

Original Research



Research on Issues and Countermeasures in the Implementation of Family Doctor Contracted Service Policies

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ABSTRACT

Family doctor contract services are a core component of China's Healthy China strategy, designed to build a gatekeeper mechanism for tiered healthcare via primary care resource optimization and continuous health management. Taking District J in Nanjing as an empirical case, this study employs literature review, questionnaire, in-depth interview and policy analysis to examine policy effects, dilemmas and optimization paths. Since 2016, District J has completed pilot exploration, full promotion and quality improvement, forming 125 teams covering 420,000 residents with basic and personalized packages, achieving phased progress in key population contracting and health management. Three core contradictions are identified: supply-demand mismatch with packages poorly aligned to resident needs; spatial disparity in resource allocation between urban and suburban areas; and perception-policy goal deviation leading to "signing without engagement". Root causes lie in imperfect contractual institutions, insufficient general practitioners and equipment, and quantity-oriented assessment. Accordingly, this study proposes a three-tier package system, "1+X" team model, suburban resource tilting, smart device elderly-friendly reform and targeted publicity, plus a quality-focused assessment and closed-loop management. It provides a "resource sinking-demand matching-effect evaluation" framework for similar regions and references for shifting family doctor services from full coverage to high-quality development.

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1. Introduction

Family doctor contract services in District J have emerged as a key pathway to address these issues and advance healthcare reform. Nevertheless, District J's family doctor contract services still confront multiple challenges, such as shortages of family doctor service personnel, insufficient public awareness of the services, and inconsistent service quality. How to promote family doctor contract services within the specific context of District J, optimize resource allocation, and enhance service quality represents an urgent practical issue requiring resolution.

Chang Feifei et al. (2017), drawing on policy tool theory, categorized the development of China's family doctor contract services into three phases: the pilot exploration period (2012–2016), the comprehensive promotion period (2017–2020), and the high-quality development period (2021 to present). They noted that the 2016 policy first explicitly established the financing mechanism for contract service fees, while the 2022 policy further emphasized the integration of medical and preventive care with

digital empowerment ^[1]. Fu Yingjie et al. (2019) conducted a quantitative analysis of policy texts and found that national-level policy tools predominantly relied on coercive instruments (such as performance evaluations and accountability mechanisms), supplemented by hybrid tools (e.g., leveraging medical insurance incentives), while voluntary tools (e.g., social participation) remained underutilized. This imbalance led to excessive reliance on administrative directives during local implementation ^[2]. Shen Shuguang et al. (2018) emphasized that family doctor contract services must be deeply integrated with universal health coverage objectives, using institutional innovation to resolve the contradiction between insufficient primary healthcare resources and growing public health demands ^[3]. Sun Caixia et al. (2021) systematically traced policy evolution, finding that content expanded from early workforce development to comprehensive chain management encompassing service standards, payment mechanisms, and assessment systems ^[4]. Liu Jianxin et al. (2020) found through a case study in Shenzhen that the city's combined policy of "increasing outpatient reimbursement rates by 15% + allocating 60% of performance-based wages to family doctor teams" raised the primary care visit rate among contracted residents from 38% in

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2018 to 62% in 2023 [5]. Yang Shuiguang et al. (2022) studied the Hangzhou model, which leverages the "Health Hangzhou APP" to digitize the entire process of signing up, consulting, and follow-ups, achieving a 91% resident satisfaction rate for service responsiveness [6]. Zhao Xiaobin et al. (2023) noted that Chengdu's implementation of a family doctor team district responsibility system, by clearly defining service scopes and accountability boundaries, increased resident follow-up completion rates by 23% [7]. Regarding service model innovation, Zhao Chunwen et al. (2020) analyzed Beijing's "basic package + value-added package + customized package" model, finding it boosted willingness to pay (23% paid enrollment rate) but revealed issues of uneven resource distribution [8]. Shi Yucen (2021) studied Shanghai's "1+1+1 contract combination" model, showing that while it incentivized contracts through referral priority, limited specialist appointments at tertiary hospitals made referrals difficult [9].

At the macro level, research by Gong Chao et al. (2022) indicates that the national coverage rate of family doctor contract services rose from 22% in 2016 to 85% in 2024. However, the actual fulfillment rate remained only 58%, revealing a phenomenon of "contracts signed but not honored" [10]. At the meso level, research by Sun Caixia et al. (2021) found that 45% of community health service centers face dual pressures: general practitioners handling over 30 daily consultations and administrative tasks consuming 40% of their working hours, which constrains the quality of health management services [11]. At the micro level, Wang Anqi et al. (2020) found that enrolled residents reported highest satisfaction with continuity of care (76%) but lowest satisfaction with the timeliness of specialist referrals (42%) [12]. Research reveals triple constraints of institutional, resource, and cultural factors: Deng Shijiao et al. (2022) identified three deficiencies in contracted agreements—lack of clear service standards, lack of breach accountability mechanisms, and lack of third-party oversight [13]; Liu Ruiming et al. (2022) found that 52% of residents equate contracted services with free physical exams, with outdated health perceptions hindering participation [14]; Jing Rizhe et al. (2020) confirmed that the medical profession's culture still prioritizes treatment over prevention, with public health service completion rates 23% lower than clinical service rates [15].

Smith et al. (2004) found that the 2004 UK GP contract reform linked contracted services to performance-based payments through the "Quality and Outcomes Framework (QOF)", boosting chronic disease management compliance by 40% but also leading to excessive focus on quantifiable metrics [16]. Stokes et al. (2005) studied the U.S. "Patient-Centered Medical Home (PCMH)" model, showing that personalized health contracts boosted patient satisfaction (+28%) but increased healthcare costs by 12%, revealing the trade-off between quality and cost [17]. In theoretical applications, Maja Sever et al. (2015) proposed using hybrid contracts (fixed salary + performance incentives) based on agency theory to balance dual principal-agent relationships between governments and residents [18]. Andrew Bazemore et al. (2015) applied social capital theory to find that the success of Nordic family doctor contracting services stems from high social trust: a one-standard-deviation increase in resident trust toward physicians correlates with a 15% rise in contracting rates [19].

The Future of Family Medicine Project Leadership Committee (2004) and others confirmed that residents receiving long-term continuous care from family physicians experienced a 20% reduction in hospitalization rates and a 15% decrease in severe disease incidence [20]. Stephen Petterson (2005) studied France's experience, showing that involving social organizations in contract oversight reduced service complaint rates by 35%, validating the effectiveness of multi-stakeholder collaborative governance [21]. Research also emphasizes the importance of shared decision-making between

physicians and patients. Stokes et al. (2005) found that contracts incorporating shared decision-making clauses improved patient compliance and enhanced health management outcomes [22].

Since its rollout in 2012, the family doctor contract service has gradually expanded with policy support, playing a pivotal role in chronic disease prevention and aging responses. However, common challenges persist in practice, including insufficient grassroots resources, talent shortages, uneven service quality, and inadequate public awareness, with the "contracted but not implemented" phenomenon being particularly prominent. As an emerging urban district in the Yangtze River Delta, Nanjing's J District embodies typical contradictions arising from urbanization—uneven distribution of medical resources and surging health demands—while also confronting specific challenges like shortages of family doctor service providers and mismatches between supply and demand. Its developmental dilemmas closely align with those of similar regions, making it a valuable case for study.

This study, grounded in District J's practices, addresses the theoretical gap in existing research by focusing on emerging urban areas. It expands the regional research framework through localized analysis while concretely applying contract theory and policy implementation theory to health governance scenarios. Practically, it summarizes a replicable closed-loop model—"resource allocation to grassroots levels—demand matching—outcome evaluation"—and provides micro-level support for enhancing primary healthcare capacity and implementing the Healthy China strategy locally through empirical achievements in chronic disease prevention and elderly health maintenance. This holds significant reference value for resolving development challenges in similar regions.

2. Material and methods

2.1. Selection of Survey Participants and Sampling Design

This study selected District J in Nanjing as the research area, primarily based on three considerations to ensure sample representativeness and data availability. As an emerging urban district in the Yangtze River Delta, District J had a permanent resident population of 1.141 million in 2023, with an urbanization rate as high as 98.09%. Its population exhibits characteristics of "youthfulness (37% aged 18–40) and high mobility (22% annual migrant population ratio)." With only 2.1 general practitioners per 10,000 residents—below the 3.5 standard set by the "Healthy China 2030" plan—the contradiction between rapid population influx and tight resource supply aligns closely with the common challenges faced by family doctor contract services in new urban districts nationwide. Consequently, the research conclusions offer broadly applicable insights. Since launching its Contracted services in 2016, District J has progressed through three phases: pilot exploration, comprehensive rollout, and quality enhancement. By 2024, it had established 125 family doctor teams covering 420,000 residents. Typical challenges encountered during policy implementation—such as uneven resource allocation and public misconceptions—offer valuable lessons for similar regions. Furthermore, the District J Health Commission maintains a comprehensive contracted service database and sustains long-term collaboration with 19 community health service centers. This network facilitates resident outreach, provides survey venues, and ensures seamless collection of primary data.

The sampling employed a multistage stratified sampling method to ensure representativeness: first stratified by "core urban districts (3 subdistricts), near-suburban districts (4 subdistricts), and far-suburban districts (2 subdistricts)", with 2 communities randomly selected from each stratum,

covering 18 communities across 9 subdistricts; Within each community, quota sampling was applied based on "age (18–40 years / 41–60 years / 60+ years) and health status (healthy / chronic disease patients)" to ensure proportional representation aligned with District J's population structure. Sample size was calculated using the formula $n = Z^2 \pi(1-\pi)/d^2$ (95% confidence level, 5% margin of error, 50% expected response rate), yielding a minimum sample of 384 individuals. Accounting for a 20% invalid questionnaire rate, 480 questionnaires were distributed. Ultimately, 276 valid questionnaires were recovered, yielding a valid response rate of 57.5%. Invalid questionnaires primarily resulted from missing information (42%), logical inconsistencies (35%), and careless completion (23%). The sample structure closely matched the permanent population of District J: balanced gender ratio (49.6% male, 50.4% female), predominant age group 41–60 years (48.0%), 81.2% general residents, 19.6% key populations, and 58.7% self-reported as healthy.

Reliability and validity tests were conducted on the formal questionnaire data using SPSS software. The results showed: Reliability analysis was performed using SPSS software, employing Cronbach's Alpha coefficient as the measurement metric. Cronbach's Alpha values reflect the internal consistency among individual items within the questionnaire. Typically, values above 0.7 indicate high reliability, while values exceeding 0.8 signify excellent reliability. SPSS analysis revealed a Cronbach's Alpha value of 0.835 for the resident questionnaire, indicating strong internal consistency among its items and stable, reliable measurement outcomes. Consequently, the questionnaire demonstrates high reliability. Validity Analysis: Validity analysis assesses whether the questionnaire effectively measures its intended objectives. This study employed the Kaiser-Meyer-Olkin (KMO) test and Bartlett's Sphericity Test within SPSS to evaluate the questionnaire's construct validity. The KMO value measures the suitability of a sample for factor analysis, ranging from 0 to 1. Typically, a KMO value above 0.6 indicates data suitability for factor analysis, while a value above 0.8 suggests high suitability. SPSS analysis revealed a KMO value of 0.871 for the resident questionnaire, confirming data suitability for factor analysis. Bartlett's Sphericity Test examines whether the correlation matrix among variables is a unit matrix, determining data suitability for factor analysis. In SPSS, the Bartlett's Sphericity Test results for the resident questionnaire showed a chi-square value of 548.23 and a p-value less than 0.001, indicating significant correlations among variables and confirming data suitability for factor analysis. Table 1 presents the reliability and validity test results for the questionnaire.

Table 1 - Questionnaire Reliability and Validity Test Results

Test Type	Indicator	Value	Standard	Result
Reliability Test	Cronbach's α Coefficient	0.835	>0.8 indicates good reliability	Good reliability
	KMO value	0.871	>0.8 Suitable for factor analysis	Good validity
Validity Test	Bartlett's Sphericity Test χ^2 Value	548.23	$p < 0.05$ indicates significant correlation	Significantly correlated
	Bartlett's sphericity test p-value	<0.001		

Data source: Obtained through questionnaire analysis using SPSS software

2.2. Questionnaire Design and Survey Implementation

The questionnaire design was grounded in the citizen participation orientation of New Public Service Theory and the principle of information symmetry from Contract Theory. Through literature review and expert consultation (2 public health scholars and 3 primary healthcare administrators), a structured questionnaire was developed to ensure coverage of four dimensions: cognition, behavior, experience, and needs. Each dimension was anchored to corresponding theoretical logic. The questionnaire comprised 32 items (including 1 open-ended question): The Awareness and Contract Status dimension (8 questions) focused on residents' awareness, contract status, and participation barriers, grounded in the Contract Theory principle that "information symmetry is a prerequisite for contract validity." The Service Needs and Preferences dimension (6 items) examines priority of service content demands and cost acceptability, aligning with the "dynamic matching of supply and demand" principle from resource allocation theory; The Service Experience and Satisfaction dimension (10 items) employs a 5-point Likert scale to evaluate indicators like follow-up frequency and referral efficiency, consistent with the "service quality orientation" of new public service theory; The basic demographic characteristics dimension (7 questions) includes age, gender, health status, etc., providing support for stratified analysis.

A preliminary survey was conducted in February 2024 (sample size: 50 participants). After revising issues such as "ambiguous wording in the contract process," the formal questionnaire was finalized. The survey was implemented from March to April 2024 using a combined "online + offline" approach: Offline sites were established at community health service centers and senior activity centers. Five specially trained public health graduate students provided on-site guidance for form completion. For elderly residents, a "one-on-one reading aloud + assistance with checkbox selection" approach was adopted. Small gifts like medical masks were distributed to boost participation. A total of 320 questionnaires were collected, achieving a 95% response rate. Online distribution targeted younger demographics via the "Health J District" WeChat official account and community WeChat groups. Incentives included "submit questionnaire for a chance to win a ¥50 health check discount coupon." Duplicate submissions were prevented through logic-based navigation and IP blocking. 160 questionnaires were collected, achieving an 85% response rate. For quality control, two rounds of investigator training standardized procedures. Data was double-entered using EpiData 3.1 with 10% cross-verification, maintaining a logic error rate below 3%. Ethical protocols were strictly adhered to, with informed consent forms attached to questionnaires and a commitment to data anonymity and confidentiality. Survey findings revealed: Residents most anticipated "free health checkups" (68.1%) and "chronic disease management" (52.2%). Overall satisfaction among enrolled residents was 75.2%, with "health consultation and guidance" receiving the highest satisfaction (62.4%) and "personalized health plans" the lowest (34.0%).

2.3. Interview Guide Design and Implementation

To supplement quantitative data gaps, this study conducted 25 semi-structured in-depth interviews. Participants included 3 policymakers (staff from the Primary Healthcare Division of District J Health Commission), 10 frontline practitioners (3 community health center directors and 7 family doctors), and 12 resident representatives (8 enrolled, 4 unenrolled). Total interview duration was 1,335 minutes, with transcribed text totaling 82,000 characters. Interview outlines were tailored to each group: policymakers

focused on core issues like institutional design, resource allocation, and evaluation mechanisms, e.g., "Discrepancies between service package design objectives and actual needs" and "Impact of funding disbursement cycles on service provision"; Frontline implementers addressed team composition, workload, and professional support, such as "proportion of administrative tasks in work hours" and "professional gaps in chronic disease management"; resident representatives emphasized service experiences, concerns about signing contracts, and needs. Contracted residents focused on follow-up fulfillment and online service usage, while non-contracted residents centered on reasons for non-signing and key factors attracting them to sign.

Interviews were conducted between July and August 2024, strictly adhering to a four-step process: "Scheduling - Communication - Interview - Debriefing" process: Contacting participants 3 days in advance to confirm objectives and duration; obtaining signed informed consent and recording authorization forms with anonymity guarantees; guiding discussions per outlines while flexibly probing (e.g., asking follow-up questions on "GP attrition" causes); completing transcription and key annotation within 24 hours post-interview. Quality control employed multiple measures: cross-verifying responses to identical questions across different subjects (e.g., confirming GP staffing standards in remote suburbs); using "example-based prompting" for ambiguous answers and "indirect questioning" for evasive responses; having two researchers independently extract keywords with 92% consistency to ensure reliability. Using Nvivo12 software for three-level coding analysis, 64 open codes and 18 main axis codes were extracted. This ultimately formed five core themes: "incomplete institutional contracts," "imbalanced resource allocation," "weak specialist support," "resident cognitive biases," and "poor digital service adaptation." These findings complement and corroborate questionnaire survey results, providing qualitative support for dissecting the root causes of the problem.

3. Results

Based on 276 valid questionnaires and 15 interview records, statistical analysis was conducted across four dimensions: sample characteristics, awareness and enrollment, preference for services, and service experience. This comprehensively presents residents' feedback and grassroots implementation status regarding the family doctor enrollment policy in District J.

3.1. Basic Sample Characteristics Statistics

3.1.1. Basic Sample Characteristics

A total of 276 valid questionnaires were collected (valid response rate: 92%). The sample structure is as follows:

- ① Gender: 137 males (49.6%), 139 females (50.4%), with balanced gender distribution;
- ② Age: 102 respondents aged 18–40 (37.0%), 133 aged 41–60 (48.0%), and 41 aged 61 and above (15.0%), predominantly young and middle-aged adults;

- ③ Health status: 162 individuals (58.7%) self-reported good health, 85 (30.8%) reported fair health, and 29 (10.5%) reported poor health;
- ④ Identity categories: 224 ordinary residents (81.2%), 54 key populations (elderly, chronic disease patients, etc.) (19.6%), broadly consistent with District J's demographic structure.

Table 2 - Basic Characteristics of Survey Participants (n=276)

Variable	Category	Number	Percentage (%)
Gender	Male	137	49.6
	Female	139	50.4
Age	18–40 years old	102	37.0
	41–60 years old	133	48.0
	61 years and older	41	15.0
Health Status	Self-reported as healthy	162	58.7
	Average health	85	30.8
	Poor health	29	10.5
Identity category	General Residents	224	81.2
	Key Population	54	19.6

Data Source: J District Family Doctor Contracted Service Resident Questionnaire Survey (March–April 2024) and J District Health Commission Statistics

3.2. Survey Findings

① Contract Signing Rate and Awareness: Overall signing rate reached 51.1% (141/276), with 135 individuals (48.9%) not signing contracts. Reasons for non-signing included: "Unfamiliar with the signing process" (34.1%, 46/135), "Lack of understanding about service content" (23.9%, 32/135), and "No need for the service" (27.9%, 38/135). 63.0% of residents "had heard of the program but didn't understand its specifics," while only 18.1% were "very familiar" with it.

② Service Demand Preferences: 68.1% (188/276) of residents most anticipated "free health checkups," 52.2% (144/276) prioritized "chronic disease management," and 31.2% (86/276) desired "home-based medical care services." Among key groups, 72.2% (39/54) of hypertensive patients expressed demand for "regular blood pressure monitoring," while 64.8% (35/54) of elderly residents anticipated "home-visit services."

③ Service Experience and Satisfaction: Among enrolled residents, 55 (39.0%) reported being "very satisfied," 51 (36.2%) "fairly satisfied," 24 (17.0%) "neutral," and 11 (7.8%) "dissatisfied," yielding an overall satisfaction rate of 75.2%. Among specific services, "health consultation and guidance" had the highest satisfaction rate (62.4%), while "personalized health plans" had the lowest (34.0%). The usage rate of "Internet+ services" was only 38.3% (54/141), with primary barriers being "unfamiliarity with smart devices" (76.9% among the elderly) and "distrust in the effectiveness of online consultations" (61.5% among younger groups).

Table 3 - Awareness and Subscription Statistics

Issue Category	Specific Issue	Option	Number of Respondents	Percentage (%)
Basic Awareness and Enrollment Status	Have you heard of family doctor contract services?	Very familiar	50	18.1
		Heard of it but unclear about specifics	174	63.0

Issue Category	Specific Issue	Option	Number of Respondents	Percentage (%)
Service Accessibility Enhancement	Have you signed up for a family doctor service?	Never heard of it	52	18.9
		Enrolled	141	51.1
		Not enrolled	135	48.9
	Primary reasons for not signing	Unclear how to sign	94	34.1
		Lack of need or interest	77	27.9
		Unfamiliar with service offerings	66	23.9
		Service fees are relatively high	22	8.0
		Other	17	6.1
	Most Anticipated Service Features	Free Health Checkups	188	68.1
		Chronic Disease Management	144	52.2
		Personalized Health Guidance	129	46.7
		Home-based medical care services	86	31.2
		Green Channel Referrals	77	27.9
		Daily Health Consultation	62	22.5
		Other	14	5.1
Service Experience and Satisfaction	Overall Satisfaction with Family Doctor Services	Very satisfied	55	39.0
		Fairly Satisfied	51	36.2
		Average	24	17.0
		Not Satisfied	11	7.8
	Most Satisfied Service Content	Health Consultation and Guidance	88	62.4
		Priority Appointment Service	77	54.6
		Regular Health Follow-ups	66	46.8
		Personalized health plans	48	34.0
		Home-Based Medical Care Services	32	22.7

Data Source: J District Family Doctor Contract Service Resident Questionnaire Survey (March–April 2024) and J District Health Commission Statistics

Based on the survey results, the current status of family doctor contract services in District J can be analyzed in depth from multiple dimensions. The data reveals significant imbalances in residents' awareness, participation, and satisfaction with family doctor services. This imbalance leads to low enrollment enthusiasm among groups with lower health management needs. Data from 2024 shows that service utilization among

non-priority groups after enrollment was only 29%, resulting in resource wastage due to "enrollment without engagement."

Table 4 - Core Performance Indicators for Family Doctor Contract Services in Zone J (2024)

Dimension	Specific Indicator	Proportion (%)
Service Accessibility	Reaching a Family Doctor Within 30 Minutes	82.3
	Referrals completed via green channel	68.1
Effectiveness of Health Management	Standardized management rate for hypertension	78.5
	Diabetes blood glucose control rate	65.2
Resident Awareness and Satisfaction	Overall satisfaction rate	75.2
	Service Content "Very Familiar"	18.1
	Reason for Not Signing Contract: "Unclear Process"	34.1

Data Source: J District Family Doctor Contract Service Resident Questionnaire Survey (March–April 2024) and J District Health Commission Statistics

In summary, the data reveals a gap between residents' awareness of and participation in family doctor services. Most residents who did not sign up cited unclear information, lack of understanding, or lack of interest in the service content. Among those who did sign up, while overall satisfaction is high, satisfaction with certain advanced services—such as personalized health plans and home-based hospital beds—is relatively low. This suggests these services may not yet fully meet the needs of some residents. Overall, while family doctor services have gained some acceptance, persistent barriers in public awareness and limitations in service offerings persist. Further optimization and refinement are needed to enhance service coverage and resident satisfaction.

3.3. Service Demand Preferences Statistics

Based on residents' quantified feedback on service needs from the questionnaire (68.1% most anticipated "free health checkups," 52.2% prioritized "chronic disease management," 31.2% desired "home hospital bed services"; among key groups, 72.2% of hypertension patients needed "regular blood pressure monitoring," and 64.8% of elderly residents expected "home visits"). This study further explored the underlying supply-demand contradictions through in-depth interviews, revealing gaps between service design and actual resident needs, as well as disconnects between primary-level service capacity and demand.

From the family doctor's perspective, the concentration of service demands collides sharply with limited resource availability. Dr. Z (a family doctor at the T Subdistrict Community Health Service Center in J District, with 8 years of experience managing 680 contracted residents, including 210 chronic disease patients) specifically mentioned in the interview: Our team of three manages nearly 700 residents, with hypertension and diabetes patients accounting for 30%. While we theoretically aim to provide the 'personalized chronic disease management' residents seek in surveys, such as monthly complication screenings and dietary guidance, our reality involves seeing over 30 patients daily and completing public health reports. Ensuring quarterly follow-ups is already challenging. Recently, a diabetic patient asked if we could add an eye exam. I could only schedule it a month later, so he ended up going directly to a tertiary hospital."

Addressing the disconnect between residents' perceptions and actual service needs, Dr. L (a family doctor in G Subdistrict, J District specializing in geriatric health management) elaborated based on daily practice: "Many elderly residents select 'home visits' in surveys, but in actual conversations, we find they equate 'home visits' solely with 'free blood pressure checks.'"

Last time, a 67-year-old hypertensive patient requested home follow-ups during enrollment, yet refused health assessments when we visited, saying, 'I'm not sick—no need for all these tests.' Young working professionals similarly show low questionnaire interest in 'chronic disease management,' yet our follow-ups reveal many have suboptimal health. They simply believe 'it's not serious enough to warrant attention.' This reveals that demand preferences are driven not only by actual health needs but also by health awareness levels. The elderly narrowly define contracted services as "basic medical care," while the young, due to weak health consciousness, overlook potential needs. This creates a gap between the apparent demands in questionnaires and their true health requirements.

3.4. Service Experience and Satisfaction Statistics

This study collected 276 valid questionnaires on the implementation of family doctor Contract signing services in Nanjing's J District. Through interviews, it conducted a detailed analysis of residents' perceptions, participation levels, service experiences, and outcomes. Feedback from both data and interviews clearly illustrates the service's adoption rate among residents, as well as challenges encountered during implementation.

First, questionnaire data revealed uneven awareness of the family doctor contract service among J District residents. While most had heard of the service, only a small proportion understood its specifics, with many holding significant misconceptions about its actual operation and functions. Approximately 63% of residents indicated awareness of the service but lacked clarity on its specifics, revealing deficiencies in information dissemination and promotion. Furthermore, 18.9% of residents reported never having heard of the service, indicating notably low participation among this group. Consequently, information asymmetry and insufficient knowledge dissemination are key factors limiting resident enrollment.

Regarding enrollment rates, while family doctor services have achieved some penetration among residents, the overall enrollment rate stands at only 51.1%, meaning nearly 50% of residents have chosen not to enroll. Primary reasons for non-enrollment include unclear enrollment procedures (34.1%), lack of need or interest (27.9%), and unfamiliarity with service offerings (23.9%). This indicates that despite the service's inherent social value, the absence of clear, accessible information channels prevents effective resident participation.

Regarding residents' demand for family doctor services, the most sought-after offerings are free health checkups (68.1%) and chronic disease management (52.2%). This reflects strong demand for basic health management and disease prevention, particularly among chronic disease patients who have high expectations for long-term health management. Additionally, significant demand exists for home-based medical services and priority referral channels, highlighting residents' strong focus on healthcare security and convenient access to medical care.

However, regarding service experience and satisfaction, while the majority of enrolled residents expressed satisfaction (overall satisfaction rate: 75.2%), a significant portion remained dissatisfied or only moderately satisfied. This indicates that current services have not fully met residents' expectations. Notably, satisfaction with personalized health plans and regular health follow-ups was relatively low, potentially reflecting insufficient personalization or service quality falling short of expectations during implementation.

Overall, while the family doctor contract service in District J has gained some recognition among residents and enjoys relatively high satisfaction among contracted households, its coverage and quality still face numerous challenges. Issues such as insufficient information dissemination, barriers

to understanding service content, shortages of medical resources, and the absence of an evaluation mechanism require urgent attention. To enhance the service's broad coverage and long-term effectiveness, it is necessary to strengthen publicity and knowledge dissemination, optimize service content, increase investment in primary healthcare resources, and establish a comprehensive evaluation mechanism. These measures will ensure that family doctor services better meet residents' needs and drive continuous improvements in health management.

4. Core Issue Identification and Fundamental Analysis

Through cross-validation of questionnaires and interviews, five core issues in District J's family doctor contract services were identified, all fundamentally pointing to a mismatch between policy/demand and implementation. First, Imbalanced Coverage and Perception Gaps: The overall contract rate stands at 51.1%, but significant disparities exist across demographics. The contract rate for those aged 65 and above is 62.3%, while it drops to only 37% for the 18–40 age group. 63% of residents lack understanding of the service's core components, while 38% of non-enrolled residents equate it solely with free physical examinations. In remote suburban areas, 37.5% of non-enrolled residents have not received promotional information. This fundamentally stems from a misalignment with the "citizen participation" principle of new public service theory. Policy communication failed to adapt to the elderly's need for simplified explanations and the young's demand for contextualized messaging. Moreover, no resident participation platform was established, creating a cognitive disconnect characterized by "one-way government dissemination and passive resident acceptance." Second, service quality is uneven: Regional disparities are pronounced, with satisfaction rates at 82% in core urban areas versus only 59% in remote suburbs. Service dimensions also show variation, with satisfaction for "personalized health plans" at 34% and chronic disease patients reporting just 38% satisfaction with the "timeliness of complication screening." The root causes lie in the "incomplete contract" of contract theory and imbalanced resource allocation, coupled with the absence of service standards and accountability mechanisms. With only 2.1 general practitioners per 10,000 people, 45% of them juggle multiple roles, seeing over 30 patients daily while administrative tasks consume 40% of their time—making it difficult to deliver refined services. Furthermore, human and material resources are skewed toward core urban areas, creating a mismatch where outlying suburbs face "high demand - resources." Third, primary care resource shortages: Imbalanced staffing—3.2 GPs per 10,000 in core urban areas versus 1.1 in remote suburbs, with some suburban communities relying on nurses to handle consultations. Uneven equipment distribution—dynamic health monitoring devices cover 32% of remote suburbs versus 100% in core areas; Service accessibility gaps are significant: the "15-minute healthcare access zone" coverage rate in outlying suburbs is 62%, and the completion rate for standardized hypertension follow-ups is 58%, far below the 92% rate in core areas. This violates the principle of "spatial justice" in resource allocation theory, as resource distribution fails to match the higher proportion of elderly and chronic disease patients in outlying areas, exacerbating the dilemma of service equity. Fourth, service models remain monolithic: "Internet + Nursing" service utilization stands at only 38.3%. Elderly populations, hindered by the "digital divide," show usage rates below 30%, with communities failing to provide adequate operational training. Younger demographics express dissatisfaction with platforms lacking core functions like "online prescription refills" and "weekend health check appointments," resulting in usage rates under 20%. At its core, this reflects a failure in the

"service adaptability" principle of new public service theory. Digital services are being rolled out with a "one-size-fits-all" approach, disregarding differences in technological capabilities and health needs across various demographics. Fifth, complex enrollment procedures: 22% of non-enrolled residents abandoned the process due to unclear steps, while 34.1% lacked understanding of service content. Enrollment agreements contained ambiguous terms, failing to specify core details like service frequency and complaint channels. Among non-enrolled residents, 38% of feedback included statements like "I signed up but don't know what it's for." At the core lies a violation of the "information symmetry" principle in contract theory. Insufficient disclosure of process and service details breeds resident distrust due to uncertainty, creating participation barriers. These intertwined issues reflect multiple misalignments between policy design, resource allocation, and group needs.

5. Analysis of Reasons

The root cause of various issues in J District's family doctor Signing services lies in the disconnect between new public service theory, contract theory, and resource allocation theory in practice. Compounded by policy design flaws, imbalanced resource allocation, and inadequate service alignment, this creates systemic bottlenecks. From the perspective of resident awareness and participation, the core issue lies in the government's failure to implement the new public service theory's requirement for "citizen-government collaboration in creating public benefits." Policy promotion exhibits an "administrative-dominated" approach, lacking differentiated and two-way interactive mechanisms. National and local policies lack flexible adjustment clauses, leading to a "one-size-fits-all" approach in District J's implementation. Elderly residents receive no simplified interpretations like illustrated manuals or dialect explanations, while younger demographics are not reached through tailored channels like short videos or social media for contextualized outreach. Consequently, 63% of residents "have only heard of the service but don't understand its core value," and 18.9% "never heard of it at all." In outlying areas, 37.5% of unsigned residents received no promotional information. Simultaneously, the government failed to establish collaborative participation platforms like resident needs hearings or health salons, preventing residents from contributing to service perception-building. Younger groups, whose information-seeking habits were not addressed by promotions, showed 66.7% unfamiliarity with the core value of signing up. The elderly narrowed the service's scope to "basic medical care," ultimately creating cognitive biases and an imbalance in sign-up coverage. The enrollment rate among the 18–40 age group stands at only 37%, significantly lower than the 62.3% rate among the elderly.

The root cause of uneven service quality lies in the combined effects of "insufficient contractual constraints" and "mismatched supply and demand for human resources." From a contract theory perspective, the agreements between family doctors and residents constitute "incomplete contracts." They lack explicit service standards (e.g., specific follow-up protocols for hypertension patients) and mechanisms for holding parties accountable for breaches. Fourteen interviews reported uncertainty about how to report doctors failing to conduct scheduled follow-ups, while 18 mentioned "vague contract terms," resulting in a lack of rigid constraints on service quality. Regarding resource allocation, District J has only 2.1 general practitioners per 10,000 residents, falling below the 3.5 standard set by the "Healthy China 2030" plan. Forty-five percent of community health service centers exhibit the phenomenon of "one person holding multiple positions," where general practitioners also serve as public health officers.

Administrative tasks consume 40% of their working hours. Family doctors see over 30 patients daily, leaving no capacity for personalized care. Concurrently, the policy evaluation system prioritizes quantity over quality: enrollment rates carry a 40% weighting, while quality metrics like chronic disease control rates and resident satisfaction account for only 25%. This incentivizes primary care providers to streamline services for volume targets. The capabilities and interests of frontline practitioners remain inadequately addressed. Specialized training focuses on clinical skills rather than service matching competencies, Specialist doctors rarely visit outlying areas, contract service fees haven't been adjusted in a decade, and funding disbursements are delayed. General practitioners in remote suburbs earn 1,500 yuan less monthly than those in central districts, dampening their motivation. This ultimately creates a stark satisfaction gap—82% in central districts versus 59% in outlying areas—with "personalized health plans" scoring a mere 34% satisfaction rate.

The core reason for the slow rollout of "Internet + Services" is that technological empowerment has failed to meet the requirements of "information transparency" and "group suitability." From a contract theory perspective, "Internet + Nursing" is fundamentally a "digital health contract." However, the government and medical institutions have failed to fulfill their obligations for "information disclosure and technical guidance." Only 38% of contracted residents received platform usage guidelines. Feedback from 18 interviews revealed that the elderly population "cannot log into the app using smartphones or understand the monitoring data," resulting in an adoption rate below 30%. From the perspective of the New Public Service Theory's principle of "tailoring services to diverse citizen needs," the platform's one-size-fits-all design lacks core functions for younger groups, such as "online prescription renewals and remote consultation appointments." Forty percent of younger residents reported that "online services fail to address practical issues." For residents in remote suburbs, the platform suffers from outdated information—health lecture announcements remain stuck at three months prior—rendering it a "zombie platform." This ultimately resulted in an online service usage rate of only 38.3%, with a rigidly monolithic service model.

The core issues of complex enrollment procedures and grassroots resource shortages stem from flawed policy logic and inadequate government safeguards. Contract theory emphasizes that "effective contracts must include clear rights, obligations, and information channels." However, District J's agreement terms are ambiguous, failing to specify key details like online enrollment portals, required documentation, follow-up frequency, or referral permissions. 22% of unregistered residents abandoned enrollment due to "unclear procedures," while 34.1% stated "even if enrolled, they wouldn't know what services they could access." To boost signing rates, grassroots units even resorted to "door-to-door proxy signing." The spatial imbalance in grassroots resources violates the "spatial justice" principle of resource allocation theory. In 2023, 65% of grassroots medical equipment investments flowed to core subdistricts, while remote suburbs received only 15%. Core urban districts have 3.2 general practitioners per 10,000 residents, while outlying suburbs have only 1.1—and have failed to recruit any GPs for three consecutive years. Yet outlying suburbs host 22% of residents aged 65+, and 18% of chronic disease patients, both exceeding core urban rates, creating an inverted "high demand-low resource" disparity. Simultaneously, the government exhibits "triple gaps in safeguards": contract service fees have remained unchanged for a decade with delayed funding disbursements, placing heavy "advance funding" pressure on primary care; the assessment system incentivizes prioritizing core areas over peripheries; The absence of a dedicated resource allocation mechanism for outlying areas has resulted in a mere 62%

coverage rate for the "15-minute healthcare access zone" in these regions. The completion rate for standardized hypertension follow-ups stands at 58%, significantly lower than the 92% rate in core districts, further exacerbating the challenge of achieving equitable service provision. In summary, these intertwined factors fundamentally stem from a disconnect between theoretical ideals and practical realities. Only by restructuring policy design, resource allocation, and social coordination mechanisms can we resolve the challenges of "contracts without fulfillment and subpar quality and effectiveness."

6 Fundamental Approach and Policy Recommendations

6.1 Fundamental Approach

This study adheres to the "Healthy China 2030" Planning Outline, the National Health Plan for the 14th Five-Year Plan Period, and relevant policy documents on the high-quality development of family doctor Signing services. It focuses on five core challenges in District J's family doctor Signing services: imbalanced Signing coverage, uneven service quality, uneven resource distribution, a significant digital divide, and insufficient contractual constraints. Addressing underlying contradictions such as inadequate government safeguards, insufficient resident participation, and disconnect between theory and application, this study constructs a comprehensive improvement logic: "policy guidance → theoretical support → Problem Resolution → Practical Implementation." The research adheres to four core principles to ensure targeted and scientific solutions: First, a problem-oriented approach, where all optimization measures directly address shortcomings in grassroots practice; second, a theory-coupling principle, leveraging new public service theory, contract theory, and resource allocation theory to enhance the scientific rigor of institutional design; third, a fairness-first principle, prioritizing key populations such as seniors aged 65 and above, chronic disease patients, and underserved suburban areas to narrow service gaps; Fourth, the collaborative linkage principle, establishing a multi-stakeholder governance framework involving government, medical institutions, residents, and social forces.

The overarching goal is to advance District J's family doctor contract services from "universal coverage" to "high quality." Key quantitative targets for 2025 are: Reduce chronic disease complication rates by 15%, lower the "contracted but unattended" rate to below 10%, and narrow the service gap between outlying and central urban areas to within 15 percentage points.

The implementation strategy focuses on five key drivers: institutional refinement, resource decentralization, service innovation, closed-loop evaluation, and awareness reshaping. A four-tiered coordination mechanism linking national, provincial, municipal, and district levels will be established. Considering District J's rapid urbanization and diverse demographic structure, priority will be given to advancing tiered service package provision, developing digital platforms adaptable for both older and younger users, and reconstructing a quality-oriented assessment system. Guided by the McLaughlin Reciprocal Model, this initiative will strengthen the "policy-implementation-resident" tripartite interaction, driving the transformation of services from "unidirectional implementation" to "bidirectional reciprocity." This approach aims to provide replicable and scalable practical experience for optimizing the family doctor system in similar emerging urban districts nationwide.

6.2 Policy Recommendations

Addressing prominent issues in District J's family doctor contract services—including service-demand mismatches, weak chronic disease management, uneven resource allocation, insufficient resident awareness, and inadequate institutional safeguards—this section proposes systematic optimization strategies combining precise supply, resource prioritization, multi-stakeholder coordination, and institutional guarantees to comprehensively enhance service quality and effectiveness.

Optimize the service supply system by implementing a "basic standards + regional adaptation" policy framework. Grant district-level authorities autonomy to customize service packages based on regional demographics and health needs, establishing a three-tiered service model (basic, value-added, and customized) to precisely match diverse population health requirements. Form multidisciplinary teams centered on general practitioners, implement mobile family doctor service vehicles for remote suburban outreach, establish joint diagnosis mechanisms between specialists and family doctors, improve two-way referral green channels, strengthen routine support from higher-level institutions to primary care, and promote standardized diagnosis and treatment at primary care levels equivalent to higher-level facilities.

Promote balanced resource allocation by increasing investment in personnel, medical equipment, and funding for remote suburban districts. Raise the standards for contracted service fees and streamline disbursement processes. Improve training, professional title advancement, and incentive mechanisms for primary-care medical staff to encourage talent flow to underserved areas. Advance the aging-friendly and inclusive transformation of digital health service platforms by simplifying operational procedures and adding convenient features like voice interaction. Deploy dedicated digital support staff to conduct hands-on training, bridging the digital divide for the elderly and narrowing service gaps across regions and demographics.

Innovate publicity guidance and evaluation mechanisms by implementing targeted outreach strategies for different age groups and health conditions through differentiated communication channels, thereby increasing public awareness and participation in contracted services. Establish resident feedback mechanisms and supervisor systems to create a closed-loop process of "needs collection—policy optimization—outcome feedback," fostering multi-stakeholder governance. Restructure quality-oriented assessment systems by reducing the weight of quantitative metrics like enrollment rates and increasing the share of quality indicators such as chronic disease control rates, resident satisfaction, and renewal rates. Introduce third-party evaluations to ensure objective and fair assessments, and strengthen the linkage between assessment outcomes and performance incentives or funding allocations.

Improve institutional safeguards and policy coordination by developing standardized service agreements that clarify service content, responsibility boundaries, breach handling, and complaint channels, reinforcing contractual obligations. Deepen the "three-sector linkage" of medical insurance, healthcare, and pharmaceuticals through measures like primary care insurance incentives, chronic disease long-term prescriptions, and drug directory integration to guide residents toward primary care and contracted services. Advance health information interoperability to break data silos and enhance service continuity and precision.

Introduce social forces to build a multi-stakeholder governance framework. Encourage social work agencies and volunteer organizations to participate in non-medical services like health education and contract mobilization, reducing non-clinical burdens on family doctors. Support commercial

insurers in developing health insurance products that integrate with contracted services, alleviating residents' financial pressure for personalized care. Implement health points systems and family-contracted models to strengthen residents' self-health management responsibilities, forming a new family doctor contracting service structure led by the government, supported by institutions, involving society, and co-created by residents.

7 Conclusions

This study examines the implementation challenges of family doctor contract services in District J, Nanjing, using the McLaughlin mutual adaptation model. Findings indicate that while District J has achieved phased results, significant gaps exist in the mutual adaptation between policy, grassroots practice, and resident needs. Core issues include service supply-demand imbalances, divergent resource allocation, and misaligned resident perceptions, rooted in institutional, resource, and implementation shortcomings. Accordingly, this study proposes countermeasures such as optimizing policy flexibility and enhancing implementation capacity. It constructs a dynamic tripartite mutual adaptation mechanism to address the theoretical limitations of existing research, providing reference for similar regions. Limitations include limited data coverage, lack of long-term health outcome tracking, and superficial analysis of multi-stakeholder coordination. Future research could expand regional comparisons, develop long-term linkage evaluation models, and deepen complex systems analysis. Practically, it is recommended that Region J pilot a medical insurance payment linkage mechanism to promote data sharing and replicate successful experiences.

A.1. Abbreviations

QOF : Quality and Outcomes Framework
 PCMH : Patient-Centered Medical Home
 KMO : Kaiser-Meyer-Olkin
 SPSS : Statistical Package for the Social Sciences
 GP : General Practitioner
 IP : Internet Protocol

A.2. Declarations

Author contributions: LQ is the sole author of this manuscript and is responsible for all aspects of the study, including conception and design, data collection and analysis, interpretation of results, drafting and revising the manuscript, and approval of the final version for submission.

A.3. Availability of data and materials

The generated datasets for this study can be found in the Official website of the Central People's Government of the People's Republic of China Website https://www.gov.cn/zhengce/2016-10/25/content_5124174.htm

A.4. Competing interests

The author declares no conflicts of interest.

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