Postprint: Current Status and Influencing Factors of Knowledge Sharing Among Family Doctor Teams in County Medical Consortiums

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Abstract

Background Knowledge sharing among family doctor teams within county-level medical communities represents an important form of interaction between county, township, and village institutions, playing a significant role in enhancing regional medical and health service quality and improving residents' health levels.

Objective To investigate the current status of knowledge sharing among family doctor teams within county-level medical communities and explore its influencing factors, thereby providing a scientific basis for promoting internal knowledge management and capacity building within family doctor teams.

Methods From October to December 2022, two county-level medical communities in Hubei Province were selected using convenience sampling, and 381 family doctor teams under these communities were chosen as study subjects through multistage sampling. A self-developed team knowledge sharing questionnaire was employed to assess the teams' knowledge sharing levels, encompassing two dimensions: explicit knowledge sharing and tacit knowledge sharing. Multiple linear stepwise regression analysis was utilized to explore the influencing factors of knowledge sharing among family doctor teams.

Results The total knowledge sharing score of family doctor teams within county-level medical communities was $(27.84\$\pm3.84), with average scores of (5.51\pm0.79) and (5.61\pm\$0.77)$ for explicit knowledge sharing and tacit knowledge sharing dimensions, respectively. Multiple linear stepwise regression analysis revealed that educational background heterogeneity index, team leader role, team communication intensity, platform carrier usage level, team activity intensity, and members' learning initiative were significant influencing factors of knowledge sharing scores among family doctor teams within county-level medical communities ($P<0.05$).

Conclusion Internal knowledge sharing among family doctor teams within county-level medical communities is at a satisfactory level, with room for improvement. Recommendations include promoting knowledge sharing among family doctor team members by increasing the frequency of team activities, enhancing team communication capabilities, implementing relevant incentive measures, and expanding knowledge sharing channels.

Full Text

Study on the Current Status and Influencing Factors of Knowledge Sharing Among Family Doctor Teams Under the County Medical Community

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Abstract

Background

Knowledge sharing among family doctor teams under the county medical community represents a crucial form of interaction between county- and township-level institutions, playing a vital role in enhancing regional healthcare service quality and improving population health outcomes.

Objective

To investigate the current status of knowledge sharing within family doctor teams under the county medical community, explore its influencing factors, and provide an evidence-based foundation for promoting knowledge management and capacity building within these teams.

Methods

From October to December 2022, we employed convenience sampling to select two county medical communities in Hubei Province with relatively consistent policy environments, followed by multistage sampling to recruit 381 family

doctor teams. All members of the selected teams were surveyed using a self-administered team knowledge-sharing questionnaire. The questionnaire assessed knowledge sharing levels across two dimensions: explicit and implicit knowledge sharing. Multivariate linear stepwise regression analysis was conducted to identify influencing factors.

Results

The total knowledge sharing score for family doctor teams under the county medical community was (27.84$\pm$3.84).$Meanscoresforexplicitandimplicitknowledgesharingdimensionswere$(5.51
respectively. Stepwise regression analysis revealed that educational heterogeneity index, team leader effectiveness, team communication intensity, platform utilization level, team activity intensity, and member learning motivation significantly influenced knowledge sharing scores (P<0.05).

Conclusion

Knowledge sharing within family doctor teams under the county medical community is at a good level with room for improvement. Recommendations include increasing team activity frequency, enhancing communication intensity, implementing incentive measures, and expanding knowledge sharing channels to promote knowledge sharing among team members.

Keywords: County medical community; Family doctor team; Knowledge sharing in team; Team management; Root cause analysis

Introduction

Within county medical communities, technical support between county, township, and village-level institutions has become the primary content of inter-institutional interaction, with knowledge sharing emerging as an important modality for personnel engagement [1]. Family doctor teams serve as the main providers of basic medical and public health services within county medical communities, primarily comprising township health center staff, village clinic personnel, and county hospital specialists. Team members collaborate to deliver contracted family doctor services, exchanging knowledge and information to better serve residents, making knowledge sharing a critical mechanism for improving service quality and efficiency. Team knowledge sharing refers to multi-channel knowledge exchange and discussion among members that maximizes the utility value of knowledge through technical and experiential communication [3]. Based on knowledge attributes, knowledge sharing can be divided into explicit knowledge sharing (documented knowledge such as protocols, guidelines, and manuals) and implicit knowledge sharing (technical skills and experiences that are difficult to document) [4]. Through knowledge exchange, transfer, and sharing, county medical communities can form knowledge asset chains and avoid

knowledge resource waste [5]. Internal knowledge sharing within family doctor teams constitutes an essential component of county medical community knowledge sharing and plays a significant role in enhancing primary healthcare service capacity and quality. Existing research on knowledge sharing in healthcare has primarily focused on hospital team knowledge sharing [6], doctor-patient knowledge sharing [7], and inter-institutional knowledge sharing within medical communities [1,8], with relatively few studies examining knowledge sharing within family doctor teams. Investigating knowledge sharing in family doctor teams under county medical communities can provide insights for optimizing internal team operations from social cognition and team interaction perspectives. This study examines family doctor teams to explore current knowledge sharing levels and influencing factors, offering a scientific basis for improving team knowledge management and optimizing communication mechanisms.

Methods

1.1 Survey Subjects

From October to December 2022, we used convenience sampling to select two integrated county medical communities with consistent policy environments in Hubei Province. Random sampling was then used to select 24 township health centers within these communities. From each health center, we sampled family doctor teams at 60% of the total number, considering the geographic distribution of administrative villages. All members of the selected teams were surveyed. A total of 1,587 questionnaires were distributed and 1,587 valid questionnaires were recovered, yielding 381 family doctor teams. Inclusion criteria were: (1) team established and operating for >1 year; (2) response rate $ $2/3 of team members; (3) passing internal consistency checks. Informed consent was obtained from all participants before data collection.

1.2 Survey Method

We used a self-administered questionnaire for family doctor team members comprising four sections: (1) Member demographics: gender, age, education, professional background, and employment type; (2) Team characteristics: establishment duration, team size, composition, number of contracted residents, and personnel turnover in the past 3 years; (3) Knowledge sharing-related factors: team leader effectiveness, communication intensity, platform utilization, activity intensity, cooperation satisfaction, management satisfaction, learning motivation, and learning gains, all measured on 3-point scales; (4) Team knowledge sharing: adapted from the scale developed by Bock et al. [9], including 5 items across two dimensions (2 for explicit, 3 for implicit knowledge sharing), using a 7-point Likert scale with higher scores indicating better knowledge sharing. The scale demonstrated good reliability in this study (Cronbach's α=0.98).

1.3 Quality Control

Before the formal survey, we conducted a pilot test with family doctor teams from two township health centers under an integrated county medical community in Hubei Province. Feedback from the pilot was used to revise and improve the questionnaire. The formal survey was administered anonymously on-site with standardized instructions, completion guidelines, and uniform responses to potential questions. During data processing, we performed logical checks and excluded questionnaires with obvious response patterns or >20% missing items.

1.4 Statistical Analysis

This study was conducted at the team level, requiring aggregation of individual-level measurements. We used within-group agreement (Rwg) and intraclass correlation (ICC) indices to test whether individual data could be aggregated to the team level [10]. Individual data passing these tests were aggregated to the team level using averaging. Heterogeneity in member demographics was calculated using the Blau index for categorical variables (gender, education, professional background, employment type) with the formula 1- $(Pm)^2$, where Pm represents the proportion of members in category m. The Blau index ranges [0,1], with lower values indicating less heterogeneity. For continuous variables like age, we calculated the coefficient of variation (SE/mean), where larger values indicate greater heterogeneity [11].

Data were analyzed using SPSS 26.0. Categorical data are presented as frequencies and percentages. Normally distributed continuous data are presented as (mean±SD). Two-group comparisons used t-tests, while multi-group comparisons used one-way ANOVA. Influencing factors of team knowledge sharing were analyzed using multiple linear stepwise regression. Statistical significance was set at $P<0.05$.

Results

2.1 Data Aggregation Results

The average Rwg values for knowledge sharing and related factors ranged from 0.71 to 0.78 (median: 0.75-0.77), exceeding the recommended threshold of 0.7. ICC(1) values ranged from 0.20 to 0.30, above the critical value of 0.12, while ICC(2) values ranged from 0.52 to 0.64, exceeding the critical value of 0.5. All variables met the criteria for aggregation from individual to team level.

2.2 Team Characteristics and Knowledge Sharing Status

Among 1,587 family doctor team members, 722 (45.49%) were male and 865 (54.51%) female, with a mean age of (43.7$±$11.2) years. Educational backgrounds were primarily high school/technical secondary school or below (638, 40.20%), followed by junior college (594, 37.43%), and bachelor's degree (347, 21.87%). Professional backgrounds included Western clinical medicine (891,

56.14%), nursing (477, 30.06%), preventive medicine (53, 3.34%), and traditional Chinese medicine (52, 3.28%). Employment types were mainly permanent staff (827, 52.11%) and contract workers (347, 21.87%).

Team heterogeneity indices were: gender (0.37$±0.16), age(0.24±0.10), $education$(0.49±0.15), $professionalbac$ Regarding team functioning: 200 teams (52.5%) had strong team leader effectiveness, 186 (48.8%) had high communication intensity, 200 (52.5%) had high platform utilization, 180 (47.2%) had high activity intensity, 188 (49.3%) had high cooperation satisfaction, 187 (49.1%) had moderate management satisfaction, 203 (53.3%) had high member learning motivation, and 188 (49.3%) had high learning gains.

The total knowledge sharing score was (27.84$±3.84). $Explicitknowledgesharingtotaled$(11.01±1.57)$withamea$

2.3 Comparison of Knowledge Sharing Scores

Significant differences in total knowledge sharing scores and dimensional scores were found across teams with different establishment durations, compositions, personnel turnover, team leader effectiveness, communication intensity, platform utilization, activity intensity, cooperation satisfaction, management satisfaction, learning motivation, and learning gains (P<0.05). No significant differences were observed based on team size or number of contracted residents (P>0.05) .

2.4 Multiple Linear Stepwise Regression Analysis

Using total knowledge sharing score, explicit knowledge sharing score, and implicit knowledge sharing score as dependent variables (entered as actual values), we performed stepwise linear regression (α-entry=0.05, α-removal=0.10) with team heterogeneity variables and statistically significant variables from Table 1 as independent variables. Results showed that educational heterogeneity, team leader effectiveness, communication intensity, platform utilization, activity intensity, and member learning motivation significantly influenced total knowledge sharing scores (P<0.05). Educational heterogeneity, communication intensity, platform utilization, activity intensity, and learning motivation influenced explicit knowledge sharing scores (P<0.05). Educational heterogeneity, team leader effectiveness, communication intensity, platform utilization, activity intensity, cooperation satisfaction, and learning motivation influenced implicit knowledge sharing scores (P<0.05) .

Discussion

3.1 Current Status of Knowledge Sharing in Family Doctor Teams

Our findings indicate that family doctor teams under county medical communities achieved a total knowledge sharing score of (27.84$±3.84), $withameanitemscoreof$(5.57±0.77), $representin$ $midlevelonthe$1−7$scale.Structurally$, $explicitknowledgesharing$(5.51±0.79)$scoredslightlylowerthanimplicitk$ suggesting members perceived greater implicit knowledge sharing. This differs from findings in research teams where explicit knowledge sharing was more

prominent [12]. Possible explanations include the need to address complex individualized problems in medical practice, which relies more heavily on experiential skills, quality control, and coordination capabilities—forms of implicit knowledge [13]. Research also indicates that active communication, cooperation, information sharing with senior physicians, and engagement in learning are essential competencies for high-quality contracted services [14].

In terms of content, explicit knowledge primarily refers to team work systems, service protocols, and clinical guidance on disease diagnosis and treatment. Implicit knowledge mainly includes clinical skills, public health service competencies, doctor-patient communication techniques, and comprehensive disease assessment abilities. Regarding forms, knowledge sharing occurs primarily through online platforms, supplemented by offline activities including rural supervision, clinical guidance, outreach clinics, training sessions, and village doctor meetings.

3.2 Impact of Team Heterogeneity on Knowledge Sharing

Results show that teams with lower educational heterogeneity demonstrated higher knowledge sharing levels. From a social categorization perspective, demographic similarities in gender, age, and education serve as primary cues for members to differentiate themselves and form subgroups. Members more readily identify with similar others, preferentially interacting within their subgroup, reducing communication across subgroups, creating team faultlines that ultimately impair performance [15]. Educational differences trigger social categorization processes where similarly educated members resonate more and interact frequently in knowledge utilization behaviors. Larger educational gaps may reduce willingness to establish exchange relationships with out-subgroup members [16], lowering knowledge transfer efficiency. Our surveyed teams showed relatively high educational heterogeneity, necessitating enhanced communication and activities to break down subgroup barriers, facilitate knowledge flow and perspective exchange, and improve overall diagnostic and treatment capabilities. Team leaders and healthcare administrators should monitor and intervene in team knowledge sharing when necessary.

3.3 Impact of Team Interaction Factors on Knowledge Sharing

Team communication and activity intensity positively influenced knowledge sharing. Communication intensity had a direct positive effect, which is essential given that team members are distributed across township health centers and village clinics [17]. Beyond joint rural services, daily communication typically occurs through online platforms like WeChat groups for scheduling, preliminary diagnosis, and medication guidance. More frequent and intense communication accelerates knowledge transfer. According to the family doctor team effectiveness model [18], good communication enhances member engagement, creates positive team climate, and facilitates knowledge sharing. Teams with moderate to high activity intensity showed higher knowledge sharing than low-activity

teams. Activities mainly included rural outreach services, free clinics, organizing team member knowledge training, lectures, and regular meeting discussions. Increased face-to-face interaction time and joint service delivery enable demonstration and guidance on chronic disease management, traditional Chinese medicine techniques, and clinical nursing skills, promoting implicit knowledge sharing through practical demonstration [19].

Member learning motivation and cooperation satisfaction also significantly impacted knowledge sharing. Teams with higher learning motivation showed greater knowledge sharing. Research indicates that attitudes toward knowledge sharing influence sharing intentions more than subjective norms [20]. From the knowledge recipient's perspective, members must acquire relevant knowledge and skills to match job requirements, making peer knowledge exchange a convenient pathway for learning and application. From the knowledge sharer's perspective, strong learning motivation in recipients enhances the sharer's willingness, particularly for implicit knowledge requiring demonstration rather than verbal instruction. Cooperation satisfaction positively influenced implicit knowledge sharing, reflecting members' perceptions of trust, interpersonal relationships, and supportive climate. Good cooperation saves medical resources and improves service quality [21]; higher satisfaction increases willingness to share knowledge, especially implicit knowledge that requires demonstration and is otherwise difficult to transfer without proper channels.

3.4 Impact of Team Management Factors on Knowledge Sharing

Platform utilization significantly affected knowledge sharing—higher usage correlated with better sharing. County medical communities' knowledge management systems and medical record databases provide technical support [6]. Many regions have enhanced knowledge sharing through integrated rural systems, smart information platforms, and standardized training. Platforms including telephone, WeChat, and cloud systems enable convenient remote communication, allowing village doctors to consult senior family doctors promptly and nurses to provide guidance on care procedures. Family doctors can access patient progress and medication information after referrals, facilitating knowledge flow across space constraints.

Team leader effectiveness, particularly for implicit knowledge sharing, significantly influenced knowledge sharing. In county medical communities, team leaders are typically family doctors who serve as primary knowledge sharers [22]. Effective leaders who actively share knowledge and skills create positive discussion climates, enhance trust, and stimulate sharing motivation. Competent leaders organize rural visits, case discussions, and training to facilitate experience exchange. As primary knowledge sharers, they provide hands-on teaching, analyze typical cases, and guide team members in transferring implicit knowledge. Inclusive leadership in medical teams reduces hierarchical distance and promotes knowledge sharing [23]; similarly, inclusive team leaders in family doctor teams reduce status barriers, making members more willing to

communicate.

3.5 Recommendations for Enhancing Knowledge Sharing

As knowledge-intensive groups, family doctor teams can maximize knowledge resource utilization through internal sharing. Valuing and effectively using these resources is crucial for optimizing family doctor services. To improve knowledge sharing quality and efficiency, we recommend: (1) Increasing team activity frequency and communication intensity to promote close interaction, enhance understanding and trust, reduce social categorization effects from educational differences, and facilitate explicit and implicit knowledge transfer among members. (2) Stimulating intrinsic motivation for knowledge sharing through team-based assessment and incentives to enhance cooperation initiative and team cohesion, improve cooperation satisfaction, and implement knowledge sharing incentives to encourage active sharing. (3) Maximizing team leader effectiveness by not only guiding leaders to share knowledge but also incentivizing them to assume management responsibilities and foster active communication and mutual learning. (4) Expanding knowledge sharing channels by improving information system construction and application, leveraging county medical community advantages to provide expert technical assistance, clinical skills training, and professional development tailored to team needs, thereby enhancing the relevance and depth of knowledge sharing.

Conclusion

This study investigated knowledge sharing among family doctor teams in Hubei Province's county medical communities, revealing multiple influencing factors: team heterogeneity (primarily educational), team interaction (communication intensity, activity intensity, learning motivation, cooperation satisfaction), and team management (platform utilization, team leader effectiveness). Health administrators should prioritize increasing team activities and communication, implement incentives, maximize team leader roles, and expand sharing channels to promote knowledge sharing and improve service quality. Limitations include: (1) Self-reported data aggregated from individual to team level may involve reporting and aggregation bias; (2) Cross-sectional design precludes causal inference; (3) Convenience sampling limits representativeness. Future research will conduct comprehensive longitudinal studies with expanded scope to accumulate evidence.

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