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Bridging the Gap: Innovative Strategies and Systematic Approaches to Enhance Medication Adherence in Cardiovascular Disease Management

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ABSTRACT

Cardiovascular diseases (CVDs) are the leading cause of morbidity and mortality globally, placing a substantial burden on public health systems. Effective management of these chronic conditions requires long-term adherence to medication regimens aimed at controlling risk factors such as hypertension, diabetes, dyslipidemia, and obesity. Medication adherence, as defined by the World Health Organization (WHO), is the extent to which a person's behavior aligns with the agreed recommendations of a healthcare provider. Adherence is a critical determinant of therapeutic success, particularly in elderly populations who often face challenges due to multiple comorbidities, polypharmacy, cognitive decline, and socioeconomic factors. This review highlights the importance of medication adherence in managing CVDs, emphasizing its role in reducing adverse cardiovascular events, minimizing healthcare utilization, and preventing disease progression. We explore the multifaceted factors influencing adherence, including patient-related, medication-related, healthcare provider-related, healthcare system-related, and socioeconomic determinants. Patient-centric strategies, such as regular mental and physical health assessments, behavioral support, education, and empowerment, are essential in addressing these barriers. Additionally, medication-related interventions, including regimen simplification and ensuring affordable access, play a pivotal role in enhancing adherence.

Healthcare provider interventions focused on building trust, effective communication, and regular monitoring, combined with healthcare system-level changes such as comprehensive education programs and support services, are critical for fostering an environment conducive to adherence. The review also underscores the significance of a systematic approach, advocating for interdisciplinary collaboration among healthcare professionals and policy-level changes that support adherence-related services and improve resource allocation.

Innovative technological solutions, such as MedpeR®, a smart pillbox designed to assist elderly patients, offer practical tools to enhance medication management. The integration of such technologies with traditional approaches can significantly improve adherence rates. Empathy and accessibility in patient-provider relationships are highlighted as crucial factors in promoting adherence, drawing parallels to spiritual teachings that emphasize humility, selflessness, and support. By addressing the diverse barriers to medication adherence through a comprehensive and systematic approach, healthcare providers can improve therapeutic outcomes, reduce healthcare costs, and enhance the quality of life for patients with CVDs. This review provides a foundation for developing targeted interventions and implementing evidence-based strategies to improve medication adherence, particularly among vulnerable elderly populations, thereby contributing to better health outcomes and reduced mortality in CVD management.

Keywords: Cardiovascular diseases, Medication adherence, Chronic disease management, Patient-centered care, Technological innovation

INTRODUCTION

Cardiovascular diseases (CVDs) remain the leading cause of morbidity and mortality worldwide, with a significant impact on public health systems. Managing these chronic conditions requires long-term medication regimens to control risk factors such as hypertension, diabetes, dyslipidemia, and obesity.

These regimens are crucial not only for managing existing cardiovascular conditions but also for preventing the onset of new cardiovascular events. Medication adherence, defined by the World Health Organization (WHO) as 'the degree to which a person's behavior corresponds with the agreed recommendations from a healthcare provider,' is a fundamental component influencing the effectiveness

Healthcare Provider Interventions

Building Trust and Effective Communication: Building a trusting relationship between healthcare providers and patients is fundamental to improving medication adherence. Trust is built through empathetic, transparent, and patient-centered communication. Healthcare providers should employ active listening techniques, provide clear and jargon-free explanations about medication regimens, and ensure that patients feel heard and understood. Encouraging patients to voice their concerns and preferences can foster a collaborative environment where adherence is more likely to be prioritized.

Regular Monitoring and Feedback: Continuous monitoring of medication adherence and providing timely feedback are crucial to sustaining adherence behaviors. Utilizing tools such as electronic health records (EHRs) to track medication refills, self-reporting methods, and digital adherence monitoring devices can help in assessing adherence levels. Regular follow-up appointments to review adherence, discuss any difficulties, and adjust treatment plans as necessary provide opportunities for reinforcing positive behaviors and addressing barriers to adherence. Moreover, engaging patients in self-monitoring activities, such as maintaining medication diaries or using smartphone apps, can empower them to take an active role in their adherence management.

Healthcare System Interventions

Implementing Comprehensive Patient Education Programs: Healthcare systems should implement robust patient education programs that provide ongoing support and information about medication adherence. These programs should be multifaceted, incorporating various educational formats such as group classes, one-on-one counseling, digital resources, and written materials tailored to different literacy levels. Education should cover not only the technical aspects of medication use but also address behavioral strategies for overcoming common barriers to adherence. Health literacy promotion should be a key focus, as low health literacy has been identified as a significant barrier to effective medication management.

Support Services and Community-Based Interventions: Providing support services such as medication management programs, automated reminder systems, and access to community nursing services can significantly enhance adherence rates. Community-based interventions, such as home visits by healthcare professionals, can provide personalized support, monitor medication use, and address any environmental or social barriers to adherence. Additionally, integrating technological solutions, like mobile health apps for medication reminders or telehealth services for remote consultations, can offer scalable and efficient ways to support patients in adhering to their prescribed regimens.

Socioeconomic and Policy Interventions

Addressing Socioeconomic Barriers: Addressing socioeconomic barriers to medication adherence involves a concerted effort from policymakers and healthcare systems to ensure equitable access to healthcare resources. This includes implementing policies that provide financial assistance to low-income patients, ensuring availability of medications in underserved areas, and developing community-based support networks that can provide the necessary resources and support for medication management.

Policy Changes and Advocacy: Healthcare systems and policymakers must advocate for changes that prioritize adherence as a public health goal. Policies should focus on incentivizing adherence, such as through value-based insurance design (VBID) that reduces out-of-pocket costs for medications crucial for managing chronic conditions. Additionally, implementing adherence as a quality measure in healthcare delivery can drive systemic improvements and enhance patient outcomes.

Improving medication adherence requires a comprehensive, multi-level strategy that incorporates patient-centered care, streamlined medication regimens, robust healthcare provider support, and systemic changes within the healthcare infrastructure. By addressing the diverse barriers to adherence through tailored interventions and coordinated efforts, healthcare providers can significantly improve therapeutic outcomes and quality of life for patients with cardiovascular diseases [5,6].

Innovative Solutions for Medication Adherence: MedpeR®

Technological innovations offer promising solutions to improve medication adherence. MedpeR®, a smart pillbox designed specifically for the elderly, provides a practical example. Developed by Inovocare Healthsoft Solutions Pvt. Ltd., MedpeR® features multiple compartments for different medications, alarm systems for reminders, and assistive refill features to minimize errors. Such devices, which are user-friendly and do not require smartphones for operation, are particularly effective for elderly populations, promoting independence and reducing anxiety around medication management.

Systematic Approaches to Improving Medication Adherence

Improving medication adherence is a complex challenge that requires a comprehensive, systematic approach. The World Health Organization (WHO) emphasizes addressing all elements within the healthcare system to enhance adherence to medication regimens, especially for chronic diseases like cardiovascular conditions. This approach includes several key strategies-

established. Just as a soul must overcome pride and ignorance to attain divine knowledge, patients need to overcome psychological barriers-such as fear, mistrust, and a lack of understanding about their medications-to adhere effectively to their treatment regimens. When healthcare providers demonstrate empathy-actively listening, addressing concerns, and providing emotional support-they foster a trusting environment where patients feel valued and understood, thus enhancing adherence to prescribed treatments.

Furthermore, Shree Krishna, in verse 15.6, as shown in figure 2, describes the divine abode, which is self-luminous and not dependent on external sources of light like the sun or moon-

*na tad bhāsayate sūryo na śhaśhāṅko na pāvakaḥ|
yad gatvā na nivartante tad dhāma paramaṁ mama||*

Translation: 'Neither the sun, nor the moon, nor fire can illuminate that Supreme Abode of Mine. Having gone There, one does not return to this material world again.'

This verse underscores the self-sufficiency and perfection of the spiritual realm, created by *Yogmaya* (spiritual energy), free from the defects and dualities of the material world. Similarly, in healthcare, a systematic and self-sufficient approach is essential to ensuring patients have easy access to their medications, both in terms of availability and affordability. Just as the divine abode is self-illuminating, healthcare systems must be designed to eliminate barriers that prevent patients from obtaining their medications-whether these are financial, logistical, or informational [8,9].

Real-Life Case Scenario

Consider the case of Mrs. TP, a 68-year-old woman with hypertension and type 2 diabetes. Living in a rural area with limited access to healthcare facilities and on a tight budget, Mrs. TP initially struggles with medication adherence due to the high cost of drugs and a lack of understanding about the importance of regular medication intake. Her situation mirrors the spiritual state of ignorance and attachment that Shree Krishna describes, where pride and a lack of knowledge prevent one from surrendering to the divine will. Her healthcare provider, Dr. XYZ, adopts a compassionate and patient-centric approach, much like a spiritual guide leading a soul towards enlightenment. Dr. XYZ spends extra time explaining the significance of each medication, using simple language to ensure Mrs. TP understands, and addresses her concerns empathetically. Recognizing her financial constraints, he finds more affordable medication alternatives and connects her with a community pharmacy that offers discounts for senior citizens. Moreover, understanding the importance of continuous support, Dr. XYZ arranges for a community health worker to visit Mrs. TP regularly.

These visits provide ongoing education on medication adherence and emotional support, much like the continuous engagement of a soul in divine service, as described in the scriptures. This consistent, empathetic interaction helps build trust and reinforces the importance of adherence, gradually eliminating Mrs. TP's fears and misconceptions.

Over time, Mrs. TP becomes more consistent with her medication regimen, leading to stabilized blood pressure and blood sugar levels, reducing her need for frequent hospital visits. This improvement reflects the analogy of a purified soul attaining the divine abode, free from the cycles of birth and death. Similarly, Mrs. TP's improved adherence frees her from the cycle of frequent medical crises.

Empathy and accessibility in healthcare are akin to the spiritual journey towards the divine abode. By addressing both emotional and practical barriers, healthcare providers can help patients like Mrs. TP achieve better health outcomes, mirroring the soul's journey towards enlightenment and eternal bliss, as described in the Bhagavad Gita.

CONCLUSION

Medication adherence is a cornerstone in the management and prevention of cardiovascular diseases, particularly among the elderly. A comprehensive understanding of the factors influencing adherence and the implementation of targeted, systematic strategies are essential for improving adherence rates. **Technological innovations like MedpeR® and systematic approaches involving interdisciplinary collaboration, policy changes, and patient-centered care models offer promising avenues to enhance adherence.** By improving adherence, healthcare providers can achieve better therapeutic outcomes, reduce healthcare costs, and improve the overall quality of life for patients with cardiovascular diseases.

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