

# The Influencing Factors of Health-Seeking Preference and Community Health Service Utilization Among Patients in Primary Care Reform in Xiamen, China

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**Introduction:** Patients often seek healthcare at general hospitals rather than at community healthcare centres (CHCs) which leads to inefficiency of health services. The primary healthcare reform developed by Xiamen has proven to break through the barriers of hierarchical diagnosis and treatment. The influencing factors of health-seeking behaviours of patients in the Xiamen reform, however, are unclear.

**Objective:** This study aimed to assess patients' healthcare-seeking preferences and CHCs utilization, and identify influencing factors among patients affected by the Xiamen reform.

**Methods:** A cross-sectional study composed of 2200 individuals with hypertension or diabetes was conducted in association with Xiamen's reform. The choice of health institutions was used to measure health-seeking preference. The probability and frequency of outpatient service use were used to measure CHC utilization. The social ecological model and two-part model were employed to examine influencing factors.

**Results:** As high as 72.5% of the subjects, including those who were under 60 years old, had low education level, with long disease duration, good self-report health and low household income expressed a preference for CHC ( $P < 0.05$ ). Also, participants who had good-condition CHCs ( $\chi^2 = 6.736$ ,  $P = 0.010$ ), joined in three-in-one chronic disease management ( $\chi^2 = 81.615$ ,  $P < 0.01$ ) and were insured by medical insurance ( $\chi^2 = 21.142$ ,  $P < 0.01$ ) significantly preferred to visit CHCs for treatment. In addition, patients who had a preference for CHC utilized many more CHCs ( $P < 0.01$ ). Analysis of influencing factors found that education, self-reported health, smoking, household income, condition of the CHC, whether the patient had joined the healthcare reform and whether the patient had medical insurance were important factors affecting health-seeking preference and CHC utilization ( $P < 0.05$ ).

**Conclusion:** The Xiamen healthcare reform made some achievements in improving CHC utilization. However, certain challenges remain. The government should further strengthen CHCs, deepen and expand healthcare reform, and make efforts to guide reasonable health-seeking behaviour and improve the efficiency of primary health systems.

**Keywords:** health-seeking preference, community health services utilization, social ecological determinants, chronic diseases, primary care reform

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## Introduction

The community health centre, as the cornerstone of a healthcare system, is characterized by providing first-contact, continuous, comprehensive, and coordinated care to individuals as well as families.<sup>1</sup> The population of a country with a strong

primary care system has improved health outcomes, particularly reflected in relieving chronic conditions, higher quality of life, and better healthcare system satisfaction in individuals.<sup>2</sup> In 2008, the World Health Organization (WHO) proposed that primary care be used as an approach to provide effective, fair, and efficient care and that primary care systems be strengthened in all countries.<sup>3</sup> Many countries, such as the UK, have attempted to use various structures and models to improve primary care and have tried to establish chronic care models to improve primary care for patients with chronic illness.<sup>4</sup> These models have proved to be effective in improving care and reducing costs.<sup>5</sup>

The healthcare delivery system in China is based on three tiers, namely, primary, secondary and tertiary levels of healthcare. Primary healthcare services are mainly provided by CHCs, which were initially established to maintain public health in the late 1990s and have continued to expand and develop since 2008.<sup>6–8</sup> However, due to the lack of restrictions in patients' choice of healthcare providers and lower trust in CHCs, most patients tend to seek treatment in hospitals (particularly tertiary hospitals) regardless of disease type and severity.<sup>9,10</sup> Statistics show that the number of visits to tertiary hospitals was 1.8 times the number of visits to CHCs.<sup>11</sup> In addition, with the alteration of the disease spectrum, chronic diseases have come to represent a significant threat to human health and development in the current world. Although CHCs have played an increasingly important role in the prevention, treatment and rehabilitation of chronic diseases, patients with chronic diseases prefer to go higher-tier hospitals for routine treatment.<sup>12,13</sup> This phenomenon in China has resulted in considerable wastage of high-quality medical resources in not only tertiary hospitals but also in unused CHCs and further aggravated health inequity among residents.<sup>14,15</sup>

To optimize patients' current healthcare-seeking preferences and improve the efficiency of the healthcare system, the Chinese government initiated the "Healthy China 2020 Plan" in 2012 and subsequently implemented a series of pilot projects across the country.<sup>16–18</sup> In 2014, the National Health and Family Planning Commission (NHFPC) selected the city of Xiamen as the pilot city for hierarchical diagnosis and treatment reform for hypertension and diabetes.<sup>19</sup> As a municipality in the economically developed southeast coastal area of China, Xiamen has a relatively high level of healthcare and prevalence rate of chronic diseases, and the average life expectancy is

above 80 years.<sup>19,20</sup> Statistics indicated that 13.65% of residents were aged 60 years and over, and the prevalence of hypertension and diabetes in Xiamen was 16.67% and 4.61%, respectively. Such serious ageing problems and the shifting of the disease spectrum made hypertension and diabetes rank as the top two issues addressed in all medical visits before 2014 in Xiamen, accounting for more than half of outpatient visits in hospitals.<sup>21</sup>

To address these problems, Xiamen introduced a "three-in-one" team-based care model for chronic disease management in 2015, tested first among patients with hypertension and diabetes. In this model, patients with diabetes or hypertension are assigned to a team of three healthcare workers that consists of a specialist from a general hospital (GH), a general practitioner (GP) from a CHC, and a dedicated health manager.<sup>20</sup> The specialists play the most significant role in curing patients with severe diseases and training GPs and health managers. The GPs are responsible for managing patients' health through physical examination, prescriptions, and reference to hospitals. Health managers mainly provide services for disease prevention and control, including regular follow-up and health education, and establish personal health records. Moreover, the government provided financial incentives by increasing fees for chronic disease case management and enhancing the reimbursement mechanism.<sup>22</sup>

It has been reported that the proportion of hypertensive visits to CHCs increased from 72.6% to 95.7% and that diabetic visits increased from 40.7% to 78.1%.<sup>23</sup> The three-in-one team-based care model proved to be an effective way to improve the efficiency of the healthcare system. The factors influencing health-seeking preference and CHC utilization in the Xiamen reform, however, are unclear.

There is a strong correlation between health-seeking preference and health service utilization.<sup>23–26</sup> Existing research has indicated that the health-seeking behaviour of patients is complex and influenced by many factors. However, qualitative studies have examined influential factors of patients' health-seeking behaviour by using the behavioural model of health service use.<sup>13,27,28</sup> The health promotion field is often criticized for neglecting the environmental underpinnings that impact individuals.<sup>29</sup> The social ecological model (SEM), as a multi-systems theoretical model, recognizes individuals as embedded within larger social systems and describes the interactive characteristics of individuals and environments.

Social ecological theory has been proposed as a useful framework for forecasting illness-management behaviours<sup>30</sup> as well as for community health promotion programmes.<sup>31</sup> It assumes that complex individual behaviours, such as health-seeking behaviours, are determined by multiple factors and reflect interactions within multiple systems. Building on the SEM, we hypothesized that patients' health-seeking behaviours would be influenced by intrapersonal, interpersonal, institutional, and policy factors.<sup>32</sup>

Employing SEM as a conceptual model, this study aimed to assess patients' healthcare-seeking preference and utilization of CHCs and identify influential factors among patients in the programme of three-in-one team-based care. Our work will generate fresh insight into the study on preferences and utilization of healthcare and provide valid reference for the promotion of primary care in developing countries, such as China.

## Materials and Methods

### Participants

A cross-sectional study composed of 2200 individuals with hypertension or diabetes was conducted from June to September 2016. Given that the prevalence rate of hypertension or diabetes was 20.8% in 2014, 2200 patients were selected by a two-stage random sampling method according to the formula:  $N = 400 \cdot (1-p)/p$ , where  $p$  is the prevalence rate of diseases, including a 40% increase to allow for potential non-responders. At the first stage, 5 CHCs (defined as A, B, C, D and E) were selected from 25 CHCs in Xiamen according to economic levels. At the second stage, 440 patients aged over 18 years old were recruited according to treatment records in each CHC. Thereafter, the participants were interviewed by well-trained investigators through face-to-face interviews, and the response rate was 89.6%. Each interviewee was fully aware of the study purpose and of the anonymity and confidentiality of their responses. We checked for completeness of all questionnaires and used EpiData software (version 3.1. EpiData Association, Denmark) for data entry. Double entry was conducted to ensure data accuracy.

### Independent Variables

#### Health-Seeking Preference

Given that China's healthcare delivery system is mainly composed of CHCs (providing primary care) and hospitals

(providing secondary/tertiary care), health-seeking preference was measured by asking subjects "In what type of medical institution would you prefer to seek treatment?" (CHC or hospital).

### Community Health Services Utilization

The main services provided by CHCs are outpatient services; therefore, we used the probability and frequencies of outpatient service utilization to express the CHC utilization, which was measured by the questions (1) "Did you see a doctor in the past two months in a CHC?" (2) "How many times did you visit a doctor in the past two months in a CHC?"

### Dependent Variables

According to the multilevel framework proposed by Urie Bronfenbrenner and McLeroy,<sup>32,33</sup> dependent variables were categorized into personal characteristics, personal behaviour, interpersonal factors, institutional factors, and public policy. Personal characteristics variables included gender (male/female), age (<60 years old/≥60 years old), education (primary school and below, middle school, and high school and above), BMI (<18.5 kg/m<sup>2</sup>, 18.5–23.9 kg/m<sup>2</sup>, 24–27.9 kg/m<sup>2</sup>, and ≥28 kg/m<sup>2</sup>), complications (yes/no), duration of diseases (years), and self-reported health (poor, neutral, and good). Personal behaviour variables included smoking (yes/no), drinking (yes/no), and sleep quality (poor, neutral, and good). Interpersonal factors included marriage (married/not married) and monthly household income (<2000 RMB, 2000–3999 RMB, and ≥4000 RMB). Institutional factors included five CHCs, which are named A, B, C, D, and E. Public policy included whether the patient's treatment was managed by the GP team (joined the Xiamen mode) (Yes/no) and whether the patient had medical insurance (uninsured, Urban Employee Basic Medical Insurance (UEBMI), Urban Resident Basic Medical Insurance (URBMI), and others. The New Rural Cooperative Medical System (NRCMS) was not included in this study due to urbanization in Xiamen).

### Statistical Analysis

Descriptive statistics (frequency, percentage, mean (SD)) were used to describe the characteristics of the study sample. Chi-square tests and t-tests were used to analyse the differences in health-seeking preferences and CHC utilization among patients with different characteristics. Logistic regression analysis was employed to explore factors affecting health-seeking preference. Count data are

usually characterized by heteroscedasticity, so we constructed a two-part negative binomial model (two-part Negbin) by using the SAS GLIMMIX process to study the influential factors of the probability and frequency of CHC utilization.<sup>34–36</sup> Data cleaning and analysis were performed by SAS soft, version 9.4 (SAS Institute Inc, Cary, NC, USA).

## Results

### Characteristics of the Study Sample

The total number of collected valid samples was 1972. A total of 76.2% were over 60 years old, and 54.4% were female. A total of 61.5% had an education attainment of middle school level and below, and 40.6% of the participants had a BMI larger than 24 kg/m<sup>2</sup>. Twenty-six percent lived with complications, and the chronic disease duration was 9.3±7.2 years. In total, 17.8%, 47.7%, and 32.6% of the respondents provided self-reported health statuses of poor, neutral and good, respectively. A total of 87.5% of the respondents were married, and 77.1% lived in a family with an income of more than 2000 RMB per month. The proportion of respondents was well distributed across CHCs (approximately 20%). Overall, 50% of the sample had joined the three-in-one team-based care model, and 92.2% were covered by medical insurance (Table 1).

### Health-Seeking Preference

Of 1972 respondents, 1429 (72.5%) individuals reported that they usually sought healthcare in CHCs. As Table 2 shows, in personal characteristics level, respondents under 60 years old were more likely to see a doctor at a CHC than those over 60 (78.7% vs 70.5%,  $\chi^2=11.906$ ,  $P<0.001$ ). More than 70% of participants with middle school education and below were more likely to receive treatment in CHCs, compared with 68.2% of those with high school education and above ( $\chi^2=12.038$ ,  $P=0.002$ ). Patients with a long disease duration tended to be less likely to seek healthcare in CHCs than those with a short disease duration ( $t=2.070$ ,  $P=0.038$ ). A total of 479 (74.6%) individuals with good self-report health preferred to seek treatment in CHCs compared to those with poor health status ( $\chi^2=4.627$ ,  $P=0.032$ ). There was no significant difference in health-seeking preference at the individual behaviour level (smoke, drink and sleep quality). On the interpersonal level, patients with high household income had greater willingness to visit CHCs than those with low

**Table 1** Characteristics of the Study Sample

Variables		N/Mean	%/SD
Gender	Male	900	45.6
	Female	1072	54.4
Age (years)	<60	469	23.8
	≥60	1503	76.2
Education	Primary school and below	695	35.2
	Middle school	519	26.3
	High school and above	758	38.4
BMI (kg/m <sup>2</sup> )	<18.5	53	2.7
	18.5–23.9	1119	56.7
	24–27.9	540	27.4
	≥28	260	13.2
Complication	Yes	464	26.0
	No	1319	74.0
Duration of Diseases (years)		9.3	7.2
Self-report health	Poor	390	17.8
	Neutral	940	47.7
	Good	642	32.6
Marriage	Married	1725	87.5
	Unmarried	247	12.5
Monthly household	<2000	451	22.9
Income (RMB)	2000–3999	959	48.6
	≥4000	562	28.5
CHCs	A	400	20.3
	B	398	20.2
	C	394	20.0
	D	379	19.2
	E	401	20.3
Managed by GP team	Yes	990	50.2
	No	982	49.8
Medical insurance	Uninsured	140	7.1
	UEBMI	801	40.6
	URBMI	916	46.5
	Others	115	5.8

household income ( $\chi^2=4.349$ ,  $P=0.037$ ). In terms of the institutional factors, participants had different health-seeking preferences. Specifically, most patients of CHCs A, B, C and E tended to express a preference for a CHC, while fewer patients of CHC D did so ( $\chi^2=6.736$ ,  $P=0.010$ ). At the policy level, the preference for the CHC was much higher in respondents managed by the GP team (81.5% VS 63.4%,  $P<0.001$ ) and insured by the UEBMI or URBMI ( $\chi^2=21.142$ ,  $P<0.001$ ).

**Table 2** The Health-Seeking Preference of the Sample

Variables		Yes (N=1429)		No (N=543)		Chi-Square	P
		N/Mean	%/SD	N/Mean	%/SD		
Personal Characteristics							
Gender	Male	635	70.6	265	29.4	3.024	0.082
	Female	794	74.1	278	25.9		
Age (years)	<60	369	78.7	100	21.3	11.906	0.000
	≥60	1060	70.5	443	29.5		
Education	Primary school and below	515	74.1	180	25.9	12.038	0.002
	Middle school	397	76.5	122	23.5		
	High school and above	517	68.2	241	31.8		
BMI (kg/m <sup>2</sup> )	<18.5	31	58.5	22	41.5	5.745	0.125
	18.5–23.9	398	73.1	142	26.3		
	24-27.9	191	73.5	69	26.5		
	≥28	809	72.3	310	27.7		
Complication	Yes	323	69.6	141	30.4	2.063	0.151
	No	964	73.1	355	26.9		
Duration of diseases <sup>a</sup> (years)		9.09	7.1	9.84	7.3	2.070	0.038
Self-report health	Poor	266	68.2	124	31.8	4.627	0.032
	Neutral	684	72.8	256	27.2		
	Good	479	74.6	163	25.4		
Personal Behaviour							
Smoke	Yes	268	75.7	86	24.3	2.272	0.132
	No	1161	71.8	457	28.2		
Drink	Yes	245	69.8	106	30.2	1.518	0.218
	No	1184	73.0	437	27.0		
Sleep quality	Poor	361	72.3	138	27.7	0.322	0.570
	General	469	71.3	189	28.7		
	Good	599	73.5	216	26.5		
Interpersonal Levels							
Marriage	Married	1248	72.4	477	24.2	0.094	0.759
	Unmarried	181	73.3	66	26.7		
Monthly household income (RMB)	<2000	310	68.7	141	31.3	4.349	0.037
	2000–3999	699	72.9	260	27.1		
	≥4000	420	74.7	142	25.3		
Institutional factors							
CHCs	A	292	73.0	108	27.0	6.736	0.010
	B	276	69.4	122	30.7		
	C	273	69.3	121	30.7		
	D	312	82.3	67	17.7		
	E	276	68.8	125	31.2		
Political Levels							
Managed by GP team	Yes	807	81.5	183	18.5	81.615	<0.001
	No	622	63.4	360	36.7		

(Continued)

**Table 2** (Continued).

Variables		Yes (N=1429)		No (N=543)		Chi-Square	P
		N/Mean	%/SD	N/Mean	%/SD		
Medical insurances	Uninsured	84	60.0	56	40.0	21.142	<0.001
	UEBMI	585	73.0	216	27.0		
	URBMI	689	75.2	227	24.8		
	Others	71	61.7	44	38.3		

**Note:** <sup>a</sup>t-test was used to compare the duration of diseases between different health-seeking preferences.

## The Influencing Factors of Health-Seeking Preference and CHC Utilization

In the logistic regression of health-seeking preference, we found that patients with chronic illness who were female, were aged under 60 years old, had a middle school education level and had good self-reported health preferred to seek treatment in CHCs. Cigarette smoking, household income  $\geq 4000$ , management by GP team and being insured by URBMI increased the preference for CHCs (Table 3).

Putting health-seeking preference as an independent variable in the two-part model of CHC utilization, we found a strong association between preference for and utilization of CHC. Patients with BMI beyond 28, higher household income, poorer sleep quality, using alcohol or cigarettes, managed by the GP team and insured by UEBMI or URBMI had a higher probability and frequency of using CHC. In addition, having high school education and above, no complications, long duration of disease and good self-reported health significantly reduced the frequency of CHC utilization. At the institutional level, we found that the CHC utilization in CHC B and CHC E was rather low due to the poor-quality medical service and irrational distribution of medical resources (Table 3).

## Discussion

Currently, chronic disease is the leading global health threat and consumes large amounts of medical resources,<sup>37</sup> especially in China. Statistics indicate that chronic disease treatment accounted for more than 50% of outpatient visits in tertiary hospitals in Xiamen, with more than 30% of them for renewing an existing prescription.<sup>38</sup> According to earlier papers, only approximately 5% of all patients require treatment by a specialist, while more than 90% of chronic diseases can potentially be well managed by a GP.<sup>39</sup> Therefore, there is an urgent need to optimize Chinese patients' current healthcare-seeking preferences to release medical resources

in hospitals and improve the efficiency of CHC utilization. As a pilot city for health policy reform, the Xiamen government introduced an innovative reform named the three-in-one team-based care model, which changed chronic disease management and redesigned the healthcare system.

In our study, 72.5% of respondents preferred to seek treatment in CHCs, and those with a health-seeking preference for CHCs had a high probability and frequency of using CHCs in the Xiamen reform. These results mean that the three-in-one team-based care model had an impact on encouraging more appropriate health-seeking behaviour in patients with chronic diseases and more efficient use of CHCs.<sup>20,40</sup> Then, we adopt an ecological perspective to examine the influencing factors of the health-seeking behaviour regarding CHCs.

## Personal Characteristics

Gender and age are the primary factors influencing patients' preference. Women may prefer to use CHCs for the following two reasons: 1) Women usually live in worse health status than men in China; 2) With the development of CHCs, there are more incentives to seek treatment in community centres than in hospitals.<sup>41,42</sup> In our study, 70.8% of women reported poor or neutral health, and the incentive policy allowing patients to buy nearly one month of medicine in a CHC and other incentives are more attractive to women.<sup>23</sup> With respect to age, worse health conditions could limit the activities of daily living of the elderly. As a result, elderly individuals are more inclined to seek treatment in hospitals with the help of families when they have serious health problems and require healthcare.

Patients with a high school education and above showed a lower preference for and frequency of using CHCs in the past two months. This is consistent with the fact that the more educated elderly tend to pursue higher quality medical care and techniques in higher-tier hospitals and have lower trust in CHCs.<sup>43–45</sup> To achieve a higher quality of care for

**Table 3** Influencing Factors of Health-Seeking Preference and CHC Utilization

Variables		(1)	(2)	
			Probability	Frequency
Patients' preference				
CHC (Ref. Hospital)		–	0.701**	0.361**
Personal Characteristics				
Gender (Ref. Female)	Male	–0.169*	–0.054	0.006
Age (years) (Ref.<60)	≥60	–0.227**	–0.181	–0.104
Education (Ref. Primary School and below)	Middle school	0.244**	–0.117	–0.073
	High school and above	–0.279**	–0.322	–0.225*
BMI (kg/m <sup>2</sup> ) (Ref.18.5–23.9)	<18.5	–0.481*	0.067	0.044
	24~27.9	0.130	0.043	0.009
	≥28	0.186	0.486*	0.273*
Complication (Ref. Yes)	No	0.011	–0.249	–0.289**
Duration of diseases (years)		–0.009	0.016	0.012*
Self-report health (Ref. Poor)	Neutral	0.037	–0.136	–0.192
	Good	0.218*	–0.277	–0.276*
Personal Behaviour				
Smoking (Ref. No)	Yes	0.259**	–0.155*	–0.007*
Drinking (Ref. No)	Yes	–0.082	–0.105*	–0.068*
Sleep quality (Ref. Poor)	Neutral	–0.167	0.098	0.114
	Good	0.049	–0.354**	–0.237*
Interpersonal Factors				
Marriage (Ref. Married)	Others	0.083	–0.140	–0.038
Monthly household income (RMB) (Ref.<2000)	2000–3999	0.099	0.614**	0.346**
	≥4000	0.203*	0.662**	0.430**
Institutional factors				
CHCs (Ref. A)	B	–0.306**	–0.696**	–0.335**
	C	–0.134	0.041	–0.080
	D	0.562**	–0.019	–0.078
	E	–0.098	–0.182	–0.278*
Political Factors				
Managed by GP team (Ref. No)	Yes	0.543**	0.336*	0.247**
Medical insurance (Ref. Non)	UEBMI	0.189	0.739**	0.648**
	URBMI	0.354**	0.614*	0.524**
	Others	–0.295	0.425	0.432

**Notes:** \*Significant at 0.05 level, \*\*Significant at 0.01.

**Abbreviations:** Column 1, factors influencing the patients' preference for treating in CHCs; Column 2, factors influencing the patients' CHS utilization.

patients with different education levels, it is urgent to enhance the quality of CHCs (capacity of health staff, medical environment, and medical techniques).<sup>46</sup>

In this study, health status was found to be the determining factor of CHC utilization, which is consistent with an earlier paper.<sup>47</sup> People who were obese, had complications, had a long disease duration or reported poor health usually

went to CHCs more frequently. This might be explained by the fact that obesity increases the risk of developing chronic diseases, leading to complications and worse health conditions. Moreover, chronic disease patients need long-term prescriptions. Compared to hospitals, which can prescribe medicine for chronic diseases for only one week at a time, the Xiamen reform allowed CHCs to extend prescription

drugs for 4–8 weeks, which greatly increased the convenience of and compliance with chronic disease management for patients.<sup>22</sup>

## Individual Behaviour

Our analysis indicated that smoking, drinking and poor sleep quality slightly increased CHC utilization. This was mainly because health-risk behaviours may expose the elderly to higher health risks, thereby increasing their demands for healthcare.<sup>48</sup>

## Interpersonal Level

We found that household income significantly impacted health-seeking preferences and CHC utilization. People with high income tended to visit CHCs more often, which was different from Tian Shen's result.<sup>44</sup> Other authors found that low income is linked to unmet needs and poor access to healthcare.<sup>49</sup> Although the Xiamen reform has subsidized medicine expenses and raised reimbursement rates in CHCs, the health inequalities caused by income disparities remain. The government should make additional efforts to enhance the compensation of medical expenses and eliminate the barriers to accessing healthcare for low-income populations.<sup>50</sup>

## Institutional Factors

Residents from different CHCs showed different health-seeking preferences and CHC utilization. In this study, patients from CHC B had the lowest preference for, probability of and frequency of CHC use. We found that the small scale, poor healthcare conditions and heavy traffic of CHC B were the dominant limitations for people using health services. This might explain why healthcare inequity still existed in CHCs<sup>51</sup> in Xiamen and is in line with the results of Lin YB.<sup>52</sup> Previous studies have pointed out that to improve health equality, the scale of the community and its administered population should be considered.<sup>53</sup> Therefore, the government should concentrate on promoting healthy equality by distributing health resources reasonably and taking advantage of different geographical characteristics.

## Public Policy

Patients managed by the GP team preferred to see doctors in CHCs and had a higher probability and frequency of CHC utilization, which suggested that the disease management method by the GP team was an effective way compared to the patients' disease management by themselves. First and

foremost, the health managers in the GP teams maintained the continuity and improved the effectiveness of chronic disease management via frequent contacts, health education, health interventions and follow-ups, which substantially enhanced patient compliance.<sup>20</sup> Second, the increasing drug variety and replacement of obsolete equipment increased the attractiveness and acceptance of CHCs as the initial point of contact for care.

Furthermore, medical insurance plays a key role in health-seeking preference and could be one of the most important measures towards reducing health inequity.<sup>54</sup> Compared to the 30% out-of-pocket percentage in hospitals, the lower out-of-pocket percentage (7%) required for CHC use by patients managed by the GP team could attract more CHC utilization.<sup>55</sup> Therefore, it is necessary to make efforts to extend medical insurance coverage in order to establish primary care-oriented healthcare based on CHCs, with GPs serving as "gatekeepers".

## Limitations and Strengths of the Study

A few limitations, however, remain in this study. First, most of the sampled individuals in our study were over 60 years old, which contributes to potential bias. A possible reason is that the elderly are more likely to have chronic diseases and need more medical service. Another reason is that most participants in the three-in-one chronic disease management programme are elderly. Second, this study focused on two main chronic diseases, hypertension and diabetes, which may weaken the generalizability of our findings. This is because the first stage of the three-in-one chronic disease management programme is specifically aimed at hypertensive and diabetic patients. Third, there was limited analysis of the relationship between influencing factors within the framework of SEM. Such analysis is expected to be considered in future studies.

Despite these limitations, the findings reported here shed new light on health-seeking preferences and the utilization of CHCs. Our study will make several contributions to the current healthcare system. First, our study focused on the major issue of patients crowding into hospitals, which aggravates the inefficiency and difficulty of health resource allocation in the healthcare system in China. Then, we explored the influencing factors of health-seeking behaviour based on SEM, which not only makes up for the deficiencies in prior studies but also provides a new comprehensive perspective to evaluate healthcare

reform. Last, our results have great reference value for further deepening health reform.

## Conclusion

The implementation of innovative primary care reform in Xiamen has made some achievements in improving CHC utilization. However, certain challenges remain, such as underutilization of CHCs among marginalized groups (elderly, poor, uneducated), lower recognition of CHCs among higher educated populations, and insufficient incentives and coverage of health reform. To guide reasonable healthcare-seeking behaviour and improve the efficiency of primary health systems, the government should further strengthen the primary healthcare system, deepen and expand healthcare reform, make efforts to protect the interest of marginalized populations and eliminate health inequalities.

## Abbreviations

NCDs, non-communicable chronic diseases; CHCs, community health centres; SEM, social ecological model; GP team, general practitioner-centred team; two-part model, two-part negative binomial model; UEBMI, Urban Employee Basic Medical Insurance; URBMI, Urban Resident Basic Medical Insurance; NRCMS, New Rural Cooperative Medical System; USA, the United States of America.

## Ethics and Consent Statement

The study was carried out in conformance with the declaration of Helsinki. Ethical approval was received from the Ethics Committee of Health Care District of Central Finland and the Ethics Committee of the School of Public Health, Xiamen University. All participants in our study completed a participant's informed consent form prior to participation.

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## Disclosure

The authors report no conflicts of interest in this work.

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