RESEARCH PAPER

Implementation and Outcomes of AI-Enhanced Care Coordination Models for Improving Quality of Life and Reducing Hospital Readmissions in Adult Patients with Multiple Chronic Conditions

Tran Jake[1]*, Rawshani Kamran[2]
[1]Ph.D, MSc-CH, IIWCC-CAN, RRT Adjunct Professor, York University
Email: jtran@torontograce.org
[2]Morris Knolls High School, Rockaway NJ
Email: krrawshani@gmail.com

ABSTRACT
Multiple chronic conditions (MCC) often face complicated healthcare needs that require the coordination of care among various clinical providers. Fragmented communication and extended decision-making processes are the challenges to conventional care frameworks. The current study evaluated the performance of an AI-enhanced care coordination model that integrates predictive analytics to improve the outcomes of adults with MCC. The participants of the intervention were 100 participants (50 undergoing AI-assisted care and 50 undergoing standard care). Quantitative data were assessed between groups with regard to 30-day readmission, emergency department, medication adherence and quality of life. Findings showed that the AI-assisted group had statistically significantly fewer emergency department visits ($p<0.001$), medication adherence ($p<0.001$), and quality of life ($p<0.001$) compared to the standard-care group. Nevertheless, there were no significant differences in readmission rates in groups ($p = 0.177$). The qualitative data of health care providers and patients highlighted the role of the system in the provision of early interventions, improving the interaction process, and promoting patient engagement. On the whole, the AI model showed significant potential to enhance care coordination and patient outcomes in patients with MCC; however, additional studies with larger samples and longer-term follow-ups are justified.

Keywords: AI-enhanced care coordination, chronic conditions, medication adherence, quality of life, healthcare outcomes.

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INTRODUCTION

Multiple chronic conditions (MCC) increase considerable difficulties for adult patients in managing their overall quality of life.1 MCC refers to the simultaneous occurrence of two or more chronic diseases, including diabetes mellitus, systemic hypertension, coronary heart disease, and chronic respiratory diseases.2 This condition is especially prevalent in aging populations, where the incidence of multiple chronic conditions increases with age. Modern epidemiological analyses indicate that 75% of the aged group live with MCC. According to recent studies, a substantial portion of older adults suffer from MCC, leading to complex healthcare needs that require continuous, coordinated management across various healthcare providers and services3,4. The numerous factors often interfere with the management of such patients, including discontinuity in care delivery, inconsistency in interprofessional communication, delays in clinical decision-making, and significant differences in patient compliance with prescribed therapeutic regimens.5 These barriers habitually lead to sub-optimal health care outcomes, increased hospitalisation, and reduced quality of life.

The current models of care coordination among adults with MCC are mostly based on manual charting and non-electronic methods of communication, which are intrinsically ineffective and prone to errors.6 As a result, multidisciplinary teams experience barriers in effective communication across heterogeneous care environments with subsequent discontinuities in patient care. Additionally, a delay in the identification of clinical deterioration among patients with MCC results in unnecessary hospitalisation, prolonged duration of stay, and expenditure of more healthcare resources.7 The complexity within the very nature of numerous

simultaneous chronic conditions only exacerbates the situation, with the patient potentially. Therefore, effective strategies that are specifically designed to meet patient health needs are necessary.

To address these ongoing issues, modern healthcare organisations have adopted new modalities, especially in the integration of artificial intelligence (AI) technologies.8 AI promises to optimise care coordination with the help of predictive analytics, which evaluates patient risk in real time. AI-enhanced coordination systems are based on advanced machine learning algorithms that can analyse large amounts of patient data, including medical records, current health status, and continuous tracking of essential physiological indicators.9 These systems are designed to identify the early signs of clinical deterioration, predict adverse health conditions, and alert medical personnel to take pre-measures to prevent the patient's deteriorating condition. AI-based models can improve patient outcomes, reduce the number of unnecessary hospitalisations, and increase the overall quality of care provided to people with MCC. It is because they equip clinicians with timely and evidence-based decision support.10

The current study aims to evaluate the efficacy of an AI-supported care coordination model that is able to improve quality of life, continuity of care, and reduce hospital readmissions in adults with MCC. The AI system in this study is based on a predictive analytics platform that integrates patient data and health monitoring tools. This platform creates stratified risk profiles that facilitate immediate recognition of patients who are at higher risk. Thus, ensuring that clinical teams are given prior health risk alerts before they develop into more serious complications. The comparison in the study is carried out between two groups of patients who are given the AI-based care coordination model and the other group who is given conventional care. The main outcomes to be measured are 30-day readmission, emergency department visits, medication adherence indicators, and patient-reported quality of life measures. Hence, this study aims to determine the impact of AI on improving care coordination and reducing healthcare utilization for adults with MCC.

MATERIALS AND METHODS

The mixed-method approach was used in this study, combining quantitative and qualitative data to determine the effect of an AI-based care coordination model on patient outcomes. The aim was to assess whether the AI system could enhance important health outcomes among adults with multiple chronic conditions (MCC), especially in terms of decreasing hospital readmissions, emergency department (ED) visits, medication non-adherence, and improving the quality of life of patients. The study was carried out in various adult-care facilities and outpatient clinics, and the sample of 100 patients was used. The patients were randomly assigned to two groups: 50 patients were given AI-assisted care coordination, and 50 patients were involved in standard-care treatment. The baseline characteristics were assessed in the comparison of both groups, including age, sex, and chronic conditions. Patients with more than one chronic disease were eligible for this study.

AI-Enhanced Care Coordination Model

The intervention that was used in this study was an AI-based predictive analytics platform. This system is incorporated into the current electronic health records (EHR) of the patients. EHR helps to record patient data.11 The AI was also planned to update the patient health status in real time based on essential data that is monitored, such as vital signs, lab results, medication history, and past medical history. Risk assessment of patients and creation of individualised risk assessments were tested using machine learning algorithms. The early detection algorithms were included to detect patients who are at risk of deterioration, so that healthcare providers can timely intervene and avoid additional complications. As an example, a patient with a worsening condition or declining vital signs might alert the AI, which would alert the care team, and the necessary changes might be made to the treatment plan.

The AI system also included medication management capabilities in addition to clinical monitoring. It monitored the taking of prescribed drugs and identified cases of non-compliance. Such notifications were sent to healthcare practitioners who could, in turn, correct the situation by reminding the patients about the medications they are taking or changing their medication plan. The AI-enhanced care model was designed to minimise variation in patient outcomes by assisting both providers and patients in real time.

The quantitative data collection is conducted through a questionnaire. The main outcomes were 30-day readmission rates, ED visits, medication adherence, and

patient-reported quality of life. The collection of data about each of these outcomes was as follows:

30-Day Readmission Rates: This was an outcome measured as a binary variable, whereby a value of Yes (1) signified the patient was readmitted within 30 days after discharge, and the value of No (0) signified that the patient had not been readmitted within 30 days of discharge.

ED Visits: The total number of unscheduled ED visits in the last 30 days was taken as a count variable. The frequency of visiting the ED was measured by the number of visits of 0 (No ED visit), 1 (one-day visit), 2 (two-day visit), 3 (three-day visit), and 4 (4th-day visit).

Medication Adherence: Medication adherence was measured by calculating the percentage of medications that were prescribed that the patient took throughout the course of the research. Observation was done using self-reports and data generated by the system that monitored medication adherence rates and usage history.

Quality of Life: The EQ-5D-5L Visual Analogue Scale (VAS) was used to measure the quality of life of the patients. The EQ-5D-5L VAS is a programmed tool that determines the general health of a patient on a scale of 0 (poorest health imaginable) to 100 (best health imaginable)12. This score was used to determine the effect of the AI system on the well-being of patients by giving a measure of the self-reported health status of the patients.

Statistical Analysis: To compare the results of the AI-assisted care and the standard-care control group, the outcome was compared between both groups. In continuous variables, such as medication adherence and the quality of life, independent-samples t-tests were performed to assess the possibility of significant differences between the two groups. The test involved a comparison of group means, so it was possible to evaluate whether the AI intervention resulted in better outcomes as compared to conventional care. The chi-square tests were used in the case of categorical variables, i.e. 30-day readmission rates and ED visits, to compare proportions between groups. The chi-square test was a measure to check whether there were significant differences in the frequency of readmissions and ED visits.13

All tests had the level of significance established as $p>0.05$, meaning that all results whose p-value was less than this were considered statistically significant.14 The statistical tests were performed using SPSS.

Qualitative Data Collection

Healthcare providers and patients were interviewed to provide qualitative feedback to assess the effect of the AI-on-care-coordination model. The interviews with providers were conducted to understand how the AI system impacted the workflow, decision-making process, and communication within the care team, whether it enabled early interventions and improved the coordination of care. Difficulties that were experienced in the implementation process and perceived gain or loss were also addressed.

Qualitative Analysis

Thematic analysis was used as a means of qualitative data analysis. Thematic analysis helps to assess the textual data.15 Interviews were transcribed word-to-word, and the data were coded to establish common themes, patterns and sentiments shared by the two providers as well as patients. The thematic analysis was performed on the topics of the usability of the AI system, its effect on the workflow, coordination of care, and patient interactions. Patient interviews were analysed to identify the themes connected with the perceived advantages of the AI system (such as better quality of care, health outcomes, satisfaction, engagement, communication, and ease of use)

RESULTS

Quantitative Results

The sample population included 100 participants, 50 in an AI-assisted care group (n = 50) and 50 in a control group that received standard care (n = 50). The demographic characteristics of the two groups, including age, sex, and the number of chronic conditions, were identified.

The average age in the group of AI-assisted individuals was 66.8 years (SD = 13.4), and the average age in the group of care providers was 65.4 years (SD = 11.1) (Table 1). Most of the participants were female: 30 females in the AI-assisted group and 24 in the standard-care group (Table 2). There was no significant difference in the number of chronic conditions between the groups: 3.84 chronic conditions in the AI-assisted group and 4.08 in the standard-care group.

30-Day Readmission Rates: For the AI-assisted group, 36 patients (72 %) did not return to the hospital in 30 days, and 14 patients (28 %) returned to the hospital. There

were 31 patients (62% avoidance) and 19 patients (38% avoidance) in the standard-care cohort. Even though the readmission rates of the AI-assisted cohort were lower, the difference was not statistically significant ($p = 0.177$) (Table 3). This indicates that although the AI model showed a tendency toward decreased readmission rates, the difference between the two was not statistically significant.

Emergency Department (ED) Visits: ED visits were significantly lower in the AI-assisted group (mean = 1.24, SD = 1.22) than in the standard-care group (mean = 2.24, SD = 1.51) ($p < 0.001$). The number of patients with multiple ED visits was also lower in the AI cohort, which shows that the AI-enhanced model of care coordination was effective at preventing unnecessary ED visits (Table 4). This result highlights the possibility of the AI system to identify early instances of clinical decline and assist in timely response, reducing the need for emergency care

Table 1: Baseline Characteristics of Study Participants

Descriptives	Descriptives	Descriptives
	Group	**Age**
Mean	**AI-Assisted**	66.8
Mean	**Standard Care**	65.4
Standard deviation	**AI-Assisted**	13.4
Standard deviation	**Standard Care**	11.1

Table 2: Frequencies of Sex

Sex	Group	Counts	% of Total	Cumulative %
Female	**AI-Assisted**	30	30.0%	30.0%
Female	**Standard Care**	24	24.0%	54.0%
Male	**AI-Assisted**	20	20.0%	74.0%
Male	**Standard Care**	26	26.0%	100.0%

Table 3: Frequencies of 30_Day_Readmission

Frequencies of 30_Day_Readmission (Yes=1, No=0)	Frequencies of 30_Day_Readmission (Yes=1, No=0)	Frequencies of 30_Day_Readmission (Yes=1, No=0)	Frequencies of 30_Day_Readmission (Yes=1, No=0)	Frequencies of 30_Day_Readmission (Yes=1, No=0)
30_Day_Readmission (Yes=1, No=0)	**Group**	**Counts**	**% of Total**	**Cumulative %**
No	**AI-Assisted**	36	36.0%	36.0%
No	**Standard Care**	31	31.0%	67.0%
yes	**AI-Assisted**	14	14.0%	81.0%
yes	**Standard Care**	19	19.0%	100.0%

Table 4: Frequencies of ED_Visits_Last_30_Days

ED_Visits_Last_30_Days	Group	Counts	% of Total	Cumulative %
Four ED visits	**AI-Assisted**	0	0.0%	0.0%
Four ED visits	**Standard Care**	7	7.0%	7.0%
No ED visits	**AI-Assisted**	13	13.0%	20.0%
No ED visits	**Standard Care**	9	9.0%	29.0%
One ED visit	**AI-Assisted**	14	14.0%	43.0%
One ED visit	**Standard Care**	14	14.0%	57.0%

Three ED visits	**AI-Assisted**	0	0.0%	57.0%
Three ED visits	**Standard Care**	7	7.0%	64.0%
Two ED visits	**AI-Assisted**	23	23.0%	87.0%
Two ED visits	**Standard Care**	13	13.0%	100.0%

Medication Adherence:

Normality was assessed using the Shapiro-Wilk test, which indicated data were normally distributed for both medication adherence (p = 0.25) and quality of life scores (p = 0.31) (Table 6).

Independent samples t-tests were used to compare the AI-assisted group and standard-care group in terms of medication adherence. The outcomes showed that the AI-assisted group had a much higher drug adherence (mean = 91.4) than the standard-care group (mean = 72.4), and the p-value was less than 0.001 (Table 5). The Cohen's d value of 2.32 indicates a large effect size, which indicates a large difference between the two groups.

Quality of Life (EQ-5D-5L VAS Score): The quality of life measured in terms of EQ5D5L Visual Analogue Scale (VAS) score showed a distinctly higher score in the AI-assisted group (mean = 80.9) compared to the standard-care group (mean = 64.3). The t-test was used to prove that there was a statistically significant difference (p = < 0.001) and the effect size is large (Cohen's d = 2.50) (Table 5). These results indicate that the AI-based model of care coordination had a significant effect on the perceived quality of life in patients.

Table 5: Independent Samples T-Test

									95% Confidence Interval	**95% Confidence Interval**
		Statistic	**df**	**p**	**Mean difference**	**SE difference**		**Effect Size**	**Lower**	**Upper**
Medication_Adherence (%)	**Student's t**	11.6[a]	98.0	<.001	16.0	1.38	Cohen's d	2.32	1.81	2.83
Quality_of_Life_Score (EQ-5D-5L	**Student's t**	12.5	98.0	<.001	14.9	1.20	Cohen's d	2.50	1.97	3.02

VAS Score (0–100))						
Note. H_a μAI-Assisted ≠ μStandard Care	Note. H_a μAI-Assisted ≠ μStandard Care	Note. H_a μAI-Assisted ≠ μStandard Care	Note. H_a μAI-Assisted ≠ μStandard Care	Note. H_a μAI-Assisted ≠ μStandard Care	Note. H_a μAI-Assisted ≠ μStandard Care	Note. H μAI-Assist ≠ μStand d Care
[a] Levene's test is significant (p < .05), suggesting a violation of the assumption of equal variances	[a] Levene's test is significant (p < .05), suggesting a violation of the assumption of equal variances	[a] Levene's test is significant (p < .05), suggesting a violation of the assumption of equal variances	[a] Levene's test is significant (p < .05), suggesting a violation of the assumption of equal variances	[a] Levene's test is significant (p < .05), suggesting a violation of the assumption of equal variances	[a] Levene's test is significant (p < .05), suggesting a violation of the assumption of equal variances	[a] Leven test is signifi nt (p < .05), sugges ng a violati of the assum on of equal varian s

Table 6: Normality Test (Shapiro-Wilk)

	W	**p**
Medication_Adherence (%)	0.954	0.25
Quality_of_Life_Score (EQ-5D-5L VAS Score (0–100))	0.958	0.31
Note. A low p-value suggests a violation of the assumption of normality	Note. A low p-value suggests a violation of the assumption of normality	Note. A low p-value suggests a violation of the assumption of normality

Qualitative Results

Besides the quantitative results, the qualitative feedback on the healthcare provider and patient levels was examined to evaluate the perceived efficacy and usefulness of the AI-enhanced care coordination model. Thematic analysis was used to determine common trends, themes, and sentiment based on interviews of healthcare

providers and patient satisfaction surveys (See Tables 7 and 8). These lessons proved necessary to learn how the AI system could be used in a real-life scenario and whether it has an impact on care coordination and patient engagement.

Healthcare Providers' Feedback

The healthcare providers were also generally positive about the AI-enhanced care coordination model, as it has the potential to improve patient management and simplify clinical workflows. Two major themes were identified based on the information collected on the providers: Early Detection and Proactive Care, and Integration Challenges and Training Needs.

Early Detection and Proactive Care: The ability of the AI system to track the health of patients in real time and provide alerts about the initial signs of clinical deterioration turned out to be incredibly useful, as perceived by the providers. This helped in taking timely actions that allowed the healthcare teams to intervene with the possible problems before serious complications. The participants noted that the AI system assisted in early recognition of the at-risk patients, which enhanced a more proactive attitude towards patients. The shift towards proactive care instead of reactive care was perceived by many as one of the most advantageous features of the AI model, especially as it applies to the patient population with a known chronic condition and is prone to sudden health deterioration.

One of the providers said, "*The AI system enables us to detect issues before they become difficult, it means that we can respond very fast and prevent some complications. This was the overall feeling that was generally echoed in interviews and many of the providers emphasised that early intervention had the potential to mean fewer hospitalisations or visits to the Emergency Department, and this would benefit patients*."

Integration Problems and Education Requirements: Although the general response was positive, multiple providers expressed concerns about how the AI system would integrate with the current Electronic Health Records (EHR) systems. To a large extent, these apprehensions came about as a result of the technical challenges first experienced during the process of aligning the AI system with the already available healthcare infrastructure. Although the respondents admitted that the AI system was a useful tool, they added that without the necessary integration into the current working process, the potential of the latter cannot be achieved.

One healthcare practitioner said, "*The implementation into our current system was somewhat difficult at first. More training should be provided to tap its full potential*." This feedback implies that despite the positive perceptions of the AI system, there are still a number of challenges related to the adaptation of the system to users and its integration with technical systems. The respondents noted that they needed more training so that they could make the maximum use of the system, particularly when new features and changes were being added.

Patients' Feedback

The patient feedback demonstrated that there was general agreement that the AI-enhanced model of care coordination enabled the patient to engage more and receive a more personalised therapeutic experience. Two main themes were identified by the thematic analyses: Empowerment and Patient Engagement, and Personalised and Supportive Care.

Empowerment and Patient Engagement: Most of the respondents indicated that the AI system helped increase a sense of control over the management of their chronic conditions. The ability of the system to track health indicators and send medication alerts was also mentioned more than once as a relevant characteristic. Patients reported that the reminders were necessary in their compliance with the pharmacological treatment, which is often a major problem with long-term disease patients. Therefore, the AI-based delivery of timely notifications and information-based knowledge seemed to enable patients to play a more active role in the maintenance of their health.

One patient stated, *Reminders were very helpful in reminding me to remember my medications. I was more in control of my health."* This point of view was supported by several respondents, and all of them stressed that the AI system provided the required tools and knowledge to allow them to actively manage health conditions. The subsequent engagement enhancement probably led to better medication adherence, a critical success in chronic disease management.

Individualised and Supportive Care: The ability of the AI system to tailor care plans according to individual health information was repeatedly noted by interviewees as the fundamental benefit of the system. This customisation

was seen to fit in with individual health goals and worries of patients and cemented the feeling of custom treatment. This personalised care is typically considered a beneficial characteristic of the technologically enhanced care models.

One patient said, *"the system accommodated my needs. It had the feeling that the care was made with me in mind*." This was reflected by many respondents who stated that the model provided some degree of responsiveness that was sensitive to their unique conditions. The delivery of real-time updates and safety notifications also made the patients feel like their condition was constantly being monitored and improved to achieve the best results.

DISCUSSION

The current research shows that AI-enhanced care coordination can produce meaningful changes in various outcomes among adults with multiple chronic conditions (MCC). It helped to decrease the number of emergency department (ED) visits, improve medication adherence, and improve quality of life. These results are consistent with the available literature that demonstrates how artificial intelligence can be used to promote healthcare services by providing clinicians with the ability to recognise high-risk patients before the escalation of risk factors to more serious health issues.16 Real-time risk assessment, facilitation of early intervention, and improvement of communication within care teams are some of the ways AI systems can be utilised to improve healthcare delivery. The combination of such tools into clinical practice can therefore be a promising approach to the necessary complexity of chronic disease management.17 One of the main findings of the current study was the reduction in ED visits recorded in the AI-assisted group compared to the standard care group. The use of ED is one of the key issues in the treatment of patients with chronic illnesses, as it is costly, preventable, and a marker of deteriorating health conditions.18 The ability of the AI-based system to constantly track patients and provide real-time notifications about the first indicators of worsening condition must have played a significant role in the number of unwarranted ED visits. Patients with MCC are vulnerable to rapid health changes, so it is vital to detect the condition and act early to prevent emergencies and enhance long-term effects.19 The proactive nature of the system of raising concerns before they get out of control allowed care teams to intervene earlier and, as a result, reduce emergency care and possibly slow down spending on healthcare. The reduction in ED visits in the AI-assisted group is consistent with the previous research that highlighted the significance of real-time monitoring and early intervention in avoiding unnecessary hospitalisations and ED visits.20 The practical evidence shows that AI systems can reduce the rates of hospitalisations and ED visits with the help of preparing healthcare professionals to act until the conditions of patients become worse, thus reducing the need for emergency treatment. This alignment provides further basis for the assumption that predictive analytics and early detection will improve the efficiency and effectiveness of care coordination among chronically affected patients, which will eventually result in better health outcomes and cost containment. Another area where the AI system brought significant change was in the field of medication adherence. Lack of compliance with prescribed pharmacotherapies is an established factor of suboptimal outcomes in the management of chronic diseases, which is associated with more frequent hospitalisation and higher healthcare expenditures. The possibility of the AI-enhanced model to monitor therapeutic regimens and remind patients of taking medications was a central factor in the increase in the adherence rates in the intervention group. The major difference in the rates of medication adherence in the two groups supports the idea that AI-based systems can successfully deal with non-compliance, which is one of the main barriers to successful chronic disease management.21 The increase in medication adherence rates reported in this study aligns with a broader body of literature that proves the effectiveness of digital health interventions in promoting patient adherence to prescribed therapy.22 Using AI tools, e.g., in medication reminders, progress monitoring, real-time alerts, etc., has been revealed to enhance patient interactions and increase adherence to therapeutic routines. The above findings indicate that introducing the use of such systems in chronic care management not only enhances compliance but also leads to improved patient health outcomes, thus reducing the chances of complications and hospitalisations often triggered by non-adherence. In addition to medication adherence, another significant effect of the AI intervention was the quality-of-life measure, which indicated an increase in the quality of life in patients belonging to the AI-assisted group. The EQ-5D-5L Visual analogue Scale (VAS) showed that

patients in the AI-enhancing care group gave significantly better health status scores than the standard care condition. This quality-of-life improvement could probably be explained by the fact that the AI system is constantly controlling the well-being of patients and provides them with personalised care.23 Since people who have chronic conditions have to face regularly a continuum of physical, emotional, and social factors, the provision of personalised care that would meet the particular needs will significantly improve the overall well-being and satisfaction with care. Individualised care is a highly important aspect of chronic disease care, and AI systems are perfectly placed to provide personalised care.

The AI model enabled clinicians to provide more specific interventions by tailoring the care plans to the needs of individual patients based on real-time data and constant monitoring. When patients feel that they are receiving care that is personalised, they are likely to achieve positive health results and have increased satisfaction with their treatment. The observed improvement in the quality of life of the AI-assisted group is an additional indication of the need to use AI to enhance individual care delivery and support the specific needs of patients with multiple chronic conditions. Despite these significant results, the research is limited by a number of constraints. First, long-term follow-up is not available, which eliminates the possibility of defining whether the benefits of AI-enhanced care coordination are long-lasting. A long observation duration is needed to determine the long-term efficacy of AI in the better patient outcomes, the reduction of hospital readmissions, and the quality of life.24 Considering the chronicity of conditions that were examined, it is essential to measure the maintenance of the improvements that have been observed over a lengthy period. The longitudinal follow-up to clarify the long-term effect of AI-based care coordination should be included in future studies, therefore. Second, the sample (100 patients) is small but sufficient to conduct an exploratory analysis. However, larger and more diverse populations are needed to confirm the conclusions and to determine that the AI-enhanced model can be extrapolated to various healthcare conditions and a wider range of patients.25 The sample of the study was limited to a particular clinical setting, and a larger multi-centre analysis with diverse patient groups would provide a more detailed estimation of the scalability and applicability of the AI system to dissimilar clinical settings. Another limitation is the possibility of bias presented through self-reported outcome measures like medication adherence and quality of life. Although patient-reported measures play an invaluable role in assisting in the expression of patient viewpoints and experiences, they are prone to biases, as the respondents can over-report adherence or give socially desirable responses. To address this shortcoming, future studies might also include objective outcome measures such as medical documents or clinical evaluations in addition to patient-reported data. Objective indicators would provide a more accurate representation of health status and health outcomes, especially when self-reported information can be manipulated.

CONCLUSION

In conclusion, AI-based care coordination shows a significant potential to optimise the management of adults with a variety of chronic conditions. The AI system tested in this research was effective in minimising emergency department visits, improving medication adherence, and improving the quality of life of patients, all of which are important determinants in the care of patients with complex health requirements. These results suggest that AI has the potential to be a key factor in enhancing care coordination, reducing hospital readmissions, and positively affecting patient outcomes. However, the results need additional investigation to support them in larger and more diverse populations, and also to evaluate the efficacy of AI in the long-term management of chronic diseases. Besides, subsequent research must assess the cost-effectiveness of an AI-based care model implementation and the challenges and barriers to its implementation in various healthcare environments. The solutions to these problems will be necessary in order to make AI an integral part of healthcare and, eventually, to improve the quality of care offered to adults with multiple chronic conditions.

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Authors' Contributions

All authors contributed to data analysis, drafting, and revising the paper, and agreed to be responsible for all aspects of this work.

Declaration of Conflicts of Interest

The authors declare that they have no conflict of interest.

Ethics Approval and Consent to Participate

Ethical approval was obtained from the research committee. Informed consent from participants and healthcare professionals was taken.

Availability of Data and Materials

Not applicable.

Use of Artificial Intelligence

Not applicable.

Declarations

The authors declare that all works are original and that this manuscript has not been published in any other journal.

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Appendix

Table 7: HealthCare's Feedback Themes Development

Quote	Code	Theme
"The AI system helps us catch problems before they escalate, which means we can act quickly and avoid complications."	Early Intervention, Real-time Alerts	Early Detection and Proactive Care
"There was a bit of a struggle initially with integrating it into our existing system. We need more training to fully leverage its potential."	System Integration, Training Needs	Integration Challenges and Training Needs

Table 8: Patients' Feedback Themes Development

Quote	Code	Theme
"The reminders really helped me stay on top of my medications. I felt more in control of my health."	Medication Reminders, Engagement	Empowerment and Patient Engagement
"The system tailored to my needs. It felt like the care was specifically designed for me."	Personalized Care, Tailored Treatment	Personalized and Supportive Care