Shanghai General Practice Research Network: Research Environment and Return Preferences of Primary Care Providers—A Mixed-Methods Study Postprint

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Abstract

Practice-based Research Networks (PBRNs) connect healthcare professionals with researchers to conduct research oriented towards general practice and community health. Since 2023, China has established multiple domestic PBRNs, yet there remains insufficient understanding of the research environment in which primary healthcare professionals operate and the rewards they expect.

This study aims to explore the research environment faced by primary healthcare professionals interested in engaging in general practice and primary care research within the nascent Shanghai General Practice Research Network (SGPRN), as well as the rewards they hope to obtain through relevant research activities. This work will provide information for the organizational development, research capacity enhancement, and research design of PBRNs in China, thereby supporting the formulation of corresponding strategies.

This study employed an explanatory sequential design of mixed-methods research. The quantitative component used purposive sampling to conduct an online electronic questionnaire survey on October 12, 2024, among 145 primary healthcare professionals in SGPRN who intended to participate in research activities, collecting information on background, research capacity, research environment, and desired rewards when participating in PBRN-organized research, and analyzed and classified these using descriptive statistical analysis and the Kano Model. The qualitative component selected 24 primary healthcare professionals from the quantitative respondents, conducting one focus group interview and 21 semi-structured interviews using qualitative descriptive methods, and performed iterative analysis of the interview data to validate and supplement the

quantitative data. The quantitative and qualitative data were finally integrated using joint display and meta-synthesis methods.

Among the participating primary healthcare professionals, 84.83% (123/145) reported that their community health centers provided an environment conducive to conducting research, 68.97% (100/145) reported that their research work could be closely integrated with clinical work, 66.89% (97/145) reported easy access to resources for learning research knowledge and skills, 60% (87/145) reported having resources needed to conduct research, 50.34% (73/145) reported being able to find research collaborators, and 42.75% (62/145) reported having adequate research time. Qualitative results confirmed all quantitative findings and provided some expanded supplementation. The rewards primary healthcare professionals most hoped to obtain from the research network included acquiring knowledge and skills for conducting research, leading and completing studies on questions of personal interest, obtaining primary authorship, and accessing shared data when it could be utilized, all of which were closely related to the design of research incentive policies at community health centers and even the healthcare system. Additionally, qualitative results emphasized that pre-established, open, and transparent collaboration rules, as well as mutual trust among participants, were necessary conditions for attracting primary healthcare professionals to participate in PBRN-organized research.

This study found that the research environment for community healthcare professionals in SGPRN was neutral to slightly favorable and was significantly influenced by current research incentive and career development policies of medical and health institutions. The rewards primary healthcare professionals hoped to achieve in research work focused on overcoming limitations due to insufficient professional research knowledge and skills, with the fundamental goal of obtaining research performance outputs. These findings suggest that future development of PBRNs in China should, while drawing on mature international experience to provide systematic resources supporting primary healthcare professionals in enhancing research knowledge and skills, formulate corresponding strategies to mitigate and overcome the negative impacts of current research policies on general practice and primary care research, and conduct truth-seeking, pragmatic, high-quality research primarily oriented towards improving practice and benefiting patients.

Full Text

Preamble

Primary Care Research Capacity Building
The Research Environment and Reward Preferences of Primary Care Practitioners in the Shanghai General Practice Research Network: A Mixed Methods Study

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Abstract

Background
Practice-Based Research Networks (PBRNs) connect healthcare practitioners with researchers to conduct primary care and community health-oriented research. Since 2023, China has established multiple indigenous PBRNs, yet understanding remains limited regarding the research environment faced by primary care practitioners within these networks and the rewards they expect from research participation.

Objective
This study explores the research environment confronting primary care practitioners interested in general practice and primary care research within the nascent Shanghai General Practice Research Network (SGPRN), along with their desired rewards from research activities. These findings will inform organizational development, research capacity building, and research design for PBRNs in China, thereby supporting strategy formulation.

Methods
This study employed a mixed-methods explanatory sequential design. The quantitative component used purposive sampling to conduct an online survey on October 12, 2024, of 145 primary care practitioners from SGPRN who expressed interest in research activities. The survey collected information on background characteristics, research capabilities, perceived research environment, and preferred rewards for participating in PBRN-organized research. Descriptive statistical analysis and the Kano Model were used for analysis and classification. The qualitative component selected 24 practitioners from the survey sample for one focus group discussion and 21 semi-structured interviews using qualitative descriptive methods. Interview data underwent iterative analysis to validate and complement quantitative findings. Quantitative and qualitative data were integrated through joint display and meta-synthesis.

Results
Among participating practitioners, 84.83% (123/145) reported that their community health centers provided a favorable research environment, 68.97% (100/145) reported that their research and clinical work could be closely integrated, 66.89% (97/145) reported easy access to resources for learning research knowledge and skills, 60% (87/145) reported having necessary resources for research, 50.34% (73/145) reported being able to find research collaborators, and 42.75% (62/145) reported having adequate research time. Qualitative findings confirmed all quantitative results and provided extensive supplementary insights.

The most desired rewards from research networks included acquiring research knowledge and skills, leading studies on topics of personal interest, obtaining primary authorship, and accessing shared data when usable—all closely related to research incentive policy design at community health centers and the broader healthcare system. Additionally, qualitative results emphasized that pre-established, public, and transparent collaboration rules, along with mutual trust among participants, are essential prerequisites for attracting practitioners to PBRN-organized research.

Conclusion
This study found that community practitioners in SGPRN operate in a neutral-to-slightly-favorable research environment significantly influenced by current institutional research incentive and career development policies. Practitioners' desired rewards from research focus on overcoming limitations in professional research knowledge and skills to achieve research productivity. These findings suggest that future PBRN development in China should draw on international experience to provide systematic resources supporting practitioners' research knowledge and skill enhancement while developing strategies to mitigate negative impacts of current research policies on general practice and primary care research. PBRNs should pursue authentic, pragmatic, high-quality research aimed at improving practice and benefiting patients.

Keywords
Primary care research; Practice-based research networks; Research capacity building; General practitioners; Research collaboration; General practice

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Introduction

Drawing on extensive experience and evidence from North America, Europe, and other regions, the World Organization of Family Doctors (WONCA) identifies primary care research as the core of research activities in this field in its research manual, emphasizing that active participation and support from primary care practitioners are indispensable foundations for conducting such research. As one of the core international systems and pathways for this research, Practice-Based Research Networks (PBRNs) enable frontline practitioners serving community residents to assume critical roles such as practice facilitators and research assistants. When research projects are initiated and led by them, they may even serve as principal investigators.

In recent years, many primary care systems in Europe and America have begun transforming into Learning Health Systems (LHSs), which integrate science, data, and culture to generate new knowledge continuously through clinical and health service data, thereby driving continuous improvement and innovation in healthcare quality. Against this backdrop, some PBRNs in Europe and America have further evolved into Primary Care Practice-Based Research and Learning Networks (PBRLNs). In these networks, the connotation of "research" has shifted from narrowly defined "research projects" to broadly oriented "learning, improvement, and innovation" aimed at enhancing practice and serving patients. In this system, the role of primary care practitioners extends beyond traditional functional roles defined research-project-centrically as "data collectors" or "intervention implementers" to becoming generators of experiential knowledge and ultimate users of research findings in practice, thereby further highlighting their foundational and principal role in PBRNs.

This background underscores the value of deeply understanding the research environment of PBRN practitioners and their expected rewards for participation. This understanding is essential because the former critically influences the formation and development of practitioners' research capabilities, while the latter directly reflects their initial motivations and preferences regarding PBRNs'"value proposition." These two factors fundamentally shape and determine PBRN research capacity, organizational operations, and research directions by affecting practitioners' "capability" and "willingness." Without adequate understanding of these elements, PBRN organizational structures and research pathways risk

becoming detached from reality– "castles in the air" –and failing to achieve intended objectives.

A recent scoping review of global studies identified up to 12 external environmental factors affecting primary care practitioners' engagement in primary care research, including institutional management emphasis on research, resource availability, and practitioners' own research knowledge and skills. Both domestically and internationally, primary care practitioners face relatively disadvantaged external environments that severely limit their research capacity development. Moreover, multiple international studies indicate that research participation essentially represents an opportunity cost for practitioners. Therefore, PBRNs can only fully motivate practitioners to join and sustain participation by providing reasonable rewards (such as monetary compensation, opportunities to collaborate with renowned peers, knowledge gains, and clinical practice improvements). However, due to significant differences between China' s social environment and primary healthcare system and those of Europe and America, this evidence may not directly and adequately support PBRN development in China. Finally, although at least four PBRNs centered in Beijing, Shanghai, Zhejiang, and Sichuan have entered initial development stages since 2023, detailed information and reports on their actual organizational operations and research implementation pathways remain scarce. The research environment of participating practitioners and their expected rewards for joining these PBRNs are similarly unknown.

Therefore, leveraging an internal research training opportunity organized by the Shanghai General Practice Research Network (SGPRN)—one of the four PBRNs –during September-October 2024, the research team designed and implemented this mixed-methods study using an explanatory sequential design. The study aims to understand the research environment confronting primary care practitioners interested in general practice and primary care research within SGPRN, and their desired rewards from participating in SGPRN activities, thereby informing organizational strategy development and research pathway design for SGPRN and other Chinese PBRNs.

Methods

This study employed a mixed-methods explanatory sequential design, first conducting a questionnaire survey of participants, followed by qualitative interviews based on survey results, and finally integrating both components. For research question purposes, qualitative results provide contextually appropriate explanatory information that is more readily translatable into practical strategies for China, while also validating quantitative findings to enhance overall reliability.

Participants

On October 12, 2024, using purposive sampling, the research team surveyed primary care practitioners from 27 community health centers already in SGPRN

who were recommended for training (5 practitioners per center with relatively rich research experience) and from 23 community health centers planning to join SGPRN (2 practitioners per center). Inclusion criteria were: (1) practitioners working in SGPRN-affiliated community health centers; (2) those reporting $ $6 on a 10-point scale measuring "willingness to conduct primary care research." Among eligible practitioners, those explicitly refusing participation were excluded. The final sample comprised 145 practitioners, with distribution shown in [Figure 1: see original paper]. This study protocol was approved by the Ethics Committee of Tongji University Affiliated Yangpu Hospital (Approval No.: LL-2024-KY-005).

Data Collection

Survey Questionnaire Based on previous scoping reviews, the research team designed a four-section online questionnaire using Wenjuanxing: (1) basic practitioner information related to research; (2) a Chinese-translated, validated version of the Basic Research Capacity Scale (adapted from the classic WReN-Spider instrument); (3) several 4-point Likert-scale questions (1=not at all, 2=uncertain, 3=perhaps, 4=definitely) about practitioners' research environment based on prior reviews; and (4) several 4-point Likert-scale questions in both positive (willingness to participate when SGPRN provides a reward) and negative (unwillingness when SGPRN does not provide a reward) formats, developed from literature and the Kano Model. Scoring is shown in . The survey was distributed electronically during day one of a research skills training meeting, with participants completing it on mobile phones or computers. The survey remained open for 14 days, during which three reminders were sent, closing on day 14.

After data cleaning, the team first used descriptive statistics to analyze participants' basic information, self-reported primary care research capabilities, and self-assessed research environment. Categorical data were expressed as percentages, and continuous data as ($\bar{x}\pm s$). The Kano Model classification method was then applied to categorize six types of desired rewards based on participants'positive and negative responses into four attribute categories: performance (presence directly and strongly affects network attractiveness), attractive (not expected but enhances satisfaction when present), must-be (basic needs whose absence reduces attractiveness), and indifferent (presence or absence does not affect attractiveness). Classification is detailed in .

Qualitative Interviews Based on quantitative data, the research team conducted one focus group discussion and 21 semi-structured interviews with 24 practitioners selected from survey participants who agreed to interviews. Maximum variation sampling was used based on gender, age, education, clinical experience, and self-reported research capability. Qualitative description served as the methodological approach. Rather than using existing theories, the team designed interview content around quantitative survey findings to enable ex-

planatory and validation functions required by the sequential design.

Two core interview topics were designed: practitioners' current research environment and their preferences for rewards from SGPRN. Example questions are shown in . The first focus group on October 12, 2024, involved three practitioners in a one-hour session led by a researcher specializing in primary care research capacity and PBRNs, together with a practicing general practitioner. This revealed that deeper discussion might involve sensitive evaluations of institutional leadership and research management. To allow candid discussion in a private setting, subsequent interviews were adjusted to semi-structured format, conducted one-on-one via online meetings between 19:00-22:00. Each lasted 30-50 minutes. At least one day before each interview, the interviewer contacted participants to schedule and provide informed consent forms detailing interview topics and ethical information for voluntary participation. During interviews, the interviewer first explained the research background, confirmed consent, and informed participants that recording would occur.

Data analysis using constant comparison proceeded iteratively with interviews. The researcher completed analysis the day after each interview and adjusted subsequent questions accordingly. Given that quantitative data provided broad descriptive statistics, qualitative analysis primarily employed low-inference content analysis, staying close to raw data. After automatic transcription and manual verification, the researcher read transcripts line-by-line, generating codes based on original content and writing memos. Codes were then grouped into sub-themes and two predetermined themes. Besides the two interviewers, another researcher participated in partial data analysis, with cross-checking and group discussions to resolve discrepancies.

After the 17th and 18th interviews, the researcher experienced clear data redundancy. Three additional interviews confirmed no new information emerged, indicating saturation. Reflexivity was checked through two approaches: periodically summarizing and confirming information with participants during interviews, and discussing core points from early interviews with later participants. Through these methods, the researcher concluded that collected information comprehensively and accurately reflected participants' perspectives.

Data Integration

The team integrated quantitative and qualitative data using joint display methods proposed by Guetterman et al. and meta-inference methods by Creswell et al., which involve using qualitative data to explain and validate quantitative findings, combined with literature and practical experience, to generate more complete and contextually appropriate insights through comparative and holistic analysis.

Results

Participant Characteristics

The survey included 145 practitioners: 113 female (77.93%), 119 aged $ $30 years (82.06%), and 64 with master' s degrees or higher (44.04%), as shown in . Mean self-reported primary care research capability was 2.35 points, with most sub-dimensions scoring between minimal experience (2 points) and some experience (3 points), shown in [Figure 2: see original paper]. Among 77 practitioners (53.1%) who agreed to interviews, 24 ultimately participated, detailed in .

Research Environment for Primary Care Practitioners

Regarding research environment, the proportion of practitioners who fully or mostly agreed with the following statements, from highest to lowest, were: community health centers provide a favorable research environment (123/145, 84.83%), research and clinical work can be closely integrated (100/145, 68.97%), easy access to resources for learning research knowledge and skills (97/145, 66.89%), having necessary resources for research (87/145, 60.00%), ability to find research collaborators (73/145, 50.34%), and having adequate research time (62/145, 42.75%). Qualitative results further validated and enriched these findings: while institutional collaboration was relatively easy to establish, professional researcher support was lacking; beyond absolute time insufficiency, fragmented time distribution also negatively impacted research efficiency and motivation, as shown in .

Reward Preferences and Kano Model Classification

presents practitioners' preferences for six rewards and their Kano Model classifications, with [Figure 3: see original paper] illustrating these preferences. Although quantitative Kano analysis classified all six rewards as performance attributes, qualitative results revealed several differences. Specifically: (1) Qualitative findings confirmed "acquiring primary care research knowledge and skills" and "addressing personally interesting research questions" as performance rewards, while expanding their meaning—the former focuses on systematic knowledge supporting independent research, the latter requires conditions supporting practitioner-led studies. (2) Contrary to quantitative results, qualitative findings suggested "receiving reasonable monetary compensation" was more likely an indifferent reward, as limited compensation held little appeal; whereas "working in a research-conducive atmosphere" was a must-be reward, as its absence significantly weakened participation enthusiasm and effectiveness. (3) "Receiving authorship based on contribution" split into two scenarios: primary authorship, crucial for career development, was considered performance or attractive; secondary authorship was mostly indifferent, providing only minor honor. Finally, the appeal of "accessing shared research data" varied individually: for those whose research aligned and could effectively use the data, it was performance or attractive; otherwise, it was indifferent. Qualitative results further emphasized

that mutual trust among collaborators is a prerequisite for these rewards to attract practitioners to PBRN research. Without trust, practitioners would not participate openly and fully; if PBRNs repeatedly failed to deliver on promises, they would refuse further collaboration. Building trust requires not only the personal prestige and track record of PBRN core teams and experts but also clear, transparent, credible, and feasible research plans and collaboration rules established and publicized by PBRNs.

Discussion

This SGPRN-based mixed-methods study preliminarily explored the research environment for primary care practitioners in Shanghai' s PBRN-affiliated institutions who are relatively interested in primary care research. They often conduct research driven by institutional performance incentives, oriented toward publishing papers and obtaining grants, using limited fragmented time, working alone or in small institutional teams, lacking professional researcher guidance, and relying on fragmented research knowledge and clinically relevant experience. These characteristics subtly align with their reward expectations from PBRNs: the four most desired rewards (acquiring research knowledge and skills, leading personally relevant studies, obtaining primary authorship, and accessing usable shared data) all closely relate to their main constraint (insufficient professional research knowledge and skills) and primary goal (achieving research output).

These findings indicate that Chinese primary care practitioners face research environments and dilemmas similar to international peers, such as deficient research knowledge and skills, lack of professional researcher collaboration, and limited time due to clinical workload. To address these challenges, several mature international experiences warrant consideration. For example, the European General Practice Research Network (EGPRN) developed resources to help practitioners establish disciplinary foundations, such as the European General Practice Research Agenda and an online research training course for general practitioners. The North America Primary Care Research Network (NAPCRG) established a "mentor-mentee matching platform" to facilitate long-term one-on-one guidance relationships between general practitioners and researchers of different backgrounds. U.S. experts also developed PBRN-specific research designs like card studies to reduce additional time burdens. Related work already undertaken in China, such as the series of general practice research resources developed and translated by the Chinese General Practice Magazine since 2019, continuous community research capacity training by various institutions, and medical research discussion groups organized by general practitioners, provide good foundations for localizing these international experiences.

Moreover, this study reveals that China' s research management and reward system decisively influences practitioners' participation in PBRN research. Positively, it drives many practitioners to invest time and effort in research, producing substantial outputs. Bibliometric statistics show rapid growth in Chinese

primary care research publications from 2001-2020, with at least 3,122 papers published in 2021—estimated at 1.5 times the U.S. output and over 3 times the U.K. output, with nearly 60% produced by primary care institution staff. This suggests that PBRNs, as theoretically effective collaborative platforms for higher-quality research, will strongly attract practitioners interested in research, offering opportunities for productive collaboration.

However, the negative aspect is that primary care institutions' universal adoption of top-down, single-metric (paper output) research performance evaluation standards, recognizing only one or two primary authors, inevitably channels practitioners' research pathways toward "individual/small workshop-style production oriented toward research output."This differs fundamentally from North American primary care physicians' motivations for PBRN participation in two ways: first, it neglects the core value of practitioner participation— "collectively conducting practice-relevant research activities" —narrowly focusing on the final outcome of "grant acquisition and paper publication" ; second, it prioritizes "publishing papers and obtaining rewards" for personal income and career development over "improving practice and benefiting patients."The former encourages practitioners to ignore research' s natural course, tending toward hasty, fragmented, low-quality, zero-sum competition, even fabrication; the latter detaches them from practice, ignoring research' s real value for patients, institutions, disciplines, and society, leading to "empty research" oriented toward personal gain.

Previous research by the Chinese General Practice Magazine showed that among original studies published in 2021, most from primary care institutions were single-author works with generally poor methodological quality that could not constitute valid scientific evidence. This demonstrates the negative effects of the research management reward system and urgently requires researchers and institutions in this field to break the 困境 of "small workshop model + extreme utilitarian orientation" through developing PBRNs or similar collaborative models with shared resources and research collaboration to enhance future research quality and value.

These findings suggest that when formulating development strategies, Chinese PBRNs should, while learning from international experience, first clarify their purpose of serving patients, the discipline, and practice, and develop strategies to address negative impacts of current research management systems on community practitioners. While respecting and acknowledging practitioners' motivations, PBRNs should not be held hostage by their personal interests in publishing. During this period, establishing four principles is crucial:

1. **Core Purpose**: PBRNs should promote research serving clinical and health service practice, not push practitioners to make unpaid contributions to "a few researchers' work." Research value should aim to provide knowledge and technical support for Chinese general practice and primary care development, ultimately benefiting healthcare workers and patients —not reversing cause and effect by demanding practitioners collect data for "high-impact journal" publications detached from general practice, in-

creasing their burden and potentially harming practice.

2. **Practitioner Partnership**: Active, long-term practitioner participation and collaboration are the cornerstone of PBRNs. Practitioners should be regarded as key trusted partners driving PBRN operation and development, not "cheap data collectors." PBRNs should build mechanisms supporting practitioners in translating practice questions into research questions, help them master basic, rigorous, and practical research knowledge systems to enhance their capacity for deep participation and leadership, and develop multi-problem and qualitative-embedded methods to support practitioner research while ensuring data authenticity, thereby alleviating pressure from current performance evaluation policies.

3. **Evaluation Culture**: As research organizations, PBRNs should reject narrow, mechanistic research performance evaluation culture that ignores research field, actual contribution to patients and the discipline, and frontline practitioners' real contributions—simply focusing on "journal impact factor, paper count, and core authorship."PBRNs should ensure practitioners' actual contributions gain peer and researcher recognition, preventing their research motivations from being continuously hijacked and misguided by crude, impractical research management systems that corrode collaborative, trusting, and win-win relationships.

4. **Research Design**: Considering the above, PBRN research design should prioritize "problem" importance over "method," and "method" over "data." Within "data," authenticity and practice relevance should precede sample size and participant/institution scale, encouraging PBRN research to continuously improve authenticity and value for general practice improvement, avoiding blind expansion and preventing PBRNs from becoming tools for inter-institutional research output competition and "foam" detached from general practice.

This study' s main limitation is its location in Shanghai—a region with high economic development, relatively mature primary healthcare systems, and dense research institutions. Additionally, SGPRN' s initial recruitment involved preselection, making participants generally from Shanghai' s better-resourced community health centers with stronger research interest. Thus, findings represent "leading"practitioners rather than all Chinese primary care practitioners. Future studies in other regions should survey research environments and reward preferences of PBRN-affiliated practitioners to support locally adapted organizational and research design strategies.

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Author Contributions

WANG Yang proposed the research objectives, designed the study, led protocol development and implementation, conducted formal data analysis and validation, and drafted the manuscript. WANG Yang and PAN Ying collected and organized data, performed statistical analysis, and created figures and tables. WANG Yang, JIN Hua, and YU Dehua secured funding. WANG Yang and YU Dehua managed and supervised the project. YU Dehua provided research resources. WANG Yang, PAN YING, YANG Hui, Helen Elizabeth Smith, JIN Hua, and YU Dehua participated in manuscript review and final revision. YU Dehua oversaw the entire paper.

Conflict of Interest

The authors declare no conflict of interest.

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