

# Community Health Centers' Responsiveness and Its Associated Factors Among Outpatients in Southeast China: A Cross-Sectional Study

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**Background:** The responsiveness of community health centers can reflect the soft capacity of medical institutions and is related to the improvement of health outcome indicators. This study is aimed at assessing the level and distribution of community health centers' responsiveness and its associated factors among outpatients under the health-oriented integrated healthcare system in China.

**Methods:** A total of 634 outpatients were recruited from six community health centers in Zhejiang Province, China, in July 2022. SPSS software was used to conduct the analysis (version 23.0). Health system responsiveness was used as a measure of outpatient responsiveness to health care services through a self-administered questionnaire. Determinants of community health centers' responsiveness were determined by using a multiple linear regression model at a  $p$ -value  $<0.05$ .

**Results:** The total score of community health centers responsiveness was  $8.25 \pm 1.01$ , and the Gini coefficient is 0.027. Within these domains, social support and dignity received the highest scores, while choice of providers and autonomy scored the lowest. Age group between 60–74 years ( $\beta$ : 0.129; 95% CI: 0.042–0.529),  $\geq 75$  years ( $\beta$ : 0.095; 95% CI: 0.006–0.707), monthly income with 8000 RMB and above ( $\beta$ : 0.098; 95% CI: 0.035–0.653), having a family doctor ( $\beta$ : 0.124; 95% CI: 0.096–0.410), and satisficing with community health service ( $\beta$ : 0.298; 95% CI: 0.848–1.428) were significant predictors of community health centers' responsiveness.

**Conclusion:** The Chinese community health centers show high responsiveness, indicating that the construction of a health-oriented integrated healthcare system has been effective. The family doctor contract service is important and should continually enhance both technical proficiency and health promotion capabilities. Encourage residents to actively participate in their treatment process is also essential.

**Keywords:** responsiveness, community health center, outpatient

## Introduction

In 2000, the World Health Organization (WHO) introduced a novel performance framework for health systems, which for the first time highlighted health responsiveness as one of the main targets.<sup>1</sup> Health system responsiveness is defined as the ability to meet the common and reasonable non-medical technical expectations of the population when they seek healthcare.<sup>2</sup> This concept comprises two aspects: “respect for persons” and “client orientation”. Respect for persons implies that the patients have autonomy and the right to choose their medical plans, as well as the entitlement to privacy and effective communication. Client orientation refers to the healthcare institution's capability to promptly address patients' needs and provide the necessary facilities, ensuring that patients have the freedom to choose their medical institutions and doctors. In recent years, the responsiveness of health systems has gained increasing importance on a global scale. It reflects the soft capacity of medical institutions and is closely related to the improvement of health

outcome indicators.<sup>3</sup> By focusing on enhancing responsiveness, healthcare systems can better cater to the diverse needs and expectations of individuals, thereby contributing to the overall advancement of public health and well-being.

Health system responsiveness is a multi-dimensional concept. WHO has developed a measurement tool that includes eight domains: dignity, prompt attention, clarity of information, autonomy, confidentiality, choice, quality of basic amenities, and social support. On a global scale, many countries utilize this tool to assess the responsiveness of their health systems and to make international comparisons,<sup>4</sup> considering it a crucial indicator of the quality of medical care. The subjects of health system responsiveness measurements encompass inpatients, outpatients, chronic disease patients, the elderly, and pregnant women. Literature analyzes their responsiveness to improve health systems to meet the diverse needs of residents.<sup>5</sup> Regarding the institutions responsible for measurement, most studies assess the responsiveness of combined entities, such as the whole health system within a country and facilitating cross-country comparisons.<sup>6,7</sup> However, fewer studies focus on measuring individual entities, such as public or private hospitals and community health centers.<sup>1,8</sup>

Health system responsiveness can be influenced by lots of factors, including sex, age, occupation, education level, marital status, perceived health, types of payments, and types of health insurance.<sup>6,9</sup> However, the impact of these factors may differ due to cultural variations across countries. For example, a study conducted in Ethiopia revealed that perceived financial fairness, rather than out-of-pocket expenses, was a significantly positive correlate of health system responsiveness, attributable to the local economic challenge.<sup>10</sup> In contrast, a study in Germany demonstrated that the type of health insurance can affect health system responsiveness, with residents having private health insurance exhibiting relatively higher expectations for treatment services compared to those with national health insurance.<sup>11</sup> Additionally, a study in Thailand observed that there are differences in health system responsiveness among religious affiliations, with Buddhist residents exhibiting a lower level of health system responsiveness than their Muslim counterparts.<sup>12</sup>

Previous studies on responsiveness have primarily focused on the overall health system or hospitals, with limited attention given to the outpatients at primary health community centers.<sup>9,11,13</sup> In China, the government has initiated the construction of a health-oriented integrated healthcare system since 2017, and particular emphasis on enhancing primary healthcare service. A range of policies have been implemented, including integrated chronic disease outpatient services, county hospital specialists providing outpatient treatment services at community hospitals, and the enhancement of the scope and quality of contracted services offered by family doctors.<sup>14,15</sup> However, the implementation of these policies has largely been from the perspective of managers and service providers. It is essential to urgently incorporate feedback from residents, who are the demand-side stakeholders, to verify the effectiveness of these policies and to garner valuable input for the subsequent stages of healthcare reform. Concurrently, examining the factors related to responsiveness can enable international comparisons, offering a benchmark for assessing and improving healthcare services on a global scale.

To fill this research gap, the current study aims to assess the levels and distributions of responsiveness among outpatients at primary health centers in China. Additionally, it seeks to explore the significant factors of community health centers' responsiveness scores under the health-oriented integrated healthcare system.

## Materials and Methods

### Study Setting

The study was conducted in community health centers in Zhejiang province, southeast China. Two cities, Hangzhou and Yuhuan, were selected to represent the well and less-developed economic levels of the province. From each city, one integrated health service alliance was selected. Within these alliances, three associated community health centers were chosen to represent the well-, middle-, and less-developed economy levels from each health service group. In total, six community health centers were selected as the investigation sites.

### Study Design and Period

A cross-sectional study was conducted in July 2022.

## Study Participants

Participants were recruited from residents waiting in the outpatient hall of each community health center. Eligibility criteria for participation included the following: 1) residents have been living in the local area for more than half a year; 2) they have utilized local health services; 3) without any cognitive disability; and 4) agree to participate in the study.

## Sample Size Determination

The sample size was calculated using a single population proportion formula assuming the satisfactory rate of primary health service in our previous study in 2021 is 79.4%,<sup>15</sup> the 95% confidence level is 1.96, and the margin of error is 5%,  $n=(Z_{\alpha/2})^2p(1-p)/d^2=(1.96)^2(0.794*0.206)/(0.05)^2=251$ . With the inclusion of 10% non-response, the minimum sample is 276. Finally, a total of 693 questionnaires were distributed across six community health centers, and 634 valid questionnaires were returned, resulting in a 91.49% response rate.

## Data Collection Method

### Data Collection Technique and Instrument

The health system responsiveness scale was developed by WHO in 2000,<sup>1,7</sup> and was translated from English into Chinese with cultural validations in 2003.<sup>16</sup> Health system responsiveness scale comprises 15 items, and covers two main aspects: “respect for persons” and “client orientation”. The dimension of “respect for persons” contains four domains: dignity (2 items, respectful treatment), autonomy (2 items, involvement in decisions), confidentiality (2 items, confidentiality of medical information), and communication (2 items, clarity of communication by providers). The dimension of “Client orientation” contains four domains: prompt attention (2 items, short waiting times), basic amenities (2 items, clean facilities for patients’ convenience), choice of providers (1 item, patient choice of providers), and social support (2 items, spiritual and material support). In the current study, each item was responded to on a 5-point Likert scale from 1 (very poor) to 5 (very good). Then the domain score was obtained as the total score of the corresponding items standardized on a 1–10 scale.<sup>17</sup> The overall health system responsiveness score using the formula as follows:

$$Y=0.125*V_1+0.125*V_2+0.125*V_3+0.125*V_4+0.2*V_5+0.1*V_6+0.15*V_7+0.05*V_8$$

Weights were determined based on the WHO questionnaire and were modified to align with the Chinese cultural context by expert opinions.<sup>2,18</sup> Higher scores indicate better performance of the health system. According to previous studies, it has a good internal consistency and Cronbach’s alpha coefficient was 0.774–0.902.<sup>16</sup> In this study, the Cronbach’s  $\alpha$  of the overall scale is 0.922. The respondent’s socio-demographic and socio-economic variables including age, gender, district (urban or rural), marital status (married or unmarried), education level (primary school and below, middle and high school, or college school and above), monthly income (less than 3500 RMB, 3501–7999 RMB, or 8000 RMB and above), employment status (employed or unemployed), chronic disease status (yes or no), having a family doctor (yes or no), and service satisfaction (yes or no).

### Data Quality Control

Before data collection, the questionnaire was pre-tested on a sample comprising 5% of the total sample size at two community health centers within one of the study locations. This pre-testing ensured that the content of questionnaire was clear and easily understood by the target population. Data collectors and supervisors received centralized training and adhered to uniform procedures before data collection. During the data collection process, supervisors conducted daily reviews to ensure the completeness and accuracy of the filled questionnaires. After the data collection was completed, double data entry and validation were implemented to prevent entry errors.

### Data Processing and Analysis

Data were entered using EpiData 3.1 (The EpiData Association, Odense, Denmark) and analyzed with SPSS 23.0 (SPSS Inc., Chicago, IL, USA). Descriptive analyses were performed for socio-demographic variables, and categorical data were presented as frequencies and percentages. Scores for the community health centers’ responsiveness scale were displayed as frequencies, percentages, means, and standard deviations. The Gini coefficient was used to calculate the

distribution of community health centers' responsiveness. The independent two-sample *t*-test and analysis of variance (ANOVA) were used to test differences in health system responsiveness scale scores and demographic characteristics of the participants. Separate multiple linear regressions were conducted to explore the significant correlates of the two domains of health system responsiveness scale. Each domain was treated as the dependent variable and was regressed on independent variables including age, gender, district, marital status, education level, monthly income, employment status, chronic disease status, having a family doctor, and service satisfaction. The significant level for all the regressions was set as  $P < 0.05$ .

## Results

### Socio-Demographic Characteristics

Table 1 summarizes the socio-demographic characteristics of the study sample. The mean age of the subjects was 44.79 years old (SD=23.86), 45.11% of them were males and 54.89% were females. More than half of them (58.99%) come

**Table 1** Socio-Demographic Characteristics of the Participants and Associated Factors of Responsiveness (n,%)

Variable	n/ $\bar{x}$ (%/SD)
<b>Age</b>	44.79(23.86)
<60	396(62.46)
60–74	188(29.65)
≥75	50(7.89)
<b>Gender</b>	
Male	286 (45.11)
Female	348 (54.89)
<b>District</b>	
Urban	260(41.01)
Rural	374(58.99)
<b>Marital status</b>	
Married	468(73.82)
Unmarried	166(26.18)
<b>Education level</b>	
Primary school and below	262 (41.32)
Middle and high school	236 (37.23)
College school and above	136(21.45)
<b>Monthly income</b>	
Less than 3500 RMB	333 (52.52)
3501–7999 RMB	243 (38.33)
8000 RMB and above	58(9.15)
<b>Employment status</b>	
Employed	257(40.54)
Unemployed	377(59.46)
<b>Chronic disease status</b>	
Yes	193 (30.44)
No	441 (69.56)
<b>Having a family doctor</b>	
Yes	282(44.48)
No	352(55.52)
<b>Service satisfaction</b>	
Yes	586(92.43)
No	48(7.57)

Abbreviation: SD, Standard Deviation.

from rural areas. The majority of them (73.82%) were married. 41.32% of them were in primary school and below, and around half (52.52%) have less than 3500 RMB monthly income. More than half of them (59.46%) were unemployed status. About one-third of them (30.44%) have chronic disease status. Around two-fifths of them (44.48%) have a family doctor. The majority of them (92.43%) feel satisfaction with community health services.

## Total Scores and Fairness Distribution of Community Health Centers' Responsiveness

Table 2 presents the results of the total and eight domain scores of community health centers' responsiveness. The total score of community health centers' responsiveness was  $8.25 \pm 1.01$ , and the Gini coefficient of distribution of outpatients' responsiveness was 0.027 (Figure 1). The score of respect for persons was higher than client orientation. In respect for persons, dignity ( $8.55 \pm 1.11$ ) had the highest average score, while autonomy ( $8.03 \pm 1.35$ ) had the lowest average score. In the client orientation, social support ( $8.60 \pm 1.21$ ) had the highest average score, while choice of providers ( $7.93 \pm 1.56$ ) had the lowest average score.

## Demographic Characteristics Associated with Community Health Centers' Responsiveness

Table 3 displays the demographic characteristics associated with community health centers' responsiveness. The respect for persons score shows a significant difference in different age groups ( $P < 0.05$ ), whether having a family doctor ( $P < 0.001$ ), and whether service satisfaction ( $P < 0.001$ ). The client orientation score and community health centers responsiveness total score all show significant differences in whether having a family doctor ( $P < 0.001$ ), and whether service satisfaction ( $P < 0.001$ ).

## Multiple Linear Regression Model of Community Health Centers' Responsiveness

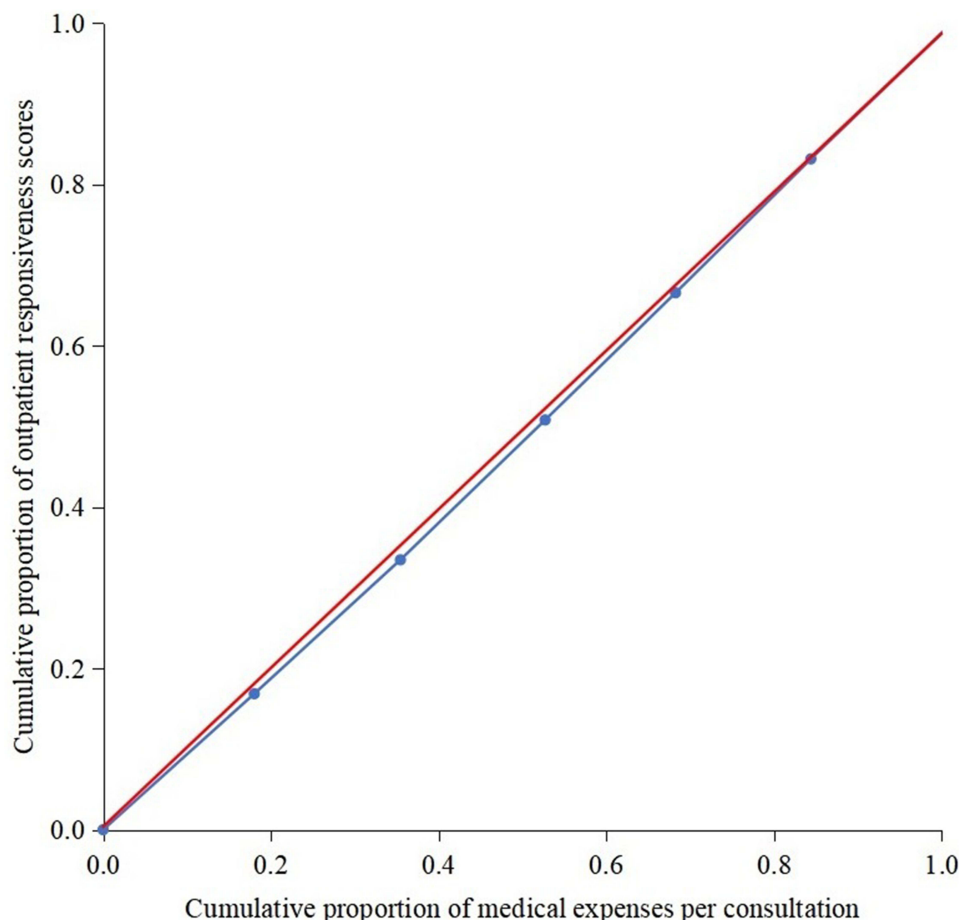
Table 4 shows the results of the multiple linear regression analysis on the relationship of community health centers' responsiveness with demographic characteristics factors. The results indicated that elderly residents, a higher monthly income level, having a family doctor, and being satisfied with community health services, were significantly associated with higher responsiveness score levels.

In this study, the responsiveness total score model suggested that those aged between 60–74 years ( $\beta$ : 0.129; 95% CI: 0.042–0.529),  $\geq 75$  years ( $\beta$ : 0.095; 95% CI: 0.006–0.707), monthly income with 8000 RMB and above ( $\beta$ : 0.098; 95% CI: 0.035–0.653), having a family doctor ( $\beta$ : 0.124; 95% CI: 0.096–0.410), and satisficing with community health service ( $\beta$ : 0.298; 95% CI: 0.848–1.428) reported higher responsiveness score levels. The respect for persons model suggested

**Table 2** Response Frequency and Scores of Community Health Centers' Responsiveness Indicators

Domain	Satisfactory		Score	Rank by Score
	n	%	mean $\pm$ SD	
<b>Respect for persons</b>	434/634	68.45	8.32 $\pm$ 1.03	
Dignity	543/634	85.65	8.55 $\pm$ 1.11	1
Autonomy	451/634	71.14	8.03 $\pm$ 1.35	4
Confidentiality	518/634	81.70	8.41 $\pm$ 1.13	2
Communication	482/634	76.03	8.28 $\pm$ 1.26	3
<b>Client orientation</b>	422/634	66.56	8.27 $\pm$ 1.06	
Prompt attention	472/634	74.45	8.21 $\pm$ 1.26	3
Basic amenities	508/634	80.13	8.34 $\pm$ 1.24	2
Choice of providers	465/634	73.34	7.93 $\pm$ 1.56	4
Social support	574/634	90.54	8.60 $\pm$ 1.21	1
<b>Total score</b>	401/634	63.25	8.25 $\pm$ 1.01	

Abbreviation: SD, Standard Deviation.



**Figure 1** Distributions of outpatients’ responsiveness in six community health centers.  
**Notes:** Gini=0.027.

that those aged between 60–74 years ( $\beta$ : 0.123; 95% CI: 0.026–0.524), having a family doctor ( $\beta$ : 0.099; 95% CI: 0.044–0.364), and satisficing with community health service ( $\beta$ : 0.286; 95% CI: 0.813–1.406) reported higher responsiveness score levels. In the client orientation model suggested that those age between 60–74 years ( $\beta$ : 0.140; 95% CI: 0.067–0.583),  $\geq 75$  years ( $\beta$ : 0.100; 95% CI: 0.024–0.767), monthly income with 8000 RMB and above ( $\beta$ : 0.114; 95% CI: 0.093–0.747), having a family doctor ( $\beta$ : 0.130; 95% CI: 0.112–0.445), and satisficing with community health service ( $\beta$ : 0.276; 95% CI: 0.804–1.418) reported higher responsiveness score levels.

**Table 3** Association Between Patient Characteristics and Scores of Community Health Centers’ Responsiveness Scale

	Respect for Persons		Client Orientation		Total Score	
	Mean(SD)	T/F	Mean(SD)	T/F	Mean(SD)	T/F
<b>Age</b>						
<60	8.23(1.02)	3.690*	8.21(1.10)	2.048	8.18(1.02)	2.674
60–74	8.47(1.00)		8.39(0.98)		8.38(0.96)	
$\geq 75$	8.39(1.09)		8.33 (1.08)		8.33(1.09)	
<b>Gender</b>						
Male	8.32(1.02)	0.687	8.28(1.10)	0.862	8.25(1.03)	0.001
Female	8.32(1.03)		8.26(1.04)		8.25(1.00)	

(Continued)

**Table 3** (Continued).

	Respect for Persons		Client Orientation		Total Score	
	Mean(SD)	T/F	Mean(SD)	T/F	Mean(SD)	T/F
<b>District</b>						
Urban	8.28(1.05)	0.031	8.25(1.05)	1.239	8.21(1.01)	0.579
Rural	8.34(1.01)		8.28(1.08)		8.28(1.01)	
<b>Marital status</b>						
Married	8.35(1.02)	0.108	8.29 (1.04)	1.264	8.28(1.00)	0.176
Unmarried	8.23(1.05)		8.22(1.12)		8.18(1.05)	
<b>Education level</b>						
Primary school and below	8.38(1.05)	1.157	8.29(1.07)	1.103	8.30(1.03)	0.581
Middle and high school	8.24(1.05)		8.25(1.11)		8.20(1.05)	
College school and above	8.32(0.94)		8.26(0.98)		8.25(0.92)	
<b>Monthly income</b>						
Less than 3500 RMB	8.28(1.03)	0.454	8.20(1.06)	2.080	8.19(1.01)	1.406
3501~7999RMB	8.35(1.05)		8.32(1.07)		8.30(1.03)	
8000RMB and above	8.39(0.93)		8.48(1.02)		8.39(0.95)	
<b>Employment status</b>						
Employed	8.32(1.02)	0.551	8.31(1.08)	1.577	8.28(1.02)	0.940
Unemployed	8.31(1.03)		8.24(1.05)		8.23(1.01)	
<b>Chronic disease status</b>						
Yes	8.40(1.06)	1.344	8.29(1.02)	0.232	8.30(1.01)	0.733
No	8.28(1.01)		8.26(1.08)		8.23(1.01)	
<b>Having a family doctor</b>						
Yes	8.48(1.03)	1.404***	8.45(1.03)	0.220***	8.43(1.00)	0.961***
No	8.19(1.01)		8.13(1.07)		8.11(1.00)	
<b>Service satisfaction</b>						
Yes	8.40(0.96)	4.224***	8.36(1.01)	4.146***	8.34(0.95)	3.355***
No	7.24(1.18)		7.20(1.18)		7.15(1.10)	

Notes: \*P<0.05, \*\*\*P<0.001.

Abbreviation: SD, Standard Deviation.

**Table 4** Multiple Linear Regression Analysis for Community Health Centers' Responsiveness Scores

Related factors	Respect for Persons			Client Orientation			Total Score		
	β	95% CI	P-value	β	95% CI	P-value	β	95% CI	P-value
<b>Age</b>									
<60									
60–74	0.123	0.026–0.524	0.030	0.140	0.067–0.583	0.014	0.129	0.042–0.529	0.022
≥75	0.079	–0.060–0.657	0.102	0.100	0.024–0.767	0.037	0.095	0.006–0.707	0.046
<b>Gender</b>									
Male									
Female	–0.026	–0.216–0.110	0.524	–0.018	–0.207–0.131	0.658	–0.019	–0.198–0.121	0.636
<b>District</b>									
Urban									
Rural	0.030	–0.103–0.229	0.458	0.015	–0.140–0.204	0.716	0.032	–0.097–0.228	0.428
<b>Marital status</b>									
Unmarried									
Married	–0.058	–0.383–0.112	0.281	–0.105	–0.511–0.002	0.052	–0.086	–0.440–0.044	0.109
<b>Education level</b>									
Primary school and below									
Middle and high school	–0.036	–0.266–0.115	0.437	0.001	–0.196–0.199	0.989	–0.023	–0.235–0.138	0.608
College school and above	0.001	–0.247–0.249	0.994	–0.014	–0.294–0.220	0.777	–0.015	–0.278–0.206	0.770

(Continued)

**Table 4** (Continued).

Related factors	Respect for Persons			Client Orientation			Total Score		
	$\beta$	95% CI	P-value	$\beta$	95% CI	P-value	$\beta$	95% CI	P-value
<b>Monthly income</b>									
Less than 3500 RMB									
3501~7999 RMB	0.035	-0.123-0.268	0.465	0.057	-0.079-0.326	0.230	0.057	-0.073-0.309	0.227
8000 RMB and above	0.066	-0.082-0.550	0.146	0.114	0.093-0.747	0.012	0.098	0.035-0.653	0.029
<b>Employment status</b>									
Unemployed									
Employed	0.028	-0.155-0.272	0.590	0.055	-0.101-0.340	0.288	0.046	-0.114-0.303	0.375
<b>Chronic disease status</b>									
No									
Yes	-0.009	-0.228-0.186	0.841	-0.050	-0.329-0.099	0.293	-0.033	-0.275-0.129	0.478
<b>Having a family doctor</b>									
No									
Yes	0.099	0.044-0.364	0.013	0.130	0.112-0.445	0.001	0.124	0.096-0.410	0.002
<b>Service satisfaction</b>									
No									
Yes	0.286	0.813-1.406	<0.001	0.276	0.804-1.418	<0.001	0.298	0.848-1.428	<0.001

**Abbreviation:** CI, confidence interval.

## Discussion

As an important non-health evaluation index globally, responsiveness assesses what occurs when the healthcare system interacts with individuals, which can be instrumental in enhancing the quality of health service.<sup>19</sup> Community health centers bear the responsibility of providing primary healthcare services, and the government is making strenuous efforts to bolster the development of these centers to satisfy residents' health needs and achieve better health outcomes.<sup>20</sup> This is the first large-scale survey to assess the responsiveness of community health centers under the reform of a health-oriented integrated healthcare system in China. Our findings indicate that the community health centers' responsiveness scores are 8.25, significantly higher than the health system responsiveness score of China (7.33) in 2000, Wuhan province (7.46) in 2009,<sup>1</sup> Jiangsu province (7.44) in 2016,<sup>21</sup> and with no recent literature available for further comparison. The score of respect for persons is slightly higher than that for client orientation, and the gap between two components is narrowing considerably. In countries like Ethiopia and Thailand, the score of respect for persons is notably higher than client orientation,<sup>12,20</sup> in contrast to Israel and several European countries.<sup>13,22</sup> Most Western countries have shifted from a disease-centered approach to a patient-centered approach to enhance the service experience, allowing patients considerable autonomy in choosing their medical treatment. However, in many Asian countries, doctors still focus on the disease and lead the entire treatment process.<sup>18</sup> The Chinese government has recognized this issue and has emphasized a people-oriented approach in a recent series of policies for an integrated healthcare system. For example, the establishment of a health information platform aims to optimize primary health care conditions, and the creation of integrated chronic disease clinics is designed to offer both treatment services and health management services. These initiatives may account for the improved score in client orientation compared to previous literatures,<sup>16</sup> and have helped to balance the score of respect for persons.

The domain scores for the responsiveness of community health centers indicate that social support and dignity have the highest scores, while choice of providers and autonomy are the lowest. This is similar to previous literature in China, but differs from that of other countries. In India, basic amenities and choice of providers have relatively higher domain scores, while prompt attention is the lowest. Due to their less-developed economic level, the government strives to improve the quality of basic public health facilities, and enhance the choice of private providers for poor through cost subsidies and health insurance schemes.<sup>22</sup> In Germany, dignity has the highest domain score, and confidentiality is the lowest. Residents may feel discomfort when disclosing health problems, arranging follow-up appointments or receiving drug prescriptions, and they prefer having a separate space to communicate with doctors.<sup>11</sup> In contrast, in China,



residents place a higher value on emotional support during the treatment process in the traditional culture. They seek substantial respect from doctors and nurses, and their spouses or children often accompany them to provide social support and care.<sup>16,23</sup> The low score for choice of providers might be due to, firstly, the total number of GPs is insufficient in rural China, the average number of GPs per 10,000 population was 3.28 in 2022, which is lower than the 8–10 GPs per 10,000 population in developed countries, thus limiting patients' choices;<sup>24,25</sup> secondly, the current diagnosis and treatment capabilities of GPs is relatively lower and cannot meet patients' expectations.<sup>26</sup> China has long focused on the training of specialist doctors. Medical students with a high level of education and quality can become specialist doctors, while those with a lower level of education and capability will become GPs. The low score for autonomy might be due to the doctors were respected at a high status under the traditional Confucian ideology in China, leading residents to be more deferential to doctor's authority and less inclined to question or express their opinions, and they often prefer that doctors make the best decision for them.<sup>27</sup> Moreover, Chinese doctors typically see a large number of patients daily, which leaves limited time to engage patients in discussions or explain treatment processes in detail.<sup>26–28</sup>

Findings from the current study suggest that positive factors influencing the total score of community health centers' responsiveness include age, having a family doctor, and service satisfaction. While previous studies from other counties have identified education level, district, marital status, and employment status as having a significant effect, these factors were not found to impact responsiveness in our study.<sup>6,9</sup> Residents aged 60 years old and above were found to report a significantly higher level of responsiveness. This might be attributed to two reasons. Firstly, elderly individuals with chronic diseases, who utilize healthcare services more frequently, are more familiar with the hospital environment and facilities, and have more realistic medical expectations.<sup>29</sup> In addition, they develop a better relationship of trust with doctors during the multiple treatments, which in turn enhances their perception of service responsiveness.<sup>30</sup> Secondly, compared with young people, elderly people with chronic diseases have a higher demand for timely and convenient treatment, and community health centers are well positioned to meet these needs due to their accessibility and proximity.<sup>31</sup>

It is worth noting that the family doctor contract service was found to be associated with significantly higher scores for respect for persons, client orientation score, and total responsiveness score. In recent years, the government has been actively promoting the family doctor contract service as part of the construction of a health-oriented integrated healthcare system. Firstly, the teams of family doctors have been expanding, with specialists from town hospitals, health managers, and public health doctors all joining the local family doctor teams. And the service content has also broadened to include health education, remote health monitoring, health risk assessment and follow-up, rehabilitation guidance, home care, and other diversified services, moving beyond the clinical treatment services provided only by family doctors and nurses in the past.<sup>14</sup> Secondly, contracted residents enjoy preferential policies regarding treatment and fees. These include the convenience of scheduling appointments with town hospital specialists, an increased reimbursement ratio for outpatient services, and the provision of long-term prescriptions for chronic diseases. Such policies are beneficial for enhancing the responsiveness experienced by contracted residents.<sup>32,33</sup>

Satisfaction and responsiveness are considered to have a close relationship and together play a crucial role in measuring health outcomes.<sup>34</sup> Service satisfaction reflects patients' expectations of the health system, while responsiveness is closely tied to the patient's experiences with the interaction of health system.<sup>35</sup> When patients are satisfied with the non-medical aspect of care and hold reasonable expectations for health services, they tend to be more compliant and understand the service interactions better, which in turn leads to relatively higher responsiveness.<sup>20,35</sup> This relationship has also been confirmed in other countries.

## Limitations

There are several limitations to this study. Firstly, the data were collected in Zhejiang province alone, and therefore may not be representative of the overall situation in China. Secondly, the questionnaires used in this study are all subjective questions. Although self-administered questionnaire has been used to reduce social desirability bias, it still has this effect. Respondents might provide answers that they perceive as more favorable or acceptable rather than their true feelings or experiences.

## Conclusion

The study has revealed that the responsiveness of community health centers in Zhejiang province of China is at a higher level, with respect for persons and client orientation being maintained at a relatively balanced level. It was found that the elderly population, having a family doctor and satisfied with healthcare services all positively influence the responsiveness of community health centers. The establishment of a health-oriented integrated healthcare system has proven to be effective. Within this system, the family doctor contract service is particularly instrumental in enhancing the responsiveness of community health centers. To further this progress, there is a need for continuous improvement in the technical proficiency and health promotion capabilities of family doctors. Additionally, it is important to encourage residents to actively participate in their treatment process, thereby increasing their choice of healthcare providers and enhancing their autonomy in healthcare decisions.

## Abbreviations

SD, Standard Deviation; CI, Confidence Interval; WHO, World Health Organization; ANOVA, analysis of variance; GPs, general practitioners.

## Data Sharing Statement

The data are available from the corresponding author upon reasonable request.

## Ethics Approval and Consent to Participate

This study was approved by the Hangzhou Normal University Ethics Board (University of Zhejiang, China) (No. 2022–1118). Written informed consent form was obtained from each participant prior to the enrolment. A copy of the signed consent form was given to each participant. We confirm that our study complies with the declaration of Helsinki.

## Acknowledgments

Chi Zhou and Xu Li are co-first authors for this study. We thank the help of doctors and nurses from the six hospitals and twelve community health centers of Hangzhou and Yuhuan Counties from Zhejiang Province, and all the research staffs during the surveys.

## Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

## Funding

This study was supported by Zhejiang Province Philosophy and Social Science Planning Zhijiang Youth Special Project (No: 24ZJQN106Y), National Natural Science Foundation of China (No: 72274050), the MOE (Ministry of Education in China) Project of Humanities and Social Sciences (No: 22YJCZH262), Social Development Science and Technology Programme Projects of Yuhuan City in 2023 (No: 202307), and Beijing Kangmeng Charity Foundation Zhejiang County Hospital health development promotion research project (No: 2023XY-WSJK201).

## Disclosure

The authors declare no conflicts of interest in this work.

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