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Scientific Research Conception Guided by General Practice Thinking: Post-print

Authors: Yu Dehua

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Abstract

As basic medical services receive increasing attention and social demands continue to grow, numerous scientific research questions have emerged in the fields of general practice medicine and community health. This problem-based scientific research promotes discipline construction and development. General practice medicine, belonging to the category of clinical medicine, and community medicine, with its focus on public health, have disciplinary connotation characteristics and professional thinking elements that determine the focal points of research design and research methodologies. However, a common issue in current scientific research within China' s general practice medicine and community health fields is the insufficient attention and depth of consideration given to the distinctive thinking characteristics of general practice medicine research. Accordingly, this article, grounded in the thinking elements of general practice medicine ("person-centered" , holistic perspective, and systematic nature), specifically elaborates on conducting scientific research under the guidance of general practice thinking from three aspects: identifying and positioning research questions, establishing multidisciplinary research teams and achieving technological integration, and developing holistic and systematic research designs. These concepts are illustrated with practical cases from the Department of General Practice Medicine at Yangpu Hospital Affiliated to Tongji University, aiming to provide references for researchers in general practice medicine and community health to conduct research that aligns closely with the connotation characteristics of general practice medicine, thereby contributing to the healthy development of scientific research in this field.

Full Text

Preamble

Scientific Research Conception Guided by General Practice Thinking

With increasing attention to primary care services and growing societal needs, numerous scientific research questions have emerged in the field of general practice and community health. This problem-based research promotes discipline construction and development. General practice, belonging to clinical medicine, and community medicine, focusing on public health, have disciplinary characteristics and professional thinking elements that determine research design priorities and methods. However, a common problem in general practice and community health research in China is insufficient attention to and depth of thinking about the characteristics of general practice research thinking.

Based on the elements of general practice thinking (“human-centered” , holistic view, and systematization), this paper elaborates on conducting scientific research guided by general practice thinking from three aspects: identifying and positioning research questions, building multidisciplinary research teams to achieve technology crossover, and developing holistic and systematic research designs. Using practice cases from the Department of General Practice at Yangpu Hospital, Tongji University, this paper aims to provide references for researchers in general practice and community health to conduct scientific research that aligns with the connotation and characteristics of general practice, thereby contributing to the positive development of general practice research.

Author Affiliations: 1. Department of General Practice, Yangpu Hospital, Tongji University, Shanghai 200090, China 2. Shanghai General Practice and Community Health Development Research Center, Shanghai 200090, China 3. Academic Department of General Practice, Tongji University School of Medicine, Shanghai 200090, China

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1 Elements of General Practice Thinking

As a clinical discipline with distinctive characteristics, scientific research constitutes one of the internal driving forces for the development of general practice. Over the past two decades, research productivity in general practice and related fields in China has significantly improved, with substantial progress in research topics, content, methods, and team development. The number of published articles has increased annually, and several regional research hubs have initially formed, producing a certain number of research achievements. However, general practice research in China remains in its early stages, manifested by limited research topics, constrained research types, unrigorous research designs, fragmented research teams, and the absence of large-scale collaborative networks. Among these shortcomings, a common problem is that researchers lack profound understanding of the starting points and endpoints of general practice research, often remaining at the superficial level of practical problems without deeply

contemplating the thinking characteristics of general practice research. This leads to trivial topics, inappropriate methods, redundant resource investment, and fragmented research, hindering the healthy development of general practice research.

This paper does not explain specific research design methods but describes important thinking processes that should be undertaken before initiating research —what might be called research conceptualization. Although this thinking approach does not directly determine specific research plans or tools, it helps researchers clarify the main thread of general practice research using general practice thinking, enabling more comprehensive and authentic engagement with the problems facing general practice development, applying appropriate research methods, and making holistic and systematic designs.

Whether in healthcare service objects, basic medical characteristics, or community health service capacity evaluation, general practice embodies the "human-centered" disciplinary characteristic and thinking element. "Human-centered" reflects the "bio-psycho-social" medical perspective, focusing on psychological conditions and social contexts behind individual physiological status rather than solely on diseases or organs. It emphasizes attention to human needs: respect, social support, and security. "Human-centered" expands the definition of "patient-centered," indicating that general practice covers not only diseased populations and treatment but also healthy and sub-healthy populations. It reflects a shift from "passive medical care" to proactive health promotion.

"Human-centered" extends to two other thinking elements: holistic view and systematization, which examine individual health needs and health service delivery strategies from comprehensive and systematic perspectives. The holistic view emphasizes attention to health maintenance needs across the life course, evaluating individual and family health or disease from integrated medical perspectives of physical, psychological, and social dimensions rather than isolated organ states. Systematization requires general practitioners to serve as coordinators of multidisciplinary medical services, effectively integrating pharmacological treatment, rehabilitation, nutrition, nursing, psychological support, and other technologies for systematic diagnosis and treatment. It involves coordinating resources across medical institutions and community health promotion to implement proactive health management based on community residents' health promotion needs, improving accessibility and comprehensiveness of health services. Through family doctor contract services, various forms of proactive health management programs are developed to provide systematic personalized medical management.

In summary, "human-centered," holistic view, and systematization fully embody the characteristics of general practice thinking, providing clear guidance for medical services, scientific research, and teaching in general practice.

2.1 Identifying Research Questions

Unlike other clinical specialties that emphasize pathogenesis and basic research, the scientific research scope of general practice has a distinctive framework. First, it reflects "human-centered" general practice. Second, it explores individual health maintenance and disease management from a holistic perspective, including physiological, psychological, and social influencing factors; individual agency in implementing proactive health; and individual, family, social, environmental, and cultural influences on disease states and pathogenesis. Third, it studies health management and disease diagnosis and treatment from a systematic perspective, including integration and implementation of multiple technologies such as disease prevention, clinical treatment, rehabilitation, nutrition support, and psychological counseling.

Within this research framework, questions can be identified around four directions: clinical issues, population health, community medicine, and primary health systems. Clinical issues include standardized chronic disease management in general practice, diagnosis and treatment of undifferentiated diseases and multimorbidity, identification and management of psychosomatic diseases in communities, multidisciplinary integrated medical care, and application of artificial intelligence in chronic disease management. Population health issues involve evaluating health status, assessing and intervening in disease risk factors, and implementing health promotion strategies for family groups and community populations from clinical medicine and public health perspectives—representing distinctive research thinking in general practice compared to specialty medicine. Community medicine issues expand from individuals and families to predictive communities, maintaining personal and family health from a community prevention perspective. Community medicine emphasizes applying social and preventive medicine concepts and theories, using epidemiological and health statistics methods to collect information through social surveys, community surveys, and population screening, then proposing community diagnoses to identify major health problems and influencing factors and developing community health promotion plans. Although public health personnel primarily implement community medicine, general practitioners can predict or grasp disease epidemics in communities through individual cases and rapidly implement effective prevention and control measures. Primary health system issues include numerous research questions about China' s primary health system construction and development, such as functional positioning of primary healthcare institutions, tasks and resources, support incentives and environmental constraints, service quality and capacity improvement, building general practice foundations while enhancing specialty services, and factors influencing talent career development.

Correct topic selection is the starting point and key to scientific research. During this process, researchers must continuously study and comprehend the characteristics, meaning, and functions of general practice, especially understanding and exploring the thinking elements of general practice, to continuously expand research horizons and identify appropriate research questions for more compre-

hensive understanding of problems and stakeholders in general practice and community health development and to enhance systematic solutions.

2.2 Interdisciplinary Collaboration and Technology Integration

General practice research questions and tools involve clinical medicine, public health, epidemiology and health statistics, management, and other disciplines. Particularly in analyzing community disease patterns, disease risk prediction and assessment, population health status and intervention evaluation, and disease diagnosis and treatment factors, numerous public health and management theories and analytical tools are needed. These include Delphi methods for constructing community evaluation index systems, disease management models and outcome evaluations, survey questionnaires, competency models, structural equation modeling for analyzing factors influencing community screening participation, quantitative incentive mechanisms for general practitioners, and living conditions of key community populations. Compared with traditional statistical models, machine learning enables more precise prediction and continuous incorporation of new data, with widespread applications in disease prediction and image recognition.

Therefore, general practice research should advocate for establishing multidisciplinary collaborative teams, selecting appropriate research techniques and tools based on specific questions and objectives, and developing scientific research protocols. The foundation of building multidisciplinary teams lies in the nature of research questions and protocol needs, with team composition and division determined by specific problems and requirements. Establishing a general practice research network is an important pathway for achieving regional research information complementarity and resource sharing. By establishing scientific research collaboration networks nationally or regionally, multi-center studies on common problems can be conducted to explore development paths suitable for China' s national conditions.

2.3 Systematic Design

For topics already identified and planned, many researchers fall into the trap of rushing to start while neglecting systematic design—failing to think systematically about overall layout and implementation steps before initiating research. Without systematic design, researchers may only see current problems while ignoring underlying associated factors or systemic causes. Additionally, lacking systematic design and overall research frameworks leads to unclear team coordination mechanisms and member division, hindering information sharing and resulting in multiple researchers conducting similar "fragmented" studies with

redundant resource investment, while isolated local research results struggle to generate true value.

Conducting systematic design for general practice research requires first thinking about the relevance and systematization of research topics. For specific clinical problems, consider physical-psychological-social systemic factors and integrated medical technologies across prevention-treatment-rehabilitation. For health service development issues, consider demand, quality, capacity, models, and effectiveness. For discipline construction and development, consider management, resources, technology, talent, research, and teaching. Only through correlation analysis of individual problems can systemic influencing factors and multiple problems with their causes be identified, laying foundations for systematic solutions.

Based on correlation analysis, systematic research design includes main research questions, overall objectives, research threads, and branch projects (sub-objectives and implementation plans). The focus lies in reflecting sub-plans under overall layout, enabling shared research data, avoiding redundant investment, improving research efficiency, achieving integration of sub-research projects, and consolidating branch research results to enhance overall research value.

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3 Case Study

Using the "Regional Health Collaborative Development" study conducted by the Department of General Practice at Yangpu Hospital, Tongji University, as a case study, this section illustrates the application of general practice thinking in research.

Regional health collaborative development refers to integrating various medical resources within a certain area to achieve resource complementarity and maximize utilization, enabling medical institutions to collaborate and develop synergistically. Its value lies in compensating for resource shortages in primary healthcare institutions through resource integration and sharing, optimizing regional health resource layout, improving regional health service capacity, providing more balanced and multi-level healthcare for residents, and ultimately promoting hierarchical diagnosis and treatment. Among numerous topics on "building health security systems and strengthening primary capacity building," the research team, after in-depth analysis and close integration with general practice thinking elements, selected "regional health collaborative development research" as its direction, conducting studies from 2014 to 2020 that generated academic influence and informed local health administrative planning.

3.1 Problem Positioning and Research Framework

In the process of integrating regional medical centers with community health service centers and implementing hierarchical diagnosis and treatment, two major problems persist. First, bidirectional referral between regional medical centers (general hospitals) and community health service centers suffers from unclear standards and pathways, resulting in inefficient and obstructed referrals. Since China vigorously promoted hierarchical diagnosis and treatment system construction in 2015, research has comprehensively covered current situation analysis, theoretical models, and practice models, with chronic diseases recognized as the breakthrough point. However, compared with international research and practice, current domestic studies lack norms and standards for "upward and downward" referrals, necessitating effective methods for precise referral and hierarchical diagnosis and treatment based on regional characteristics and needs. Second, the traditional collaboration model between hospital specialists and community general practitioners remains limited to one-way medical support, yielding minimal effects on community health service centers' discipline development and talent cultivation. Although several regional collaboration models have emerged in China, such as tertiary hospitals hosting, trusteeship, merging, joint ventures, or paired support of community health service centers, no widely applicable model consensus has formed regarding organizational forms and collaboration scope. Traditional models focusing on large hospital-dominated medical collaboration have limited effectiveness in enhancing community health service centers' capacity. Therefore, effective pathways and methods for regional health collaboration between regional medical centers and community health service centers need clarification.

Based on this problem analysis, the research team needed to determine: how to use general practice concepts to identify problems and integrate them throughout the research; how to determine regional health collaborative development goals from both "patient" and "physician" human-centered dimensions (the starting and ending points of research); and how to fully explore problems and stakeholder needs in regional health collaborative development to formulate holistic research objectives and systematically consider involved factors as sub-research components.

3.2 Systematic Design

Based on preliminary problem analysis and closely following the connotation characteristics and elements of general practice thinking, the overall research plan was formulated as follows:

Overall Objective: To enhance primary health service capacity and optimize resource allocation at all levels in the region, through big data mining and systematic construction of an evidence-based decision-making system for hierarchical diagnosis and treatment, explore key technologies for community collaborative development led by regional medical centers, construct a three-

dimensional collaborative regional development theory of medical service-talent cultivation-scientific research support, empirically optimize it in Shanghai, establish a maximized collaborative development model for regional medical resource utilization, and ultimately promote hierarchical diagnosis and treatment and community health development, improving residents' healthcare access.

Sub-components and Objectives: (1) Based on community outpatient big data mining and decision tree information entropy algorithms, construct a regionally characteristic bidirectional referral decision system matching regional population disease characteristics, focusing on current situations and development trends of regional acute and chronic diseases to provide evidence for precisely constructing a feasible regional hierarchical diagnosis and treatment decision system. (2) Based on systems theory and synergy theory, starting from community service needs, construct three dimensions of medical service, talent cultivation, and scientific research support for regional health collaborative development, fitting a three-dimensional theoretical model for regional health collaborative development and conducting regional empirical studies in Shanghai. (3) Break through the current universal single cooperation model dominated by tertiary hospital interests and specialist medical support, guided by general practice discipline development and linked by regional medical center-community health service center general-specialist team integration, conduct health collaboration practice with community health service centers from multiple dimensions of medical care, scientific research, and talent cultivation to comprehensively enhance community health service capacity and promote hierarchical diagnosis and treatment. This design fully considers patients' health maintenance needs and resource allocation, as well as primary healthcare workers' career development needs—practicing the "human-centered" element throughout the research process. Systematic design enables team members to clarify overall objectives and sub-implementation plans, maintain homogeneity and effective progress across sub-projects, and ensure general practice thinking and working concepts permeate all research components.

3.3 Building a Multidisciplinary Research Team

The project research team includes researchers from general practice (clinical medicine), health management, public health, and epidemiology and health statistics from general hospitals, university medical schools, and schools of public health. Based on the research protocol, member division was established, various research projects were applied for, and research data and results were shared to propose scientific research summaries from each discipline' s perspective.

In conclusion, scientific research in general practice must align with the discipline' s connotation characteristics, and the "human-centered," holistic, and systematic thinking elements of general practice should serve as researchers' "sci-

entific research compass," permeating the entire research process—including refining research questions, establishing objectives, constructing implementation pathways, and determining research tools and design protocols. Whether addressing macro-management or specific problems, only research plans guided by general practice thinking can closely align with general practice characteristics, and only such research results can truly benefit general practice development.

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