

The impact of family doctor contract services on the utilization of and satisfaction with primary health care among Chinese residents: A cross-sectional study

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ABSTRACT

Introduction: Family doctor contract service (FDCS) is a vital part of China's primary health care system. This study aims to explore whether contracting with FDCS affects residents' utilization of and satisfaction with primary health care. **Methods:** A structured questionnaire was employed to collect data in January 2022. The questionnaire mainly included the following three parts: the social-demographic characteristics, health-related information, and utilization of and satisfaction with primary health care. Propensity score matching (PSM) was used to adjust for social-demographic differences between participants who contracted with a family doctor and those who did not. For the matched population, we used the Chi-square test to examine the differences in the utilization of and satisfaction with primary health care between contracted and non-contracted participants. Moreover, multiple logistic regression and linear regression were used to explore the influencing factors of the utilization of and satisfaction with primary health care. **Results:** A total of 10,850 people were investigated and 10,419 participants were incorporated into the data analysis. After matching, there were no significant differences in most of the matching variables between the contracted and non-contracted groups ($P > 0.05$). The utilization rate was significantly higher among the contracted population than of the non-contracted (96.3% vs 92.6%, $P < 0.001$). The quality of services (e.g., good service attitude, high medical level, and a trusted family doctor) was more likely to be cited as the main reasons for the contracted people to utilize primary health care than for the non-contracted. The contracted people were also significantly more satisfied than the non-contracted in all terms of satisfaction. Moreover, people who contracted with a family doctor were more likely to use primary health care with OR = 1.979 (95% CI, 1.511–2.593). **Conclusion:** The contracted people were more likely to utilize and be satisfied with primary health care than the non-contracted. In addition, the contracted people tended to use primary health care because of the quality of services rather than because of the close distance or short waiting time. Therefore, it is important to further promote the high quality of FDCS to ensure residents' sense of gain and improve their satisfaction.

Keywords: Family doctor, primary health care, satisfaction, utilization

Introduction

A robust primary health care system is the cornerstone and assurance of an effective health care system, as has been

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demonstrated across the globe.^[1,2] In China, a hospital-centered health care system can hardly meet the public's demand for long-term and continuous health care. Since 2009, China's health care system reform has given more attention to the primary care system that is expected to bring new energy for the construction of a high-quality and efficient health service system.^[3] However, the implementation of the primary care system encountered some problems, such as a low utilization rate, limited general

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practitioners, weak service capacity, and distrust of residents.^[4] It is still common for patients with minor illnesses to go to large hospitals.

Under such background, the family doctor system was introduced to China for the promotion of primary health care.^[5] The family doctor system has been established in over 50 countries and regions worldwide, including Britain, the United States, Australia, Brazil, etc.^[6-9] It was also described as general practitioners or family physicians in some countries who play a valuable role in the primary health care system.^[10-12] For example, previous studies have emphasized the role of “gatekeeper” played by the family doctor system, which could reduce healthcare costs, optimize the allocation of health resources, and finally positively promote the health outcomes of residents.^[13,14] Since 2016, China has accelerated the implementation of family doctor contract service (FDCCS) in nationwide areas, with a series of supportive policies.^[15,16] The short-term goal was to equip two to three family doctors for every 10,000 residents in China by 2020. Unlike other countries, in China, the family doctor refers to the team that provides FDCCS, which is composed of a physician, a nurse, and a village doctor. The team offers a variety of primary health care services to local residents who contract with the FDCCS, such as chronic disease management, physical examinations, referrals, health consultations, and so on.^[17,18]

Previous studies about FDCCS in China mostly focused on the current status of FDCCS,^[19,20] residents’ awareness,^[21-23] and the influencing factors of whether contract or not.^[24,25] Due to the short period of time since the implementation of the FDCCS system in China, the system is still in an early stage and its impact on primary health care is yet to be identified. This study aims to explore whether contracting with FDCCS affects residents’ utilization of and satisfaction with primary health care.

Materials and Methods

Study design

This descriptive study used a cross-sectional survey design that follows the guidelines for reporting survey-based research.

Participants

Data were collected using a self-designed structured questionnaire in January 2022 through Credamo, a professional online survey platform in China. Credamo has the same functionality as Amazon’s Mechanical Turk.^[26,27] This online survey recruited a non-probability sample of residents across China. Theoretically, at least 605 samples were required based on 5–10 times of entries of the questionnaire considering 10% of invalid questionnaires.

Measures

The questionnaire was designed based on our previous qualitative investigation in eight primary health institutions in Zhejiang province, which were chosen based on purposive sampling. The questionnaire included three parts. The first

part was about the social-demographic characteristics of the participants, such as age, gender, monthly income, educational level, household registration, and marital status. The second part was health-related information which contained self-rated health scores, whether diagnosed with chronic diseases, the distance to the nearest health institutions, the utilization of primary health care, and whether contracted FDCCS. The third part was the reasons for utilizing and satisfaction with primary health care. The satisfaction was evaluated from four aspects including charges, medical level (i.e., doctors’ skills, ethics, service attitude, and doctor–patient communications), medical resources (i.e., staff, types of medicines, and medical equipment), and environment (i.e., construction and decoration). All participants were asked to rate their satisfaction using satisfied, neutral and not satisfied, scoring 2, 1, and 0 point (s), respectively. The scores for each question were added together to obtain the total satisfaction score. In addition, we examined the reliability and validity of the questionnaires using Cronbach’s α coefficient ($\alpha = 0.877$), which showed that the questionnaire exhibited high reliability and validity.

Procedure

This self-administered online survey was launched on the Credamo platform in January 2022 to collect data for the study. Eligible Credamo users could access the survey and read a written consent form with detailed information about the research. Those who agreed to participate in this study could continue to fill out the question one by one. To ensure the quality of the online survey, an attention-check question was included in the questionnaire.

Statistical analysis

Propensity score matching (PSM) was used to adjust for social-demographic differences between participants who contracted with a family doctor team and those who did not. Based on the conditional probability, individuals in the contracted group and the non-contracted group were screened by score, and the score represented the probability of being selected into a certain group, so as to match individuals with equal or similar probabilities.^[28] The propensity score in this study was estimated with gender, age, and monthly income. 2:1 nearest neighbor matching was performed based on the propensity scores of each individual, with a 0.20 caliper value. Of the matched population, we used the Chi-square test to examine the differences in the utilization of and satisfaction with primary health care between contracted and non-contracted participants. Moreover, multiple logistic regression and linear regression were used to explore the influencing factors of the utilization of and satisfaction score on primary health care. All statistical analyses were performed using R version 4.2.1 with a statistical significance of $P < 0.05$.

Results

In our study, a total of 10,850 people were investigated and 10,419 participants were incorporated into the data analysis after deleting the invalid cases.

The characteristics of the respondents for the unmatched population and matched population are shown in Table 1. In the unmatched group, the distribution of most of the characteristics (e.g., gender, age, monthly income) showed significant differences between the family doctor contracted group and non-contracted group with $P < 0.001$. In the matched group, there were no significant differences in most of the matching variables between the two groups ($P > 0.05$).

Figure 1 shows the utilization of primary health care among the family doctor contracted and non-contracted groups. After matching, the utilization rate was still significantly higher among the contracted population than of the non-contracted (96.3% vs 92.6% , $P < 0.001$).

Figure 2 shows the reasons why residents utilize primary health care. The quality of services was more likely to be cited as the main reason for the contracted population choosing to use primary health care than for the non-contracted population. For example, more contracted people chose primary health care because of a good service attitude (24.2% vs. 18.6% , $P < 0.001$), high medical level (18.2% vs. 13.3% , $P < 0.001$), good medical equipment (9.3% vs. 6.8% , $P < 0.001$) than those of who did not contract. Moreover, a trusted family doctor was cited as a reason for choosing primary health care by 20.4% of the contracted population compared to 8.9% of the uncontracted ($P < 0.001$). In addition, the contracted people placed less importance on convenience or accessibility of health services than the non-contracted population, such as a close distance (74.2% vs. 81.8% , $P < 0.001$) and short waiting time (22.3% vs. 33.2% , $P < 0.001$).

Table 2 shows the satisfaction with primary health care among people who contracted with a family doctor and those without.

The contracted people were significantly more satisfied than the non-contracted in all the terms of satisfaction, including charges (56.9% vs 37.5% , $P < 0.001$), medical level (67.1% vs 44.8% , $P < 0.001$), medical ethics (80.0% vs 63.6% , $P < 0.001$), service attitude (80.4% vs 62.0% , $P < 0.001$), doctor-patient communication (89.1% vs 78.8% , $P < 0.001$), number of staffs (66.5% vs 50.8% , $P < 0.001$), type of medicines (83.2% vs 70.1% , $P < 0.001$), medical equipment (38.8% vs 18.8% , $P < 0.001$), construction (58.8% vs 39.9% , $P < 0.001$), and decoration (71.8% vs 59.4% , $P < 0.001$).

Multivariable logistic regression [Table 3] showed that whether contracted with a family doctor or not ($P < 0.001$), self-rating of health status ($P = 0.009$), household registration ($P < 0.001$), and marital status ($P < 0.001$) were significantly associated

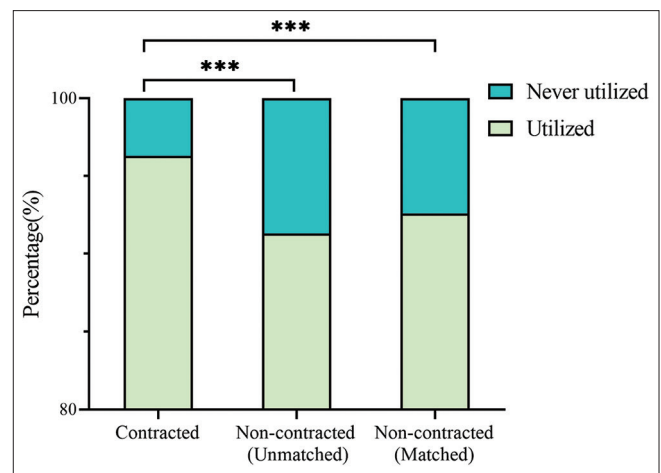


Figure 1: The utilization of primary health care between people contracted with a family doctor and those without

Table 1: The basic characteristics of participants

| Items | Category | Unmatched (n=10419) | | | Matched (n=5732) | | |
|----------------------------|---------------------------|----------------------|------------------|--------|----------------------|------------------|--------|
| | | Non-contracted (n,%) | Contracted (n,%) | P | Non-contracted (n,%) | Contracted (n,%) | P |
| Gender | Male | 3,755 (44.3) | 963 (49.6) | <0.001 | 1,822 (48.1) | 963 (49.6) | 0.29 |
| | Female | 4,721 (55.7) | 980 (50.4) | | 1,967 (51.9) | 980 (50.4) | |
| Age (Years) | <16 | 27 (0.3) | 2 (0.1) | <0.001 | 1 (0.0) | 2 (0.1) | 0.458 |
| | 16~29 | 5,325 (62.8) | 659 (33.9) | | 1,316 (34.7) | 659 (33.9) | |
| | 30~39 | 2,233 (26.3) | 922 (47.5) | | 1,802 (47.6) | 922 (47.5) | |
| | 40~49 | 562 (6.6) | 243 (12.5) | | 453 (12.0) | 243 (12.5) | |
| | 50~59 | 276 (3.3) | 90 (4.6) | | 182 (4.8) | 90 (4.6) | |
| | >60 | 53 (0.6) | 27 (1.4) | | 35 (0.9) | 27 (1.4) | |
| Monthly income (×1000 RMB) | <3 | 2,404 (28.4) | 217 (11.2) | <0.001 | 427 (11.3) | 217 (11.2) | 0.702 |
| | 3~5 | 2,221 (26.2) | 418 (21.5) | | 846 (22.3) | 418 (21.5) | |
| | 5~10 | 2,922 (34.5) | 924 (47.6) | | 1,812 (47.8) | 924 (47.6) | |
| | 10~30 | 844 (10.0) | 358 (18.4) | | 641 (16.9) | 358 (18.4) | |
| | 30~50 | 64 (0.8) | 23 (1.2) | | 55 (1.5) | 23 (1.2) | |
| | >50 | 21 (0.2) | 3 (0.2) | | 8 (0.2) | 3 (0.2) | |
| Education level | Junior high and below | 190 (2.2) | 37 (1.9) | 0.822 | 89 (2.3) | 37 (1.9) | 0.26 |
| | Senior high school | 1,121 (13.2) | 258 (13.3) | | 549 (15.0) | 258 (13.3) | |
| | University degree | 6,321 (74.6) | 1,450 (74.6) | | 2739 (72.3) | 1450 (74.6) | |
| | Master's degree and above | 844 (10.0) | 198 (10.2) | | 412 (10.9) | 198 (10.2) | |
| Marital status | Unmarried | 4,771 (56.3) | 470 (24.2) | <0.001 | 1,282 (33.8) | 470 (24.2) | <0.001 |
| | Married | 3,705 (43.7) | 1,473 (75.8) | | 2507 (66.2) | 1,473 (75.8) | |

Table 2: Satisfaction with primary health care among participants who used primary health care

| Items | Non-contracted | | | Contracted | | | P | |
|-------------------|------------------------------|-------------|---------------|-------------------|-------------|---------------|------|--------|
| | Not satisfied (%) | Just so (%) | Satisfied (%) | Not satisfied (%) | Just so (%) | Satisfied (%) | | |
| Charges | Reasonability | 3.2 | 59.2 | 37.5 | 1.5 | 41.6 | 56.9 | <0.001 |
| Medical level | Medical skills | 2.8 | 52.4 | 44.8 | 1.7 | 31.2 | 67.1 | <0.001 |
| | Medical ethics | 1.4 | 35.1 | 63.6 | 1.3 | 18.8 | 80.0 | <0.001 |
| | Service attitude | 2.1 | 36.0 | 62.0 | 1.2 | 18.4 | 80.4 | <0.001 |
| | Doctor–patient communication | 2.9 | 18.4 | 78.8 | 1.8 | 9.1 | 89.1 | <0.001 |
| Medical resources | Number of staffs | 7.6 | 41.6 | 50.8 | 4.7 | 28.8 | 66.5 | <0.001 |
| | Types of medicines | 9.0 | 20.9 | 70.1 | 4.6 | 12.2 | 83.2 | <0.001 |
| | Medical equipment | 13.0 | 68.2 | 18.8 | 6.5 | 54.7 | 38.8 | <0.001 |
| Environment | Construction | 26.6 | 34.5 | 38.9 | 19.8 | 21.3 | 58.8 | <0.001 |
| | Decoration | 10.1 | 30.5 | 59.4 | 6.1 | 22.1 | 71.8 | <0.001 |

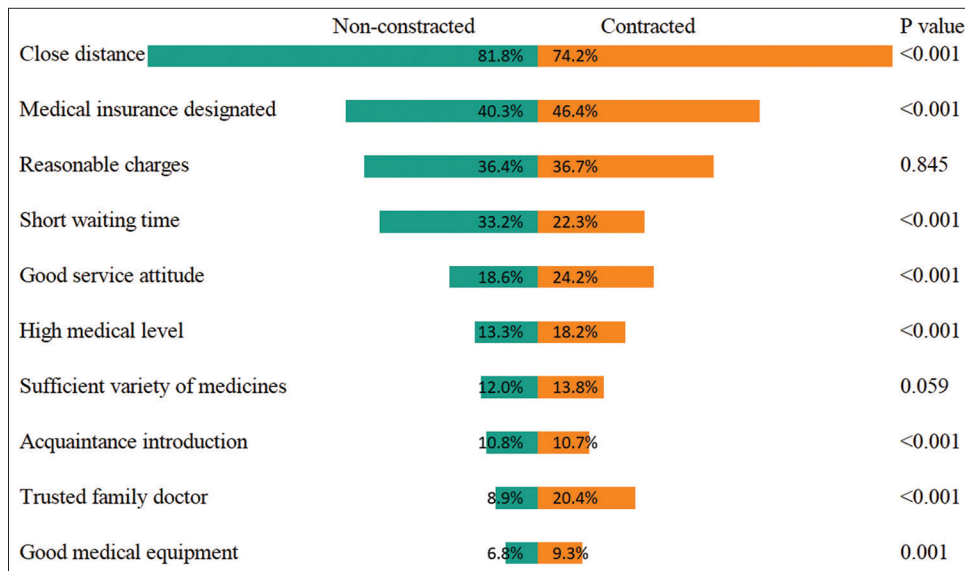


Figure 2: Reasons for utilizing primary health care between people contracted with a family doctor and those without

with the utilization of primary health care. People who contracted a family doctor were more likely to use primary health care with OR = 1.979 (95% CI, 1.511–2.593). People living in urban areas (OR = 1.921; 95% CI, 1.501–2.459), being married (OR = 1.905; 95% CI, 1.349–2.691), and higher self-rated health status (OR = 1.102; 95% CI, 1.025–1.186) were more likely to use, while people aged 50–59 were less likely to use primary health care (OR = 0.533, 95% CI, 0.319–0.892; OR = 0.465, 95% CI, 0.310–0.697).

Table 4 showed that contraction with FDCS, short distance to the nearest health institutions, low education level, being married, urban household registration, and health scores were positive factors in satisfaction scores.

Discussion

In this study, we explored the association between FDCSs and utilization of and satisfaction with primary health care in China. The results indicated a positive impact of FDCSs on primary health care. Individuals who contracted with a family doctor

were more likely to utilize primary health care services and were significantly more satisfied with primary health care than individuals who did not.

People who contracted a family doctor were more likely to use primary health care (96.3% vs 92.6%, $P < 0.001$) with OR = 1.979 (95% CI, 1.511–2.593), which is consistent with the results of previous studies.^[29,30] This suggests that the family doctor contracting service may increase residents’ acceptance and utilization of primary health care. One possible reason may be that FDCS facilitates the interaction between doctors of primary health institutions and residents. The family doctor team provides health care services to residents, including chronic disease management, health checkups, health education, etc., which enhance the connection between doctors and patients, and thus residents are more likely to choose primary health institutions as their first consideration.^[29]

An interesting finding is that people who contracted with a family doctor team placed more importance on the quality of health

Table 3: Influencing factors for people’s visits to primary health care

| Variables | P | OR ^a | 95% CIs | |
|---|--------|-----------------|---------|-------|
| | | | Lower | Upper |
| Health score | 0.009 | 1.102 | 1.025 | 1.186 |
| Whether contract with FDACS or not (Reference: No)^b | | | | |
| | <0.001 | 1.979 | 1.511 | 2.593 |
| Household registration (Reference: Rural)^b | | | | |
| | <0.001 | 1.921 | 1.501 | 2.459 |
| Marital status (Reference: Unmarried)^b | | | | |
| Married | <0.001 | 1.905 | 1.349 | 2.691 |
| Age (Reference: <16)^b | | | | |
| 16~29 | 0.999 | 101945837.2 | 0 | . |
| 30~39 | 0.163 | 1.284 | 0.904 | 1.825 |
| 40~49 | 0.426 | 0.832 | 0.528 | 1.31 |
| 50~59 | 0.017 | 0.533 | 0.319 | 0.892 |
| >60 | 0.367 | 1.954 | 0.456 | 8.372 |
| Monthly income (×1000 RMB, Reference: <3)^b | | | | |
| 3~5 | 0.075 | 0.486 | 0.220 | 1.077 |
| 5~10 | 0.865 | 0.968 | 0.664 | 1.411 |
| 10~30 | <0.001 | 0.465 | 0.310 | 0.697 |
| 30~50 | 0.364 | 1.169 | 0.835 | 1.637 |
| >50 | 0.126 | 0.287 | 0.058 | 1.42 |

^aOR: odds ratio. ^bReference category set to a value of 1

Table 4: Influencing factors for people’s satisfaction with primary health care

| Variables | B | 95% CIs | | P |
|---|--------|---------|--------|--------|
| | | Lower | Upper | |
| Distance to the nearest health institutions (Reference:>5 km) | | | | |
| <1 km | 1.182 | 0.567 | 1.797 | <0.001 |
| 1–2 km | 1.308 | 0.684 | 1.933 | <0.001 |
| 2–3 km | 1.130 | 0.486 | 1.774 | 0.001 |
| 3–4 km | 1.068 | 0.372 | 1.764 | 0.003 |
| 4–5 km | 0.539 | -0.281 | 1.360 | 0.198 |
| Whether contracted with FDACS or not (Reference: Yes) | | | | |
| No | -1.723 | -1.920 | -1.525 | <0.001 |
| Education level (Reference: Master’s degree and above) | | | | |
| Junior high and below | 1.806 | 1.064 | 2.547 | <0.001 |
| Senior high school | 1.672 | 1.257 | 2.086 | <0.001 |
| University degree | 1.059 | 0.738 | 1.379 | <0.001 |
| Marital status (Reference: Married) | | | | |
| Unmarried | -0.904 | -1.200 | -0.609 | <0.001 |
| Household registration (Reference: Rural) | | | | |
| Urban | 0.564 | 0.359 | 0.769 | <0.001 |
| Health score | 0.661 | 0.588 | 0.733 | <0.001 |
| Intercept | 6.866 | 4.278 | 9.455 | <0.001 |

care and less importance on convenience than those who did not contract. One possible explanation is that more health-conscious people may be more inclined to contract with a family doctor, and the increasing communication brought by the contract may promote the perception of the quality of primary health care.

Moreover, the contracted residents were more satisfied with primary health care, which is consistent with other countries’ previous studies.^[11,29,31] The satisfaction rate of the contracted population was 19.6% higher than that of the non-contracted population for the reasonability of charges. When visiting primary health care institutions, residents contracted with a family doctor enjoy free consultation fees, which reduces residents’ medical expenses, especially for patients with chronic diseases who need frequent visits. Residents contracted with a family doctor were more satisfied with the doctor’s attitude and doctor–patient communication, which is consistent with the results of previous studies.^[31,32] The family doctor system can establish a long-term relationship between doctors and patients and improve mutual communication between doctors and patients, which not only improves the doctor’s sense of responsibility to the patient but also enhances the patient’s compliance and trust in the doctor. At the same time, the long-term relationship with the patient makes the doctor more aware of the patient’s disease status, which is more conducive to making the correct diagnosis and treatment prescription, benefiting the patient’s health outcome in the long run. This may be one of the explanations why residents were more satisfied with doctors’ medical skills and ethics.

Strengths and Limitations

One of the highlights is that we focus on the association between FDACS and the utilization of and satisfaction with primary health care to provide evidence for the sustainable development of primary health institutions. Moreover, the data were collected at the nationwide level and participants from areas with different economic levels were incorporated. However, this study also has several limitations. First, as this was a cross-sectional study, meaningful differences could only be considered as correlational and not causal. Second, since China is a big country, the regions of participants may influence their satisfaction, which we did not exclude. Third, since the data was collected via a self-reporting survey, there may be a recall bias. Moreover, the data were collected online, which may be subject to the limitation of online investigation. For example, the data might be, to a certain extent, affected by the quality of answers, although we set an “attention check” in the questionnaire to identify the careless respondents. In addition, it is possible that residents who could not use smartphones or computers were excluded from the study, which may lead to a bias on utilization and satisfaction.

Conclusion

The contracted people were more likely to utilize and be satisfied with primary health care than the non-contracted people. In addition, the contracted people tended to use primary health care because of the quality of services (e.g. good service attitude, high medical level, and a trusted family doctor) rather than because of the close distance or short waiting time. Therefore, it is important to further promote the high quality of FDACS to ensure residents’ sense of gain and improve their satisfaction.

Ethical issues

Ethics Committee of School of Public Health, Zhejiang University School of Medicine (ZGL202203-6)

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Conflicts of interest

There are no conflicts of interest.

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