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# STUDY ON THE IMPROVEMENT OF MEDICAL SERVICE QUALITY IN BEIJING'S TIANQIAO COMMUNITY HEALTH SERVICE CENTRE

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## ABSTRACT

Within the context of the COVID-19 pandemic, community-level medical institutions as health service centres have been gaining importance in the medical reform expansion. As prior research has not fully addressed how to index and evaluate the quality of medical service, this article proposes a framework based on the service quality gap theory and the three-faceted “structure–process–outcome” quality evaluation theory. The study took the medical services at Beijing’s Tianqiao Community Health Service Centre as an example to construct an index system for medical service quality evaluations. Data was collected from 211 people, and SPSS software was used for data processing and analysis. Due to the COVID-19 pandemic, patients without serious diseases tend to choose community hospitals to reduce their infection risk. As a result, they have growing requirements for clinics to have more departments and specialists. The studied community health service centre has encountered difficulties connected to low patient expectations, a poor medical environment, outdated hardware and equipment, and a low level of medical services. Some suggestions have been made to add specialised departments and consider the convenience of medical treatment for the elderly.

## KEY WORDS

community health service centre, quality improvement, service quality, SERVQUAL model

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## INTRODUCTION

Community health care is a critical component of primary health care. Community health service centres play a positive role in solving prominent social problems related to the availability of complex

and expensive medical treatment to the public, reducing the cost of medical treatment for most patients and promoting the harmonious development of the doctor–patient relationship. Community health service centres have become an inevitable development

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trend in China, aiming to build an urban health service system based on comprehensive community health services. By 2020, China had set up 35 365 community service centres (“stations”), of which 9 826 were community health service centres, providing services to 620 million people nationwide. In recent years, the state has continuously increased its support to the medical and health fields, and the fifth plenary session of the 18th CPC Central Committee of China has elevated “building a Healthy China” to the status of the national strategy (Dong, 2018). China’s new medical reform policy priorities the upgrading of community health care. Support for community medical care has been gradually improved. Attention should be given to the medical efficiency of community health service centres.

The relationship between doctors and patients has always been a hot issue in society, and the quality of medical service directly influences people’s medical care experience. At present, China’s medical and health systems are in the key stage of in-depth reform. Problems, such as low utilisation rate of medical resources, high medical costs, and failure to provide guarantees of treatment efficacy, have become targets of this medical reform. Over the years, the state continuously increased policy support and capital investment in medical and healthcare fields and made the quality improvement of medical services a focus for the future work of the medical industry. As community-level medical institutions, community health service centres have wide coverage of special features and provide convenient access to medical services for the public. However, such medical institutions as community health service centres now face many problems, including inadequate medical facilities, a lack of competent medical workers, a “reversed triangle” pattern of resource structure etc., indicating an urgent need for improvement of the medical service quality.

Community health service centres, as primary medical facilities in the medical system, conveniently provide a wide range of medical treatment to the people under their jurisdiction. A community health service centre is a major source of primary health care for millions of Americans (Maggi et al., 2020). High-quality medical services can meet different health service needs of the people to improve the satisfaction level. Against the backdrop of the COVID-19 pandemic, community health service centres as community-level medical institutions have been gaining importance in medical reform. On the one hand, because of the routine COVID-19 control,

community health service centres are shouldering a heavier workload to provide public health service, epidemic detection, and routine epidemic prevention within their communities. On the other hand, community-level medical institutions should help ease the burden of larger hospitals when secondary and tertiary medical institutions get overcrowded. In addition, the reform poses new challenges to community health service centres, such as intelligent medical care and more diverse patient needs. However, most existing quality evaluation standards focus on the static analysis of aftercare results and expenditure while ignoring the dynamic quality management process of provided medical services, which is unsuitable for the current quality development status of medical services. The design of a reasonable and efficient evaluation framework becomes essential for solving these problems.

Many local and foreign scholars have conducted extensive studies on improving the quality of medical services. Ehlke (2018) examined the historical forces and antecedents that helped shape community health centres. Though the current iteration of community health centres dates back to the 1960s, their predecessors existed at the beginning of the 20th century. They mostly started as an urban phenomenon and rode the wave of the wider political programme and socioeconomic reforms of the Progressive Era (Ehlke, 2018).

The research on service quality began in the late 1970s. Lewis and Booms found that service quality has become the key basis for measuring customer service of enterprises (Lewis & Booms, 1983). In recent years, researchers have focused on the design of a service quality evaluation system. Parasuraman et al. proposed a conceptual service quality model, hoping to stimulate the interest of academia and quality service practitioners in providing a framework for further empirical research in this important field (Parasuraman et al., 1985; Yerdavletova & Mukhambetov, 2015). Ayanian included patient care in the medical quality evaluation system (Ayanian & Markel, 2016). Martin et al. (2016) found that the results of doctor rating websites had a positive impact on patient care. Fayissa et al. (2020) conducted a quantitative study on the classification rules for health care service quality in the nursing home industry.

The study found that the quality evaluation of community medical service has attracted much attention. Ai (2020) established the evaluation index system of Shanghai Medical and Health Care Inte-

grated Community Medical Service by SPO. Finnish scholars believed that the quality of medical service could be assessed by evaluating such indicators as treatment information, integrity, politeness, service professionalism, service awareness, disease development, privacy protection, test efficiency, and overall treatment success rate (Hiidenhovi et al., 2021).

Many scholars believe that heterogeneity factors will affect the quality of the evaluation. Meng et al. (2017) studied the construction of Internet Plus intelligent hospitals. Bowblis & Smith (2018) explored the impact of occupational licensing on service quality for community workers. Based on SERVQUAL evaluation, Al Borie & Sheikh Damanhour (2013) studied the satisfaction of medical service quality at public and private hospitals in Saudi Arabia and found that service quality had a certain impact on medical care strategies. Shi (2019) studied the improvement of community medical service using a patient experience survey based on the PPE-15 questionnaire. Du (2020) analysed the defects of public hospital service quality based on the five aspects of the SERVQUAL model.

Although no unified definition of medical service quality exists, Brook pointed out that “a good quality of medical service should guarantee high technical quality and should guarantee that the patients can receive loving and culturally appropriate treatment and fully participate in the decision-making of treatment plans”. This means that the quality of medical service includes not only traditional factors, such as accuracy, timeliness, and diagnostic integrity, but also new ones, such as patient satisfaction with the effectiveness of medical services, respect perceived by patients, medical service efficiency, medical continuity, a systematic approach, etc. (Robert et al., 2000). Wen Jie formulated targeted measures to improve the quality of medical services in a health centre. Such measures have promoted the health centre’s overall service capacity and given it a competitive edge compared to the competition (Jie, 2018).

The necessity to optimise the evaluation system for quality medical service is undeniable. Hou Xiong pointed out the problems existing in the service quality of Internet hospitals by developing the index system for their service quality evaluation and applied the Kano model analysis method to propose targeted improvement strategies for promoting a beneficial attitude regarding the development of Internet hospitals (Xiong, 2020). Larry et al. (2002) described the establishment of an on-site pharmacy in community health centres (CHC) to improve access to medica-

tions for impoverished patients, the implementation of pharmaceutical care programmes and clinical pharmacy services to improve patient care and therapeutic outcomes, and the development of an ambulatory care site for training pharmacy students. Wei Haizhu et al. took Hainan medical service practice as an example to study the optimization of medical service quality (Wei & Dong, 2020).

By constructing a theoretical model, Hasan (2012) evaluated the quality of primary health services in rural Bangladesh from structure to process and then to results. Structural dimensions included a lack of medical staff and absenteeism, a lack of available health experts, a harsh environment, and scarce resources. Process dimensions included timeliness and accessibility of health services, consultation time, provider behaviour, referral, and emergency services. The survey results showed that the lack of medical and health experts, inappropriate use of resources, slow health providers, and service consultation dominated by service providers would lead to low service efficiency and patient dissatisfaction (Hasan, 2012).

Chinese scholars also carried out relevant studies. Quan et al. (2018) pointed out that the current development of domestic community health service institutions is lagging behind, has a weak foundation and declining relative development ability, so it is urgent to build a good strategic ecosystem. They mainly highlighted two aspects. First, at the institution’s construction and management level, the health service institutions in most urban communities show imbalance, which is mostly caused by regional differences, specifically reflected in the layout and business development of institutions.

Second, the internal services and guarantees for urban communities are insufficient, i.e., there is a certain gap between the institutions’ business skills and the people’s new requirements for health and sports services, the number of family doctor service teams is insufficient, the composition and structure of teams are unreasonable, the allocation and updating speed of medical equipment has not reached the required level for basic diagnosis and treatment, and the construction of information platforms needs to be strengthened. The management level, the distribution mechanism, and the salary system need to be improved (Quan et al., 2018). By comparing the primary care quality in China and the United States, Liu (2016) constructed an evaluation framework for the quality of community-level medical and health services based on input, process, outcome, and quality evaluation methods.

To sum up, local and foreign scholars have already analysed the medical service quality in different types of institutions from the patient's perspective. Most authors agree that the quality of medical service determines whether patients are willing to obtain medical service at community health service centres. More people choose community health service institutions for medical treatment in China, which can promote the rational use of China's medical resources and form good practice. The following hypotheses are proposed based on the discussion above:

Hypothesis 1 (H1): The quality of medical service affects patient intentions.

Hypothesis 2 (H2): Community health service centres encounter low patient expectations and have inadequate environment, hardware, equipment, and medical level.

This study focuses on building an index system for the evaluation of the medical service quality of the primary medical facilities to provide an empirical context to describe and measure factors applicable to Chinese scenarios. Three main research questions are addressed: (1) How to build an evaluation index for the medical service quality while achieving both process quality and result quality? (2) Does the quality of medical service affect patient decisions? (3) What are the problems encountered by community health service centres? To answer these research questions, the authors present an evaluation model under the framework of Donabedian's structure–process–outcome theory and the SERVQUAL evaluation scale. The analysis of the data collected by a questionnaire survey showed that the quality of medical service is one of the principal factors affecting patient decisions. Also, the empirical results demonstrated that low patient expectations and inadequate environment, hardware, equipment and medical level might be the basic problems of community health service centres.

This study, therefore, makes three main contributions. First, it provides definitions, measurements and principles for building an index system for the evaluation of medical service quality. Second, it uses an example in China to examine the relationship between the quality of medical service and patient intentions.

The empirical results prove the rationality of the index system constructed in this study. Third, it examines several problems in community health service centres. SWOT analysis helped to identify reasons for advantages, disadvantages, opportunities and threats. Also, this research effort contributes by

suggestions for the improvement of medical service quality.

## 2. MATERIALS AND METHODS

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An American scholar, Donabedian, first proposed measuring the three facets (structure, process, and outcome) as quality indicators to evaluate the quality of medical service. This paper attempts to use Donabedian's classic framework for healthcare assessment as a baseline for analysis (Huang et al., 2021). At present, the evaluation index of medical service quality often focuses on the "outcome" but lacks the evaluation of "structure" and "process". This study focused on how to build an index system for the evaluation of the service quality of community hospitals and then performed empirical tests. Service quality reflects the customers' perception, which is highly subjective and perceptive. Therefore, if medical and health institutions are to improve the overall service quality, they must be grounded in patient needs and their perceptions while achieving both process quality and result quality (Huang et al., 2021).

### 2.1. SAMPLE AND PROCEDURE

The sample for this study was a group of patients from the Beijing's Tianqiao Community Health Service Centre, including 107 male patients (50.71 %) and 104 female patients (49.29 %). This particular Centre was selected because of: (1) The complex structure of residents serviced by the Centre offers this study an applicable sample in terms of diversity and research significance, satisfying the research needs. Beijing's Tianqiao Community Health Service Centre is responsible for 46 300 residents in the area (managed by eight neighbourhood committees) in terms of providing the "Six-in-One" community health service covering basic medical care, preventive health care, rehabilitation, etc. (2) The Centre has three service stations and has established a new internal management organisation with a Health Management Department and a Performance Evaluation Department, consistent with the research purpose of the study. Unlike other institutions, the focus on service performance gave this study an innate advantage in the quality of data collection.

The data collection proceeded as described next. First, factors and dimensions were identified. Then, a research model was built to fully capture the research hypothesis. Finally, the evaluation index system was established according to the selection

principle of the evaluation index, and a questionnaire was produced. The research authors contacted the Beijing's Tianqiao Community Health Service Centre to solicit their help in distributing questionnaires to their patients.

Then, the analysis focused on the main factors that influence the evaluation of the quality of medical service. Liu and Wang (2008) pointed out social demographic characteristics, external environmental factors, and a medical service organisation system as the most important three aspects of building index systems for the evaluation of the service quality of community hospitals. The authors of this article referred to the conclusions of the meta-analysis by Liu and Wang et al. to define the variables as follows:

Medical Setting means medical environment, medical facilities, and equipment.

Medical Level means the physical recovery of patients after medical treatment.

Service Attitude means the service attitude of non-medical staff, operational efficiency, and standardisation of medical staff.

Medical Expenses mean the amount of medical expenses spent during the whole visit.

Information Construction means online platforms and self-service equipment for patients' use.

Service Response means timely improvements per the patient's suggestions and the timely resolution of disputes.

## 2.2. SERVICE QUALITY EVALUATION MODEL

The research framework (Fig. 1) was developed following the guidance in the literature. Under the framework of Donabedian's theory, six variables were subdivided into ten aspects according to tangible quality, process quality, and result quality to evaluate patient service expectations and service perceptions. The following is the logic of the theoretical framework design. As the proxy variables of tangible quality, medical environment and medical equipment are used to describe the Medical Setting. In fact, environment and equipment are the basic conditions of medical quality. For the evaluation of process quality, the authors considered service attitude, information construction, service response and medical level. Service attitude can be considered in two ways: one is for the patients and needs to focus on the service attitude of the medical staff; and the other is for the medical staff. In this study, work standardisation covers the willingness to measure staff attitudes.

Communication and service response accurately describe the information structure and service response. From the patient's perspective, the study uses the two above-described aspects to consider the efficiency of interactions between patients and medical staff. It should be noted that the medical level has three main parts. Medical level and diagnosis, and treatment efficiency belong to the category of process quality, while rehabilitation belongs to the quality of

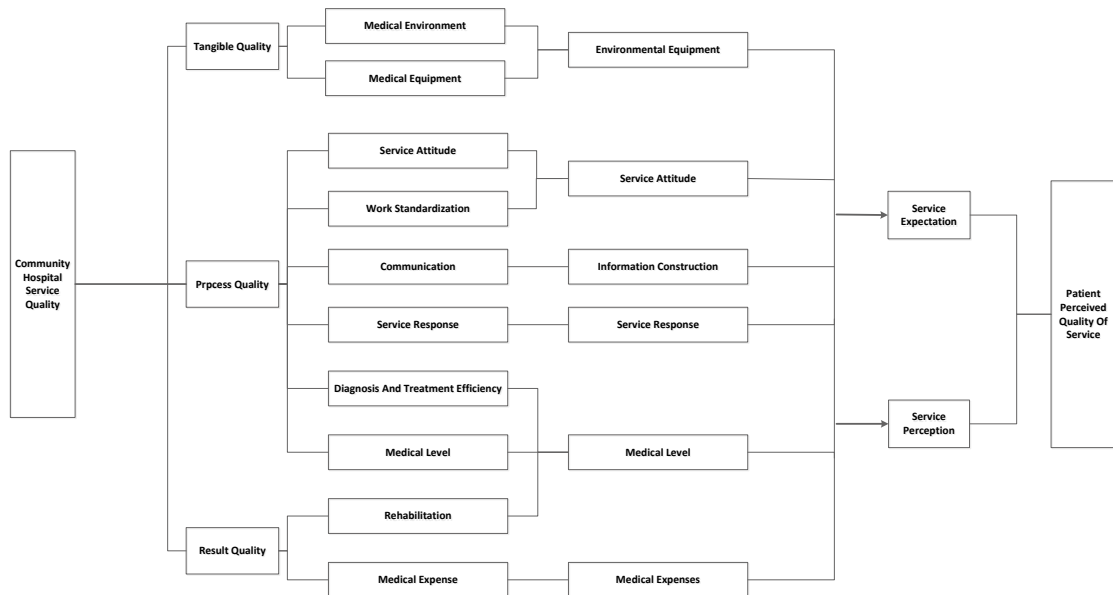


Fig. 1. Medical service quality evaluation model based on the three-faceted theory

results. Medical expenses also belong to the quality of results. The compatibility between the cost and the effect of diagnosis and treatment is considered a key factor in patient satisfaction.

This study has constructed an index system following the characteristics of the sample. It passed the robustness and effectiveness tests. Referring to the design of the quality index evaluation system for the primary healthcare service (Huang et al., 2014), in this research, the authors focused on relevant structure, processes, and outcomes in terms of service quality.

### 2.3. SELECTION PRINCIPLE USED FOR THE EVALUATION INDEX

This paper followed the four basic principles for the design of the evaluation index system. Three principles were taken from the “O-C-W-I-S-D” approach (Peng et al., 2017), i.e., Objective, Complete, Workable, Independent, Significant and Dynamic. Also, considering that the measurement has a certain relationship with the region, the regional principle was followed.

#### (1) Regional principle

Based on the specific example of overpass streets, the operation of a health service centre is measured so that the evaluation indicators are targeted.

#### (2) Dynamic principle

The selected indicators can measure the changes of the same indicator in different periods and have practical significance over a long time.

#### (3) Quantifiable principle

It is better to obtain the indicators directly/indirectly through the calculation to ensure the operability of the evaluation.

#### (4) Hierarchy principle

Secondary indicators are established under primary indicators. Among the many secondary indicators, the indicators with strong correlation are classified and set as the same indicator group to form different levels for better analysis

### 2.4. DIMENSIONS OF THE SERVICE QUALITY EVALUATION

The service quality model SERVQUAL was divided into five dimensions: tangibles, reliability, responsiveness, assurance, and empathy. Questions were set to collect data in questionnaires, asking the respondents to score the expectation value (E) and perception value (P) for each question. The service quality score was thus comprehensively calculated using the following formula: SERVQUAL score = perception score – expectation score (Dong, 2018). Based on relevant research of JCI and KTQ, this study classified the quality of community medical service into three aspects: tangible quality, process quality, and the quality of results. The SERVQUAL scale dimensions were repurposed by the whole diagnosis and treatment process characteristics, then reranked and redivided into tangible environment quality, process quality, and result quality.

### 2.5. INDEX SYSTEM FOR THE EVALUATION OF SERVICE QUALITY IN COMMUNITY HOSPITALS

Drawing on the references in 2.4 and combining the SERVQUAL model and the three-faceted evaluation system, environment–process–result, this study constructed an index system for the evaluation of the medical service quality of community hospitals and designed a questionnaire, adhering to principles of regionality, dynamics, and quantification. In this

Tab. 1. Variables and questionnaire

INDEPENDENT VARIABLE	CORRESPONDING QUESTIONNAIRE QUESTIONS	REFERENCES
Medical setting	1, 2, 3, 5, 17	(Hasan, 2012; Quan et al., 2018)
Medical level	6, 13, 18, 19, 23	(Al-Borie & Sheikh Damanhour, 2013; Bowblis & Smith, 2018; Fayissa et al., 2020; Larry et al., 2002)
Service attitude	10, 11, 12, 14, 15, 16, 20, 22, 24	(Hiidenhovi et al., 2001)
Medical expenses	21, 29, 30	(Wei & Dong, 2020)
Information structure	4, 7, 8, 9	(Meng et al., 2017; Xiong, 2020)
Service response	25, 26, 27, 28	(Ayanian & Markel, 2016; Hiidenhovi et al., 2001; Robert et al., 2000)

Tab. 2. Index system for the evaluation of service quality in community hospitals

PRIMARY INDEX	SECONDARY INDEX	
Objective Condition Quality	1	Good word of mouth and reputation
	2	Convenient and fast transportation
	3	Clean environment
	4	Self-service equipment operating normally
	5	Departments reasonably distributed and clearly marked
	6	Various specialist clinics
	7	Online reservation registration and electronic medical records are available
	8	Guidance on the use of medical IoT information technology system
Diagnosis and Treatment Process Quality	9	Activities propagating scientific knowledge in innovative forms
	10	The efficiency of guiding service
	11	Efficient service handling
	12	Transparent service process
	13	Alignment and referral with large hospitals
	14	Staff service attitude
	15	Communication skills of medical staff
	16	Personal privacy protection
	17	Patient flow control
	18	Personalized treatment planning
	19	Explanation of the principle of medicine
	20	Accurately recording diagnosis and treatment process
	21	Patients' trust in doctors
	22	Doctors treating patients indiscriminately
	23	Timely rehabilitation guidance
Quality of Results	24	Providing doctor consultations at home
	25	Timely return visit
	26	Establishing patients' medical records
	27	A fair settlement of doctor-patient disputes
	28	Rapid response to patients' suggestions
	29	Reasonable prescription charges
	30	Open and transparent treatment costs

Tab. 3. Evaluation criteria of the service quality evaluation system

NO.	SCORE RANGE	IMPLICATION	EVALUATION CONTENT
1	$SQ < -1$	Much lower than expected	It shows that the service quality of community hospitals is relatively low, the overall quality is not qualified, and it demands urgent improvement
2	$-1 < SQ < 0$	There is a gap in expectations	The service quality is below the average level and unqualified
3	$0 < SQ < 1$	Meets expectations	The service quality is at the general level and qualified, but there is still much room for improvement
4	$SQ > 1$	Higher than expected	The service quality level is excellent. It can be deemed as an advantageous programme whose high service quality should be maintained and advertised

index system, three primary and thirty secondary indexes were selected, as shown in Table 2.

## 2.6. EVALUATION CRITERIA OF THE SERVICE QUALITY EVALUATION SYSTEM

Drawing from research experience and exploring the application of the SERVQUAL principle in the evaluation of medical service quality, the following efforts were made in the attempt to build evaluation criteria for the service quality evaluation system (Wu & Yu, 2013). The SERVQUAL principle is based on the notion that service quality depends on the degree of difference between the service level perceived by users and the service level expected by users. The medical service quality (SQ) of Beijing's Tianqiao Community Health Service Centre equals the perception value minus the expectation value scored by patients. The quality is classified according to the SQ scores, as shown in Table 3.

A total of 211 questionnaires were collected from 107 male patients (50.71 %) and 104 female patients (49.29 %).

## 3. RESULTS

### 3.1. DESCRIPTIVE STATISTICAL ANALYSIS

The distribution of the respondents by age group is shown in Fig. 2. The proportion of respondents between 30 and 39 and 18 and 29 are the largest, accounting for 32.70 % and 30.81 % of the total num-

ber, respectively. The actual survey process tends towards the age distribution in the youth and middle-aged groups.

A relatively high proportion of patients had bachelor's degrees or master's degrees. Only 15.19 % of respondents had a high school or technical secondary school or a lower education level, indicating a relatively high level of education in this study sample. Consequently, respondents were capable of independent thinking and objectivity and fairness, which ensured the high quality of the questionnaires and the study's credibility.

The distribution of patients by occupation is shown in Fig. 3. Civil servants, staff, and entrepreneurs comprised a larger number of respondents, with most respondents (70.14 %) covered by social health insurance and 49 people (23.22 %) with commercial insurance. The portion of respondents paying for services entirely out of their pocket accounted for 6.64 %.

The survey also showed that patients chose medical institutions for different reasons. Community hospitals were selected because they are close to home and recommended by the local government. A small number of patients considered the environment of community hospitals as the factor of choice.

#### 3.1.1. PAIRED SAMPLE T-TEST

The significant results of the survey data are shown in Table 4. The paired sample t-test by SPSS software showed that the comparison between the two was  $t = 2.005$ ,  $P = 0.046 < 0.05$ , reaching a sig-

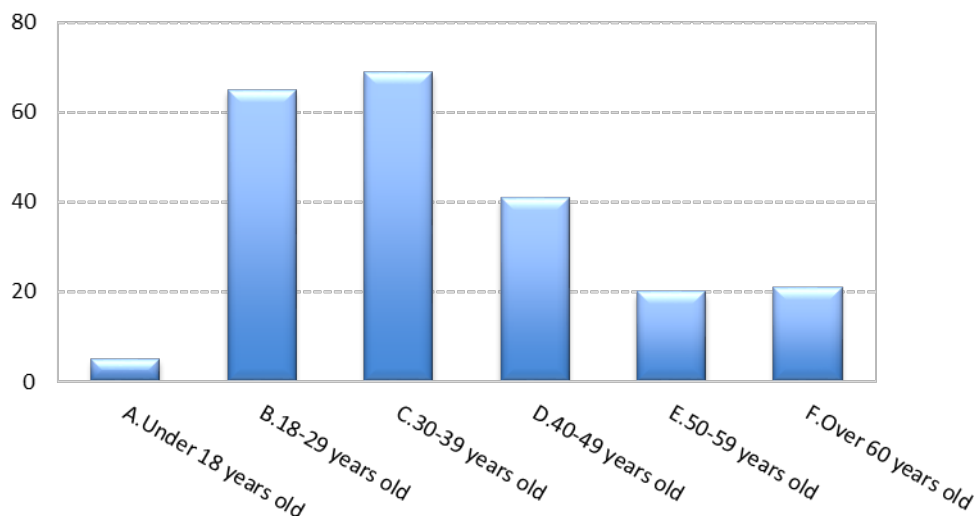


Fig. 2. Age distribution



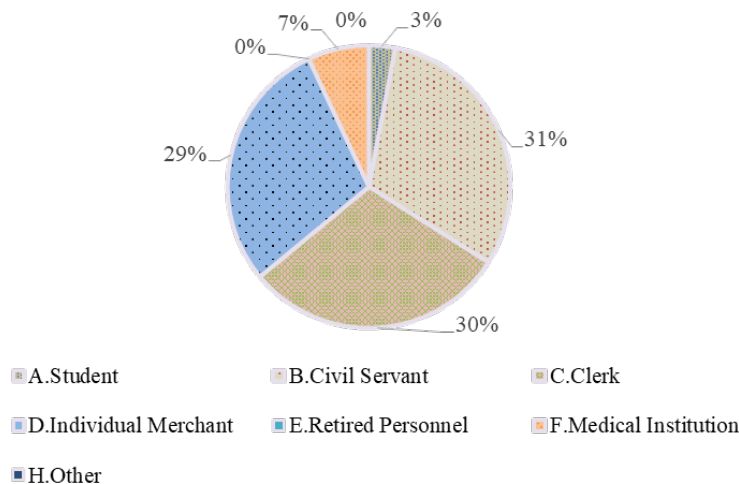


Fig. 3. Distribution by occupation

Tab. 4. Paired t-test analysis of perceived value and expectation value

NUMBER OF CASES (CASES)	PERCEIVED VALUE ( $\bar{x} \pm s$ )	EXPECTED VALUE ( $\bar{x} \pm s$ )	T	P
211	119.39±15.98	115.88±19.45	2.005	0.046

nificant level, and the verification results showed great differences, indicating their objectivity and accuracy.

To continue targeted discussion on the research results, it is necessary to further confirm the difference value of each facet and analyse the impact of these differences on the overall results to evaluate the overall service quality of community hospitals and the quality of different facets.

### 3.1.2. MEAN ANALYSIS AND SERVICE QUALITY COMPARISON OF DIFFERENT DIMENSIONS

Through the statistical sorting of 211 valid questionnaires, this study clarified the data of 30 question items in the questionnaire (N1–N30), made a specific analysis of each facet, and used the service quality gap theory to evaluate the final results. Accordingly, a better quantitative analysis of the overall service quality could be conducted to obtain clear final results. The sample analysis of the difference between patient expectations and the perception of community hospital service quality is shown in Table 5.

As evident from Table 5, respondent expectations of the Centre’s medical service quality ranged from a general to a very high level, with item N14 (“Staff service attitude”) scoring the highest (4.02). This shows that patients who come to the Community

Health Service Centre pay great attention to the service attitude of the staff. This conclusion is consistent with reality. On the one hand, the staff is in direct contact with the patients, and the patients have direct and strong perceptions. On the other hand, patient experiences directly affect their treatment effectiveness and follow-up visits. In general, according to the SQ values, most of the patient evaluation results of the Centre’s medical service quality were higher than expected, of which 28 items were qualified, accounting for 93 %, while only two items were unqualified, accounting for 7 %. Among them were the advantages of the Centre, items with higher scores included N11 (“Efficient service handling”), N13 (“Alignment and referral with large hospitals”), and N20 (“Accurately recording diagnosis and treatment process”). The patients’ actual perception scores of N5 (“Departments reasonably distributed and clearly marked”) and N6 (“Various specialist clinics”) were lower than expected. This result is closely related to the increasing and diversified medical needs of patients.

As shown in Table 6, the horizontal comparison of the six selected dimensions demonstrates that the importance ranking of the factors affecting the whole is in the following order (S1–S6): Service Response, Service Attitude, Medical Expenses, Information Construction, Medical Level, and Medical Setting. Beijing’s Tianqiao Community Health Service Centre

Tab. 5. Sample analysis of the difference between patient expectations and their perception of community hospital service quality

ITEM	PERCEIVED SERVICE (P)	EXPECTED SERVICE €	SERVICE QUALITY (SQ)
N1	3.85	3.81	0.04
N2	3.84	3.82	0.02
N3	3.87	3.82	0.05
N4	3.95	3.87	0.08
N5	3.81	3.83	-0.02
N6	3.91	3.93	-0.02
N7	3.85	3.76	0.09
N8	3.93	3.91	0.02
N9	3.95	3.88	0.07
N10	3.98	3.84	0.14
N11	4.13	3.89	0.24
N12	4.09	3.91	0.18
N13	4.03	3.78	0.25
N14	4.02	4.02	0.00
N15	4.02	3.86	0.16
N16	4.01	3.86	0.15
N17	4.05	3.96	0.09
N18	3.93	3.78	0.15
N19	3.99	3.82	0.17
N20	4.15	3.93	0.22
N21	4.05	3.91	0.14
N22	4.03	3.86	0.17
N23	4.05	3.9	0.15
N24	3.92	3.79	0.13
N25	4.01	3.83	0.18
N26	3.96	3.87	0.09
N27	4.07	3.87	0.20
N28	3.98	3.79	0.19
N29	4.00	3.95	0.05
N30	3.96	3.82	0.14

Tab. 6. Scores and sq values of various dimensions of medical service quality evaluation indexes

INDEX	PERCEIVED SERVICE (P)	EXPECTED SERVICE (E)	INDEX SQ
S1	3.85	3.88	0.03
S2	3.84	3.98	0.04
S3	3.89	4.04	0.15
S4	3.89	4.00	0.11
S5	3.86	3.91	0.05
S6	3.84	4.00	0.16
R	3.85	3.88	0.03

is recognised by patients in terms of staff attitude and improvement; however, its environment and medical level remain inadequate. These conclusions are consistent with the self-positioning and limited medical level of the Centre.

### 3.2. SWOT ANALYSIS OF MEDICAL SERVICE QUALITY

SWOT analysis is a tool for situation analysis. The SWOT analysis of the medical service quality of the Beijing's Tianqiao Community Health Service Centre further clarified the advantages and disadvantages of the Centre's medical service quality and the opportunities and limitations of its future development. The results are as follows:

**Advantages:** High service level and qualified rate. "Efficient service handling", "Alignment and referral with large hospitals", and "Accurately recording diagnosis and treatment process" received high scores. The Centre may fully emphasise these advantages to ensure that these three items continue to maintain at a high level in the following improvement process and continuously improve the service level. At the same time, located in the community, the Centre can attend to the general medical needs of the community effectively.

**Disadvantages:** Third-level hospitals are the main medical resource in the region, including more scientific department design, advanced and expensive medical equipment resources, etc. China's medical system is undergoing reform. The time for the establishment of a community health service centre is relatively short. Also, due to the limitation of technologies and equipment, the overall service quality is still relatively low. The available equipment and the environment are inadequate, which limits the rapid improvement of service quality.

In addition, due to the small number of patients, the setting of departments is not standardised, and the direction signs are not sufficiently clear, which contributes to patients' negative medical experiences to a certain extent. Some patients lack information, fail to use self-service devices or talk to medical workers via WeChat groups or other online channels, as they are unwilling to disclose their medical problems. Therefore, information services fail to be fully utilised, and the efficiency and effect of the treatment can be compromised.

**Opportunities:** The visit identified difficulties for the public to access a doctor. On the one hand, patients attach great importance to their health. They

hope to go to the top three hospitals if they have any problems, resulting in seriously uneven resource allocation. On the other hand, the overall development of intelligent medical services is relatively backward.

Many patients cannot make timely appointments or have consultations online, resulting in a negative experience. It explains the low loyalty of residents to the Centre and higher expectations for the medical service quality.

**Threats:** Some local highly educated medical graduates and experienced medical specialists would seek longer careers in academic research, senior professional ranks and titles. They are more inclined to work in class III hospitals. The technical, diagnostic and treatment level of community health service centres fails to meet patient needs, which reveals the lack of talent in grass-root medical institutions. Information provided by the Centre's manager explained difficulties in the recruitment and retention of medical staff. Most medical specialists have a bachelor's degree, and there is a serious shortage of medical staff with higher professional titles. Consequently, patient expectations are low, and many potential customers choose other hospitals for treatment.

## 4. PROBLEM ANALYSIS

The third part, which was a preliminary proof of hypotheses 1 & 2, was unlike all previous studies. The authors found that patient expectations for the Community Health Service Centre were below the realistically available standard, and inadequate medical environment, hardware equipment, and medical level are more important factors than patient expectations. From 1 July 2021, insured urban and rural residents of Beijing can use all designated community health service institutions in Beijing as their first outpatient medical care facilities for services (Sina.com, 2021).

On the one hand, due to COVID-19, patients are willing to go to a community hospital when they are not suffering from serious diseases to reduce the risk of infection. On the other hand, to help the public and reduce the pressure on class III hospitals, the government made intense investments in the development of community hospitals, and patient satisfaction has been improved. As more patients opt for community hospitals, requirements grow to have more diverse departments and specialist clinics.

#### 4.1. PROBLEMS

Despite the substantial role of community health centres in local populations and the broader safety-net healthcare system, very limited research has been conducted on community health centre research experience, infrastructure, or needs from a national perspective (Sina.com, 2021; Beeson et al., 2014).

(1) Sometimes, the results of diagnosis and treatment fail to satisfy patients and customers.

About 1 % of surveyed patients indicated that diagnosis and treatment results of community hospitals failed to meet the expectations due to technical issues, such as wound sutures that were too visible.

(2) Medical services sometimes take a long time to complete.

Individual customers indicated the failure to successfully receive the test or injection for themselves or their children during one visit to the community hospital. They needed another intervention or several procedures, which wasted time and affected the service experience. Also, patients wanted to be served by more qualified medical staff.

(3) Lack of a complete service recovery system and streamlined service process.

Some customers said that the community hospital could not give the customer a relatively satisfactory explanation and implement positive remedial measures in the case of customer dissatisfaction caused by its improper operation.

(4) Insufficient use of Internet technologies.

The existing information system is relatively weak, utilising only the basic LIS, RIS, and EMR systems. It supports the functions of WeChat and Alipay's recharge query report or the hospital information based on the basic functions. In terms of management, there is no partial management software such as OA office automation, medical record management system, hospital experience system, and clinical pharmacy to conduct information-based management of the hospital's situation, which is semi-manual and semi-information-based. Hospital information structure fails to keep up with modern medical development.

Due to the need for epidemic prevention and control of COVID-19, patients need to scan three codes when entering the hospital, including Jiankangbao, Hospital Information Registration Form, and a Travel Itinerary. These requirements are unfriendly to elderly patients without smartphones and living alone, making them feel uneasy about going to community hospitals.

#### 4.2. ANALYSIS

##### 4.2.1. PROFESSIONAL LEVEL OF MEDICAL STAFF NEEDS IMPROVEMENT

Medical staff often make mistakes during interventions. Some patients indicated that medical staff failed to complete interventions, such as sticking a needle and blood drawing, from the first attempt. Others specified that medical staff failed to handle the wound properly during suture, resulting in inflammation at a later stage or prominent scarring. Respondents also believed that outpatient doctors and surgeons failed to make effective judgments in time for some emergencies.

##### 4.2.2. SYSTEMS SHOULD BE DEVELOPED FOR REGULAR EVALUATION OF MEDICAL SERVICE LEVEL AND STAFF TRAINING

Failure to establish systems for regular evaluation of the service and staff training is among the key reasons for the insufficient skills of medical specialists and the low speed of technological improvement.

##### 4.2.3. MORE ATTENTION SHOULD BE GIVEN TO THE SERVICE RECOVERY SYSTEM

Attention should not only be given to the medical setting of facilities but also to their service recovery systems. Service quality evaluation is becoming popular among the patients of community hospitals. It should be considered that patients satisfied with their diagnosis and treatment give a high score, while customers with a less smooth process of medical treatment tend to give a negative evaluation.

#### 4.3. CONCLUSIONS AND RECOMMENDATIONS

In conclusion, the Community Health Service Centre has encountered difficulties and problems, such as low patient expectations, a negative media environment, inadequate equipment and a low medical level. Proceeding from the Centre's actual condition, the following suggestions are made to improve its medical service quality.

First, strengthen publicity. On the one hand, to expand the scope of offline publicity, community health service centres should actively cooperate with local communities and residents' self-governing organisations for promotion and popularization, using the advantages of their specialist clinics and

characteristic activities. On the other hand, community health service centres should optimise online publicity platforms. They may set up clear and easy-to-read signs, simplify procedures, adopt online registration, and cooperate with the medical service platforms often used by residents, such as JingYiTong and 114 Health. These methods can make registration more convenient. Patients' needs for health knowledge can be satisfied by setting up online resources to propagate scientific knowledge to special groups, thus forming a benevolent interaction with residents. Strategically aligning nurse shifts to demand is also an effective approach to meeting client needs without increasing total nurse staffing levels in a community health centre context (Merino et al., 1982).

Second, improve the medical environment. Community medical services mainly refer patients with different degrees of illness and undertake the first diagnostic function. However, due to a high flow of patients, community medical services failed to meet residents' basic needs, and relevant medical facilities still need to be strengthened (Yuan, 2020). According to Marshall, early planning measures, the focus on community needs and formed strategic partnerships can provide a valuable foundation for future events aimed at boosting community engagement in public health efforts (Samantha et al., 2021). The main reasons patients avoid choosing this Centre are the lack of available departments, the inadequate qualification of doctors, and the fear of poor treatment results. Therefore, the Centre must improve medical service quality. (1) In terms of the hospital's layout, the location of departments should be reorganised and guiding signs should be placed reasonably according to medical procedures, making patients walk less to improve the overall experience in the hospital's environment. (2) In terms of equipment and facilities, community hospitals should actively seek to adopt state-of-the-art technologies considering their relatively small space. To improve patient satisfaction, boost the hospitals' relevance and support their long-term development ambitions, community hospitals should also implement strict procedures for technology upgrades and inspection. The focus on community needs and strategic partnerships can provide a valuable foundation for future events aimed at community engagement in public health efforts.

Third, promote medical techniques. As the mainstay of medical service is medical professionals, staff training becomes the key to improving medical service. (1) Intensify the development of a well-trained

workforce, improve the quality and professional competence of medical workers, and enhance their medical techniques. (2) Particular attention should be given to general medical practitioners. More specialised departments should be established, continuously enlarging the scope of medical diagnostics and treatment. (3) Create a learning atmosphere, encourage medical staff to pursue further studies, professional titles, qualification certifications, etc. (4) Take full advantage of the geographical location, actively cooperate with large hospitals for opportunities to learn, hire external experts, etc.

Fourth, accelerate the application of information technology (IT). Replace the workforce with IT applications to improve efficiency. Against the backdrop of the COVID-19 pandemic, information technologies can reduce the physical flow of people, enable the use of early warning systems for infectious diseases in hospitals and promote IT-based management systems. Establish specialised IT, recruit qualified staff, undertake timely inspection of equipment, and ensure training for medical workers to ensure the appropriate operation of equipment. Implement various forms of appointment diagnosis and treatment services via telephone, network, WeChat, and on-site booking.

A WeChat official account or a cell phone application can be set up to provide online booking, payment, and follow-up services to reduce waiting time and effectively divert patients to the doctors. Promote Internet Plus healthcare. Use cloud computing, big data, mobile Internet applications, and other technologies to achieve unified data management, improve patient treatment experience, realise health information integration, and promote the development of the hospitals. Utilise mobile Internet, reengineer operation management and service process to improve management efficiency and service level.

Fifth, establish patient complaint mechanisms and channels. Full understanding and active solving of medical service complaints are effective means to continuously improve the medical service quality and an important way to maintain harmonious doctor-patient relationships. Hospitals should establish feasible complaint mechanisms and channels to timely deal with various problems raised by patients. Considering patient flows, hospitals may take patient suggestions by establishing special complaint reception offices, building online platforms to post comments, or other ways, based on existing channels of telephone complaints, random telephone return visits, etc., to ensure that medical disputes are handled as

soon as possible, and medical service quality is improved.

Sixth, the Centre should care for its medical staff and raise their salaries. A post-performance appraisal and incentive system should be established with service quality at the core to encourage the medical staff. Personal development for medical professionals should be planned, providing training and promotion opportunities. Other measures should also be considered, including a good working environment, logistic support and improved social status of medical workers. If possible, community volunteers should be recruited to help the elderly seek medical treatment. Also, the government can facilitate the interactions between the medical school and the community (Marshall et al., 2021).

## 5. DISCUSSION AND IMPLICATIONS

By taking Beijing's Tianqiao Community Health Service Centre as an example and using Donabedian's structure-process-outcome theory and the SERVQUAL evaluation scale to construct an evaluation model, the study closely followed the direction of medical reform and integrated intelligent medical care into the evaluation of medical service quality. After analysing the data collected by a questionnaire survey, specific measures for the improvement of services were proposed, also providing a new research idea for studies on the improvement of medical service quality.

Three research questions were examined in this study: (1) How to build an index for the evaluation of medical service quality to achieve both process quality and the quality of results? (2) Does the quality of medical service affect patient decisions? (3) What are the problems encountered by community health service centres in China? Using a sample of data from Beijing's Tianqiao Community Health Service Centre, we found direct associations between medical service quality and patient decisions (H1 supported). Patient expectations for the Community Health Service Centre were below the realistically available standard, and inadequate medical environment, hardware equipment, and medical level are more important factors than patient expectations (H2 supported).

In terms of theoretical implications, this study makes several contributions to service quality research and practice. It contributes to the advancement of the theoretical framework of Donabedian's

structure-process-outcome theory and the SERVQUAL evaluation scale in the Chinese context and the application of quality management theory in the field of medical service quality management. Also, it provides definitions, measurements, principles and ideas for how to construct the medical service quality evaluation system. This research effort also contributes to suggestions for the improvement of medical service quality. This study filled the gap left by previous studies, which often focused on the "outcome" but lacked the evaluation of "structure" and "process".

In terms of managerial implications, the effectiveness of quality evaluation results is often affected by various factors. This study measured the evaluation results of the index system which was designed. Measurement results and SWOT analysis were used to determine the advantages, disadvantages, opportunities and threats of Beijing's Tianqiao Community Health Service Centre. Six main suggestions for improving the quality of medical services were formulated, including strengthening publicity, improving the medical environment, promoting medical techniques, accelerating the adoption of information technologies, establishing patient complaint mechanisms and channels, and caring for medical staff by improving their salaries.

Limitations were encountered due to the recurrent outbreaks of COVID-19 at the time of questionnaire distribution. Consequently, the elderly group who use smart devices less actively was not included. In the future, the authors plan to conduct in-depth research on the construction of intelligent medical care and study the integration and practice of IT applications and patients.

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