

Choice of and Equity in First-Contact Care in China's Zhejiang and Qinghai Province: A Comparative Study

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Research article

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Abstract

Background

The imbalance between health needs and healthcare resources has become more serious in China. The hierarchical diagnosis and treatment system has played an important role in solving the problem, one goal of which was to increase the use of basic-level medical facilities. This study aimed to compare the choice of and equity in first-contact care among residents in Zhejiang and Qinghai provinces, China.

Methods

First-hand data were obtained through a cross-sectional survey of residents of Zhejiang and Qinghai. We first compared the proportion of residents who select primary healthcare institutions as the setting for first-contact care. Then we compared horizontal equity using the concentration index decomposition method. An urban-rural subgroup analysis was carried out for both provinces.

Results

A total of 4899 residents were enrolled, 2872 from Zhejiang and 2027 from Qinghai. The proportion of residents selecting a PHI as their first-contact care provider was 82.5% in Qinghai, and 54.4% in Zhejiang. The horizontal inequity index of selecting a PHI as first-contact care was -0.180 and 0.007 in Zhejiang and Qinghai, respectively. The HI was -0.088 , -0.160 , 0.069 , and -0.058 in rural Zhejiang, urban Zhejiang, rural Qinghai, and urban Qinghai, respectively.

Conclusions

The proportion of residents selecting a PHI as their first-contact care provider in Zhejiang was lower and the extents of horizontal inequity were more serious compared with Qinghai's. We suggest that medical reform should be implemented based on socioeconomic development, because of China's geographic vastness and the considerable amount of difference in development among geographic areas. Larger gaps in the medical insurance reimbursement ratio between different levels of medical institutions might aid in increasing the equitable utilization of PHIs.

1. Background

Primary healthcare institutions (PHIs) play an extremely important role in China's National Medical and Health Care System (NMHCS), a situation that is considered the foundation of an effective health system [1, 2]. It is the responsibility of PHIs to tackle frequently encountered medical conditions, common minor diseases, and chronic conditions [3]. However, PHIs are still underutilized in China [3]. With the

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health care services by walking into one of the hospitals. Both PHIs and hospitals can be directly accessed by walk-in patients [3]. Meanwhile, given that there are more professional personnel and specialized resources in large hospitals, more patients would select large hospitals as their first-contact care provider regardless of their health issue. The freedom of patients to select institutions has caused a great dilemma for large hospitals and PHIs. Large hospitals are crowded, whereas PHIs have few patients. This situation is referred to as the “inverted triangle” phenomenon of health resource allocation [1].

To alleviate this dilemma, the National Hierarchical Medical System (NHMS) was formed as an important part of the New Medical Reform in China in 2009 [4]. The management, personnel, and health services of PHIs were entirely funded by the government [5]. It was proposed that improvements should be made in the structure of the health care system in order to promote the utilization of PHIs [6–8]. In the NHMS, patients must first seek care at a PHI. Then with a referral from PHI, they can seek care at a hospital. Patients who seek first-contact care at a hospital without having been referred by a PHI, receive less reimbursement from their medical insurance provider. Meanwhile, a dual referral system was also launched, which enhanced the accessibility and equity of health care between PHIs and hospitals [3]. The implementation of the NHMS and other relevant measures have facilitated the utilization of PHIs.

However, there are significant differences in the proportion of residents selecting PHIs as first-contact care among the different regions. For example, previous studies have found that the proportion of individuals who choose to seek first-contact care from a PHI was 63% for Xiamen, 74.0% for Jilin, 60.2% for Shandong, 52.3% for Chengdu, and 82.1% for Xuzhou [9–12]. There is a gap between the proportion in several regions in China and the World Health Organization recommended proportion of above 80% [13]. China is a vast land with great differences in socioeconomic development among its regions; therefore, we were interested in the differences in choice of first-contact care in regions with different levels of development. We chose two study sites with entirely different levels of development to compare the proportions of residents who selected primary health care institutions as their first-contact care provider. Zhejiang was chosen as the developed province, and Qinghai was chosen as the underdeveloped province.

Equitable access to healthcare services that meet health needs regardless of socioeconomic status (SES) is an important goal of the health care service system [14]. Because medical insurance reimbursement plays an important role in the NHMS, people with different levels of socioeconomic status can be influenced to different degrees. Prior studies, primarily on associated factors, have revealed that the choice of first-contact care is significantly affected by such factors as region type (urban or rural), income level, and distance from a PHI [1, 5, 9, 13]. However, there is a lack of research on the relationship between health needs and the choice of first-contact care. Equity with regard to the choice of first-contact care for residents with similar health needs but different levels of SES and differences in other variables have yet to be examined. Equity is the core of primary health care; horizontal equity refers to the situation where people with the same health needs have the same access to health care. This concept has been applied in the United States [15, 16]. The horizontal inequity (HI) index

was first proposed by Wagstaff et al.; the HI index can be used to determine whether, with the influence of socioeconomic status and other variables, the utilization of health care is equitable for residents with similar health needs [15].

The objective of this study was to compare the choice of and equity in first-contact care in Zhejiang (a developed province) and Qinghai (underdeveloped province). First, the proportions of residents choosing PHIs as their first contact provider were compared. Next, the levels of equity were compared using HI. Because China has an urban-rural dual economic structure, for each province, sub-comparisons of the choice of first-contact care and level of equity in choice of first-contact care between rural and urban regions were also carried out for each province.

2. Methods

2.1 Data source and sampling

A cross-sectional study was conducted in Zhejiang and Qinghai during a 1-year period between August 2016 and August 2017. Two counties in Zhejiang and three districts in Qinghai were selected using a multi-stage stratified cluster random sampling method. The selection of study sites was based on two criteria: 1) the counties (districts) represented different levels of socioeconomic development; 2) the governments of the counties (districts) were able to support our research. In each county (districts), 10 neighborhood committees of one street were randomly selected (towns), or 10 administrative villages were randomly selected in each township (rural areas) [17].

Our questionnaire was developed based on the high-quality questionnaire of the National Services Survey, which contained several items on residents' sociodemographic information, health status (self-reported health, chronic diseases), health care utilization, and whether a PHI was their choice of first-contact care [18]. Prior to conducting the field surveys, all investigators were trained on the research protocol and the administration of the questionnaires. This study was conducted in accordance with the Declaration of Helsinki.

2.2 Data collection

The collection of data was conducted during the period of the field investigation. We contacted with the governments of Zhejiang and Qinghai provinces to obtain the support of local health departments. Prior to conducting the field surveys, all investigators were trained on the research protocol and the administration of the questionnaires. Any family not responding after three attempts was replaced by another randomly chosen family in the same neighborhood. If the residents were younger than 16 years old, their survey would be completed by their parents or other family members at least 16 years of age (For accuracy).

2.3 Indicator and variables

Choice of first-contact care was applied as an indicator in this study, and was a dichotomous observed dependent variable (1 = selected PHI; 0 = did not select PHI).

In this study, variables were determined and classified based on previous studies and Andersen's behavioral model, to ensure that all possible influencing variables would be fully considered [9, 11–13, 17, 19–21]. Age, sex, chronic disease status, and self-reported health score were classified as health needs variables. Income was used to assess SES. Because insurance status, education level, employment status, marital status, and distance from the nearest PHI had been previously reported to be possible influencing factors of choices of first-contact care, they were included in this study as other variables.

2.4 Data analyses

Descriptive analysis and χ^2 -tests were applied to compare the proportions of choices of first-contact care by related factors for both Zhejiang and Qinghai.

There are some misconceptions with regard to equality and equity. Equality in health refers to a state in which each person has the same level of access to health care resources; this can be measured with the concentration index (CI) [17]. Two concepts related to equity in health are horizontal and vertical equity. Horizontal equity refers to a state in which people with the same health needs have access to the same health care resources, and vertical equity refers to a state in which people with more health needs are provided with more health care resources [15, 16]. Horizontal equity is widely measured using the methods developed by Wagstaff and Doorslaer.

Horizontal inequity can be calculated by subtracting the contributions of the health needs variables to CI. Because the indicator was dichotomous, a probit model was adopted to calculate marginal effects for each factor. The formula is as follows [22]. Where y_i is the indicator of choices of first-contact care, β_j^m and γ_k^m are the partial effects, dy/dx_j and dy/dz_k of each variable treated as fixed parameters and evaluated at sample means; x_i denotes health needs variables, z_i denotes other variables, and the μ_i is the implied error term, which includes approximation errors [22, 23].

$$y_i = \alpha^m + \sum_j \beta_j^m x_{ji} + \sum_k \gamma_k^m z_{ki} + \mu_i \quad (1)$$

Because the Eq. (1) is linearly additive and the decomposition result can be applied, the CI for y is as follows [22]: Where CI is nonstandardized, C_j is the CI for x_j , C_k is the CI for γ_k and C_μ is the CI for error; \bar{x}_j denotes the mean of x_j , \bar{z}_k denotes the mean of z_k , and μ denotes the error [23].

$$CI = \sum_j (\beta_j^m \bar{x}_j / \mu) C_j + \sum_k (\gamma_k^m \bar{z}_k / \mu) C_k + GC_\mu / \mu \quad (2)$$

HI index can be calculated by subtracting the contributions of health needs variables from the nonstandardized concentration index. Based on the Eq. (2), the formula is as follows [22]:

$$HI = C - \sum_j (\beta_j^m x_j / \mu) C_j$$

(3)

3. Results

3.1 Household characteristics and their choices of first-contact care

A total of 4899 residents were enrolled in this study (2872 from Zhejiang and 2027 from Qinghai). A significantly higher percentage of residents from Qinghai selected PHIs as their choice for first-contact care compared with Zhejiang (82.5% vs 54.4% $P < 0.001$). There were significant differences between the two provinces in choice of first-contact care by income level, education level, employment status, distance from the nearest PHI, and insurance status. There was no significant difference between the two provinces in choice of first-contact care by marital status. Region type (urban or rural) was an influencing factor among residents of Qinghai; however, it was not found to be an influencing factor among residents of Zhejiang (Table 1).

Table 1

Proportions of Zhejiang and Qinghai residents choosing PHIs for first-contact care by related factors

Items	Zhejiang				Qinghai			
	No. (N)	PHI(n)	% (n/N)	P-value	No. (N)	PHI(n)	% (n/N)	P-value
Total	2872	1562	54.4	—	2027	1672	82.5	—
P-value of the proportion (Zhejiang vs. Qinghai)	P < 0.001							
Age								
0–20	451	230	51.0	P < 0.001	494	402	81.4	P = 0.864
21–40	704	337	47.9		557	463	83.1	
41–60	1008	546	54.2		670	556	83.0	
61 and older	709	449	63.3		306	251	82.0	
Mean ± SD	44.6 ± 21.0				37.7 ± 20.6			
Income (per-capita per year)								
Poorest	575	476	82.8	P < 0.001	398	286	71.9	P < 0.001
Lower middle	484	314	64.9		493	439	89.0	
Middle	595	331	55.6		303	272	89.8	
Higher middle	637	266	41.8		419	358	85.4	
Highest	581	175	30.1		414	317	76.6	
Mean ± SD	4464.0 ± 3913.1			1708.9 ± 3591.0				
Education background								
Illiteracy	287	177	61.7	P < 0.001	453	361	79.7	P < 0.001
Primary	813	543	66.8		438	357	81.5	
Middle	859	494	57.5		552	493	89.3	
High	275	131	47.6		220	169	76.8	
Technical	160	60	37.5		83	67	80.7	
College and above	478	157	32.8		281	225	80.1	
Employment								

Items	Zhejiang				Qinghai			
	No. (N)	PHI(n)	% (n/N)	P-value	No. (N)	PHI(n)	% (n/N)	P-value
Employed	1637	901	55.0	P < 0.001	1028	842	81.9	P = 0.037
Retired	395	156	39.5		240	192	80.0	
Student	374	205	54.8		347	279	80.4	
Unemployed	466	300	64.4		412	359	87.1	
Marital status								
Married	2009	1085	54.0	P = 0.533	1183	992	83.9	P = 0.055
Other state	863	477	55.3		844	680	80.6	
Insurance								
None	79	28	35.4	P < 0.001	37	30	81.1	P < 0.001
Employer-based	1089	344	31.6		263	189	71.9	
Urban and rural	1680	1188	70.7		1733	1448	84.1	
Others	24	2	8.3		5	5	100.0	
Distance to the nearest primary healthcare institutions								
0–2 km (includes 0 km, don't include 2 km)	2164	1223	56.5	P < 0.001	1451	1346	92.8	P < 0.001
2 km-4 km (includes 2 km, don't include 4 km)	574	254	44.3		514	312	60.7	
Above 4 km (includes 4 km)	134	85	63.4		62	14	22.6	
Self-report health score (from 0-100)								
Mean ± SD	84.0 ± 13.0				82.8 ± 13.6			
Household register								
Rural	1758	1255	71.4	P = 0.541	1018	819	80.5	P = 0.015
Urban	1114	807	72.4		1009	853	84.5	

3.2 Decomposition of the CI index and the value of HI index

When extracting the contributions of health needs variables to CI, the HI index was calculated to assess whether there was horizontal equity in the choice of first-contact care (i.e., to determine whether residents with similar health needs had similar options with regard to first-contact care). It was found that the contribution of health needs variables to CI was relatively low (from - 1.64–2.84%). In Zhejiang, income contributed mostly to the CI, with a proportion of contribution of 52.74%. Region type (urban or rural) followed with a proportion of contribution of 34.83%. Income contributed mostly to the CI both in urban and rural Zhejiang, with proportions of contribution of 49.03% and 96.49%, respectively. In Qinghai, the CI was mostly affected by region type (urban or rural; 59.48%), and for both urban and rural Qinghai, the CI was mostly affected by the distance from the nearest PHI (32.52%) and insurance status (36.17%) (Table 2).

The HI indexes of Zhejiang and Qinghai were - 0.180 and 0.007, respectively. The inequity of Zhejiang was pro-poor; among residents with similar health needs, poorer residents were more likely to select a PHI for first-contact care. The inequity of Qinghai was mild pro-rich (which was almost equitable, due to the fact that the HI index was very close to 0); with similar health needs, richer residents preferred to select a PHI for first-contact care. The HI indexes were - 0.088, -0.160, 0.069, and - 0.058 in rural Zhejiang, urban Zhejiang, rural Qinghai, and urban Qinghai, respectively (Table 2).

Table 2: Contributions of each factor to CI and the value of HI

	Zhejiang						Qinghai					
	Entire province		Rural Zhejiang		Urban Zhejiang		Entire province		Rural Qinghai		Urban Qinghai	
	contribution	%*	contribution	%*	contribution	%*	contribution	%*	contribution	%*	contribution	%*
Needs variables	-0.003	1.54	-0.003	2.84	0.003	-1.94	0.002	-1.64	-0.000	-0.72	0.002	-3.46
Age	-0.003	1.57	-0.004	4.41	0.004	-2.34	0.004	-2.34	-0.001	-0.80	0.000	-0.10
Self-report health	0.000	-0.14	0.001	-1.65	-0.001	0.78	-0.001	0.33	0.000	0.09	0.002	-3.23
Chronic	-0.000	0.06	-0.000	-0.11	0.000	-0.18	-0.001	0.45	0.001	0.78	0.000	-0.12
Sex	-0.000	0.05	-0.000	0.18	0.000	-0.19	0.000	-0.09	-0.000	-0.24	0.000	-0.02
SES-income	-0.096	52.74	-0.085	96.49	-0.078	49.03	-0.081	44.49	0.010	13.90	-0.009	14.69
Other variables	-0.105	57.67	-0.009	10.17	-0.035	21.90	-0.176	97.64	0.032	45.91	-0.039	59.03
Insurance	-0.036	19.50	-0.006	7.03	-0.043	27.10	-0.067	38.01	-0.000	-0.46	-0.026	36.17
Education	0.000	-0.16	-0.000	0.16	-0.000	0.04	0.009	-4.98	0.008	11.35	-0.003	5.36
Employment	-0.007	4.01	-0.001	1.47	0.003	-2.03	-0.006	3.08	-0.001	-1.02	0.004	-6.40
Marital status	-0.002	0.94	-0.001	0.91	-0.004	2.62	-0.003	1.37	0.002	3.52	-0.000	0.11
Distance	0.003	-1.45	-0.001	0.60	0.009	-5.83	-0.001	0.68	0.022	32.52	-0.014	23.79
Household register	-0.064	34.83	--	--	--	--	-0.109	59.48	--	--	--	--
Residual	0.022	-11.95	0.009	-9.50	-0.049	31.01	0.264	-40.50	0.028	40.36	-0.012	29.74
CI	-0.183	100	-0.088	100	-0.160	100	0.010	100	0.069	100	-0.058	100
HI	-0.180	--	-0.085	--	-0.163	--	0.007	--	0.069	--	-0.060	--

4. Discussion

In this study, a comparison of choices of first-contact care in Zhejiang and Qinghai was carried out. It was found that the proportion of residents who chose PHIs as their first-contact care medical institutions of Zhejiang was lower than that of Qinghai. The HI index was used to assess horizontal equity when selecting first-contact care among residents with similar health needs. Pro-poor inequity in Zhejiang and mild pro-rich inequity in Qinghai were found. Inequity was greater among the poor in rural regions in the two provinces.

In total, the proportion of residents selecting PHI as their first-contact care in Zhejiang was lower than that in Qinghai. One possible reason for the difference is the gaps in medical insurance between different institution levels. Prior studies reported that medical insurance plays an important role in the NHMS [3, 9]. The gaps in medical package benefits between different institution levels for Qinghai was larger than that for Zhejiang [24, 25]. In Qinghai, for outpatients with urban and rural medical insurance (URRMI), the reimbursement ratio was 50% with a ceiling of 120 per capita per year; for outpatients with URRMI, the deductible was 100, 600, and 1500, and the reimbursement ratio was 90%, 80%, and 70% for PHI, secondary hospitals, and tertiary hospitals, respectively [24]. For Zhejiang, using Jiaxing as an example, for outpatients with URRMI, the reimbursement ratio were 40%, 20%, and 10% for PHI, secondary hospitals, and tertiary hospitals, respectively; for inpatients with URRMI, the deductibles were 300, 500, 1000, and the reimbursement ratio were 80%, 75% and 65% for PHI, secondary hospitals, and tertiary hospitals, respectively [26]. The larger gaps in deductibles and reimbursement in Qinghai may encourage resident to use PHI more. In addition to the difference in medical insurance package, Qinghai was at the forefront of implementation of the NHMS in China in 2013, while Zhejiang developed several pilot programs in 2014 [25]. Compared with Zhejiang, residents had more time to get used to NHMS in Qinghai, which might help to increase the utilization of PHI.

With similar health needs, the degree of pro-poor inequity of Zhejiang was significant; poorer residents preferred to select PHI as their first-contact care. In Qinghai, a mild pro-rich inequity can be found, and richer residents preferred to select PHIs. Zhejiang is a relatively developed province in China, with 56.56 million inhabitants; its annual gross domestic product was 7793.69 billion dollars in 2017 [27]. Compared with Zhejiang, Qinghai is underdeveloped, with 5.98 million inhabitants, and its annual gross domestic product was 39.14 billion dollars in 2017 [28, 29]. Also, as demonstrated in this study, the income per capita per year in Zhejiang was significantly higher than that in Qinghai. Rich residents in Zhejiang may not be as sensitive to the differences in reimbursement ratio for different institution levels, which may be because the differences for them are not as significant. For Qinghai, the choices of first-contact care were almost equitable. The overall income level in Qinghai was moderate. Considering the larger gaps in reimbursement between different institution levels in Qinghai, residents with different SES status may be more likely to select PHI as their first-contact care equally.

A subgroup analysis of region type (urban or rural) was also carried out. Results indicated that the pro-poor inequity was more serious in urban regions in the two provinces. In Zhejiang, a pro-poor inequity can be found both in rural and urban regions; however, the degree of inequity was more serious among urban residents. In Qinghai, in rural regions, rich residents tended to select PHI, whereas in urban regions, more poor residents selected PHI. One possible reason for this finding may be the urban-rural income gap, which is about 2.02:1 [30]. Compared with rural residents, urban residents were richer; therefore, they may be less sensitive to the gaps in medical reimbursement between different levels of institutions when they select first-contact care providers. This situation could result in richer residents preferring not to select PHIs for first-contact care in urban regions.

These findings showed that for a country with vast land and a tremendous amount of regional socioeconomic differences, medical reform should be implemented according to local conditions. The focus of the reform should be based on socioeconomic development. For Zhejiang, residents were relatively richer, and they would be less sensitive to the gaps in medical insurance reimbursement, larger gap in the medical reimbursement ratio or other solutions can be employed to increase the utilization of PHI, especially in urban regions. For Qinghai, with similar health needs, the choices of first-contact care were almost equitable, which may serve as an example for other regions. However, the equitable utilization of PHI in rural regions of Qinghai should be further promoted.

This study had several limitations. First, possible reasons based on prior research and information from government websites were considered to explain the findings; however, not all possible factors were discussed in the study. Second, residents may have forgotten actions taken in the past regarding their health care, causing recall bias. Because the questionnaires were administered to each household, it is likely that family members discussed these past actions for better recall. Third, there were many proper nouns in the questionnaires, which may cause misunderstanding of residents. We added the explanation of these nouns, and face-to-face questionnaires were carried out to decrease misunderstandings.

There are three major policy implications from this study. First, medical reform policies should take socioeconomic status into consideration, developing different policies for different regions. Second, more focus should be placed on urban regions, in order to increase the equitable utilization of PHIs. Third, larger gaps in reimbursement at different institution levels may help increase the equitable utilization of PHIs.

5. Conclusions

In conclusion, the present study compared the choice of and equity in first-contact care in Zhejiang and Qinghai. The differences between rural and urban regions within the two provinces were also explored. In Zhejiang, the proportion was relatively lower with a pro-poor inequity; larger gaps in the medical reimbursement ratio at different institutional levels can be considered to encourage the utilization of PHI. In Qinghai, the proportion was higher than the World Health Organization recommended proportion, and the choices were almost equitable. More effort should be made to promote the equitable utilization of PHI in urban regions of the two provinces.

Abbreviations

Primary healthcare institutions=PHI; Socioeconomic status=SES; Concentration index=CI; Horizontal equity index=HI; Confidence limits=CL.; National Hierarchical Medical System (NHMS)

Declarations

Ethics approval and consent to participate

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This study was approved by the institutional review board of Zhejiang University School of Public health. Written consent was obtained from all participants, for residents who were younger than 16 years old, their consent would be written by their parents or other family members at least 16 years of age (For accuracy) .

Consent to publish

Not applicable

Availability of data and materials

Please contact the corresponding author for data requests.

Competing interest

All authors declare that they have no competing interests.

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Author Contributions

XS participated in the field investigation, was responsible for quality control, training of investigators, data collection and analysis, and the initial version of the manuscript and the revisions; HZ participated in the design of the research study, design of questionnaires, and manuscript revisions; HZ, SG, and XZ participated in the design of the research study, the design of the questionnaires, and the field investigation, and shared responsibility for quality control, investigator training, data collection, and manuscript revisions; YG, MH, and JW participated in the field investigation, and shared responsibility for quality control, investigator training, and data collection; HD participated in the design of the research plan, designed the questionnaires, participated in the field investigation, shared responsibility for quality control and investigator training, and reviewed the manuscript before final submission.

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Authors' information

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