Postprint: Study on Primary Care Physicians'Behavioral Intention for Integrated Chronic Disease Treatment and Prevention Services and Its Influencing Factors

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Abstract

Background: Chronic diseases have become a major public health concern in China. Given their prolonged course and incurability, implementing full-cycle integrated medical-preventive services represents a critical strategy for prevention and treatment. However, medical services and public health services in China currently remain fragmented, with a persistent gap in the provision of integrated medical-preventive services. Primary care physicians serve as crucial providers of integrated medical-preventive services, and their behaviors during service delivery directly impact the quality of healthcare received by patients. Therefore, investigating the behavioral intentions of primary care physicians regarding chronic disease integrated medical-preventive services is of paramount importance.

Objective: To examine the current status of behavioral intentions toward chronic disease integrated medical-preventive services among primary care physicians in Shandong Province and to identify their influencing factors, thereby providing evidence for advancing integrated medical-preventive initiatives at the primary care level.

Methods: This cross-sectional survey was conducted in Shandong Province in August 2023. Using multi-stage stratified random sampling based on geographical location and economic development status, Yantai, Weifang, and Liaocheng were selected from the eastern, central, and western regions of Shandong Province, respectively. Within each prefecture-level city, one district and one county/county-level city were randomly selected as sampling sites. A total of 481 primary care physicians were surveyed using a self-developed questionnaire titled "Primary Care Physicians' Provision of Chronic Disease Integrated

Medical-Preventive Services Survey." The instrument was refined through expert consultation and comprised four sections: general demographic information, integrated medical-preventive services cognition assessment, primary care institution environment evaluation, and behavioral intention assessment for providing integrated medical-preventive services. Influencing factors were analyzed using ^{2} tests and binary logistic regression models.

Results: 83.16% of primary care physicians demonstrated high-level behavioral intentions to provide chronic disease integrated medical-preventive services. Binary logistic regression analysis revealed that being female (OR=2.149), having a junior college education (OR=2.736), possessing higher cognitive levels regarding integrated medical-preventive services (OR=3.549), and working in institutions with better environmental conditions (OR=8.264) were significantly associated with stronger behavioral intentions ($P<0.05$).

Conclusion: Primary care physicians currently exhibit strong behavioral intentions regarding chronic disease integrated medical-preventive services. Nevertheless, it is imperative to establish and refine assessment and incentive mechanisms, develop rational policy documents and service guidelines, enhance physicians' cognitive understanding through multiple modalities, allocate special funds for integrated medical-preventive services to optimize primary care institutional environments, and increase training frequency for targeted populations.

Full Text

Study of Behavioral Intention and Influencing Factors of Integrated Medical and Preventive Care Provided by Grassroots Doctors for Patients with Chronic Diseases

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Abstract

Background: Chronic diseases have become a significant public health issue in China. Due to their prolonged course and difficulty in achieving a cure, it is essential to promote full-life-cycle integrated medical and preventive care for prevention and treatment. However, medical services and public health services in China remain separated, and there is still a gap in the supply of integrated medical and preventive care. Grassroots doctors are key providers of such services, and their behavior directly impacts the quality of care patients receive. Therefore, it is crucial to explore the behavioral intention of grassroots doctors in providing integrated medical and preventive care for chronic diseases.

Objective: This study investigates the current status and influencing factors of behavioral intention among grassroots doctors in Shandong Province regarding integrated medical and preventive care for chronic diseases, aiming to provide evidence for further promoting grassroots integration of medical and preventive services.

Methods: In August 2023, we conducted a survey in Shandong Province using multi-stage stratified random sampling. Based on geographic location and economic development level, we selected Yantai (eastern), Weifang (central), and Liaocheng (western) cities. From each city, one district and one county/county-level city were randomly selected as sample areas. A total of 481 grassroots doctors were surveyed using a self-developed questionnaire titled "Questionnaire on Integrated Medical and Preventive Care Services for Chronic Diseases Provided by Grassroots Doctors," which was refined through expert consultation. The questionnaire comprised four sections: general demographic information, cognitive assessment of integrated medical and preventive care, environmental evaluation of integrated services at grassroots medical institutions, and behavioral intention assessment. Data were analyzed using chi-square tests and binary logistic regression models.

Results: Overall, 83.16% of grassroots doctors demonstrated high-level behavioral intention to provide integrated medical and preventive care for chronic diseases. Binary logistic regression analysis revealed that female doctors (OR=2.149), those with junior college education (OR=2.736), those with higher cognitive levels regarding integrated care (OR=3.549), and those working in institutions with better service environments (OR=8.264) showed significantly stronger behavioral intention ($P<0.05$).

Conclusion: Grassroots doctors currently exhibit strong behavioral intention to provide integrated medical and preventive care for chronic diseases. However, it remains necessary to establish robust assessment and incentive mechanisms, develop reasonable policy documents and service guidelines, enhance doctors' awareness through multiple approaches, allocate dedicated funds to optimize the institutional environment at grassroots medical facilities, and increase training opportunities for specific populations.

Keywords: chronic disease; integrated medical and preventive care; grassroots doctors; behavioral intention; Shandong Province; binary logistic regression model; root cause analysis

Introduction

With socioeconomic development, lifestyle changes, and deepening population aging, chronic diseases have become a major public health problem affecting residents' health in China. Due to their prolonged course, recurrent nature, and difficulty in cure, implementing full-life-cycle integrated medical and preventive care represents a critical strategy for chronic disease prevention and treatment. However, China's healthcare system has long suffered from a separation between medical services and public health services, creating a gap in the supply of integrated care. Grassroots doctors serve as important providers of integrated medical and preventive care, and their behavior directly influences the quality of healthcare services patients receive. Consequently, investigating the behavioral intention of grassroots doctors in providing chronic disease integrated services is essential.

Current research on grassroots doctors' behavioral intentions has primarily focused on specific medical service behaviors, such as essential drug prescribing behavior or two-way referral intentions. Studies in the integrated care domain have mostly concentrated on doctors' awareness, current work status, and influencing factors, with only limited research examining behavioral intentions, often using simplistic measurements that fail to capture the multifaceted nature of integrated care behavioral intentions. This study aims to analyze the current status of grassroots doctors' behavioral intentions in providing chronic disease integrated medical and preventive care and identify its influencing factors, thereby providing evidence and references for promoting grassroots integrated care and policy formulation.

1. Subjects and Methods

1.1 Study Subjects This survey was conducted in Shandong Province in August 2023 using multi-stage stratified random sampling. Based on geographic location and economic development level, we selected Yantai City (eastern region), Weifang City (central region), and Liaocheng City (western region). From each city, one district and one county/county-level city were randomly selected as sample areas. Each district randomly selected three street community health service centers or township health centers, while each county/county-level city randomly selected four township health centers or street community health centers as sample units. Grassroots doctors working at these institutions on the survey day were gathered, and approximately 15 village doctors/community

doctors from each jurisdiction were randomly selected for the questionnaire survey. A total of 537 questionnaires were distributed, and 481 valid questionnaires were collected after excluding unreturned and incomplete responses, yielding an effective response rate of 89.6%.

Inclusion criteria: Clinical doctors from grassroots medical institutions, including community health service centers (stations), township health centers, and village clinics.
Exclusion criteria: Public health physicians, nurses, and other personnel not directly providing medical services.

This study was approved by the Ethics Committee of the School of Public Health, Shandong University (Approval No.: LL2022112).

1.2 Survey Instruments Researchers developed the "Questionnaire on Integrated Medical and Preventive Care Services for Chronic Diseases Provided by Grassroots Doctors," which was refined through expert consultation. The questionnaire comprises four main sections:

1. **General Demographics:** Including gender, age, marital status, education level, years of medical practice, and professional technical title.
2. **Cognitive Assessment of Integrated Medical and Preventive Care:** Assessing grassroots doctors' subjective understanding of integrated care content, effectiveness, and importance. This section, adapted from existing literature, contains 12 items.
3. **Environmental Evaluation of Integrated Services at Grassroots Medical Institutions:** Assessing doctors' subjective evaluation of their institution' s emphasis on integrated care, resource supply, information systems, and management mechanisms. Based on the WHO' s six health system building blocks (service delivery, human resources, information systems, essential medicines, health financing, and governance) and relevant literature, this section contains 13 self-designed items.
4. **Behavioral Intention Assessment:** Evaluating doctors'motivation and willingness to provide continuous, coordinated services including prevention, screening, diagnosis, treatment, referral, follow-up, health education, and health management for chronic disease patients. Based on the "prevention, treatment, and management" service model for chronic diseases and referencing the National Essential Public Health Services Specifications (3rd Edition), National Primary Diabetes Prevention and Management Manual (2022), and National Primary Hypertension Prevention and Management Manual (2020), this section contains 13 items.

All three assessment questionnaires (cognitive, environmental, and behavioral intention) used a 5-point Likert scale ranging from "strongly disagree" (1) to "strongly agree" (5). Scores <4 were classified as low-level, while scores $ $4 were classified as high-level. Based on this, each questionnaire used 80% of the total score as the threshold to differentiate high-level from low-level groups. The

Cronbach' s α coefficients for the three questionnaires were 0.938, 0.949, and 0.961 respectively, indicating good reliability and validity.

1.3 Statistical Analysis A database was established using EpiData 3.1 software, and all questionnaire data were double-entered and checked for consistency to ensure accuracy and standardization. Data analysis was performed using SPSS 25.0 statistical software. Categorical data were expressed as percentages, and continuous data as ($\bar{x}\pm s$). Chi-square tests were used for comparisons between groups, and binary logistic regression was used to analyze influencing factors of behavioral intention. $P<0.05$ was considered statistically significant.

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2. Results

2.1 Demographic Characteristics A total of 481 grassroots doctors were surveyed. Among them, 271 were female (56.34%); 178 were aged 40-49 years (37.01%); 419 were married (87.11%); 216 had bachelor' s degree or higher (44.91%); 152 had 20-29 years of medical practice (31.6%); 196 held primary professional titles (40.75%), while 161 had no professional title (33.47%); 245 had monthly income of 2,500-4,999 yuan (23.08%), and 125 earned less than 2,500 yuan (25.99%); 264 received training once within six months (54.89%); 270 worked in township-level institutions (56.13%); 270 had high-level cognitive assessment of integrated care (56.13%); and 257 rated their institution' s integrated service environment as high-level (53.43%). See Table 1 .

2.2 Behavioral Intention Status As shown in Table 2 , the average behavioral intention score for providing chronic disease integrated medical and preventive care was 57.28 points (total possible score: 65), with average item scores ranging from 4.28 to 4.49. A total of 400 doctors (83.16%) demonstrated high-level behavioral intention, while only 81 (16.84%) showed low-level intention. The highest-scoring items were D4 and D9, while the lowest-scoring items were D1 and D6.

2.3 Univariate Analysis Significant differences in behavioral intention were observed across gender, age, education level, years of practice, professional technical title, monthly income, training frequency within six months, institution location, cognitive level of integrated care, and institutional environment evaluation ($P<0.05$). See Table 3 .

2.4 Multivariate Analysis Using behavioral intention (low level=0, high level=1) as the dependent variable, and personal characteristics, cognitive level, and institutional environment as independent variables, binary logistic regression analysis revealed that gender, education level, cognitive level of integrated care, and institutional environment significantly influenced behavioral intention ($P<0.05$). Specifically, female doctors showed stronger intention than male

doctors (OR=2.149); doctors with junior college education showed stronger intention than those with high school/technical secondary education or below (OR=2.736); higher cognitive levels were positively associated with behavioral intention (OR=3.549); and better institutional environments showed a strong positive effect (OR=8.264). See Table 4 .

3. Discussion

3.1 Relatively Strong but Improvable Behavioral Intention The study demonstrates that grassroots doctors generally exhibit high-level behavioral intention to provide integrated medical and preventive care for chronic diseases, which is conducive to further implementation of integrated services. Doctors scored particularly high on items related to upward referral, indicating strong referral intentions consistent with previous research. However, scores were relatively lower for items concerning the necessity of integrated services and personalized care provision, suggesting room for improvement. This may be attributed to the lack of appropriate assessment and incentive systems, as well as unclear and non-standardized service protocols, which reduce doctors' willingness to provide additional integrated services. To address this, comprehensive assessment and incentive mechanisms should be established to enhance doctors' motivation and initiative. Additionally, reasonable policy documents and service guidelines should be developed to standardize service procedures and provide clear guidance for grassroots doctors.

3.2 Positive Effect of Cognitive Level on Behavioral Intention Higher cognitive levels regarding integrated medical and preventive care were associated with stronger behavioral intention, consistent with existing research. This is likely because doctors with better understanding have more positive overall evaluations and stronger motivation to provide integrated services. Notably, doctors scored relatively low on the item "I have a comprehensive understanding of integrated medical and preventive care services," possibly due to inadequate cross-disciplinary knowledge and skills, misconceptions about integrated care, and the fact that integrated care is still in its exploratory phase. Therefore, efforts should be made to strengthen publicity and training on integrated services, particularly in health education and chronic disease management skills. Within the context of comprehensive medical consortium development, cooperation between grassroots institutions and leading hospitals should be promoted to create effective learning platforms. Fundamentally, medical education reforms should break professional boundaries to integrate clinical and preventive services.

3.3 Positive Effect of Institutional Environment on Behavioral Intention Better institutional service environments were significantly associated with stronger behavioral intention to provide chronic disease integrated care. Previous research has confirmed that institutional environments, particularly

management mechanisms and information system development, positively influence doctors' service provision intentions. The surveyed doctors widely reported insufficient funding for integrated care implementation, consistent with earlier findings. Additionally, inadequate equipment configuration for integrated services was identified as a barrier. Relevant departments should strengthen financial support by establishing dedicated funds for integrated services, creating multi-dimensional investment and compensation mechanisms, and ensuring sustainable funding. Support should be prioritized at the grassroots level, with necessary medical equipment provided to meet practical needs.

3.4 Variations in Behavioral Intention Across Different Doctor Characteristics Doctors with higher education levels and professional titles demonstrated stronger behavioral intention, likely because they are prioritized in current integrated care training programs. Research indicates that more frequent training enhances knowledge and skills, which in turn influences behavioral intention. Doctors with less training reported lower job satisfaction, which is often accompanied by higher burnout and may negatively impact their intention to provide integrated services. Income also showed a positive effect on behavioral intention, possibly because higher-income doctors have stronger professional identity, which influences their service provision intentions. Therefore, targeted training should be increased for specific populations to enhance their enthusiasm and promote effective implementation of integrated services.

In summary, grassroots doctors currently show strong behavioral intention regarding chronic disease integrated medical and preventive care, yet continuous improvement is needed through establishing robust assessment and incentive mechanisms, developing reasonable policies and guidelines, enhancing doctors' awareness, allocating dedicated funds to optimize institutional environments, and increasing targeted training for specific populations.

This study developed a questionnaire to assess grassroots doctors' behavioral intention in providing chronic disease integrated care, which has practical value for both evaluation and further analysis of influencing factors. However, several limitations exist. Regarding scope and variables, the study was limited to three cities in Shandong Province due to resource constraints, and the included influencing factors were not comprehensive, limiting national representativeness. Methodologically, mixed-methods research was not employed, constraining in-depth exploration of underlying reasons. Future research should consider more comprehensive factors, expand the survey scope, and improve methodological approaches.

Author Contributions: FAN Boyang and ZHANG Yu conceptualized and designed the study, implemented the research, and drafted the manuscript. SUN Wenning and ZHANG Huifang collected and organized data and performed statistical analysis. WANG Yingjie, ZHAO Yang, and ZHANG Ao revised the

manuscript. WANG Haipeng was responsible for quality control, overall supervision, and project management.

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