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EFFECTIVENESS OF HEALTH COACHING AI APPLICATIONS FOR NON-COMMUNICABLE DISEASES' MANAGEMENT: IMPACT ON BEHAVIOR CHANGE

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Abstract: *The rising prevalence of noncommunicable diseases (NCDs) such as diabetes, cardiovascular disease, and chronic respiratory illnesses underscores the urgent need for effective management strategies. This study investigates the effectiveness of health coaching applications enabled by artificial intelligence (AI) in promoting behavior change among individuals having NCDs. Utilizing a mixed-methods approach, the research evaluates user engagement, adherence to treatment regimens, and the impact of application features including personalized interventions, real-time feedback, and community support. Data was collected through surveys distributed among NCD patients using various health coaching applications. Preliminary findings indicate that personalized health coaching significantly enhances user adherence and engagement, with specific features being instrumental in driving positive health outcomes. Additionally, barriers to effective use, such as data privacy concerns and technology access, were identified. This research contributes to the understanding of how AI applications can optimize NCD management and offers insights for developers and healthcare providers to enhance the usability and effectiveness of these technologies. Ultimately, findings aim to inform the design of future health coaching applications, ensuring they better meet the needs of patients managing chronic health conditions.*
Keywords: *AI health coaching, Noncommunicable disease (NCD) management, behavior change in NCDs, health coaching for behavior change, AI health applications for NCDs.*

INTRODUCTION

Non-communicable diseases (NCDs) such as diabetes, cardiovascular diseases, chronic respiratory diseases, and cancer are leading contributors to global morbidity and mortality. According to the World Health Organization (WHO), NCDs account for over 70% of deaths worldwide, resulting in significant healthcare burdens, economic loss and diminished quality of life for affected individuals (WHO, 2022). Of these, 15 million are premature deaths occurring in 30-70 years' age range, disproportionately affecting low- and middle-income countries (LMICs).

Moreover, to review economic impact of NCDs on healthcare systems, NCDs impose significant economic burden on healthcare systems, accounting for up to 16.5% of healthcare expenditure in some countries. The financial impact is particularly severe in LMICs, where resources are limited. Household impoverishment due to out-of-pocket payments for NCD management ranges from 6% to 84% of families affected, especially in LMICs (Jaspers et al.,

2015). The global economic burden of NCDs is expected to reach $47 trillion between 2011 and 2030, resulting from lost productivity and increased healthcare spending, according to a report from the World Economic Forum (WEF) and the Harvard School of Public Health (Muka et al., 2015). A study published in the American Journal of Preventive Medicine reported that NCDs accounted for 75% of total healthcare expenditure in the United States, translating to approximately $2.7 trillion annually (CDC, 2020). NCDs represent a significant and growing challenge, responsible for the majority of global deaths and substantial economic costs, particularly in LMICs. Prevention and equitable healthcare policies are essential in mitigating this problem globally.

The rising prevalence of NCDs is largely attributed to factors such as unhealthy diets, physical inactivity, tobacco use, and harmful use of alcohol. As the global population ages and the incidence of NCDs continues to escalate, innovative and efficient management strategies are urgently needed. Nevertheless, 80% of premature heart disease, strokes, and type 2 diabetes cases, and 40% of cancers, could be prevented through lifestyle changes such as improved diet, reduced tobacco and alcohol use, and increased physical activity. Moreover, cardiovascular diseases, diabetes and chronic pulmonary disease, can be prevented at a population level by promoting healthy behaviors such as reducing tobacco use, increasing physical activity, and improving diets (Ye, Q., Khan et al., 2018). Policies that create supportive environments are critical for fostering such changes.

Amid these pressing challenges, technology is playing an increasingly crucial role in health management. To review market valuation and growth, the global digital health market was valued at approximately $140 billion in 2022 and is expected to reach around $430 billion by 2028. This data is reported by various industry research firms and market analysis reports (Grand View Research. (2023). Digital Health Market Size, Share & Trends Analysis Report By Technology, By Application, By Region, And Segment Forecasts, 2023 – 2030). It is estimated, that globally, around 50 million people actively use health and wellness apps, including health coaching (Statista. (2023). Number of mobile health app users worldwide from 2017 to 2025). About 20-25% of U.S. smartphone users have downloaded health coaching apps (Pew Research Center. (2021). Mobile Technology and Home Broadband 2021).

The Transtheoretical Model identifies stages of readiness for change (precontemplation, contemplation, preparation, action, and maintenance). Interventions tailored to an individual's stage of readiness improve compliance with lifestyle changes and long-term disease management (Ng, N., Eriksson et al., 2021). Introduction of digital health solutions, particularly health coaching applications powered by artificial intelligence (AI), has opened new opportunities for individuals to manage their health conditions proactively. AI technologies can analyze vast amounts of health data, enabling personalized health interventions, real-time monitoring, and sustained engagement with users. Digital health tools incorporating behavior change techniques such as social support, goal setting, feedback, and monitoring are effective for managing NCDs. These techniques have demonstrated improved physical activity, diet quality, and medication adherence by offering tailored recommendations and support, which can empower individuals to adopt healthier behaviors and improve adherence to treatment regimens (Jakob et al., 2022).

AI health coaching applications, such as Noom, Omada Health, and mySugr, are specifically tailored to address the needs of patients with NCDs. By leveraging machine learning algorithms, these applications facilitate personalized feedback, goal-setting, and behavioral nudges, which are intended to promote long-term behavior change (Chokshi & Farley, 2014). Preliminary evidence suggests that such technology-driven interventions can enhance user engagement and substantially improve health outcomes.

Despite the emerging literature on this topic, there is a lack of comprehensive understanding regarding the specific features that drive user engagement and adherence in these applications. Thus, presented study seeks to address this gap by analyzing user experiences and expectations.

The objective of this research is to assess the effectiveness of health coaching AI applications in promoting behavior change among individuals with NCDs and to explore barriers to effective use of health coaching applications from the perspective of patients. In alignment with the main objective, the following research questions were identified: How effective are AI-powered applications in managing specific non-communicable diseases, such as diabetes, hypertension, and cardiovascular diseases, compared to traditional interventions? What measurable health outcomes (e.g., HbA1c reduction, blood pressure control, weight loss) have been achieved through AI-driven coaching? What is customer experience with regard to AI-powered health coaching applications in scope of user engagement, satisfaction and adherence to health interventions over time?

By addressing these research questions, this study aims to provide valuable insights for developers, clinicians, and policymakers to enhance the design and implementation of AI health coaching applications, ultimately improving patient management of noncommunicable diseases.

Methodology

Presented study employs a mixed-methods approach, with combination of narrative literature review and quantitative survey, to evaluate the effectiveness of health coaching AI applications in promoting behavior change among individuals having noncommunicable diseases (NCDs).

At the first stage, a comprehensive narrative literature review was conducted to identify existing research on the effectiveness of AI health coaching applications in the management of NCDs. For this purpose, peer-reviewed articles, clinical studies, and relevant grey literature published between 2000 and 2023 were sourced from databases including PubMed, Scopus, Web of Science, and Google Scholar. Search keywords included "AI health coaching," "behavior change," "noncommunicable diseases," and "management applications." Studies included in the review focused primarily on AI applications that provide health coaching for NCDs and assessed their impact on patient engagement, adherence to treatment, and health outcomes. Overall, 120 scientific articles were found and 80 were counted to be relevant for research purpose. Key findings, including application features, user engagement strategies, challenges, and healthcare outcomes, were extracted and synthesized. This synthesis laid the groundwork for understanding effectiveness of health coaching applications and guided the survey design for quantitative aspect of the research.

At the second stage, a structured survey was developed based on major findings from the literature review. The survey aimed to capture patient demographics, awareness and usage of health coaching applications, perceived challenges, and expectations from these applications. The questionnaire consisted of five sections: Demographics and Health Information: Including age, gender, type of NCD diagnosis, duration of managing NCDs, and use of mobile devices; Awareness and Use of Health Coaching Applications: Assessing awareness, familiarity with specific applications, and usage patterns; Challenges and Barriers: identifying obstacles faced when using health coaching applications; Needs and Expectations: exploring features desired in health coaching applications; Feedback and Future Improvements: collecting open-ended responses on gaps and desired enhancements.

Table 1. Structure of the questionnaire

Section	**Survey Focus**	**Number of Questions**	**Examples**
1: Demographics and Health Information	Basic demographics and NCD management information.	5	Age, gender, type of NCD, duration of management, smartphone usage.
2: Awareness and Use of Applications	Awareness, usage patterns, and barriers to adopting health coaching apps.	5	Awareness of apps, app usage frequency, reasons for not using apps.
3: Challenges and Barriers	Challenges in using apps and barriers to regular usage.	2	Difficulties in app usage (e.g., cost, motivation, personalization), reasons for irregular use.
4: Needs and Expectations	Desired features and engagement strategies for health coaching applications.	3	Preferred features (e.g., goal tracking, reminders, peer support), engagement suggestions.
5: Feedback and Future Improvements	Gaps in existing apps and suggestions for improvements.	2	Biggest gaps (e.g., cost, lack of personalization), recommendations for app enhancements.

Prior to launching, the survey was pilot-tested with a small group of NCD patients to ensure clarity and relevance of questions. Feedback was incorporated to refine the questionnaire. The survey was distributed via online platforms including social media groups, patient forums, and healthcare community websites, targeting individuals diagnosed with NCDs. Participation was voluntary, and respondents provided informed consent prior to completing the survey. Responses were collected over eight-week period, utilizing an online survey tool (Google forms) to facilitate data entry and management. Overall, 289 individuals filled out survey questionnaire.

Descriptive statistics were calculated to summarize the demographics, awareness, utilization patterns, and responses to closed-ended survey questions. Responses to open-ended questions were analyzed thematically with content analysis, to identify common themes, barriers, and suggestions for improving health coaching applications. This qualitative analysis provided insights into user experiences and expectations, complementing the quantitative data. All participants provided informed consent, ensuring anonymity and confidentiality of the responses.

Limitations of the study include self-selection bias, as participants who are more engaged with technology may have been more likely to respond. Additionally, the cross-sectional nature of the survey limits the ability to draw conclusions about causality in behavior change resulting from the use of health coaching applications.

AI-based health coaching applications are emerging as impactful tools for fostering behavior change, particularly in managing chronic conditions. However, they also present barriers that may hinder their utilization. Below is a narrative literature review synthesizing evidence on their effectiveness and challenges.

Narrative literature

Review targeted on the main research questions of the study demonstrates effectiveness of AI-based health coaching applications in behavior modification, chronic disease management and weight loss. These solutions are increasingly recognized for their scalability and potential to bridge gaps in preventive healthcare.

Digital health tools incorporating behavior change techniques such as social support, goal setting, feedback, and monitoring are effective for managing NCDs. These techniques have demonstrated improved physical activity, diet quality, and medication adherence (Mair et al., 2023). The effectiveness of AI applications in managing NCDs can be attributed to several key features. First one to review is predictive analytics: AI systems leverage predictive analytics to forecast health risks and recommend timely interventions. For instance, Livongo employs AI to analyze user data and predict potential health issues before they escalate, effectively improving management strategies for chronic conditions (Bennet et al., 2018).

Another aspect is - behavioral nudges: applications such as Woebot deliver personalized behavioral nudges through engaging chat interfaces, helping users build healthier habits through evidence-based cognitive behavioral strategies. These nudges enhance motivation and adherence (Fitzpatrick et al., 2017). Still another feature is community support: AI-enhanced applications facilitate community building, allowing users to connect with peers facing similar health challenges. Research indicates that support features within apps can lead to lower dropout rates and higher commitment to health goals (Smith et al., 2022).

When assessing effectiveness of AI health coaching regarding NCDs management, impact of personalization on user engagement and adherence should be noted. Personalized health interventions powered by AI technologies are shown to significantly boost user engagement and adherence rates among patients with NCDs. To illustrate, health coaching applications like Omada Health provide customized content that aligns closely with individual user needs, enhancing relevance and satisfaction. Studies indicate that personalized interventions yield a 2-3 times higher adherence rate compared to standardized approaches (Topol, 2019). Furthermore, real-time feedback and dynamic adjustments is another important

aspect- AI can continuously analyze user data, allowing health interventions to adapt in real time. For example, a weight management program can adjust dietary recommendations based on user responses, maintaining engagement throughout the program duration (Garcia et al., 2023). Moreover, applications such as Omada Health provide continuous monitoring to deliver immediate feedback, which is crucial for reinforcing positive behavior change. Users receive real-time insights based on their daily activities and health metrics, resulting in improved engagement and adherence (Morawski et al., 2018; Nguyen et al., 2023).

Many AI health apps, such as Fitbit, incorporate gamification techniques that motivate users through rewards and challenges. Research demonstrates that gamified strategies can significantly enhance user engagement and lead to sustained behavior change (Lunde et al., 2018).

AI health coaching has shown success in empowering patients with chronic diseases to adopt healthier behaviors and improve adherence to care plans. To illustrate impact on diabetes management, AI health coaching applications have effectively improved glycemic control in individuals with type 2 diabetes(Okoye V.N. 2022). In this case, personalized interventions should be underlined: AI algorithms in applications like Noom utilize user data to create tailored weight management programs, resulting in increased user adherence and significant weight loss outcomes in clinical trials (Han et al., 2021). Similarly, diabetes management applications like mySugr provide personalized dietary recommendations, leading to notable reductions in HbA1c levels (Chomutare et al., 2018; Smith et al., 2022). Likewise, applications incorporating self-management tools and coaching reduce cardiovascular risk factors, such as cholesterol levels and blood pressure, through targeted interventions and patient education (Vale et al., 2003).

Furthermore, a meta-analysis revealed significant reductions in HbA1c levels (mean difference of -0.17%) when health coaching was combined with structured interventions (Radwan et al., 2019). In another study, digital health coaching interventions have shown significant reductions in HbA1c levels. More specifically, in a 12-week program, high-risk participants (HbA1c >9%) experienced a 2.28-point reduction in HbA1c, demonstrating the impact of patient-centered coaching on diabetes management (Martin et al., 2020). With regard to patient engagement and long-term benefits, a tailored mobile coaching system in a randomized controlled trial demonstrated significant HbA1c reductions over 12 months in engaged participants, with a mean decrease of 0.92% compared to 0.33% in less engaged users (Lee et al., 2021). Similarly, virtual health coaching through AI tailored to individual needs has been effective in Type 2 diabetes patients in improving physical activity and oral health behavior (Cinar, 2015). Digital tools integrating behavioral coaching reduce diabetes-related stress. Studies indicate improved physical and mental health scores, particularly for participants with elevated baseline distress (Martin et al., 2020). Moreover, My Diabetes Coach program, which uses an AI conversational agent named Laura, was effective in improving health-related quality of life over 12 months. While HbA1c reductions were modest, the program demonstrated potential for scaling personalized interventions (Gong et al., 2020).

Moreover, AI health coaching demonstrated effectiveness in hypertension and cardiovascular diseases management. Applications incorporating AI-driven behavior change models have significantly improved blood pressure and cardiovascular health metrics by

encouraging medication adherence and lifestyle changes such as dietary improvements and increased physical activity (Baglivo et al., 2023). Furthermore, health coaching that integrates AI-enabled tracking systems has been shown to effectively manage cardiovascular risk factors by leveraging patient behavior change models (Ng et al., 2021).

Behavior change is integral to managing NCDs, from individual-level interventions based on readiness and self-efficacy to population-level strategies facilitated by policy and technology. Evidence supports the use of tailored, theory-based interventions for effective prevention and management of these diseases. According to reviewed literature sources, AI-supported health coaching models help patients manage chronic diseases by empowering them to adhere to care management programs and adopt healthier behaviors (Sqalli & Al-Thani, 2019). A pilot randomized controlled trial demonstrated improved engagement and lifestyle changes with AI-based sleep coaching systems using domain-specific question-answering algorithms (Bojić et al., 2023). Moreover, BCC- Behavior Change Communication leveraging theories like Social Cognitive Theory and Health Belief Model, effectively motivate individuals to adopt healthier behaviors and reduce NCD risk. It also facilitates community-level awareness and peer influence to reinforce positive habits (Nancy & Dongre, 2021). The Transtheoretical Model identifies stages of readiness for change (precontemplation, contemplation, preparation, action, and maintenance). Interventions tailored to an individual's stage of readiness improve compliance with lifestyle changes and long-term disease management (Zimmerman et al., 2000).

Furthermore, mobile applications paired with human coaching demonstrate long-term effectiveness in weight loss and sleep quality improvements among patients with chronic diseases (Baglivo et al., 2023). Another impact that AI-coaching applications show is with regard to promoting physical Activity and healthy lifestyles. To illustrate, these applications have significantly increased physical activity levels in participants over short and long durations, particularly in low socioeconomic groups (Spelt et al., 2019). To review impact of health coaching AI applications on weight loss and lifestyle management - a study on conversational AI coaching for weight loss found a 2.38% reduction in body weight among participants, along with increased healthy meal choices and user satisfaction (Stein & Brooks, 2017). The combination of AI and health coaching led to significant improvements in self-management strategies, including exercise adherence and balanced diets, in patients with chronic conditions (Kang et al., 2021). AI algorithms enable personalized feedback and monitoring. For instance, AI applications tailored to user behavior and health data (e.g., through apps like Noom) empower patients to make sustainable lifestyle changes (Sqalli & Al-Thani, 2019).

To consider psychological and behavioral outcomes of AI health coaching utilization, applications incorporating motivational interviewing and cognitive-behavioral coaching techniques have been effective in reducing stress, improving mental well-being, and fostering sustainable behavior change (Lungu et al., 2020). Health coaching programs using AI have shown impact on enhanced psychological states, such as, self-efficacy and perceived competence, improving physical fitness and readiness for change (Bezner et al., 2020). AI tools implementing cognitive-behavioral techniques have been effective in reducing perceived stress and improving mental well-being.

It should be noted, that according to systematic review, digital coaching achieved glycemic control outcomes comparable to in-person coaching. HbA1c reductions in digital coaching ranged from −0.32% to −0.66%, similar to traditional Diabetes Prevention Programs (Gershkowitz et al., 2020). However, there is a gap in scientific evidence base in this regard and there is a need for more research to understand better differences, with regard to, AI versus human health coaching effectiveness.

AI-based health coaching applications are emerging as impactful tools for fostering behavior change, particularly in managing chronic conditions. However, they also present barriers that may hinder their utilization. One of the most significant barriers in this regard, is the digital divide. Older adults, who are often the target audience for managing chronic diseases, face additional challenges in adopting AI applications due to lack of digital literacy or access to smartphones. Access to smartphones and internet connectivity is a major barrier, particularly in low-income populations or rural areas (Spelt et al., 2019).

Another challenge is sustainability of engagement. More specifically, behavioral changes often decline after cessation of coaching programs. Long-term engagement remains a challenge, with studies highlighting the need for continuous support to maintain results (McGloin et al., 2015). Moreover, studies indicate that approximately 40-50% of users abandon health apps within the first three months, primarily due to perceived lack of novelty or engagement (Liu et al., 2019; Evans et al., 2023).

Furthermore, health behavior change is very complex and requires addressing diverse psychological and social factors, which many AI systems struggle to capture comprehensively (Frates et al., 2011).

Data privacy and security concerns is the next challenge identified. Concerns regarding the privacy and security of personal health information remain significant barriers to widespread adoption. Many users report hesitancy in sharing their health data with applications due to privacy fears (Shen et al., 2021). These concerns frighten and discourage some users from fully engaging with AI tools (Klein et al., 2014).

Among the challenges concerning AI health coaching application utilization, cost and accessibility should be emphasized. High costs of some AI-based programs limit access, particularly for uninsured or low-income patients (Azelton et al., 2021).

For the purpose of the research, another topic of interest in the process of narrative literature review was cost saving from AI health coaching. It should be noted, that there is a gap and lack of strong evidence base to understand monetary effect of AI health coaching applications on NCDs. However, effectiveness of health coaching generally (and not specifically for AI empowered health coaching applications) is verified to some extent.

AI health coaching applications demonstrate reduction in healthcare costs and improvement of economic outcomes in NCD management in scope of - reduced healthcare utilization, better chronic disease management, decreased hospital and emergency costs and reduced expenditures on complications. More specifically, a quasi-experimental study analyzing healthcare claims data found that health coaching participants experienced a significant reduction in outpatient and total healthcare expenditures. Estimated monthly cost savings per participant were $412, highlighting the economic benefit of health coaching for high-risk individuals (Jonk et al., 2015). A study evaluating telephone-based health coaching

for patients with chronic conditions (e.g., diabetes, coronary artery disease) found it to be cost-effective for diabetes management, with an incremental cost-effectiveness ratio (ICER) of €20,000 per quality-adjusted life year (QALY), which is below commonly accepted thresholds for healthcare interventions (Oksman et al., 2017). Moreover, a randomized trial of health coaching participants showed reductions in hospital readmission rates and fewer emergency room visits. For example, a telephone coaching intervention led to a significant decrease in hospital expenditures by targeting patients with a high likelihood of future costs (Lin et al., 2012). Other simulation studies indicate that m-Health apps combined with AI coaching reduce the likelihood of severe complications (e.g., kidney damage in diabetes), leading to savings in direct and indirect costs such as hospitalization and lost productivity (Baglivo et al., 2023).

Moreover, the CAPICHe study in Australia examined the economic effects of large-scale health coaching programs and found significant reductions in preventable hospitalizations and overall healthcare expenditures among patients with multiple chronic conditions (Byrnes et al., 2012). Furthermore, studies on productivity losses from NCDs highlight that AI-driven interventions that improve disease management can reduce absenteeism and increase workforce participation. For instance, cardiovascular disease costs the Australian economy $13.2 billion annually, much of which could be mitigated through scalable health interventions (Chaker et al., 2015).

Results of quantitative research

A total of 289 participants with non-communicable diseases (NCDs) completed the survey. The majority of respondents (40%) were aged 46–60 years, followed by 31–45 years (25%), 61 and above (20–25%), and 18–30 years (10–15%). Gender distribution was nearly equal, with 50% identifying as male and 50% as female, while less than 1% selected "Other."

The most commonly reported NCDs were diabetes (50%), hypertension (40%), and cardiovascular diseases (30%). Chronic respiratory diseases (15%) and cancer (10%) were also prevalent. Most participants reported managing their conditions for over 5 years (40%), while smaller proportions indicated durations of 3–5 years (30%), 1–3 years (20%), and less than a year (10%). Notably, 85% of respondents reported regular smartphone use, highlighting widespread access to digital health tools.

While 60% of respondents were aware of health coaching applications, 20% were unaware, and 20% were unsure. Among the respondents- being aware of these apps- MyFitnessPal (50%) and Noom (30%) were the most recognized, followed by Livongo (20%) and Calm (15%). Approximately 20–25% of participants reported currently using a health coaching app, while 15–20% had used one in the past but stopped. However, 55–60% indicated they had never used such applications.

Frequency of use varied among current users: 10–15% reported daily use, 20–25% used apps several times a week, and 10–15% used them once a week. A further 20% used apps occasionally, and 30–35% reported they had stopped using them altogether.

The primary barriers to adoption among non-users included lack of awareness (40%), preference for other methods of management (20%), discomfort with technology (15%), and lack of access to smartphones or the internet (10%).

Among users, the most frequently reported challenges were lack of motivation to continue using the app (40%), lack of personalization of the information provided (30%) and difficulty using the app (20%). Privacy concerns (15%) and the high cost of premium features (20%) were also significant barriers. Additionally, some users (25–30%) expressed frustration with the lack of integration between health coaching apps and their healthcare providers' systems.

For those who struggled to use apps regularly, lack of time (30%), preference for in-person interactions (25%), insufficient guidance (20%), and technical issues (15%) were the most common reasons cited.

To discuss needs and expectations from health coaching applications, participants identified personalized health tips (70%), goal-setting and progress tracking (60%) and integration with wearable devices (50%) as the most desirable features in health coaching apps. Other important features included access to a health coach or expert (50%) and peer support groups (40%).

When asked what would make apps more engaging, participants highlighted real-time feedback from health coaches or providers (60%), more personalized recommendations (70%) and features like gamification (30%). Additionally, 40% of respondents emphasized the importance of focusing on mental health support.

With regard to perceived effectiveness of AI health coaching applications, while 20% of respondents rated health coaching apps as "very effective," the majority (50%) described them as "somewhat effective but needing improvement." A further 20% felt these apps did not meet their needs and 10% were unsure about their effectiveness.

Participants identified key gaps in health coaching apps, including a lack of personalization (50%), insufficient integration with healthcare providers (40%), and high costs (30%). Generalized or irrelevant content (25%) and technical issues (15%) were also noted as shortcomings.

Recommended improvements included better customization of health insights, seamless integration with clinical care systems, and more cost-effective options. Despite these gaps, 50% of participants indicated they would recommend health coaching apps to others, with an additional 30% responding "maybe."

CONCLUSIONS

The survey results reveal significant interest in health coaching applications for managing NCDs but underscore critical barriers, including motivation, usability, and cost. Personalized recommendations, real-time feedback, and integration with healthcare systems are key to enhancing adoption and effectiveness. These findings provide actionable insights for improving the design and delivery of digital health solutions for NCD management.

Aforementioned study highlights the growing potential of AI-powered health coaching applications in enhancing the management of non-communicable diseases (NCDs). The findings indicate that such applications are particularly effective in empowering patients through personalized feedback, improving health behaviors and achieving better clinical outcomes, such as glycemic control and reduced hospitalization rates. While adoption rates are

promising, barriers such as lack of personalization, cost and insufficient integration with healthcare providers remain significant challenges.

To maximize the impact of AI powered health coaching applications, future efforts should focus on addressing mentioned barriers by tailoring app features to meet diverse user needs, ensuring affordability and promoting seamless interoperability with existing healthcare systems. Furthermore, sustained engagement strategies, such as gamification and real-time coaching, could significantly improve long-term user adherence and effectiveness.

This research highlights the role of AI health coaching as a transformative tool in NCD management and calls for a multidisciplinary approach to enhance its design, accessibility and integration into routine healthcare practices. By addressing the identified gaps and leveraging advancements in AI, these applications can play a pivotal role in reducing the global burden of NCDs and improving population health outcomes.

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Appendix 1: Survey Questionnaire for Quantitative Research

Section 1: Demographics and Health Information

1. Age:
- o 18-30
- o 31-45
- o 46-60
- o 61 and above

2. Gender:
- o Male
- o Female
- o Other

3. What type of noncommunicable disease(s) have you been diagnosed with? (Check all that apply)
- o Diabetes
- o Hypertension

o Cardiovascular disease
o Chronic respiratory disease (e.g., COPD, asthma)
o Cancer
o Other: _____

4. How long have you been managing your NCD(s)?
o Less than 1 year
o 1-3 years
o 3-5 years
o More than 5 years

5. Do you use a smartphone or other mobile device regularly?
o Yes
o No

Section 2: Awareness and Use of Health Coaching Applications

6. Are you aware of health coaching applications that help manage noncommunicable diseases?
o Yes
o No
o Not sure

7. If yes, which health coaching applications have you heard of? (Select all that apply)
o MyFitnessPal
o Noom
o Omada Health
o Livongo
o Calm
o Other (Please specify): _____

8. Have you ever used a health coaching application to help manage your condition(s)?
o Yes, I currently use one
o Yes, I used one in the past but stopped
o No, I have never used one

9. If you have used a health coaching app, how often do you use it?
o Daily
o Several times a week
o Once a week
o Occasionally (less than once a week)
o I no longer use it

10. If you have never used a health coaching application, why not? (Select all that apply)

- o I don't know what they are
- o I don't think they are helpful
- o I prefer to manage my health in other ways
- o I'm not comfortable with technology
- o I don't have access to a smartphone/internet
- o Other (Please specify): _____

Section 3: Challenges and Barriers to Using Health Coaching Applications

11. If you have used a health coaching application, what challenges did/do you face? (Select all that apply)

- o The app is difficult to use
- o I didn't understand how to set goals or track progress
- o The information provided was not personalized to my condition
- o Lack of motivation to keep using it
- o Too many notifications or reminders
- o The app is not integrated with my healthcare provider's system
- o It was too expensive to use premium features
- o The app stopped being useful after a while
- o Privacy/security concerns
- o Other (Please specify): _____

12. What challenges prevent you from using health coaching apps regularly? (If applicable)

- o Lack of time
- o Lack of interest or motivation
- o Not enough support from healthcare providers
- o Technical issues (e.g., bugs, app crashing)
- o Not enough guidance on how to use the app
- o I prefer in-person interactions with a healthcare professional
- o Other (Please specify): _____

Section 4: Needs and Expectations from Health Coaching Applications

13. What features would you find most helpful in a health coaching application? (Select all that apply)

- o Easy goal-setting and progress tracking
- o Personalized health tips based on my condition
- o Reminders for medication and appointments
- o Access to a health coach or expert through the app
- o Integration with wearable devices (e.g., fitness trackers)
- o Educational resources about managing my condition
- o Peer support groups or communities
- o Ability to share my health data with my healthcare provider

o Other (Please specify): _____

14. What do you think would make a health coaching app more engaging or effective for you? (Select all that apply)
o Real-time feedback from a coach or healthcare provider
o More personalized recommendations
o Gamification (rewards, challenges, etc.)
o More frequent check-ins or follow-up from the app
o Better design and ease of use
o Integration with other health apps or devices
o A stronger focus on mental health and well-being
o Other (Please specify): _____

15. Do you feel that health coaching applications address your health needs effectively?
o Yes, they are very effective
o Somewhat effective, but they could improve
o No, they do not meet my needs
o I'm not sure

Section 5: Feedback and Future Improvements

16. What do you think are the biggest gaps in health coaching applications for managing NCDs? (Select all that apply)
o Lack of personalization
o Not enough focus on mental health or well-being
o Too expensive
o Not connected with healthcare providers
o The information is too general or not relevant to my condition
o Technical issues or lack of support
o Lack of motivational features
o Other (Please specify): _____

17. What improvements would you like to see in health coaching applications to better support your health? (Open-ended)
_____
_____
_____

18. Would you recommend a health coaching app to other patients with your condition?
o Yes
o Maybe
o No