



RESEARCH ARTICLE

Can family doctor contracted services facilitate orderly visits in the referral system? A frontier policy study from Shanghai, China

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Abstract

Background: China committed to establishing a family doctor (FD)-based referral system following the medical reform in 2009. This paper explored the effect of FD on establishing the anticipated system.

Methods: Two waves of survey were conducted in Shanghai, China. 2754 and 1995 individuals were sampled in 2013 and 2016 respectively. We compared orderly visiting behaviour between contracted and non-contracted residents. Logistic regression models were performed to further test the effect of FD on orderly visits.

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Results: More contracted residents first-contacted community health service centres (CHSCs; 45.48%) than non-contracted residents (28.93%). Contracted residents were also more likely to refer to specialists via CHSCs than the non-contracted (9.84% vs. 2.60%). The odds ratio (OR) for first-contact at CHSCs by contract status was 1.569 in 2013, but increased to 1.675 in 2016. Being contracted with a FD was associated with referral behaviour, but the OR declined from 2.692 to 2.487 over years.

Conclusion: The survey from Shanghai showed that FD had a significant effect on attracting first-contact at CHSCs and referral via CHSCs; however, the effect on the latter decreased. The effectiveness of the FD role on referral behaviour requires a well-established referral system, which has not yet been completely achieved in China.

KEYWORDS

family doctor, first-contact, orderly visits, primary healthcare, referral system

1 | INTRODUCTION

Efficient healthcare delivery systems are important to provide basic medical and public health services to the whole population. Primary healthcare (PHC) systems have been adopted in both developed and developing countries.^{1,2} At Alma-Ata in 1978, PHC was accepted by all World Health Organization (WHO) member countries as a way to provide comprehensive, universal, equitable, and affordable healthcare services. The WHO stated PHCs could work towards fairness and efficiency by providing the best way of coping with illness in the 21st century.³ However, the PHC system has been criticized as 'unrealistic and idealistic', and was eclipsed during the 1980s and 1990s by changes in economic and political philosophies. The WHO attributed the failure of PHCs to achieve the intended goal to inadequate funding and insufficient training and equipment for healthcare workers at all levels.⁴ In 2008, the WHO called for a return to the PHC model given challenges such as inequality, inefficiency, the increasing prevalence of non-communicable diseases (NCDs), and epidemics of diseases such as AIDS, tuberculosis, and malaria.^{3,5} In addition, with the adoption of 17 Sustainable Development Goals at the 2015 United Nations General Assembly, PHC was thought to have a central role in achieving the goal of ensuring healthy lives and promoting wellbeing for all.⁶ This revealed a developing global commitment to a broader concept of health.⁷

The PHC 'gatekeeper' role is widely accepted. Four key PHC attributes have been identified: first-contact, longitudinally, comprehensiveness, and coordination.⁸ The majority of diseases are able to be treated at PHC-level by family doctors (FDs) or general practitioners (GPs), rather than needing direct referral to specialists.⁹ Therefore, two essential PHC elements are emphasized: the roles of first-contact entry point to the healthcare system and coordination of referrals.¹⁰ Controlling access to specialty care and moving the focus to managing health by comprehensive and continuous services was expected to reduce healthcare expenses. Research suggests the supply of PHC services is highly correlated with better health outcomes after demographic and socioeconomic variables are controlled.^{8,11-16} In addition, the World Health Report noted that a vast proportion of resources were spent on curative services, whereas

prevention and health promotion that could cut 70% of the global disease burden were neglected.³ Although opposing opinions may exist,¹⁷ PHC-based referral systems have been (or are being) established all over the world.¹⁸

China committed to establishing a PHC-based referral system in a medical reform in 2009. This reform aimed to provide essential medical and public health services for the population by strengthening the community-based PHC system¹⁹ and positioning community health service centres (CHSCs) as the foundation of and entry point to the health system. Interestingly, PHC as conceptualized in the declaration of Alma Ata in 1978 was inspired by the massive expansion of rural medical services in Communist China, especially 'barefoot doctors'.²⁰ However, there was a shift in funding from rural to urban facilities, and from CHSCs to specialized hospital-based care, leading to the collapse of CHSCs and the cooperative referral system.^{21,22} The PHC system faced major challenges, such as lack of human resources (primary health workers), and lack of a functional gatekeeping mechanism.²³ However, after market reforms in 1978, poor access to healthcare and high health costs resulted in widespread public dissatisfaction.²⁴ Therefore, the State Council of the People's Republic of China returned to the equalization of basic public health services, and announced the establishment of a FD system in 2011. FDs, supported by family nurses, assistants, and public health doctors, were intended to form the main body of CHSCs (tier-1 hospitals). In 2015, another important document was released by China's central government, which declared the intention to establish an orderly, efficient, coordinated, and well-functioning referral system. The blueprint for this system conceptualized FDs as attracting residents to visit CHSCs for their first healthcare contact, with seriously ill residents then referred to specialists in tier-2 and tier-3 hospitals.

Despite these efforts, most patients continued their previous healthcare seeking behaviour; that is, flowing into large hospitals and visiting specialists regardless of their disease severity. On the one hand, disorderly visits can cause congestion in medical visits, which is not conducive to the prevention and control of hospital infections; On the other hand, it will lead to a waste of medical and health resources. In 2016, the National Medical Reform Office released a document outlining packages of FD contracted services to make it more attractive for residents to sign with FDs and seek first-contact in CHSCs. These contracted services varied among regions, cities, and hospitals, and provided a series of preferential offers if a resident signed with a FD. Shanghai, one of the first FD pilot cities, implemented a new policy for '1+1+1' FD contracted services in June 2015.²⁵ This policy allowed residents to sign with FDs in CHSCs, as well as with tier-2 and tier-3 hospitals. The '1+1+1' FD contracted services included free examinations, 2-month medication prescriptions for patients with NCDs, extended prescriptions from tier-2 and tier-3 hospitals, stay-home healthcare, and higher reimbursement. In the past 2 years, the Shanghai Municipal Commission of Health and Family Planning has cooperated with other departments, and committed to establishing a referral system via '1+1+1' FD contracted services.

According to current policy design, FD could promote referral system by attracting residents first-visit CHSCs and then refer those with server symptoms to specialists in large hospitals. However, most of current studies focus on and little is known about the role FDs have played in the referral system after the launch of the policies that established the PHC-based referral system. This paper explored the effect of FDs on residents' healthcare visiting behaviour over time, including first-contact in CHSCs and referral via CHSCs. The findings will provide empirical evidence for policy makers.

2 | METHODS

2.1 | Sample

The sample for the two-wave survey analyzed in this paper was recruited from one of the pilot districts for '1+1+1' FD contracted services in Shanghai, China. Based on the two waves of tracked survey, we are able to analyze the doctor visiting behaviours and related factors of the investigated residents. The first survey wave was conducted in 2013 after the FD system had initially been established. The sample was tracked 3 years later in 2016. The survey targeted

permanent residents aged over 18 years who had lived in the district for more than 6 months. Multistage cluster sampling was applied and 3040 residents were selected, following the administrative divisions in Shanghai, that is, district, sub-district, neighbourhood committee, and community. Specifically, there are 10 sub-districts in the survey district, and we selected 4 neighbourhood committees from each of them randomly, and 2 communities from each Neighbourhood Committees, and 38 households from each community, and 1 resident from each household. We designed a structured questionnaire as a survey tool, which covered demographic information, awareness of FD contracted services, signing behaviour, CHSCs use, and patient satisfaction. We trained students from our institution's sociology department as investigators. These students visited selected residents accompanied by neighbourhood committee staff. In the first survey, 2754 valid individuals were sampled, and 1995 (72.44%) were tracked successfully 3 years later (in 2016). The remainder of the sample was lost to follow-up for various reasons, including death, migration, and being absent on long-trips.

2.2 | Measures

The key variable 'orderly visits' was measured by two major items: 'Would you contact FDs in CHSCs first if you become sick?' (yes = 1, no = 0) and 'Have you ever been referred to a specialist via a FD in a CHSC?' (yes = 1, no = 0). Respondents were asked the question relating to first-contact with a FD only if they had indicated they had been sick during the last 2 months. Therefore, the sample size for this variable was smaller than that for other variables. Another key variable was whether the respondent had contracted with a FD. This was measured with the item, 'Have you contracted with a FD?' (yes = 1, no = 0).

Sociodemographic variables included: age (18–30 years = 1, 30–45 years = 2, 45–60 years = 3, and 60+ years = 4), sex (female = 0, male = 1), marital status (single = 1, married = 2, others = 3), education level (primary school or lower = 1, junior middle school = 2, high school = 3, diploma/degree or higher = 4), retired (yes = 1, no = 0), social insurance (yes = 1, no = 0), household registration (Shanghai = 1, others = 0). Other related factors included awareness of FD contracted services, presence of NCDs, and satisfaction. The presence of NCDs was measured with the item 'Do you suffer from any chronic diseases?' (yes = 1, no = 0). Awareness of FD contracted services was measured by the item, 'Do you know that FDs contract services?' (yes = 1, no = 0).

Satisfaction was measured with 15 items: f1 'Are you satisfied with the diagnosis ability of the family doctor?'; f2 'Are you satisfied with the medical skills of the family doctor?'; f3 'Are you satisfied with the communication skills of the family doctors?'; f4 'Are you satisfied with the medical advice the family doctor provide?'; f5 'Are you satisfied with the efficiency of the medical services?'; f6 'Are you satisfied with prescription of the family doctor?'; f7 'Are you satisfied with medical examination of the family doctor?'; f8 'Are you satisfied with the convenience of CHSC services?'; f9 'Are you satisfied with the treatment process?'; f10 'Are you satisfied with the medical equipment?'; f11 'Are you satisfied with the medical environment?'; f12 'Are you satisfied with treatment privacy protection?'; f13 'Are you satisfied with the referral procedure?'; f14 'Are you satisfied with the treatment duration?'; and f15 'Are you satisfied with the duration of waiting in line?' All items were scored on a Likert scale from 1 (very dissatisfied) to 5 (very satisfied).

2.3 | Statistical analyses

Focusing on the key research question, we first compared differences in first-contact and referral behaviour between contracted and non-contracted residents. Pearson's χ^2 tests were applied for these bivariate comparisons. Exploratory factor analysis (EFA) with principal component and varimax rotation was then used to synthesize the satisfaction index. The sample adequacy was assessed by the Kaiser-Meyer-Olkin (KMO) test. Finally, four logistic regression models were used to estimate the effects of FD on first-contact and referral behaviour in 2013 and 2016, after controlling for sociodemographic and other related variables. Two pooled estimation models were also used to test the mixed

effects of FD in 2013 and 2016, which employed a basic longitudinal analysis method with a population averaged model adjusted for standard errors for clustering.²⁶ We used Epidata version 3.1 (The EpiData Association) to input data and build the dataset. The dataset was then transferred to '.dta' format, and Stata version 13.0 (StataCorp LP) was used for all analyses. The level of statistical significance was set at 0.05.

3 | RESULTS

3.1 | Sample characteristics

Table 1 depicts the sociodemographic characteristics of the sample. As the second survey wave tracked the first wave, we pooled the waves to show the sample's general characteristics. Around 50% of respondents were aged over 60 years, and 61.09% were female. In addition, 76.17% were married and 12.61% were divorced/widowed, 34.52% were high school graduates and 28.57% had a diploma/degree or above. A majority of respondents (61.61%) had retired, most (95.56%) were covered by a medical insurance scheme, and most were registered in Shanghai. However, only 26.15% of respondents had signed with a FD (Table 1).

3.2 | Descriptive analysis of FD effect

Table 2 shows a descriptive comparison in first-contact rate between two groups of residents. We found that 45.48% of contracted residents reported they would contact a FD in a CHSC first if they became sick, compared with only 28.93% of non-contracted residents. Further analysis of first-contact behaviour in 2013 and 2016 showed that the first-contact rate for both groups declined dramatically, although the contracted group kept ahead consistently (Table 2).

The referral rate from CHSCs to specialized hospitals was lower than the first-contact rate: 9.84% for contracted residents and 2.60% for non-contracted residents. The differences between the two groups were statistically significant. A separate analysis showed that the referral rate had increased, although it remained lower than the first-contact rate (from 7.64% to 11.86% for the contracted group and from 1.90% to 3.71% for the non-contracted group; Table 3).

Then longitudinal analysis using 'xttrans' command was performed to observe the transfer of orderly visit behaviours for residents. Table 4 showed that contracted residents performed better as well, higher proportion of contracted residents kept on first-visiting CHSCs (44.83% vs. 37.39%) and referring via CHSC (18.75% vs. 0%).

3.3 | Multivariate analysis of FD effect

EFA was performed to synthesize the satisfaction index before satisfaction was included in the models as an independent variable. Table 4 shows the results of principle component EFA with varimax rotation. Four factors were extracted from the 15 satisfaction items, and all eigenvalues were over 1.0. Overall, the four factors accounted for 75.44% of the variance (Table 4). The first factor, 'Treatment Environment,' explained 34.77% of the total variance and included f8, f9, f10, f11, f12, f13, f14, and f15, with all factors loading >0.45. The second factor, 'Medical Technology,' explained 15.67% of the total variance and included f1, f2, and f5, with all factors loading >0.45. The third factor, 'Service Specification,' explained 12.83% of the total variance and included f6 and f7, with both factors loading >0.45. The final factor, 'Service Attitude,' explained 12.17% of the total variance and included f3 and f4, with both factors loading >0.45. No items cross-loaded over more than one factor. The KMO index was 0.886 and the Cronbach's alpha was 0.888, indicating the 15 satisfaction items were suitable for factor analysis and had good internal reliability (Table 5).

TABLE 1 Demographic characteristics of the pooled sample

Characteristics	N	%
Age		
18–45	1080	22.74
45–60	1356	28.55
60–75	1602	33.73
75+	711	14.97
Gender ^a		
Female	2896	61.09
Male	1844	38.91
Marital status ^a		
Single	531	11.22
Married	3605	76.17
Others	597	12.61
Signing rate		
Yes	1242	26.15
No	3507	73.85
Education level ^a		
Primary school or lower	501	10.60
Junior middle school	1244	26.31
High school	1632	34.52
Diploma/degree or above	1351	28.57
Retired		
Yes	2926	61.61
No	1823	38.39
Medical insurance		
Yes	4443	93.56
No	306	6.44
Household registration		
Shanghai	4232	89.11
Others	517	10.89
Total	4749	

^aSome data were missing in these variables.

Six logistic regression models were performed after synthesis of the satisfaction variable. Whether a resident had contracted with a FD was a significant predictor of first-contact behaviour if they became sick, after controlling for sociodemographic and other related variables. Specifically, the odds ratio (OR) for first-contact in CHSCs for contracted residents was 1.569 times that of non-contracted residents; this increased to 1.675 in 2016, which was 3 years '1+1+1' FD contracted services were implemented in Shanghai (Table 6).

Sociodemographic variables (age, education, and marital status) and other related variables (awareness of FD contracted services) were also significantly associated with first-contact in CHSCs, with the effect also changing over time. In 2013, the OR for first-contact in CHSCs was 1.946 for those aged 45–60 years and 1.720 for those aged 60–75 years (reference: those aged 18–45 years). However, the age effect disappeared over time, and younger people became increasingly likely to first-contact in CHSCs in 2016. In 2013, compared with those with a primary school education, jun-

TABLE 2 First-contact in CHSCs for contracted and non-contracted residents

First-contact in CHSCs	2013–2016			2013			2016		
	Contracted or not			Contracted or not			Contracted or not		
	No	Yes	Total	No	Yes	Total	No	Yes	Total
No	1366	507	1873	715	201	916	651	305	956
	71.07	54.52	65.67	67.84	48.55	62.4	75	59.34	69.18
Yes	556	423	979	339	213	552	217	209	426
	28.93	45.48	34.33	32.16	51.45	37.6	25	40.66	30.82
Total	1922	930	2852	1054	414	1468	868	514	1382
χ^2 test	76.20 ($p = 0.000$)			47.12 ($p = 0.000$)			37.13 ($p = 0.000$)		

Note: First-contact question was asked if the respondents had fallen ill recently. Thus, quite large number of residents were left out in this variable.

Abbreviation: CHSCs, community health service centres.

TABLE 3 Referral via CHSCs for contracted and non-contracted residents

Referral via CHSCs	2013–2016			2013			2016		
	Contracted or not			Contracted or not			Contracted or not		
	No	Yes	Total	No	Yes	Total	No	Yes	Total
No	3413	1118	4531	2115	544	2659	1296	572	1868
	97.40	90.16	95.51	98.10	92.36	96.87	96.29	88.14	93.63
Yes	91	122	213	41	45	86	50	77	127
	2.60	9.84	4.49	1.90	7.64	3.13	3.71	11.86	6.37
Total	3504	1240	4744	2156	589	2745	1346	649	1995
χ^2 test	112.00 ($p = 0.000$)			50.19 ($p = 0.000$)			48.79 ($p = 0.000$)		

Note: Some data were missing in referral variable.

Abbreviation: CHSCs, community health service centres.

TABLE 4 Orderly visits behaviour transfer analysis

Orderly visits behaviour	Contracted residents		Non-contracted residents	
	No (%)	Yes (%)	No (%)	Yes (%)
First-contact in CHSCs				
No	74.60	25.40	83.82	16.18
Yes	55.17	44.83	62.61	37.39
Refer via CHSCs				
No	86.32	13.68	96.70	3.30
Yes	81.25	18.75	100.00	0.00

Abbreviation: CHSCs, community health service centres.

TABLE 5 Exploratory factor analysis for the satisfaction items

Satisfaction items	Factor 1 (treatment environment)	Factor 2 (medical technology)	Factor 3 (service specification)	Factor 4 (service attitude)	Uniqueness
f1	0.1984	0.8668	0.0809	0.0864	0.1954
f2	0.2621	0.8160	0.1487	0.128	0.2269
f3	0.1691	0.1683	0.1362	0.8717	0.1646
f4	0.128	0.0808	0.1191	0.8992	0.1543
f5	0.2561	0.7537	0.1499	0.1635	0.3171
f6	0.1154	0.0998	0.9287	0.1347	0.096
f7	0.1093	0.1217	0.9321	0.0919	0.096
f8	0.7711	0.2214	0.1345	0.2365	0.2824
f9	0.7071	0.2386	0.1870	0.2005	0.3679
f10	0.7699	0.1961	0.1385	0.1952	0.3115
f11	0.8040	0.1516	0.1375	0.1587	0.2865
f12	0.8196	0.1437	0.0748	0.0416	0.3004
f13	0.8180	0.1879	0.0552	0.068	0.2879
f14	0.8272	0.2139	0.0774	0.1111	0.2517
f15	0.7832	0.1910	0.0639	0.0357	0.3447
Variance	34.77%	15.67%	12.83%	12.17%	(75.44%)
Eigenvalue	5.23	2.35	1.93	1.83	-
KMO	0.888				
Bartlett test	$\chi^2 = 10,639.302$ ($p = 0.000$)				

Note: The bold font indicates that the factor items have higher factor loadings (usually refers to ≥ 0.5) on one specific Factor, showing that the Factor can explain these analysis items.

Abbreviation: KMO, Kaiser-Meyer-Olkin.

ior middle school graduates, high school graduates, and those with a diploma/degree or above were 36.8%, 52.4%, and 58.3% less likely to seek first-contact in CHSCs, respectively. However, the significant OR for primary school graduates disappeared in 2016. First-contact in CHSCs for those with 'other' marital status (e.g., divorced, widowed) was 52.4% of the single group (reference) in 2013, but the effect of marriage disappeared in 2016. Compared with those that did not know about FDs/CHSCs and contracted services, the OR for those that knew about these services was 55.9% higher for first-contact in CHSCs, with the coefficient increasing to 1.665 in 2016. The results of pooling the two waves and estimating a mixed effect were consistent with those from the two cross-sectional models (Table 6).

Being contracted with a FD was significantly associated with residents' referral behaviour. Specifically, the ORs for contracted residents were 2.692 and 2.487 times that of non-contracted residents in 2013 and 2016, respectively. This also showed a decline over the 3 years. It was noteworthy that the first-contact variable was absorbed in the referral model, and was not a significant predictor. In other words, first-contact in a CHSC might not increase referral probability (Table 6).

In addition, sociodemographic variables (including sex and medical insurance) and other related variables (including NCDs and satisfaction) were correlated with referral behaviour. In 2013, males were less likely to be referred to a specialist in tier-2 and tier-3 hospitals. In 2016, residents who were covered by medical insurance had an OR for referral that was 69% lower than those not in a medication insurance scheme. The OR for residents with NCDs was not significant in 2013, but was 2.361 times that of residents without NCDs in 2016. Medical Technology satisfaction was positively correlated with referral OR in 2013; that is, for each unit of Medical Technology satisfaction increase, the OR increased by 122.2% on average. Medical Technology satisfaction lost effect in 2016. However, Service Specification satisfaction became a significant predictor of referral; the OR decreased by around 43% for each unit increase in Service Specification satisfaction (Table 6).

TABLE 6 Logistic regression analysis for contracting with a family doctor: first-contact and referral behaviour

Variables	First-contact in CHSCs			Referral to specialist via CHSCs		
	2013	2016	Pooled	2013	2016	Pooled
Age group (Ref. = 18–45)						
45–60	1.946**	0.971	1.609*	1.219	0.424	0.847
60–75	1.720*	0.957	1.414	1.016	1.002	1.268
75+	1.403	0.748	1.128	1.282	0.857	1.237
Gender (Ref. = Female)						
Male	0.919	1.143	1.014	0.477*	1.061	0.779
Education (Ref. = Primary school)						
Junior school	0.632*	1.252	0.771	1.646	0.942	1.379
High school	0.476***	1.018	0.595***	2.058	0.922	1.384
Diploma/degree or above	0.417***	0.779	0.507***	0.928	0.66	0.855
Marital status (Ref. = Single)						
Married	0.637	0.537	0.631*	1.019	0.719	0.995
Others	0.524*	0.641	0.613*	1.616	0.706	1.189
Social insurance (Ref. = No)						
Yes	1.658	0.771	1.212	1.087	0.310**	0.417**
Retired (Ref. = No)						
Yes	1.317	1.071	1.188	0.579	0.65	0.677
Shanghai household registration (Ref. = No)						
Yes	1.244	0.871	1.119	0.915	1.229	1.217
Whether contracted with a FD (Ref. = No)						
Yes	1.569**	1.675***	1.572***	2.692**	2.487***	2.493***
Know about FD contract services (Ref. = No)						
Yes	1.558**	1.665*	1.412**	1.68	1.01	1.527
NCD (Ref. = No)						
Yes	1.212	1.125	1.17	1.898	2.361**	1.979**
F1-Treatment environment	0.988	1.062	1.103	0.861	1.174	0.929
F2-Medical technology	1.114	1.12	1.102	2.222**	1.276	1.641*
F3-Service specification	0.991	1.001	1.009	0.865	0.574***	0.664**
F4-Service attitude	0.957	0.887	0.943	0.764	0.766	0.801
First-contact in CHSCs (Ref. = No)						
Yes				0.899	0.823	0.822
Intercept	0.274**	0.563	0.371**	0.014***	0.204	0.040***
N	1458	1177	2635	1457	1177	2634
Log likelihood	-897.931	-716.736	-1641.023	-235.993	-316.281	-568.536
	($p = 0.000$)	($p = 0.000$)	($p = 0.000$)	($p = 0.000$)	($p = 0.000$)	($p = 0.000$)

Abbreviations: CHSCs, community health service centres; FD, family doctor; NCD, non-communicable disease.

*** $p < 0.001$, ** $0.001 < p < 0.01$, * $0.01 < p < 0.05$.

4 | DISCUSSION

4.1 | Descriptive orderly visits

Our study showed that more contracted residents reported first-contact in CHSCs and referral via CHSCs than non-contracted residents. Specifically, first-contact rates were 45.48% for the contracted group and 28.93% for the non-contracted group. Similar results were obtained in other studies in China. A survey by Mi and colleagues conducted in Jiangsu Province found that 53.1% of residents were willing to attend first-contact care at CHSCs when they fell sick with a minor illness.²⁷ This finding was supported by another study conducted in Jiangsu Province.²⁸ Qin et al. reported that 54.1% of residents preferred to visit CHSCs if their sickness was minor, but this fell to 14.4% if the sickness was more serious.²⁹ A large-scale survey conducted in China's Guangzhou Province found that the proportion of patients who had initially used CHSCs was relatively low (25.56% in rural areas vs. 20.79% in urban areas; $p < 0.001$).³⁰ Other countries reported more positive results. A German population-based survey examined preferences for FDs as gatekeepers, and showed that 74% of people with an FD preferred to consult a FD first, and only 40% of people did not have a FD.³¹ However, the referral behaviour was not positive; that is, the referral rates for the contracted and non-contracted groups were 9.84% and 2.60%, respectively. Other studies have also showed low referral rates (between 0.1% and 16.03%).³²⁻³⁴ Studies from other countries have reported more positive results. For example, one study reported that about 90% of people with a FD accessed specialist resources via their FD, compared with around 58% of those without a FD.³¹ A major reason for such a low referral rate in China could be that large hospitals are unwilling to cooperate with CHSCs to establish well-functional referral systems. A sense of crisis for large hospitals increased when the government announced the establishment of a CHSC-based referral system, which might reduce the number of patients (profits) flowing to them.³⁵ Another interesting finding in this study was that the first-contact rate declined over time, although it remained higher than the referral rate, which increased gradually. We inferred that it might be attributable to the disappearance of the 'elderly dividend.' FD attracted a lot of older people to first-visit CHSCs at its initial stage, with this group accounting for most 'fans of FD'; however, those fans might have lost enthusiasm over time. We further analyzed first-contact factors to verify this point, and found age lost its impact over time.

4.2 | The effect of FD on orderly visits

We performed further model analyses to test the effect of FD, and found that being contracted with a FD played a significant role in both first-contact and referral behaviour. There was a positive relationship between being contracted with a FD and orderly visiting behaviour, with contracted residents more likely to first contact FDs in CHSCs and be referred to specialists via CHSCs. Furthermore, we found that the positive effect of being contracted with a FD on first-contact in CHSCs increased from 2013 to 2016, whereas the effect on referral via CHSCs declined. This suggested the '1+1+1' policy increased the attraction of visiting CHSCs for residents, as expected by policy-makers. Previous studies showed that special offers, such as long-term prescriptions for those with NCDs, received strong support and satisfaction from residents.³⁶ However, the FD role in referring patients to specialists had weakened, which could be attributable to the current incomplete referral system. One study criticized how double-way referral only transferred patients from CHSCs to hospitals, but not from hospitals to CHSCs.²⁴ The focus on increasing the attraction of CHSCs is currently insufficient, and there is urgent need to establish an accessible and efficient referral system. It is also necessary to enhance the motivation for tier-2 and tier-3 hospitals to receive patients from CHSCs.

4.3 | The effect of first-contact on referral

Surprisingly, we did not find a positive effect of first-contact in CHSCs on referral via CHSCs. In other words, although being contracted with a FD was positively correlated with referral behaviour, it did not relate to first-contact in CHSCs. It would be worth exploring how FDs affect referral behaviour in a further study. However, similar results have been reported by other researchers. Recent studies have shown that gatekeeping may not be linked to changes in the coordination of referral care, although it is associated with a greater range of conditions managed by GPs at the point of first contact.^{17,37,38} In addition, a negative relationship was found that indicated PHC gatekeeping could decrease hospitalization.^{39,40} Although we showed that FDs had a positive effect on first-contact and referral via CHSCs, the mechanisms by which FDs affected referral behaviour remain unclear. FDs working together may bring about both positive and negative mechanisms that affect referral behaviour.

4.4 | Other predictors on orderly visits

We observed other significant changes over time in the influence of sociodemographic and other related variables on residents' first-contact behaviour. In 2013, age played a significant role in first-contact in CHSCs; younger residents were less likely to visit CHSCs if they became sick, whereas older residents were more likely to visit CHSCs. However, the coefficient direction and significance changed in 2016. Older residents did not remain ahead of younger residents in first-contact behaviour, which may be explained by the focus of the '1+1+1' policy. In 2013, the policy prioritized vulnerable groups, including people with disabilities, lower education levels, lower incomes, and older adults as 'key populations' for the FD system. Therefore, age lost its effect as a greater proportion of older adult residents were covered by the system. Similar results were also observed for education; that is, the OR for first-contact in CHSCs for those with relatively lower education levels declined over time. Another significant variable was awareness of CHSCs. Those with high awareness of FD contracted services were more likely to report first-contact in CHSCs than those with low awareness. Other studies conducted in China reported similar results. Xie and colleagues found that awareness of the FD policy was significantly associated with residents' willingness to select a FD as gatekeeper.²⁸ Therefore, it is necessary to strengthen propaganda relating to PHC, FDs, and the healthcare services they provide.

NCDs and satisfaction were significant predictors of referral via CHSCs. People with NCDs were more likely to be referred to specialists via FDs in CHSCs, which was inconsistent with the policies' original design. CHSCs were expected to deal with the most common diseases, especially NCDs, with PHC being the gatekeeper to preserve healthcare resources at more advanced levels of care. Except for providing adequate basic healthcare services, PHC also has responsibilities of ensuring public health, NCD management, home-based healthcare, mental healthcare, and other services.⁴¹ We suggest that the FD gatekeeper role should be strengthened to improve health management, especially for patients with NCDs.

Satisfaction was also a significant predictor of referral behaviour, which suggested that first-contact might be driven by current special offers of supported preferential policies, rather than residents' experience and satisfaction. Rather than relying on special offers, it is necessary to establish stable contract relationships between residents and healthcare services. However, satisfaction significantly affected referral behaviour, with satisfaction with Medical Technology positively correlated with referral via CHSCs. This finding was consistent with a German study that found the 'family physician's professional competence' was a significant factor associated with referral frequency.³² In our study, satisfaction factors changed in 2016, with Service Specification satisfaction becoming a significant predictor with a negative effect. This suggested that the effect of Medical Technology satisfaction declined, which may be explained by the improvement in the quality and quantity of FD teams. A GP major has also been established in more universities, and standardized training has been conducted with current FD teams. However, CHSCs may still have irregular prescribing and inspection behaviours, which may push patients to seek referrals to larger hospitals. It is urgent that a standardized clinical pathway and more functional supervision system are established and promoted.

4.5 | Limitations

This study had several limitations. First, we could not distinguish direct specialist visiting behaviour, which was a significant target for the FD gatekeeper role. In further research, we may study the referral system from the perspective of avoiding direct visits to tertiary hospitals. Second, our research was conducted only 1 year after '1+1+1' policy had been implemented; therefore, it was a short period for evaluation. In addition, we could not tell the mixed effects from other policies, though we believed that the '1+1+1' policy was the direct policy in resulting in the doctor visiting behaviours changes. Third, the first-contact item in the questionnaire was asked only if the respondent fell sick in last 2 months. This means that many observations were missing when first contact was added as a significant predictor for the referral model. Fourth, the data we used is 5 years ago, however, we believe historical data is also valuable to capture the policy effect on different phases, and we are overcoming the impact of the epidemic of COVID-19 to conduct the third wave of investigation to conduct further research.

5 | CONCLUSION

We aimed to clarify the effect of FDs on establishing an orderly referral system in China, as expected by policy makers in central and local government. We found that FDs had a significant effect on attracting first healthcare contact at CHSCs and referral via CHSCs; however, the effect on referral decreased over time. We suggest that effective health management and improving residents' satisfaction are needed to attract and retain residents in CHSCs, rather than relying on special offers. It is also necessary to empower CHSCs to manage healthcare resources and enhance the willingness of specialized hospitals to receive patients from CHSCs.

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[Correction added on 11 October 2021, after first online publication: Grant number for Leading Personnel Training Program of Pudong New Area Health System has been updated in this version.]

CONFLICT OF INTEREST

The authors have no conflicts of interest or competing financial or non-financial interests to report.

ETHICS STATEMENT

This study was approved by the Academic Ethics Committee of Shanghai Pudong Institute for Health Development (approved No. PDWSL2013-1). All participants were asked to provide written consent before participating in this survey. Data were stored and processed anonymously.

DATA AVAILABILITY STATEMENT

The datasets generated and analysed during the present study are not publicly available because of the need to protect privacy of patients' doctor visiting behaviours. However, they are available from the corresponding author on reasonable academic request (zym_03730@sina.com).

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SUPPORTING INFORMATION

Additional supporting information may be found in the online version of the article at the publisher's website.

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