Postprint: A Survey on the Current Status of Family Doctor Team Contract Signing from the Perspective of General Practitioners

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Abstract

Background Currently, numerous studies on family doctor contract services have been conducted from the residents' perspective, but few scholars have investigated the current status of family doctor team contracts from the general practitioner perspective. Objective To understand the current status of family doctor contract services in primary healthcare institutions in Guangdong Province and to explore factors influencing family doctor team contract numbers from a provider perspective. Methods From July 5 to 31, 2021, general practitioners from primary healthcare institutions in Guangdong Province were selected as study subjects using a multistage stratified cluster sampling method and surveyed with a self-designed questionnaire. Family doctor team contract numbers were compared across different characteristics of general practitioners and their teams, and a two-level Logistic regression model was established using R 4.2.2 software to identify factors influencing whether a general practitioner's family doctor team exceeded 2,000 contracts. Results A total of 3,252 valid samples from general practitioners whose family doctor teams had more than 100 contracts were selected. In 2020, the median number of contracts in general practitioners' family doctor teams was 1,400 (2,499). Statistically significant differences were observed in family doctor team contract numbers across general practitioners with different genders, ages, education levels, positions, employment types, years of experience, work units, practice regions, training reception status, and annual incomes ($P<0.05$). Additionally, statistically significant differences were found in contract numbers among family doctor teams with varying staff sizes, populations under jurisdiction, willingness to have specialists from medical consortium hospitals join the team, inpatient bed resources, and guidance from higher-level departments ($P<0.05$). The null model fitting results showed that family doctor team contract numbers exhibited clustering at the level of general practitioners' practice regions ($P<0.05$). The full

two-level Logistic regression model results showed that, compared with those with a master's degree, general practitioners with junior college education [OR (95%CI) = 2.79 (1.84, 3.74)] and those with technical secondary school/high school education [OR (95%CI) = 2.83 (1.80, 3.86)] were more likely to have teams exceeding 2,000 contracts. Compared with those without a leadership position, unit heads were less likely to have teams exceeding 2,000 contracts [OR (95%CI) = 0.66 (0.33, 0.99)]. Compared with temporarily hired personnel, formally established staff were more likely to have teams exceeding 2,000 contracts [OR (95%CI) = 2.02 (1.53, 2.51)]. Compared with family doctor teams with $ $3 staff members, teams with 4-6 members [OR (95%CI) = 1.31 (1.05, 1.57)], 7-10 members [OR (95%CI) = 2.06 (1.75, 2.37)], 11-19 members [OR (95%CI) = 3.67 (3.31, 4.03)], and $ $20 members [OR (95%CI) = 3.46 (2.74, 4.18)] were more likely to exceed 2,000 contracts. Compared with teams with a population under jurisdiction of $ $2,000, teams with 2,001-9,999 [OR (95%CI) = 2.37 (2.12, 2.62)], 10,000-29,999 [OR (95%CI) = 2.92 (2.65, 3.19)], and $ $30,000 [OR (95%CI) = 2.86 (2.55, 3.17)] were more likely to exceed 2,000 contracts. Compared with teams with inpatient bed resources, teams without such resources were more likely to exceed 2,000 contracts [OR (95%CI) = 1.38 (1.14, 1.62)]. Conclusion Larger populations under jurisdiction and greater team staff size created favorable conditions for contracting; family doctor teams with leadership positions, inpatient bed resources, and higher education levels had better understanding of family doctor contract service policies and better controlled contract numbers; compared with temporarily hired personnel, formally established general practitioners' family doctor teams likely undertook more contracting tasks.

Full Text

Preamble

Current Situation of Family Doctor Team Contracting: An Investigation Based on the Perspective of General Practitioners

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Abstract

Background Currently, numerous studies on family doctor contracting services have been conducted from the perspective of residents, but few scholars have investigated the current status of family doctor team contracting from the per-

spective of general practitioners (GPs). **Objective** To understand the current status of family doctor contracting services in primary healthcare institutions in Guangdong Province and explore factors influencing the contracted number from the supplier perspective. **Methods** From July 5 to 31, 2021, GPs in primary healthcare institutions across Guangdong Province were selected using a multi-stage stratified cluster sampling method and surveyed with a self-designed questionnaire. Differences in team contracted numbers were compared across various GP and team characteristics. A two-level logistic regression model was developed using R 4.2.2 software to identify factors associated with family doctor teams having more than 2,000 contracted individuals. **Results** A valid sample of 3,252 GPs from family doctor teams with over 100 contracted individuals was obtained. In 2020, the median contracted number per GP's team was 1,400 (2,499). Statistically significant differences were observed in contracted numbers across GPs with different genders, ages, education levels, positions, employment forms, working years, institutions, practice regions, training status, and annual incomes ($P<0.05$). Team-level factors showing significant differences included staff size, population under jurisdiction, desire for specialists from medical community hospitals to join the team, inpatient bed resources, and guidance from superior departments ($P<0.05$). The zero model indicated clustering of contracted numbers at the regional practice level ($P<0.05$). The full two-level logistic regression model revealed that, compared with master's degree holders, GPs with college degrees [OR (95%CI)=2.79 (1.84, 3.74)] and secondary/high school degrees [OR (95%CI)=2.83 (1.80, 3.86)] were more likely to have teams exceeding 2,000 contracted individuals. Unit leaders were less likely than those without positions to have such teams [OR (95%CI)=0.66 (0.33, 0.99)]. Formal staff were more likely than temporary hires [OR (95%CI)=2.02 (1.53, 2.51)]. Compared with teams of $ $3 members, teams with 4-6 members [OR (95%CI)=1.31 (1.05, 1.57)], 7-10 members [OR (95%CI)=2.06 (1.75, 2.37)], 11-19 members [OR (95%CI)=3.67 (3.31, 4.03)], and $ $20 members [OR (95%CI)=3.46 (2.74, 4.18)] showed higher likelihoods. Teams serving populations of 2,001-9,999 [OR (95%CI)=2.37 (2.12, 2.62)], 10,000-29,999 [OR (95%CI)=2.92 (2.65, 3.19)], and $ $30,000 [OR (95%CI)=2.86 (2.55, 3.17)] were more likely to exceed 2,000 contracts than those serving $ $2,000. Teams without inpatient bed resources were more likely to surpass 2,000 contracts than those with such resources [OR (95%CI)=1.38 (1.14, 1.62)]. **Conclusion** Larger population jurisdiction and team size create favorable conditions for contracting. Teams with GPs holding positions, having inpatient bed resources, and higher education levels demonstrate better policy understanding and control over contracted numbers. Compared with temporary staff, formally employed GPs likely undertake more contracting tasks.

[**Keywords**] General practitioners; Family doctor team; Family doctor contract service; Influencing factor analysis; Guangdong

Introduction

In China, general practitioners, also known as family doctors, serve as the main providers of comprehensive, continuous, effective, timely, and personalized primary healthcare services [1]. Ensuring an adequate number of family doctors is a prerequisite for successfully implementing family doctor contracting services. To broaden recruitment channels, the "Guiding Opinions on Promoting High-Quality Development of Family Doctor Contracting Services" (National Health Commission Primary Health Office [2022] No. 10) specifies that family doctors may include not only GPs but also other licensed clinical physicians (including traditional Chinese medicine practitioners), rural doctors, and retired clinicians. Domestic and international practice research demonstrates that the family doctor system effectively guides residents toward primary care as the first point of contact, optimizes medical resource utilization, and improves population health outcomes [2]. Currently in China, family doctors can contract independently or through team-based services. While numerous studies have examined contracting services from the resident perspective, few have investigated team contracting status from the GP perspective. To understand the contracting situation of family doctor teams in Guangdong and enhance their service capacity, this study was conducted.

1. Methods

1.1 Data Sources

This study utilized data from the "Job Satisfaction Survey Dataset of General Practitioners in Primary Healthcare Institutions in Guangdong Province." The dataset was collected by the research team from July 5 to 31, 2021, through a multi-stage stratified cluster sampling of GPs in Guangdong's primary healthcare institutions using a self-designed questionnaire. Detailed information about the survey design, participants, and methods is available in reference [3]. The original dataset contained 8,710 samples. For this study's purposes, 3,252 valid samples from GPs whose family doctor teams had over 100 contracted individuals were selected.

1.2 Dependent and Candidate Independent Variables

Policy guidelines state that team-based family doctor contracting services should not exceed 2,000 contracted individuals per team [4]. This study's dependent variable was whether a GP's family doctor team had $ $2,000 contracted individuals. Candidate independent variables were determined based on previous research findings [3] and encompassed three domains: (1) Natural attributes (GP's gender, age, institution, institution type, team size, population under jurisdiction); (2) Socioeconomic factors (GP's education level, professional title, position, employment form, working years, practice region, annual income); and (3) Policy implementation (GP's training status, job satisfaction, reasonable team staffing, clear job responsibilities, GP's status within the team, coordina-

tion among team members, presence of senior hospital technicians, desire for specialists from medical community hospitals to join, personalized contracting services, access to expert appointments, inpatient bed resources, home bed services, referral services, long prescription services, and guidance from superior departments).

1.3 Statistical Methods

SPSS 24.0 software was used for statistical analysis. Non-normally distributed continuous data were described using median and interquartile range [M(QR)], with between-group comparisons using Mann-Whitney U test, multi-group comparisons using Kruskal-Wallis H test, and pairwise comparisons using Nemenyi test. Given the multi-stage stratified cluster sampling design, which may cause clustering of contracted numbers at the regional level, R 4.2.2 statistical software was used to develop a two-level logistic regression model with GPs as level 1 and practice region (Pearl River Delta vs. non-Pearl River Delta) as level 2. Before analysis, a zero model tested the random effect of the intercept term to determine whether multilevel modeling was appropriate [5-6]. Statistical significance was set at $P<0.05$.

2. Results

2.1 Basic Information of Respondents

Among the 3,252 GPs, 2,173 (66.82%) were male; 1,828 (56.21%) worked in community health service centers; and 1,891 (58.15%) practiced in the Pearl River Delta region. Only 25.58% (598/2,338) had received standardized training ("5+3" residency or "3+2" assistant GP training), and 53.52% (1,739/3,249) had annual incomes below 100,000 RMB. Detailed GP characteristics are presented in Table 1 .

In 2020, the median contracted number per GP's family doctor team was 1,400 (2,499). Specifically, 64.76% (2,106/3,252) of teams had $ $2,000 contracted individuals, 19.74% (642/3,252) had 2,001-5,000, and 15.50% (504/3,252) had >5,000. General team information is shown in Table 2 .

2.2 Differences in Contracted Numbers

2.2.1 By GP Characteristics Significant differences existed in contracted numbers across GPs with different genders, ages, education levels, positions, employment forms, working years, institutions, practice regions, training status, and annual incomes ($P<0.05$). Female GPs had fewer contracted individuals than males ($P<0.001$). GPs aged 35-44 and 45-54 years had more contracted individuals than those aged 26-34 ($P<0.001$). GPs with bachelor's, college, and secondary/high school education had higher contracted numbers than those with master's degrees or higher ($P=0.026$, $P=0.003$, and $P=0.017$, respectively). GPs serving as department heads or unit leaders had more contracted individu-

als than those without positions (P<0.001). Temporary and contract employees had lower contracted numbers than formally employed GPs (P<0.001). GPs with 11-20 and 21-30 years of experience had higher contracted numbers than those with $ $10 years (P<0.001). Township health center GPs had higher contracted numbers than community health service center GPs (P<0.001). GPs practicing outside the Pearl River Delta had higher contracted numbers than those in the Pearl River Delta (P<0.001). GPs who received standardized training had fewer contracted individuals than those receiving other training types (P=0.001). GPs with annual incomes below 100,000 RMB had higher contracted numbers than those earning $ $100,000 RMB (P<0.001) (Table 1).

2.2.2 By Team Characteristics Significant differences existed in contracted numbers across teams with different staff sizes, population under jurisdiction, desire for specialists from medical community hospitals to join, inpatient bed resources, and guidance from superior departments (P<0.05). No significant differences were found between teams with 7-10 or 11-19 members compared with those having $ $20 members (P=0.150 and P=1.000, respectively). Teams serving $ $30,000 people did not differ significantly from those serving 10,000-29,999 (P=1.000). Teams desiring specialists had higher contracted numbers than those not desiring them (P=0.008). Teams receiving guidance from superior departments had higher contracted numbers than those without guidance (P=0.001). Teams without inpatient bed resources had higher contracted numbers than those with such resources (P=0.030) (Table 2).

2.3 Zero Model Test Results

Using GPs as level 1 and practice region (Pearl River Delta vs. non-Pearl River Delta) as level 2, the zero model test showed statistically significant variance at the regional level (P<0.05), indicating clustering of contracted numbers and justifying the use of a two-level logistic regression model (Table 3).

2.4 Two-Level Logistic Regression Analysis

With team contracted number >2,000 as the dependent variable (no=0, yes=1) and variables showing significant differences in Tables 1-2 as independent variables, the two-level logistic regression model identified GP education level, position, employment form, team size, population under jurisdiction, and bed resources as significant factors (P<0.05). Compared with master's degree holders, GPs with college degrees [OR (95%CI)=2.79 (1.84, 3.74)] and secondary/high school degrees [OR (95%CI)=2.83 (1.80, 3.86)] were more likely to have teams exceeding 2,000 contracts. Unit leaders were less likely than those without positions [OR (95%CI)=0.66 (0.33, 0.99)]. Formal staff were more likely than temporary hires [OR (95%CI)=2.02 (1.53, 2.51)]. Compared with teams of $ $3 members, teams with 4-6 members [OR (95%CI)=1.31 (1.05, 1.57)], 7-10 members [OR (95%CI)=2.06 (1.75, 2.37)], 11-19 members [OR (95%CI)=3.67 (3.31, 4.03)], and $ $20 members [OR (95%CI)=3.46 (2.74,

4.18)] showed higher likelihoods. Teams serving populations of 2,001-9,999 [OR (95%CI)=2.37 (2.12, 2.62)], 10,000-29,999 [OR (95%CI)=2.92 (2.65, 3.19)], and $ $30,000 [OR (95%CI)=2.86 (2.55, 3.17)] were more likely to exceed 2,000 contracts than those serving $ $2,000. Teams without inpatient bed resources were more likely to surpass 2,000 contracts than those with such resources [OR (95%CI)=1.38 (1.14, 1.62)] (Table 4).

3. Discussion

The issuance of "Guiding Opinions on Promoting Family Doctor Contracting Services" (National Health System Reform Office [2016] No. 1) marked the full implementation of family doctor contracting services in China in 2016 [7]. However, primary healthcare institutions are still adapting to this new work model, with many family doctor teams having only single-digit contracted numbers—hence this study's inclusion criterion of >100 contracted individuals per team.

Large teams of over 10 members emerged from initial GP shortages. This study found that 53.82% of teams managed populations exceeding 2,000, with 29.13% managing over 10,000. Excessive team sizes persist despite increasing GP numbers, likely because primary healthcare institutions treat contracting as part of basic public health services, coordinated by public health departments where GPs play only auxiliary roles. Some township health centers even place general practice departments under public health departments. Contracting agreements designed by public health departments focus solely on free basic public health services, with 下乡 health examinations serving as the primary contracting mechanism. Residents often sign contracts simply to access free examinations without understanding the services, representing task-oriented rather than substantive contracting. Consequently, "large teams, large jurisdictions, and large-scale but insubstantial contracting" have become normalized.

The counterintuitive finding that teams without inpatient bed resources from secondary or higher-level hospitals were more likely to exceed 2,000 contracts also relates to public health department coordination. When GPs or other clinicians are not integrated into teams or deeply involved in contracting services, they cannot incorporate their capabilities or resources—such as long prescriptions, referrals, or expert appointments—into family doctor services, preventing residents from receiving proactive, continuous, comprehensive health management. This phenomenon suggests inadequate implementation of family doctor contracting policies.

Compared with master's degree holders, GPs with college or secondary/high school education were more likely to have teams exceeding 2,000 contracts. Most GPs are currently trained through rapid conversion programs that have not shifted their "clinic-centered" service models or "treatment-focused" philosophies toward the new contracting service paradigm and its historical mission. This reflects the continued shortage of GPs trained through standardized "5+3" residency or "3+2" assistant GP programs.

Unit leaders were less likely than non-leaders to have teams exceeding 2,000 contracts. Research shows that managers more readily adopt new technologies [8], and management roles can enhance productivity [9], possibly due to their directive functions [10]. This study's finding may reflect that unit leaders have more opportunities for training and better policy understanding, enabling better control over contracted numbers.

Formal staff were more likely than temporary hires to have teams exceeding 2,000 contracts. Under current systems, temporary staff receive fixed salaries without performance-based incentives, often earning less than formal staff for equivalent work. They face discrimination in career development, promotion, and training [11], reducing their professional identity and organizational belonging, which may negatively impact contracting motivation. However, the "Guiding Opinions on High-Quality Development" (National Health Commission Primary Health Office [2022] No. 10) requires annual increases of 1-3 percentage points in contracting coverage, targeting 75% coverage by 2035. To meet these targets, formal staff undertake more contracting work, resulting in team sizes exceeding the 2,000-person limit specified in the "Service Capacity Standards for Township Health Centers (2022 Edition)" (National Health Commission Primary Health Office [2022] No. 117).

GP team building forms the foundation of contracting services [12]. The analysis indicates that Guangdong's family doctor team construction requires strengthening, moving beyond outdated "large teams, large jurisdictions, and insubstantial contracting" approaches. Primary healthcare institutions must not pursue quantity over quality, as mismatched capacity and contracting-only-without-service-delivery erodes resident trust and hinders tiered diagnosis and treatment. Policies including the "State Council's Guiding Opinions on Establishing a GP System" (State Council [2011] No. 23), "Guiding Opinions on Standardizing Family Doctor Contracting Service Management" (National Health Commission Primary Health Office [2018] No. 35), and "Service Capacity Standards for Township Health Centers (2022 Edition)" (National Health Commission Primary Health Office [2022] No. 117) specify that each team should manage approximately 2,000 contracted individuals and define team composition. Institutions must rectify non-compliance, recognize the importance of contracting services, and abandon the misconception that contracting is merely basic public health work coordinated by public health departments.

As GP numbers increase, teams should be reorganized and optimized to shift from extensive to intensive work models. GPs should be empowered with responsibilities, rights, and benefits to assume core positions in teams, guiding and supervising orderly contracting service delivery. Training and evaluation should be strengthened to help institutions establish systems and standardize services, enabling healthcare workers to understand that team-based contracting represents the future primary care model and a crucial task for deepening medical reform and establishing tiered diagnosis and treatment. Healthcare workers and reform efforts share a common destiny, requiring active practice and exploration

rather than passive work. Team restructuring should draw on successful models such as Shanghai's "1+1+1" contracting model, Xiamen's "three-division co-management" model, and Sanming's "three-medical linkage" model [13] to develop Guangdong's distinctive contracting service model.

Zhao et al. [14] identified GP capacity to mobilize medical resources as a factor promoting resident contracting. This study found many teams lack expert appointments, home bed services, long prescription services, or referral capabilities, indicating inadequate understanding of contracting services' essence. Without comprehensive referral, long prescription, home bed services, and expert appointments to gain resident trust, establishing family health management and community health management systems becomes difficult [15].

Although general practice development receives strong government support, societal recognition remains lacking [16]. This survey found 53.52% of GPs earn less than 100,000 RMB annually. OECD 2019 data show GP earnings are 3.5, 3.1, and 1.9 times the social average income in the US, UK, and Australia, respectively [17]. Annual income was not a significant factor, suggesting weak association between income and contracted numbers, possibly indicating inadequate implementation of the policy allocating "no less than 70% of contracting service fees to personnel compensation," which fails to fully motivate GPs. Guangdong should accelerate primary healthcare compensation system reforms, with human resources and social security departments issuing policies to exclude contracting service fees from performance salary caps to encourage income growth through active service delivery. Prices for home beds and other services should be reasonably set, with contracting fees included in medical insurance coverage to broaden funding channels. Non-Pearl River Delta regions should increase fiscal support to ensure GP salaries match those of equivalent personnel in county-level general hospitals.

Limitations: First, this study surveyed registered GPs from township health centers and community health service centers, asking them about their team's contracting status and to evaluate aspects like "reasonable team staffing" and "clear job responsibilities." Whether these evaluations represent all team members requires further verification. Second, some GPs only estimated their team's contracted numbers, potentially affecting accuracy.

Author Contributions: HAO Aihua and CHEN Liang designed the study, conducted implementation, analysis, interpretation, and manuscript writing/revision. ZENG Weilin, LI Guanhai, and XIA Yinghua collected and organized data and performed statistical processing.

Conflict of Interest: None declared.

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Note: Figure translations are in progress. See original paper for figures.