions.

...currently planning on adding elderly care services.

...integration of medical institutions and nursing homes.

**Advantages of private healthcare organisations**

Respondents generally believed that the addition of private healthcare organisations to the market could provide more diverse and personalised medical services, which could offer patients more options and accessibility. Their flexible practices in management, staff incentives and technological innovations can stimulate market vitality and promote healthy competition, which are private healthcare organisations’ major contribution to the entire healthcare industry.

Seventy-three respondents declared that private services are more oriented towards individualised market needs and can make timely adjustments. They argued that their organisations are more concerned about the patient’s medical experience, have a stronger awareness of serving and provide a better medical environment than public hospitals. At the same time, they also provide targeted and personalised services to meet the multilevel needs of patients.

The content of the service can be flexibly modified according to market demand.

Private hospitals can grasp market demands and flexibly adjust business strategies based on market research.

Create and provide personalized, high-end services such as private customized membership service, VIP ward service, confinement club service, etc.

Private hospitals present themselves with convenient medical care, multi-level and diversified services, attention to detail, high service quality, reasonable fees, and emphasis on brand reputation.

In addition, the flexibility of private healthcare organisations in terms of staff incentives, management and operation and technical support generates the catfish effect, which can help stimulate market competition.

Among the respondents, 56 thought that private healthcare organisations could independently enforce rewards and punishments, transparent salaries and comprehensive performance appraisals to motivate medical staff.

Private healthcare organizations provided full autonomy in incentive mechanism, performance appraisal, service evaluation, etc.

The medical professionals’ salary is flexible to reflect their value to the institution and society.

Another 46 respondents answered that private healthcare organisations have advantages in management and could introduce management philosophies such as centralised procurement, cost control, chain operations and brand effects into the medical industry.

Private hospitals have a relatively mature model in terms of chain operation and group management.

...more refined management with accurate accounting and better cost control.

Private healthcare organizations enforce centralized procurement in the supply chain, lower procurement costs, and online process management.

Moreover, 37 respondents believed that private healthcare organisations could quickly introduce new technology, methods and equipment due to the flexibility of management and form unique advantages in several fields. Specifically, respondents from large organisations claimed they allocate more resources to allow their organisations to become leaders in clinical technology and skillfulness, while respondents from smaller organisations focus more on meeting current technical and clinical standards and acquiring unique skills.

Private healthcare organizations have advantages in introducing advanced technologies, techniques, and talents from abroad and obtaining international healthcare accreditation.

Lastly, 77 respondents stressed that a competitive market will help improve the quantity and quality of medical services.

**Challenges faced by private healthcare organisations**

We identified four major challenges faced by private healthcare organisations.

First, 110 respondents emphasised significant differences in policies between the for-profit private healthcare organisations and the public medical institutions, such as access to the market, taxation, health insurance policies and more.

Fifty-one respondents stated that there are barriers limiting institutional development and limited supervision regulating professional qualification.

There are contradictions between relaxing market access and regional medical institution establishment.
planning. Local governments often restrict the development of private healthcare organisations due to the restrictions of regional health planning and medical institution establishment planning.

Fifty-two respondents were dissatisfied with the current tax policy and thought tax levying only depends on the for-profit or non-profit nature of the medical organisation, without considering the scope and nature of the medical service itself. This policy led to similar medical services facing different tax treatments in medical organisations of different natures and increased the cost of medical services provided by private healthcare organisations.

Compared with public hospitals, private healthcare organisations are generally self-financing and have to pay more taxes and funds such as trade union funds, vocational education fees, disability funds, business tax, urban maintenance and construction tax, education surtax, local education fees, etc., which create a significant burden.

The basic medical services provided by for-profit hospitals are subject to 25% income tax, whereas the same services provided by non-profit hospitals are exempted from tax filing.

Ninety-four respondents argued that there were unfair treatments for private healthcare organisations in medical insurance policies compared with public healthcare institutions. Also, supplemental health insurance is underdeveloped.

It is more difficult for private healthcare organisations to obtain medical insurance designated qualifications, and they always receive a small share of the total medical insurance fund under the total prepayment system.

Due to the insurance companies’ lack of confidence in the profitability and the government’s lack of strong promotion of supplementary medical insurance, it will take some time for commercial insurance to become more universal.

Second, 70 respondents stated that private healthcare organisations face immense challenges in attracting high-quality medical talents and organising residency programmes to train and cultivate new medical school graduates due to their short development time and insufficient patient volume.

…private healthcare organizations have a severe lack of attraction for talents due to lack of staffing quota system benefits, lower academic status and a shorter establishment period.

There is a general scarcity of highly qualified medical personnel, all-around management talents and technically competent personnel.

Twenty-eight respondents expressed that although private healthcare organisations provide doctors with high salaries and favourable living conditions, private healthcare organisations’ social security benefits and welfare are far from comparable with that of public hospitals. The staffing quota system of public institutions makes it less likely for health professionals in public hospitals to have the desire to transfer to private healthcare organisations.

Public hospitals provide career status with employment benefits, while private hospitals are not able to.

Due to the imperfect social security mechanism, long-term employee benefits are still far lower than public hospitals. Moreover, under the staffing quota system of public institutions, professional and technical personnel in public hospitals will not easily move to social medical institutions.

Seven respondents reported a significant gap between private and public healthcare institutions in scientific research and academic ability and status. It is difficult for medical professionals to conduct advanced research with the resources provided by the institutions. Moreover, applications for high-level scientific research projects in private healthcare organisations are restricted by policies.

In terms of talents, it is difficult for private healthcare organisations to attract and retain backbone technical personnel and outstanding young talents with the lack of academic status, teaching and scientific research support.

As for the training of young medical staff, eight respondents said it is difficult to create residency programmes to train and cultivate new medical school graduates.

Young medical personnel recruited through campus recruitment channels can only be sent to public hospitals with standardized residency programs for rotation training. However, during the training period, young medical staff do not rotate in private healthcare organizations.

Third, 50 respondents highlighted the extremely high importance of branding and thought that private healthcare organisations’ public acceptance is low.

In the past, the phenomenon of “cheating and fraud” in private hospitals was common, which led to their bad reputation.

Due to the lack of understanding of private healthcare organisations by the public, coupled with the “Wei Zexi incident” and other non-standard operation behaviors in Putian hospital industry in recent years, the social understanding of private healthcare organisations is biased, which restricts their development to a certain extent.

Fourth, 10 respondents highlighted the long-standing history associated with public hospitals and its impact on the resources private healthcare organisations receive.

Due to the longstanding policies and historical accumulation supporting the development of public
hospitals, they enjoy a superior quality of medical resources, including various talents, technologies, and finance.

**DISCUSSION**

Since the medical reform in 2009, private healthcare services have received extensive attention as an important player in deepening the reform. Their functions in expanding medical resources, improving competition momentum and providing diversified services have been fully affirmed. How to give full play to the positive role of private healthcare organisations in the medical system is an urgent issue. This study delivered a questionnaire to private healthcare organisations to review the operating environment and regulatory policies and to analyse the main challenges encountered by these organisations in the industry.

The respondents generally believed private healthcare organisations are more sensitive to incentives and responsive to various emerging health needs. Therefore, they could pay more attention to patients’ medical experience and flexibly provide targeted and personalised services, which were also highlighted in previous studies. Especially in the case of China’s fast-growing ageing population, respondents asserted that private healthcare organisations could respond more flexibly to the new medical and disability service demands to better serve the elderly than public healthcare organisations that rely more on government programmes. Private healthcare organisations could also integrate medical services and elderly care to meet the elderly’s expectations for quality of life. Similar to other studies, private healthcare organisations could provide medical staff with broader practice space and more flexible incentive conditions.

Previous research shows that the development of private healthcare organisations in China can promote competition in the medical service industry, reduce medical expenses, steadily enhance patients’ welfare and improve efficiency. However, our research found that the current positioning of private healthcare organisations in China is mainly supplementary to public hospitals, which still dominate the healthcare market. They have not established sufficient competition with public hospitals and cannot give full play to their competitive advantages, consistent with the findings in previous studies. In addition, the dominance of public hospitals is difficult to be shaken in the upcoming years as the administrators of private medical organisations do not yet have the intention and confidence to do so. Thus, competition has not yet fully played its role in pushing the reform of public hospitals.

In contrast to public medical institutions with long-accumulated experience and long-term national financial support in discipline construction and personnel training, private healthcare organisations are disadvantaged in the capital, experience accumulation, policies, talents and branding due to their shorter operating time.

The current policies for institution establishment, tax and medical insurance pose drawbacks to private healthcare organisations. The social medical access policy has strict requirements that result in barriers restricting the establishment of private healthcare organisations, such as the specific location of the organisations, total investment, complicated application and approval procedures, and lengthy approval periods. The current domestic taxation policy is determined by whether the hospital is a for-profit or non-profit organisation. For for-profit private healthcare organisations, even if they are engaged in non-profit activities such as rehabilitation and public health services, they are still required to pay taxes due to their status restrictions. Since the ‘VAT reform’ policy in 2016, the tax burden of private healthcare organisations increased, as mentioned by the respondents, a point less discussed in previous studies. According to the law, the medical service itself is tax-exempted, but the deductions of non-medical taxable services are relatively low. Respondents also complained that this part of the operating costs of private healthcare organisations is higher than that of public medical institutions. In addition, the respondents argued that they encountered more difficulties to be selected as designated hospitals of basic medical insurance and received lower quota payments than the public healthcare institutions, which is also reflected in the data from previous statistical studies. They also expressed the desire to allow private healthcare organisations to have the same reimbursement policy as public hospitals.

Some studies mentioned that private healthcare organisations have low awareness of personnel training; managers often overlook the importance of personnel cultivation and talent pool construction. However, our study found that the existing medical system and policies restrict the ability of private healthcare organisations to attract and manage talent. The staffing quota system, scientific research project opportunities, different social security benefits and professional title promotion are major difficulties facing private healthcare organisations in attracting and retaining talents, which were also highlighted in previous research. Many respondents suggested breaking through stereotypes about current mechanisms of personnel development and encouraging healthcare personnel to flow between institutions. Systematic training and advanced studies are also needed to enable talented personnel’s value to be fully realised in private healthcare organisations.

Most private healthcare organisations are distrusted by the public, a finding that is consistent with research done from the public’s perspective. Previous studies have often attributed the source of distrust to the improper operation of private medical organisations and the adoption of improper or even illegal marketing methods, such as false publicity, price gouging, excessive medical...
treatment and even illegal operation beyond the scope of practice.\textsuperscript{54,55} In our study, the respondents argued that only a small portion of private healthcare organisations in the industry are fraudulent and ill-intentioned, but their poor reputation has led to public distrust of the entire industry. In addition, our study explored the reasons behind this distrust from the perspective of the private healthcare organisations and gathered that the public could not distinguish the qualified organisations from the unqualified, profit-seeking facilities with a history of malpractices such as illegal medical advertisements, illegal use of medical technology, and prescription of unnecessary medications and treatments. The issues mentioned previously increased the number of medical disputes, misled the public into thinking that the operation of private healthcare organisations is a malicious profit-seeking behaviour of the market economy, and damage the overall image and public credibility of private healthcare organisations.

**Limitations**

Due to the epidemic, our data were collected through open-ended questionnaires delivered via an online application to institution-level and department-level employers at private healthcare organisations. We only received 124 completed questionnaires, but we were unable to visit in person and invite more organisations to participate in our study. However, these 124 hospitals were located in 20 different provinces of China, and the number is higher than that of previous studies. A few respondents also raised some thought-provoking points regarding the pricing power and regulation of private healthcare organisations. However, their discussion of these points was brief and insufficient. Currently, we are unable to explore the answers further, but we hope to use qualitative interviews in the future to deepen our understanding of their responses. In addition, due to the format of the open-ended questionnaire, the method by which data were collected until no new content appeared, generally assumed as saturation in qualitative research, has limitations.

**CONCLUSION**

We provided an analysis of the current private healthcare organisations in China and discussed their functioning and positioning, advantages and challenges. This study illustrates that private healthcare organisations need more government support for further development and improvement. Systems that can provide a fairer insurance strategy and taxation policies, afford ground for a more equitable scientific research environment and promotion opportunities, and evaluate institutions’ reputation scores are suggested.

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**Contributors**

MW conceptualised the study and created the study design. MW, XC, QW and YS were responsible for drafting the article. QW organised the data. MW and XC were responsible for the interpretation of the data. GL supervised the study and responsible for the overall content. All authors have critically revised and approved the final version of the manuscript.

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**Competing interests**

None declared.

**Patient and public involvement**

Patients and/or the public were not involved in the design, conduct, reporting or dissemination plans of this research.

**Patient consent for publication**

Not applicable.

**Ethics approval**

This study involves human participants and was approved by Institutional Review Board (IRB) of College of Public Administration and Humanities at Dalian Maritime University (200102). Participants gave informed consent to participate in the study before taking part.

**Provenance and peer review**

Not commissioned; externally peer reviewed.

**Data availability statement**

No data are available.

**Supplemental material**

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