ORIGINAL RESEARCH

# The Application of Health Management and Drug Self-management Education in the Control of Chronic Diseases in the Elderly: A Retrospective Study

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## ABSTRACT

**Objective •** The objective of this study was to analyze the application of health management and medication self-management education in the control of chronic diseases in the elderly, specifically focusing on patients with diabetes, hypertension, cardiovascular diseases, and chronic obstructive pulmonary disease (COPD). The study aimed to assess the impact of these interventions on patients› self-management abilities, quality of life, medication adherence, intervention satisfaction, and the occurrence of adverse events. The findings aimed to provide a scientific basis for improving elderly chronic disease management and enhancing patients› health and quality of life.

**Methods •** A total of 106 elderly chronic disease patients admitted to our hospital from July 2021 to April 2023 were selected as the research subjects. All patients met the complete inclusion criteria. They were divided into two groups based on the type of health management intervention received. The control group (n=53) received conventional health management intervention. In contrast, the observation group (n=53) received health management from the medical examination center based on the PDCA model and medication self-management education intervention. The self-management ability, quality of life, medication adherence, occurrence of adverse events, and intervention satisfaction of the two groups of patients were compared. The PDCA (Plan-Do-Check-Act) model was chosen as the framework for this study due to its systematic approach to management and its potential to address the specific needs and complexities associated with chronic diseases in the elderly. The PDCA model emphasizes a continuous cycle of improvement, involving planning, implementation, evaluation, and adjustment of interventions.

**Results •** Before the intervention, there was no significant difference in self-concept, self-management responsibility, self-management knowledge, and self-management skills between the two groups ($P > .05$). After the intervention, the observation group's self-concept, self-management responsibility, self-management knowledge, and self-management skills were significantly higher than those of the control group ($P < .05$). Before the intervention, there was no significant difference in SF-36 scores between the two groups ($P > .05$). After the intervention, the SF-36 scores of the observation group were significantly higher than those of the control group ($P < .05$). The medication adherence score in the control group was (5.73±0.92), and the incidence of adverse events was 32.08%. In the observation group, the medication adherence score was (7.42±0.81), and the incidence of adverse events was 11.32%. The medication adherence score in the observation group was significantly higher than that in the control group, and the incidence of adverse events was significantly lower than that in the control group ($P < .05$). The intervention satisfaction in the control group was 73.58%. In comparison, the intervention satisfaction in the observation group was 96.23%, indicating that the intervention satisfaction in the observation group was significantly higher than that in the control group ($P < .05$). These results suggest that the implementation of the PDCA model in health management and medication self-management education can enhance patients' self-management abilities, improve medication adherence, and ultimately lead to better quality of life and reduced risk of adverse events for elderly chronic disease patients.

**Conclusion •** The application of health management and medication self-management education based on the PDCA model in the control of elderly chronic diseases is ideal. Compared to conventional health management interventions, the former can enhance patients' self-management abilities and improve medication adherence, thereby further improving patients' quality of life, satisfaction, and the risk of adverse events. Therefore, this approach is worthy of clinical promotion and application. (*Altern Ther Health Med.* [E-pub ahead of print.])


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## INTRODUCTION

Elderly chronic diseases present a formidable challenge in today's society, driven by the increasingly aging population, the high incidence of chronic illnesses, and the limited availability of medical resources.[1] As the life expectancy of elderly patients continues to extend, they require long-term management and treatment for chronic conditions such as diabetes, hypertension, cardiovascular diseases, and chronic obstructive pulmonary disease (COPD).[2] Elderly patients often have multiple chronic conditions that require long-term management and treatment. Age-related physiological changes can affect the pharmacokinetics and pharmacodynamics of medications, making medication management more complex.[3] Additionally, comorbidities can interact and complicate the management of chronic diseases, requiring a comprehensive and patient-centered approach. Moreover, the elderly population may face barriers to self-management, such as cognitive impairment, limited mobility, and social isolation. These factors can contribute to inadequate medication adherence, lack of self-monitoring, and reduced health knowledge. Furthermore, the limited

availability of medical resources and the increasing burden on healthcare systems pose additional challenges in providing optimal care to elderly patients with chronic diseases.[4]

Health management plays a crucial role in addressing the specific needs of elderly patients with chronic diseases. Tailoring health management strategies to the unique requirements of this population can have a significant impact on disease control and overall well-being. For example, comprehensive health assessments can help identify individual risk factors and develop personalized treatment plans. Regular monitoring of patients' health status allows for early detection of disease exacerbations or complications, enabling proactive interventions to prevent adverse outcomes. Furthermore, health education targeted at elderly patients can enhance their understanding of their conditions, promote self-care behaviors, and empower them to actively engage in disease management.

In this context, health management and medication self-management education have become key factors in addressing the challenges posed by chronic diseases in the elderly. Health management aims to assist patients in effectively managing their chronic diseases through comprehensive health assessments, treatment plan development, and health education.[5] These programs enable healthcare providers to closely monitor patients' health status, identify potential risk factors, and intervene proactively to prevent disease exacerbations or complications.

Effective medication management is crucial for elderly patients with chronic diseases, as they often face barriers to proper adherence. These barriers may include cognitive impairment, polypharmacy, complex medication regimens, and limited health literacy. Medication self-management education plays a vital role in addressing these challenges.

Despite the recognized importance of health management and medication self-management education, the optimal implementation of these strategies remains an ongoing challenge. It requires the development of effective and evidence-based approaches that can address the specific needs and complexities associated with chronic diseases in the elderly. The PDCA (Plan-Do-Check-Act) model offers a systematic and iterative approach to health management and medication self-management in elderly patients with chronic diseases. This model emphasizes continuous improvement through a four-step cycle. The planning phase involves developing personalized care plans based on individual needs and goals. In the implementation phase, interventions are carried out, such as health assessments, medication self-management education, and regular monitoring. The check phase involves evaluating the effectiveness of the interventions by assessing outcomes and making necessary adjustments. Finally, the act phase incorporates the lessons learned from the evaluation to refine and optimize the interventions further. The PDCA model is particularly suited for elderly care as it allows for flexibility and customization to address the complexities associated with chronic diseases in this population. Successful implementations of the PDCA model in previous studies have demonstrated improved patient outcomes, including enhanced self-management abilities, increased medication adherence, and improved quality of life.[6]

Medical examination centers, as integral components of elderly chronic disease management, play a crucial role in providing comprehensive health assessments and education to patients. These centers offer opportunities for proactive health management interventions, including regular check-ups, health screenings, and health education programs. With their multidisciplinary approach, medical examination centers can coordinate the efforts of various healthcare professionals, including physicians, nurses, pharmacists, and educators, to provide holistic and continuous care. The integration of medical examination centers in the proposed intervention ensures the delivery of comprehensive health management and medication self-management education to optimize patient outcomes. However, to date, research on the application of health management and medication self-management education based on the PDCA model in the control of elderly chronic diseases is insufficient, and its specific effects and feasibility require further investigation.

Therefore, this study aims to fill this research gap by exploring the application of health management and medication self-management education based on the PDCA model in the control of elderly chronic diseases. By assessing its impact on patients' self-management abilities, quality of life, medication adherence, intervention satisfaction, and the occurrence of adverse events, this research seeks to provide a scientific basis for improving elderly chronic disease management and enhancing patients' health and quality of life. The findings of this study are expected to offer new insights and approaches for future elderly chronic disease management, ultimately better meeting the healthcare needs of elderly patients.

## OBJECTIVES AND METHODS

### Study Subjects

A total of 106 elderly chronic disease patients admitted to our hospital from July 2021 to April 2023 were selected as the study subjects. Basic demographic information such as gender, age, marital status, education level, living arrangement, and types of chronic diseases were collected. Based on the type of health management intervention received by the patients, they were divided into two groups: the control group (n=53) received conventional health management intervention, and the observation group (n=53) received health management from the medical examination center based on the PDCA model and medication self-management education intervention. This retrospective study was conducted in accordance with the Helsinki Declaration,[7] approved by our hospital's Ethics Committee.

### Inclusion and Exclusion Criteria

**Inclusion criteria**: (1) Elderly patients aged 65 and above; (2) Patients must have been diagnosed with one or more common chronic diseases such as diabetes,

hypertension, cardiovascular diseases, chronic obstructive pulmonary disease (COPD), based on clinical diagnosis and relevant medical examinations; (3) Patients must agree to participate in this study and be randomly assigned to receive health management intervention; (4) Patients must be currently receiving one or more medication regimens for chronic diseases prescribed by medical professionals, and they must understand and be willing to adhere to the prescribed medications; (5) Patients must have sufficient cognitive and communication abilities to effectively participate in health management intervention and medication self-management education.

**Exclusion criteria**: (1) Patients diagnosed with severe cognitive impairment, such as moderate or severe dementia, were excluded from the study; (2) Patients with severe psychological disorders or mental illnesses were excluded; (3) Patients with severe other health issues, such as advanced-stage cancer or severe infections, were excluded; (4) Patients who clearly expressed unwillingness to participate in the study or were unable to understand the research objectives and procedures were excluded from the study.

## Methods

**Control Group.** The control group received conventional health management intervention. Patients in this group received routine health education from the responsible nurses at the hospital. They were provided with explanations of the etiology of chronic diseases, factors contributing to disease onset, the relationship between lifestyle and disease, clinical manifestations of the diseases, effective prevention measures, medication guidance, dietary advice, and general health-related knowledge.

**Observation Group**. The observation group received health management from the medical examination center based on the PDCA (Plan-Do-Check-Act) model and medication self-management education intervention. The specific measures were as follows: (1) PDCA Model:[8] The PDCA cycle model services were implemented for elderly chronic disease patients in the observation group by a team of general practitioners. (1) Plan (P): Patient-centric intervention plans were developed, including basic public health services, health management guidance, basic medical preferential services, and medical insurance benefits. The intervention plans were tailored to the specific conditions of elderly patients, including complications and indicators such as blood sugar and blood pressure. (2) Do (D): Responsibilities and rights of team members were defined and implemented. Targeted personalized health education interventions were carried out based on the patient's examination indicators, medical history, dietary preferences, exercise habits, etc. Effective control of consultation times was achieved through a hospital-developed plugin for the hospital's diagnosis and treatment system, ensuring the standardization of health education knowledge. (3) Check (C): Regular physical and biochemical examinations were conducted. Face-to-face follow-up visits were conducted at least quarterly to assess the patient's blood pressure, blood sugar, medication compliance, lifestyle, etc. Intervention information was recorded in the hospital's self-developed plugin for the diagnosis and treatment system. Health education intervention measures were adjusted based on the effectiveness of the interventions. Additionally, the hospital's diagnosis and treatment system plugin was used to inspect the daily work of the service team, including health management records, work logs, and intervention quality. (4) Act (A): In case of sudden changes in the patient's condition during the service, timely examination, treatment, and emotional support were provided. If necessary, the patient was explained and introduced to other doctors or referred to a higher-level hospital. (2) Health Management and Medication Self-Management Education: The goal of the intervention is to improve self-management abilities, considering the characteristics of elderly individuals. The implementation of health management and education intervention includes the following measures: (1) Patient Information Collection: Intervention personnel engage in conversations with patients and their families in a friendly and approachable manner, assessing the patients' basic information. This includes understanding the patient's diagnosis, their level of knowledge regarding the disease, their attitude towards treatment, and their ability to cope. (2) Health Knowledge Education: Intervention members identify any adverse habits or behaviors in patients based on information gathered from various sources. Through one-on-one bedside education and group seminars, they provide detailed explanations about the close relationship between chronic diseases and personal habits, emotions, diet, daily routines, and other lifestyle factors. For instance, some elderly individuals develop habits of convenience and irregular eating, leading to various gastric and biliary diseases over time. Others may consume excessive fats or cholesterol without engaging in physical activity, resulting in obesity and elevated blood lipids and blood sugar levels. Promoting leisure activities and appropriate exercise is beneficial for both physical and mental health, while regular exercise can improve blood sugar levels and lipid metabolism. (3) Changing Mindset: During the education process, special emphasis is placed on nurturing patients' internal motivation and fostering the belief that "I can do it, I can succeed." Family members are invited to participate to provide support and supervision. They help patients establish positive beliefs and train them in healthy behaviors, such as keeping medication logs, taking medication on time, self-monitoring blood pressure, pulse, and blood sugar levels daily, and measuring weight weekly. Patients can use this data for self-discovery of any dynamic changes in their condition. For instance, obese or hyperlipidemic individuals can change their dietary habits by reducing fat or cholesterol intake and opting for foods low in carbohydrates and rich in fiber. Patients with coronary heart disease can benefit from quitting smoking, limiting alcohol consumption, avoiding spicy and irritating foods, and engaging in daily outdoor activities such

as walking and exercising. Cancer patients can improve their emotional well-being by being optimistic, open in communication with others, and adopting a positive attitude towards recovery. (4) Promoting Healthy Behaviors: Some patients may believe that the damage from unhealthy lifestyles has already occurred and that there's no need for change. However, this is not the case. After quitting smoking for one year, the risk of heart disease significantly decreases, and after ten years of quitting, the risk of illness is nearly the same as that of non-smokers. Patients are encouraged to compare their lifestyle habits and make self-discoveries, correcting any issues promptly.

### Outcome Measures

**Self-management ability**: Before and after the intervention, the self-management ability of patients was assessed using the Self-Management Ability Scale (ESCA).[9] This scale consists of four dimensions: self-concept, self-management responsibility, self-management knowledge, and self-management skills, with a total of 43 items. The total score on this scale is 172 points, and a higher score indicates stronger self-management ability in patients.

The ESCA scale was selected to evaluate self-concept, which refers to an individual's perception of oneself in relation to their chronic disease and self-management abilities. The ESCA scale has been specifically developed and validated for use in elderly populations, making it a suitable measure for assessing self-concept in this study. By capturing patients' perceptions of their self-management capabilities, the ESCA scale helps assess their confidence and motivation to actively engage in disease management.

**Quality of life**: Before and after the intervention, the quality of life of patients was evaluated using the Short Form-36 Health Survey (SF-36).[10] This questionnaire comprises eight dimensions and 36 items. The questionnaire results are converted to a score ranging from 0 to 100, with a higher score indicating a better quality of life for the patient.

The SF-36 questionnaire is a widely recognized and extensively validated tool for assessing health-related quality of life. It measures multiple domains, including physical functioning, social functioning, role limitations, mental health, and overall well-being. The SF-36 is particularly suitable for evaluating the impact of health management and medication self-management education interventions on patients' overall quality of life. By capturing changes in various aspects of well-being, the SF-36 provides a comprehensive assessment of the intervention's effects on patients' functional status and overall health-related quality of life.

**Medication adherence**: Before and after the intervention, the Morisky Medication Adherence Questionnaire (MAQ)[11] was used to assess patients' adherence to related medication treatments. This questionnaire consists of 8 points, with 8 points indicating high adherence, 6-7 points indicating moderate adherence, and <6 points indicating low adherence. A higher score indicates better medication adherence in patients.

Medication adherence is a crucial aspect of chronic disease management, and the MAQ was chosen to assess patients' adherence to medication regimens. The MAQ is a validated questionnaire that evaluates patients' self-reported adherence to prescribed medications. By measuring medication adherence, the MAQ helps assess the effectiveness of medication self-management education interventions in promoting proper medication use and adherence. It provides valuable insights into patients' adherence behaviors, which are essential for optimizing treatment outcomes and disease control.

**Adverse event occurrence**: In this study, adverse events refer to events related to improper control of chronic diseases by patients, including elevated blood sugar, elevated blood pressure, and breathing difficulties. Our hospital's medical staff records the occurrence of adverse events.

**Intervention satisfaction**: Patients and their families were asked to rate their satisfaction using a self-developed "Satisfaction Survey Questionnaire" from our hospital. This questionnaire consists of 20 questions, and patients and their families rate their satisfaction with the hospital's treatment and nursing interventions. Each question is scored out of 5 points, with a total score of <70 indicating dissatisfaction, 70-89 indicating satisfaction, and ≥90 indicating very satisfaction.

### Statistical Analysis

GraphPad Prism 8 was used for data visualization, and SPSS 22.0 was used for data analysis. For continuous data, the mean and standard deviation were used to describe their distribution, and statistical analysis was performed using *t* tests or analysis of variance (ANOVA) as appropriate. For categorical data, the distribution was described using frequencies and percentages, and statistical analysis was performed using chi-square tests or Fisher's exact tests as appropriate. A significance level of $P < .05$ was considered statistically significant.

## RESULTS

### Comparison of Baseline Characteristics

The baseline characteristics of the two groups of patients were comparable, and there were no significant differences in the comparisons ($P > .05$). See Table 1 for details.

**Table 1.** Comparison of Baseline Characteristics

| | Control (n=53) | Observation (n=53) | $t/\chi^2$ | *P* value |
|---|---|---|---|---|
| Gender | | | 0.153 | .695 |
| Male | 29 | 31 | | |
| Female | 24 | 22 | | |
| Average age ( years ) | 72.71±5.23 | 73.15±5.17 (95% CI 0.23-1.25) | 0.435 | .664 |
| Spouse situation | | | 0.164 | .685 |
| Have | 33 | 35 | | |
| None | 20 | 18 | | |
| Education level | | | 0.352 | .552 |
| High school and below | 30 | 33 | | |
| College degree and above | 23 | 20 | | |
| Whether you live alone | | | 0.410 | .521 |
| Yes | 14 | 17 | | |
| No | 39 | 36 | | |
| Types of chronic diseases | | | 0.055 | 0.813 |
| ≤2 | 42 | 41 | | |
| ≥3 | 11 | 12 | | |

### Comparison of Self-Management Abilities

As shown in Figure 1, the self-concept scores in the control group before and after the intervention were (12.46±2.37, 14.32±1.47) respectively, self-management responsibility scores were (9.17±1.45, 11.13±2.35), self-management knowledge scores were (22.39±3.87, 39.32±4.26), and self-management skills scores were (16.38±2.62, 21.15±4.06). In the observation group, the self-concept scores before and after the intervention were (12.18±2.47, 17.69±2.75), self-management responsibility scores were (9.34±1.82, 14.08±2.56), self-management knowledge scores were (22.67±3.92, 45.13±4.51), and self-management skills scores were (16.19±2.47, 27.32±4.87). Before the intervention, there were no significant differences in self-concept, self-management responsibility, self-management knowledge, and self-management skills scores between the two groups ($P > .05$). After the intervention, the observation group showed significantly higher scores in self-concept, self-management responsibility, self-management knowledge, and self-management skills compared to the control group ($P < .05$).

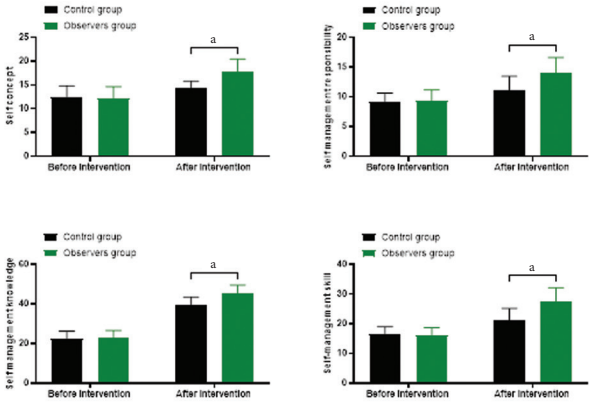
This improvement suggests that the PDCA model and medication self-management education interventions have had a positive impact on patients' ability to actively participate in their own care. Enhanced self-management abilities can lead to better self-care practices, such as improved medication adherence, regular monitoring of symptoms, and engagement in healthy lifestyle behaviors. This, in turn, has the potential to contribute to better disease control, reduced complications, and improved overall health outcomes for the patients. By empowering patients to take a proactive role in their self-care, the interventions may have facilitated greater self-efficacy and self-confidence, enabling patients to better manage their chronic diseases and achieve better health outcomes.

### Comparison of Quality of Life

As shown in Figure 2, the SF-36 scores in the control group before and after the intervention were (54.76±7.27, 65.96±10.13), and in the observation group, the SF-36 scores before and after the intervention were (55.32±7.05, 75.62±8.34). Before the intervention, there was no significant difference in SF-36 scores between the two groups ($P > .05$). After the intervention, the observation group showed significantly higher SF-36 scores compared to the control group ($P < .05$).

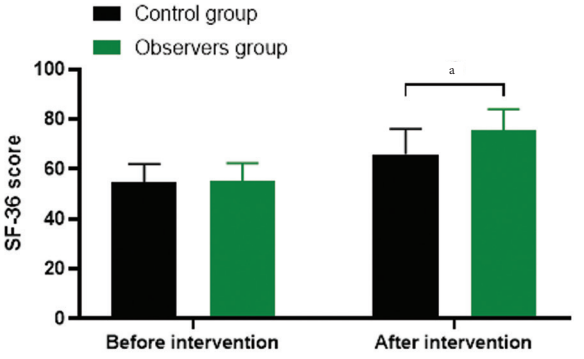
The interventions may have contributed to improvements in various domains of well-being, including physical functioning, social interactions, and mental health. By addressing patients' individual needs, providing personalized care plans, and educating them about their conditions and self-management strategies, the interventions likely helped patients better cope with their chronic diseases, experience fewer limitations, and have a greater sense of overall well-being. The interventions may have also fostered a greater sense of control and empowerment, enabling patients to maintain a higher level of functioning and engagement in daily activities.

**Figure 1.** Comparison of Self-Management Abilities




[a]Inter-group comparison, $P < .05$.

**Figure 2.** Comparison of Quality of Life




[a]Inter-group comparison, $P < .05$.

### Comparison of Medication Adherence and Adverse Events

The medication adherence score in the control group was (5.73±0.92), and the incidence of adverse events was 32.08%. In the observation group, the medication adherence score was (7.42±0.81), and the incidence of adverse events was 11.32%. The observation group demonstrated significantly higher medication adherence scores and a significantly lower incidence of adverse events compared to the control group ($P < .05$). See Table 2 for details.

The medication self-management education component of the intervention likely provided patients with a better understanding of their medications, including proper administration, potential side effects, and the importance of adherence. This increased knowledge and awareness may have contributed to improved medication adherence in the observation group. Moreover, the personalized care plans and regular monitoring provided by the PDCA model may have facilitated early detection and management of potential adverse events, leading to a lower incidence of such events in the observation group. These findings underscore the importance of comprehensive medication management and patient education in achieving better treatment outcomes and minimizing medication-related complications.

### Comparison of Intervention Satisfaction

The intervention satisfaction in the control group was 73.58%, while in the observation group, it was 96.23%. The

**Table 2.** Comparison of Medication Adherence and Adverse Events

| Group | Number of examples | Medication compliance (points) | Adverse events [n(%)] |
|---|---|---|---|
| Control group | 53 | 5.73±0.92 | 17 (32.08%) |
| Observation group | 53 | 7.42±0.81 | 6(11.32%) |
| $t/\chi^2$ | - | 10.037 | 6.718 |
| *P* value | - | <.001 | .009 |

**Table 3.** Comparison of Intervention Satisfaction

| Group | Number of examples | Not satisfied | Satisfy | Very satisfied | Total satisfaction rate [n(%)] |
|---|---|---|---|---|---|
| Control group | 53 | 14 | 23 | 16 | 39 (73.58%) |
| Observation group | 53 | 2 | 31 | 20 | 51 (96.23%) |
| $\chi^2$ | - | - | - | - | 10.600 |
| *P* value | - | - | - | - | .001 |

intervention satisfaction in the observation group was significantly higher than that in the control group ($P < .05$). Please refer to Table 3 for details.

The higher satisfaction rate in the observation group suggests that the PDCA model and medication self-management education interventions have positively impacted patients' experience of care. Several factors may have contributed to this increased satisfaction, such as personalized care plans, individualized attention from healthcare providers, and the provision of education and support tailored to patients' specific needs. The interventions may have fostered a sense of being valued and involved in their care, leading to greater patient satisfaction. Additionally, the active engagement of patients in their self-management and the positive impact on their health outcomes likely contributed to their overall satisfaction with the intervention. This finding highlights the importance of patient-centered approaches in healthcare and the potential benefits of tailored interventions in improving patient satisfaction and engagement in their care.

## DISCUSSION

In the present study, the observed improvement in self-management abilities in the observation group is a critical finding with significant implications for the overall self-care and health outcomes of the patients. The PDCA model and medication self-management education interventions have played a crucial role in enhancing patients' ability to actively participate in their own care. By empowering patients with knowledge, skills, and confidence, the interventions have likely enabled them to take a more proactive approach to managing their chronic diseases.[12] This improvement in self-management abilities implies that patients are better equipped to engage in self-care practices, such as adhering to medication regimens, monitoring their symptoms, and making lifestyle modifications.[13] Consequently, these enhanced self-management abilities may lead to improved disease control, reduced complications, and better overall health outcomes for the patients.

The significant improvement in SF-36 scores in the observation group highlights the positive impact of the PDCA model and medication self-management education interventions on patients' health-related quality of life. The interventions have likely contributed to improvements in various domains of well-being, including physical functioning, social interactions, and mental health.[14] The personalized care plans and tailored education provided through the interventions have likely helped patients better understand their conditions and develop effective self-management strategies. By promoting self-efficacy and empowering patients to take control of their health, the interventions may have facilitated a sense of mastery and control over their chronic diseases, resulting in improved quality of life.[15] Patients in the observation group may have experienced fewer limitations, greater social engagement, and enhanced emotional well-being, ultimately leading to a better overall perception of their health and well-being.

The differences in medication adherence and adverse events between the groups are critical outcomes that shed light on the effectiveness of the intervention. The medication self-management education component of the intervention has likely played a significant role in improving medication adherence in the observation group. By providing patients with comprehensive education on their medications, including instructions for proper administration, potential side effects, and the importance of adherence, the interventions have empowered patients to take ownership of their medication management.[16] This improved understanding and awareness have likely translated into better adherence behaviors and subsequently contributed to better treatment outcomes. Moreover, the personalized care plans and regular monitoring facilitated by the PDCA model may have played a role in detecting and addressing potential adverse events promptly, leading to a lower incidence of such events in the observation group.[17] These findings underscore the importance of comprehensive medication management and patient education in optimizing treatment outcomes and minimizing medication-related complications.

The higher satisfaction rate in the observation group is a significant finding that reflects the patient-centered impact of the intervention. Several factors may have contributed to this increased satisfaction. The personalized care plans tailored to each patient's specific needs, the individualized attention from healthcare providers, and the provision of education and support likely created a sense of being valued and involved in their care. The interventions may have fostered a collaborative and empowering healthcare environment, where patients felt heard, supported, and actively engaged in decision-making.[18] Additionally, the positive impact of the interventions on patients' self-care abilities, quality of life, and treatment outcomes likely contributed to their overall satisfaction. Patients who experienced improvements in their health and well-being were more likely to express higher satisfaction with the intervention.[19,20] These findings highlight the importance of patient-centered approaches in healthcare and the potential benefits of tailored interventions in improving patient satisfaction and engagement in their care.

Although the health management and medication self-education intervention model for the medical examination center based on the PDCA cycle has demonstrated some

effectiveness in controlling chronic diseases in the elderly, the study itself still has some potential limitations.

**Sample Size**: The study included a total of 106 elderly chronic disease patients, with 53 patients in each group. While this sample size is reasonable for a single-center study, it may limit the generalizability of the findings to a larger population. A larger sample size would enhance the statistical power of the study and provide more robust results. Additionally, a larger sample would allow for subgroup analyses based on different types of chronic diseases, potentially providing more specific insights.

**Duration and Follow-up**: The study spanned from July 2021 to April 2023, indicating a relatively short duration. Chronic diseases often require long-term management, and the impact of interventions may manifest over an extended period. A longer follow-up duration would provide a more comprehensive understanding of the sustained effects of health management and medication self-management education. It would also enable the assessment of long-term medication adherence and the occurrence of adverse events, which are crucial factors in chronic disease management.

**Single-Center Study**: The study was conducted in a single hospital, which could impact the generalizability of the results to other healthcare settings or regions. Factors such as healthcare resources, cultural differences, and variations in healthcare practices among different hospitals or regions may influence the effectiveness of health management and medication self-management education. Conducting multi-center studies involving diverse populations would provide a more comprehensive understanding of the impact of the interventions.

**Self-Reported Measures**: Several outcomes, such as self-management abilities, medication adherence, and intervention satisfaction, were assessed through self-reported measures. Self-reported data are subject to recall bias and social desirability bias. Patients may overestimate their medication adherence or satisfaction with the interventions, leading to inflated results. Supplementing self-reported measures with objective measures, such as pharmacy refill data or objective adherence monitoring, would provide more accurate and reliable information.

Acknowledging these limitations is crucial for interpreting the study's findings accurately. Although these limitations may impact the generalizability and internal validity of the study, they do not necessarily invalidate the overall conclusion that health management and medication self-management education based on the PDCA model are beneficial for elderly chronic disease control. Future studies should address these limitations to further strengthen the evidence base and facilitate the wider implementation of effective interventions for elderly chronic disease management.

Future research should address several limitations identified in the present study to further refine the effectiveness of the interventions. Firstly, conducting larger multi-center studies would enable the recruitment of a more diverse patient population, increasing the generalizability of the findings. By including patients from different regions and healthcare settings, we can better understand the broader impact of the PDCA model and medication self-management education interventions across various contexts and populations. Secondly, extending the follow-up duration beyond the current study's timeframe would provide insights into the long-term effects of the interventions. Chronic diseases require ongoing management, and understanding the durability of the observed improvements in self-management abilities, quality of life, medication adherence, and adverse events over an extended period would be valuable in assessing the sustainability and real-world impact of the interventions.

## CONCLUSION

The application of the health management and medication self-education intervention model for the medical examination center based on the PDCA cycle in controlling chronic diseases in the elderly is promising. In comparison to conventional health management interventions, the former enhances patients' self-management abilities and improves medication adherence. Consequently, this leads to further improvements in patients' quality of life and satisfaction levels and a reduced risk of adverse events. Therefore, this approach is worthy of clinical promotion and application.

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