An Empirical Study on Generalist-Specialist Collaborative Chronic Disease Management Based on General Practice Thinking: A Case Study of the "Six Ones" Construction in Community Osteoarthritis Management (Postprint)

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Abstract

The "general-specialist collaboration model" is currently applied primarily in the diagnosis, treatment, and management of various chronic diseases in communities, based on technical support for disease diagnosis and treatment and the implementation of tiered diagnosis and treatment. The General Practice Team of Tongji University Affiliated Yangpu Hospital, grounded in the characteristics of general practice thinking—"patient-centered," "systemic and holistic perspective"—has undertaken multi-dimensional construction around the "Six Ones" to explore and practice a more comprehensive, in-depth, and effective general-specialist collaboration model. The "Six Ones" construction is based on general-specialist collaboration between general hospitals and community health service centers. Using osteoarthritis (OA), a common chronic disease in communities, as an example, its content and features include: (1) Establishing a multidisciplinary team: The established diagnosis and treatment team can leverage the three-dimensional collaborative medical consortium foundation at the general hospital level, utilize the liaison and coordination role of general practice in general hospitals, and refine and coordinate the division of labor among multiple disciplines; (2) Improving a set of diagnosis and treatment protocols: Following scientific, evidence-based principles to improve a set of disease-graded diagnosis and treatment protocols, and conducting effectiveness evaluations of these protocols to better improve disease symptoms and enhance patients' quality of life; (3) Developing an APP: The developed APP can encompass multiple functions such as stratified diagnosis and treatment and management of OA patients, doctor-patient communication, popular science dissemination, appointment registration, and can collect complete diagnosis and treatment data in a dedicated information platform; (4) Designing a publicity and promotion plan: Through

various forms such as text, images, and videos, conducting publicity in multiple scenarios including disease diagnosis and treatment, health examination, and consultation in both general hospitals and communities; (5) Establishing a case database: Creating a disease-specific case database for OA patients, continuously following up patients and implementing stratified management of collected data to facilitate the provision of more general practice characteristic cases; (6) Developing a curriculum: The curriculum content developed around OA disease-specific topics includes "Undifferentiated Bone Pain in General Practice" and "Osteoarthritis Chronic Disease Management," with implementation forms including problem-based learning, outpatient reception demonstrations, and teaching ward round demonstrations, used for multi-level teaching and training in general practice for undergraduate, graduate, and continuing education. Using the "Six Ones" construction for community osteoarthritis management as an example, the practice of general-specialist collaborative chronic disease management based on general practice thinking suggests that general practice and specialties have the potential for comprehensive and in-depth cooperation and mutual promotion across multiple dimensions of clinical care, teaching, and research, and that optimizing and integrating team, technology, and information support related to disease-graded management effectively promotes improvements in patients' physical and mental health status.

Full Text

Abstract

The "general-specialty collaboration" model, which integrates general practice with specialty care, is increasingly applied in the diagnosis, treatment, and management of various chronic diseases in community settings. Current collaborations primarily focus on technical support for disease diagnosis and treatment and the implementation of hierarchical diagnosis and treatment systems. Building upon the core tenets of general practice thinking—namely patient-centered care, systematic perspective, and holistic view—the general practice team at Yangpu Hospital Affiliated to Tongji University has explored and implemented a more comprehensive, in-depth, and effective general-specialty collaboration model through multi-dimensional "Six Ones" construction.

Based on collaboration between general hospitals and community health service centers, this "Six Ones" framework uses community osteoarthritis (OA) management as an exemplar of common chronic disease care. Its components and characteristics include: (1) **Establishing a multidisciplinary team**: The team leverages a three-dimensional integrated healthcare system at the general hospital level, with the general practice department facilitating coordination and refining multidisciplinary division of labor; (2) **Optimizing a set of diagnosis and treatment protocols**: Following evidence-based medicine principles, the team developed hierarchical diagnosis and treatment pathways, evaluated their effectiveness, and demonstrated improvements in symptom control and qual-

ity of life; (3) **Developing a mobile APP**: The application integrates tiered diagnosis and management, doctor-patient communication, health education, appointment scheduling, and other functions, while collecting complete clinical data in a dedicated information platform; (4) **Designing a comprehensive publicity strategy**: Using text, images, videos, and other multimedia formats to promote the program across multiple scenarios including disease screening, health examinations, and consultations in both general hospitals and communities; (5) **Building a disease-specific case database**: Establishing an OA patient case repository with continuous follow-up and hierarchical data management to provide more general practice-characteristic teaching cases; and (6) **Developing a curriculum**: The OA-focused curriculum covers topics such as "bone pain as an undifferentiated disease in general practice" and "chronic disease management of osteoarthritis," delivered through problem-based learning, outpatient demonstrations, and teaching ward rounds for undergraduate, graduate, and continuing medical education.

Using community OA management as an example, this practice demonstrates that general-specialty collaboration based on general practice thinking holds significant potential for comprehensive, in-depth cooperation and mutual advancement across medical care, teaching, and research dimensions. Furthermore, optimizing and integrating team resources, technical support, and information systems related to hierarchical disease management effectively promotes patient physical and mental well-being.

Keywords: General practice; Community health services; Clinical thinking of general practice; General-specialty collaboration; Six Ones

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1. Establishing an Osteoarthritis General-Specialty Collaborative Care Team

To address the identified gaps in community chronic disease management—namely limited resource allocation for general-specialty collaboration and unclear division of responsibilities—the research team established an OA collaborative care team by partnering a general hospital with regional community health service centers. This team provides personnel and technical support for OA diagnosis and management, with clearly defined roles and responsibilities for each member (Table 1). The foundational characteristics of this team are summarized below.

The team was established under the overall design of Professor Yu Dehua, the discipline leader of general practice at Yangpu Hospital Affiliated to Tongji University. Following thorough coordination by the hospital's social services department and specialized discussions with leaders of community health service centers, project liaisons and core general practitioners were identified. In terms of medical-educational collaboration, specialists in orthopedics, rehabilitation, and psychology provide targeted training and ongoing guidance to community

physicians through community clinics, remote consultations, and two-way referral arrangements. For research collaboration, the general-specialty management of community OA patients was formalized as a joint community project, including initial surveys and interviews to assess disease awareness, current treatment status, and needs among community OA patients, as well as evaluation of the effectiveness of collaborative management strategies.

1.1 Leveraging a Three-Dimensional Integrated Healthcare System

Yangpu Hospital Affiliated to Tongji University, as a tertiary general hospital in the region, has established a "key weak discipline of Shanghai's health system" in general practice, operating both general practice wards and outpatient clinics dedicated to clinical care, workforce development, scientific research, and community engagement. The hospital's Community Cooperation Joint Office facilitates in-depth collaboration with community health service centers across medical, educational, and research dimensions, building upon an established foundation of regional three-dimensional coordinated healthcare models based on hierarchical diagnosis and treatment [5]. The OA collaborative care team was built upon this institutional framework.

1.2 Facilitating General Practice Coordination in General Hospitals

General practitioners in general hospitals within the collaborative team possess more systematic and in-depth clinical research thinking, enabling them to better serve as liaisons and coordinators between general hospitals and community health centers, as well as between general practice and specialty care. Their specific roles include: (1) serving as team leaders responsible for the overall design, management, and implementation of collaborative projects; and (2) mastering comprehensive management strategies for OA patients to provide timely feedback and resolve implementation issues. This coordination is possible because general practitioners inherently hold multiple roles as team managers, educators, and coordinators [6], and can better integrate university teaching resources and specialty expertise to understand community healthcare needs through various engagement activities.

1.3 Refining Multidisciplinary Division of Labor

Research demonstrates that multidisciplinary involvement is a crucial management strategy for OA, typically encompassing general practice, orthopedics, rehabilitation, and other specialties [7-8]. The research team therefore included experts from these disciplines plus nutritionists and psychologists to enrich and strengthen the team's composition. Notably, previous management approaches often overlooked the correlation between mental health and symptoms in OA patients, so including psychologists reflects the "bio-psycho-social medical model" in multidisciplinary OA management [9]. Given that both general hospitals and community health centers typically have general practice, traditional Chinese medicine, and rehabilitation departments, and considering stakeholder analyses

of Shanghai's hierarchical diagnosis and treatment implementation that identified multiple facilitators and barriers from providers, patients, and organizational perspectives [10], the team designated community general practitioners as the primary providers for routine OA patient management. When refractory cases require further investigation, surgery, or treatment adjustment, specialists from the tertiary general hospital provide technical support primarily through consultation and guidance, with flexibility for discussion and exchange as needed.

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2. Optimizing Community OA Diagnosis and Management Protocols

The research team referenced relevant guidelines [11] to develop and implement an evidence-based, optimized hierarchical diagnosis and treatment process for community OA (Figure 1 [Figure 1: see original paper]), validating its effectiveness. Community feedback indicated that while severe pain and previous medical encounters can facilitate patient visits, general hospitals present challenges such long travel distances and cumbersome processes, whereas community hospitals suffer from low first-visit rates and treatment discontinuation due to suboptimal outcomes [12]. The established process therefore emphasizes evidence-based, collaborative tiered management to enhance community treatment efficacy while providing adequate specialist support to overcome these barriers.

2.1 Establishing Evidence-Based Hierarchical Management

Before initiating treatment, OA patients must be assessed for disease severity and stratified. The team integrated relevant guidelines and research findings [11-13] to classify patients into low-, medium-, high-, and very high-risk groups based on WOMAC scores, comorbidities, and treatment risks. Management strategies include: (1) community-based comprehensive management (pharmacological and non-pharmacological) for low- and medium-risk patients; and (2) referral of high-risk or treatment-resistant patients to general hospitals for escalated assessment, upgraded treatment protocols, and necessary surgical interventions.

2.2 Evaluating Process Effectiveness

Comparative evaluation of the collaborative multidisciplinary management approach versus conventional community management, as well as pre-post intervention comparisons among common OA patients, demonstrated significant improvements in pain, OA severity, and body mass index [13]. Importantly, the comprehensive management protocol included psychological assessment and support. From a psychosomatic perspective, OA progression is influenced by psychological and social factors, and psychological interventions help improve negative

emotions in OA patients [14]. The study also found that collaborative management enhanced health literacy and quality of life [13], though further research is needed to refine the integrated psychological health promotion component.

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3. Developing an OA Management Mobile Application

To support the optimized management protocols, the team developed an information management software for OA collaborative care. The mobile APP serves both clinicians in diagnosis and follow-up and patients in disease awareness and self-management, embodying the patient-centered philosophy of general practice and enhancing patient engagement in care decisions.

Key features include: (1) modules for screening, assessment, diagnosis, referral, and follow-up planning, with alerts for patients at different risk levels (Figure 2 [Figure 2: see original paper]A, 2B), facilitating standardized community care and enabling collaborative development of individualized treatment and follow-up schedules; (2) doctor-patient communication functions including medical history upload and messaging (Figure 2C), plus health education 推送 to promote self-management; (3) integration with osteoporosis management (another common cause of bone pain) and linkage to the hospital's online appointment and chronic disease management systems (Figure 2D); and (4) dedicated backend archiving of all collaborative care data to enable comprehensive recording, retrieval, analysis, and sharing for research and quality improvement. While regional two-way referral platforms have demonstrated benefits in reducing costs and improving patient flow, they also face challenges such as communication barriers and data inconsistencies [15]. The OA management APP addresses these issues through integrated data sharing and communication functions, though limitations remain regarding compatibility across different mobile devices and elderly patients' unfamiliarity with smartphone technology.

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4. Comprehensive Publicity for OA Collaborative Management

The publicity strategy employs multiple formats across various settings to address community concerns about OA development and treatment while emphasizing risk factor education and prevention. Drawing from successful "hospital-community-family" triadic health education models for cardiovascular diseases [16], the OA program implements: (1) risk assessment and educational outreach during community health screenings to identify high-risk individuals and emphasize the importance of diagnosis and management; (2) promotional materials (banners, brochures) in outpatient and inpatient areas of both general hospitals and community centers, with each clinical encounter serving as an educational opportunity about multidisciplinary disease management; (3) multimedia

health education through hospital and department WeChat accounts, featuring OA-related articles and videos, participation in health education competitions, community outreach events, and publication of general practice-focused educational materials; and (4) academic dissemination through publications and conference presentations sharing experiences and insights from the collaborative OA management model.

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5. Establishing a Disease-Specific Case Database and General Practice Curriculum

5.1 Building an OA Case Repository

The mobile APP enables comprehensive, dynamic collection of multidimensional patient data, facilitating the establishment of a prospective OA case database with continuous follow-up. The system dynamically stratifies patient risk levels, allowing extraction, sharing, and discussion of complex cases involving comorbidities or complications. This repository provides evidence-based support for disease progression and tiered management while generating teaching cases with distinctive general practice characteristics.

5.2 Developing a General Practice Curriculum

Community OA management involves recognizing and managing bone pain as an undifferentiated condition, particularly in elderly patients with multiple chronic diseases. The curriculum built upon these cases therefore encompasses not only chronic disease management strategies but also training in undifferentiated conditions, multimorbidity, and doctor-patient communication. Courses are delivered through problem-based learning (PBL), case-based learning (CBL), outpatient demonstrations, and collaborative teaching ward rounds in national continuing medical education programs, Tongji University's graduate general practice courses, and residency training. Evaluation of a national continuing education workshop showed that 73.8% of 200 participants demonstrated improved general practice clinical thinking, with 78.0% showing substantial enhancement in overall competency.

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6. Summary and Outlook

Grounded in the core principles of general practice thinking—systematic perspective, holistic view, and person-centered care—the "Six Ones" framework demonstrates substantial potential for comprehensive, in-depth collaboration and mutual advancement between general practice and specialty care across clinical, educational, and research dimensions. Optimizing and integrating team resources, technical support, and information systems for hierarchical disease

management effectively promotes patient physical and mental well-being, offering valuable insights for refining general-specialty collaborative models in community chronic disease management.

Study limitations include the need to expand the case database with more patient data and the lack of in-depth analysis of performance metrics, resource allocation, and applicability to other chronic diseases. Future work will extend the "Six Ones" framework to additional common chronic diseases in community settings and further evaluate cost-effectiveness beyond clinical, educational, and research outcomes.

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Conflict of Interest Statement: The authors declare no conflicts of interest.

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