Effectiveness and Satisfaction Survey of Mobile Network-Based Community Management of Elderly Hypertension: Postprint

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Abstract

Background Against the backdrop of deep integration of information technology across various industries and national initiatives promoting smart healthcare development, community chronic disease management is gradually exploring and transitioning from traditional models to informatized and intelligent management models. As society progressively enters a stage of deep aging, the effectiveness of informatized chronic disease management for the elderly population requires clarification. Objective To understand the role of mobile networks in elderly chronic disease management and investigate satisfaction levels, aiming to provide references for conducting related research on informatized chronic disease management. Methods Using convenience sampling, 650 elderly hypertensive patients registered in community health service centers from 4 communities under the jurisdiction of Linghe District, Jinzhou City were selected as research subjects from January to July 2022. With informed consent and on a voluntary basis, and according to the principle of proximity based on residential location, the elderly were divided into an intervention group and a control group, with 325 cases in each group. The control group adopted conventional community chronic disease management methods with face-to-face follow-up once every two months. The intervention group, based on the control group's approach, adopted mobile network-based hypertension management for an intervention duration of 6 months. After the intervention, the Hypertension Knowledge Level Scale (HK-LS), Hypertension Treatment Adherence Scale (TASHP), and Hypertension Self-Management Behavior Rating Scale (HPSMBRS) were used for effectiveness evaluation, and a satisfaction survey was conducted. Results

After the intervention, the intervention group's scores on all dimensions of HK-LS, TASHP, and HPSMBRS were higher than those of the control group ($P<0.05$). 93.5% (275/294) of the elderly believed that mobile network-assisted

hypertension management facilitated medical treatment, 86.4% (254/294) believed it could reduce medical costs, and 80.6% (237/294) believed it helped with disease monitoring; further investigation revealed that the main factors affecting management effectiveness were physical factors, psychological factors, and dissatisfaction with software and hardware devices. Conclusion Mobile network-assisted community hypertension management can effectively improve elderly patients' hypertension knowledge levels, treatment adherence, and self-management behavioral capabilities, with relatively high satisfaction.

Full Text

The Effect and Satisfaction of Mobile Network in the Hypertension Management of Community-Dwelling Older Adults

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Abstract

Background: In the context of deep integration between information technology and various industries, coupled with strong national advocacy for smart healthcare development, community chronic disease management is gradually transitioning from traditional models to information-based and intelligent management modes. As society enters a period of deep aging, it is essential to clarify whether information-based chronic disease management remains effective for elderly populations.

Objective: To understand the role of mobile networks in chronic disease management among older adults and investigate satisfaction levels, thereby providing references for research on information-based management of related chronic diseases.

Methods: Using convenience sampling, 650 elderly hypertensive patients registered at community health service centers in four communities under Linghe District, Jinzhou City were selected from January to July 2022. Under informed

consent and voluntary participation, participants were divided into intervention and control groups (325 cases each) based on residential proximity. The control group received conventional community chronic disease management with face-to-face follow-up every two months. The intervention group received mobile network-based hypertension management in addition to conventional care for six months. Post-intervention effects were evaluated using the Hypertension Knowledge Level Scale (HK-LS), Therapeutic Adherence Scale for Hypertensive Patients (TASHP), and Hypertension Patients Self-Management Behavior Rating Scale (HPSMBRS), followed by a satisfaction survey.

Results: Post-intervention scores for all dimensions of HK-LS, TASHP, and HPSMBRS were significantly higher in the intervention group than in the control group ($P<0.05$). Among participants, 93.5% believed mobile network-assisted hypertension management facilitated medical access, 86.4% believed it reduced medical costs, and 80.6% believed it aided condition monitoring. Primary factors affecting management effectiveness included physical limitations, psychological barriers, and dissatisfaction with software/hardware devices.

Conclusion: Mobile network-assisted community hypertension management can effectively improve elderly patients' hypertension knowledge, treatment adherence, and self-management capabilities, with high satisfaction levels.

Keywords: Hypertension; Chronic disease; Community chronic disease management; Aged; Mobile network; Patient satisfaction; Treatment outcome

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Introduction

With the epidemiological shift from acute to chronic diseases and intensifying population aging, chronic disease management has become a global public health priority. In 2018, the General Office of the State Council issued guidelines for promoting "Internet + Healthcare," explicitly emphasizing online service management for chronic diseases such as hypertension and diabetes. China's first health management bluebook reported approximately 300 million chronic disease patients, with chronic diseases accounting for 86.6% of total mortality. Among individuals aged 65 and older, hypertension awareness, treatment, and control rates are 47.3%, 38.9%, and 12.6% respectively—significantly lower than developed countries. As a chronic, irreversible condition, elderly hypertension prognosis depends on effective blood pressure management and prevention of cardiovascular complications, with community settings serving as the primary management venue. However, no universally recognized, scientifically validated, and replicable community-based management model for elderly chronic diseases has yet emerged.

Integrating information technology into chronic disease management to drive transformation toward intelligent models has become a research hotspot. According to the Third China Population and Development Forum, over 50% of

Chinese adults aged 65–69 use smartphones, with 82.2% using them for video chatting, making mobile network-based community chronic disease management feasible. This study investigates the application effects and satisfaction of mobile networks in community-based elderly hypertension management to inform future chronic disease management and smart healthcare initiatives.

Methods

Study Participants Using convenience sampling, 650 elderly hypertensive patients registered at community health service centers in four Linghe District communities were selected from January to July 2022. Under informed consent and voluntary participation, participants were assigned to intervention and control groups (325 each) based on residential proximity.

Inclusion criteria: (1) Hypertension diagnosis per the *Chinese Guidelines for the Management of Hypertension in the Elderly 2019*; (2) Age $ $65 years; (3) Long-term community residency; (4) Smartphone ownership with basic proficiency; (5) Self-care ability, intact cognitive function, and clear verbal expression; (6) Informed consent and voluntary participation.

Exclusion criteria: (1) Secondary hypertension; (2) Cognitive impairment precluding normal communication; (3) Severe cardiac insufficiency, malignant hypertension, end-stage renal disease, or stroke; (4) Inability to comply with interventions; (5) Current hormone or immunosuppressant use; (6) Participation in other clinical studies.

Withdrawal criteria: (1) Poor compliance with incomplete data; (2) Voluntary withdrawal; (3) Inability to continue due to uncontrollable factors.

Data Collection A literature-based questionnaire was developed to collect general data including gender, age, education level, BMI, disease duration, systolic pressure, and diastolic pressure. Physical examination data were collected daily from 6:30–9:30 AM at community health centers or at home. Daily behavior and medication usage information was collected according to items from the HK-LS, TASHP, and HPSMBRS scales.

Post-intervention, a satisfaction and influencing factors questionnaire was designed based on literature review and interview analysis of the intervention group. The survey covered medical services (condition monitoring, medication guidance, complication warnings), nursing services (hypertension knowledge, dietary management, exercise guidance, emotional regulation), and convenience (medical access, cost savings). Influencing factors were assessed across four domains: device-related issues (difficult software operation, small text, insufficient device intelligence, inaccurate electronic sphygmomanometers, inability to troubleshoot), physical limitations (vision, hearing, arthritis, cervical spondylosis),

psychological barriers (fear of operational errors, cost concerns, health concerns from prolonged use), and security (privacy leakage, network security).

All data were collected by trained researchers who explained instructions in detail to participants. Data were entered after verification, with abnormal values confirmed by patients or their families to ensure accuracy.

Intervention Methods The control group received conventional community chronic disease management with face-to-face follow-up every two months (three total sessions), including blood pressure measurement, hypertension education, medication guidance, and lifestyle management.

The intervention group received mobile network-based management in addition to conventional care for six months:

1.3.1 Management team establishment: The team comprised one geriatrics chief physician, two cardiology associate chief physicians, two community health center attending physicians, two associate chief nurses, and one community public health assistant. The team managed the mobile network platform, weekly pushing hypertension-related knowledge, medication management, and blood pressure monitoring content through a management mini-program.

1.3.2 Electronic health records: Electronic records were created based on general and daily behavior data, enabling 随时随地查询 of health status, treatment history, and medication use. Healthcare providers delivered personalized health prescriptions and self-management plans based on these records for long-term tracking and monitoring.

1.3.3 Blood pressure management mini-program: The program guided standardized self-management through daily medication and blood pressure monitoring "check-ins." Hypertension health education was delivered via text and video, including weekly articles on dietary guidance, exercise recommendations, behavioral adjustments, and psychological counseling. Monthly online consultations and video diagnoses provided remote medical services, guiding proper medication use and facilitating real-time communication between elderly patients and physicians.

Observation Indicators (1) Hypertension Knowledge Level Scale (HK-LS): Developed by Turkish scholar Sultan Baliz Erkoc et al., this 22-item scale covers six dimensions (definition, medication, treatment adherence, lifestyle, diet, complications). Items are scored 1 for correct answers and 0 for incorrect/unknown responses, with total scores ranging 0–22. Higher scores indicate better hypertension knowledge (Cronbach's $\alpha = 0.81$).

(2) Therapeutic Adherence Scale for Hypertensive Patients (TASHP): Developed by Tang Hongying et al., this 25-item scale includes four dimensions: medication compliance (5 items), poor medication behavior (8 items), daily life management (10 items), and smoking/alcohol

management (2 items). Items are scored 1–5 based on frequency ("never/rarely" to "always"), with total scores ranging 25–125. Higher scores indicate better adherence (Cronbach's $\alpha = 0.862$).

(3) Hypertension Patients Self-Management Behavior Rating Scale (HPSMBRS): Developed by Zhao Qiuli et al., this 33-item scale includes six dimensions: dietary management (10 items), medication management (4 items), emotional management (7 items), work/rest management (5 items), condition monitoring (4 items), and exercise management (3 items). Items are scored 1–5 based on frequency ("always" to "never"), with total scores ranging 33–165. Higher scores indicate better self-management (Cronbach's $\alpha = 0.914$).

Statistical Analysis SPSS 25.0 was used for data analysis. Continuous variables with normal distribution were expressed as ($\bar{x}\pm s$) and compared between groups using LSD-t tests. Categorical data were expressed as percentages and compared using ^{2} tests. $P<0.05$ was considered statistically significant.

Results

Baseline Characteristics Of 650 eligible participants, 325 were allocated to each group. At study completion, the control group had 315 participants (10 lost to follow-up, 3.1% attrition) and the intervention group had 294 participants (31 lost to follow-up, 9.5% attrition). Overall, 609 participants completed the study (total attrition rate: 6.3%). Baseline comparisons showed no significant differences between groups in gender, age, education level, BMI, disease duration, systolic pressure, or diastolic pressure ($P>0.05$) .

Hypertension Knowledge Levels Pre-intervention scores showed no significant differences between groups across HK-LS dimensions (definition, medication, adherence, lifestyle, diet, complications) ($P>0.05$). Post-intervention, the intervention group scored significantly higher than the control group in all dimensions ($P<0.05$) .

Hypertension Treatment Adherence Pre-intervention scores showed no significant differences between groups across TASHP dimensions (medication compliance, poor medication behavior, daily life management, smoking/alcohol management) ($P>0.05$). Post-intervention, the intervention group scored significantly higher in all dimensions ($P<0.05$) .

Hypertension Self-Management Behavior Pre-intervention scores showed no significant differences between groups across HPSMBRS dimensions (dietary, medication, emotional, work/rest, condition monitoring, exercise management) ($P>0.05$). Post-intervention, the intervention group scored significantly higher in all dimensions ($P<0.05$) .

Satisfaction and Influencing Factors Among 294 intervention group participants, 275 (93.5%) reported that mobile network-assisted hypertension management facilitated medical access, 254 (86.4%) believed it reduced medical costs, and 237 (80.6%) believed it aided condition monitoring. Most expressed satisfaction with hypertension knowledge, medication guidance, dietary management, exercise guidance, emotional regulation, and complication warnings [Figure 1: see original paper].

Further investigation of factors affecting management effectiveness revealed: 145 participants (49.3%) cited physical limitations, 133 (45.2%) feared operational errors, 124 (42.2%) found software operation difficult, and other factors included small text size, device intelligence issues, electronic sphygmomanometer accuracy concerns, privacy concerns, health concerns from prolonged use, and desire for face-to-face communication [Figure 2: see original paper].

Discussion

Research on community-based hypertension management for older adults has continued in recent years. International studies have focused on volunteer participation, management models, and control rate investigations, while domestic research has emphasized psychological interventions, peer education, pharmaceutical interventions, influencing factor analysis, self-management, and medical-preventive integration. Few studies have examined mobile network-based community hypertension management for older adults. This study explores the feasibility of mobile network chronic disease management for elderly populations, analyzing practical experiences and needs to inform community chronic disease management.

Our results demonstrate that mobile network-based community hypertension management effectively improves elderly patients' hypertension knowledge, treatment adherence, and self-management capabilities, consistent with findings from Zong Mingcan et al. However, their study included participants aged 26–79 without specific focus on elderly populations. Our study used WeChat to bridge community managers, healthcare providers, and elderly patients, enhancing health management, promoting communication, reducing treatment costs, and improving medical experiences—findings aligned with Zhou Yuling et al. WeChat groups, official accounts, and live streaming created new communication platforms for elderly patients, expanding social networks while providing health guidance, timely problem identification, and healthy habit formation, thereby improving self-management and physiological parameters, consistent with Liao Shengwu et al.

Survey data [Figure 1: see original paper] indicate high satisfaction with mobile network-based chronic disease management, with participants reporting improved medical access, cost savings, condition monitoring, and enhanced knowledge of medication, diet, exercise, emotions, and complications. This approach

addresses three critical needs of elderly chronic disease patients: improving adherence, enabling home-based care scenarios, and supporting precise decision-making. Elderly patients can engage in self-disease management under network guidance, shifting from passive compliance to active management. The network-based approach provides a "friendly" interactive interface designed for older adults, approximating home-based medical service scenarios. It enables personalized, precise disease management decisions based on individual patient conditions, enhances comprehensive information collection, increases follow-up flexibility, facilitates health big data collection, and indirectly promotes standardized community management.

However, the primary barrier to network-based chronic disease management is "small text size," followed by "fear of operational errors." This suggests older adults are not resistant to scientifically sound chronic disease management models, but rather face age-related declines in vision, hearing, cognition, and finger dexterity. Technology must improve age-appropriate design. The digital divide among older adults cannot be ignored; this large population must not be excluded from medical informatization. Communities and family members should invest more patience and care to help older adults bridge the digital divide.

Limitations: This study only included elderly hypertensive patients who could use smartphones and mobile networks, excluding those unable to use such technology. Additionally, the study focused solely on elderly hypertension management without in-depth exploration of influencing factors such as information literacy, occupation, education, family support, and behavioral habits, which may affect intervention effectiveness and warrant further investigation.

Conclusion

Mobile network-assisted community hypertension management effectively improves elderly patients' hypertension knowledge, treatment adherence, and self-management behaviors while achieving high satisfaction. It addresses limitations of conventional chronic disease management, including lack of professional guidance, inconvenience, poor compliance, and single-channel consultations. Domestic research on mobile network management for elderly chronic diseases remains limited; this study provides references for community hypertension intervention programs and management models. Future research should expand study scope and explore factors influencing intervention effectiveness. Mobile network-based chronic disease management for older adults represents the future trend, though management pathways require continuous exploration, refinement, and optimization in practice.

Author Contributions

YAO Lin conceptualized and designed the study, implemented research, and drafted the manuscript. SHANG Danmei and ZHAO Hui collected and organized data, performed statistical analysis, and prepared figures and tables. LIU Xinyu and LIU Yongwei revised the manuscript. JIANG Yong supervised quality control and overall responsibility.

Conflicts of Interest: None declared.

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