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Hybrid Health Approach: Integrating Traditional Treatments and Wearable Technologies

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The hybrid approach of combining traditional treatments with wearable technologies and mobile appli-cations can enhance health management by improving patient adherence, enabling continuous moni-toring, and reducing healthcare costs, as demonstrated by the CardioManager app roll-out for heart failure patients in Spain.

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key points

- Combining traditional treatments with wearable technologies and mobile applications offers a more comprehensive approach to managing chronic diseases by enabling continuous monitoring and personalised care.
- Mobile applications and wearables empower patients by giving them control over their health, improving treatment adherence, and reducing hospitalisations.
- The hybrid approach can lead to significant cost savings for healthcare systems.
- Successful implementation of this approach requires collaboration between patients and healthcare professionals, data security measures, and ensuring equitable access to technology.

The evolution of technology has significantly transformed medicine, enabling the creation of new tools and approaches for treating various diseases. Cardiovascular health has seen remarkable advancements by incorporating mobile applications and wearable devices for monitoring and managing chronic diseases like heart failure. These developments have led to a hybrid approach to disease treatment, combining traditional methods with complementary technology-based solutions. This article explores how combining traditional treatments with wearable technologies can improve people's health and generate savings for healthcare systems, using the economic impact study of one App on heart failure patients in the Castilla y León community of Spain as a reference.

A Hybrid Approach Empowers Health Management

Mobile technologies and wearable devices have opened new possibilities in health management. These tools enable constant patient monitoring outside the clinical setting, providing real-time data that can be used to adjust treatments more precisely and personally. Mobile applications like the one described in this article, CardioManager, allow patients to record their symptoms, activities, and health measurements, facilitating closer monitoring of their condition.

By combining traditional treatments and wearable technologies, we create a hybrid approach that offers multiple benefits.

Patients can maintain more active control over their health, increasing treatment adherence and reducing the need for hospitalisations. Healthcare professionals, on the other hand, gain a more comprehensive and detailed view of the patient's condition. This enables them to make more informed decisions and achieve improved treatment outcomes, instilling confidence in the hybrid approach.

In today's world, where chronic diseases are a significant burden on healthcare systems, finding innovative and effective approaches to managing and treating these conditions is essential. One of the most promising combinations in this regard is the use of traditional treatments, which have proven their effectiveness over decades, alongside modern technologies, such as wearable devices and mobile applications, that facilitate continuous monitoring and health tracking. This hybrid approach not only optimises medical care but also empowers patients by giving them greater control over their well-being.

Traditional Treatments Remain Relevant

Traditional treatments, such as medication, diet, and exercise prescribed by healthcare professionals, remain the cornerstone of managing many chronic diseases. These methods have been validated over time and continue to be essential for maintaining and improving health. However, despite their effectiveness, traditional treatments often face challenges, such as patient adherence, variability in treatment response, and difficulty to monitor outcomes in real-time.

For example, conventional treatments for cardiovascular diseases include medications to control blood pressure and cholesterol, lifestyle changes to promote physical activity, and adopting a healthy diet. While these approaches are effective, they require continuous monitoring and the ability to adjust treatments based on the patient's response, something that is often limited by periodic doctor visits.

> "Introducing [the CardioManager] app could reduce heart failure management and treatment costs by 33%, translating into savings of more than 9,000 euros per patient."

The Wearables and Mobile Applications Revolution

With the advancement of technology, wearables and mobile applications have revolutionised how health conditions are managed. These devices allow continuous monitoring of key health parameters, such as heart rate, physical activity, glucose levels, and blood pressure, providing real-time data to both the patient and healthcare professionals. This continuous monitoring capability is particularly beneficial for patients with chronic diseases, where the condition's stability is crucial.

An example illustrating the benefits of this hybrid approach is described in the article through the case of the CardioManager app, specifically designed for heart failure patients. This app allows patients to record their physical activity, measure parameters like blood pressure and glucose levels, and receive reminders about medication and doctor's visits. Additionally, it offers educational information about the disease, helping patients better understand their condition and how to manage it effectively.

Benefits of the Hybrid Approach

Combining traditional treatments with wearable technology creates a hybrid approach that maximises the benefits of both worlds. This approach facilitates treatment adherence and improves health outcomes by allowing quick and personalised treatment regimen adjustments.

1. **Improvement in Treatment Adherence** One of the biggest challenges in treating chronic diseases is patient adherence. Wearables and mobile applications can help address this issue by providing regular reminders and allowing patients to monitor their progress. For instance, CardioManager enables patients to record their medication and receive alerts when it's time to take their medicines, thereby reducing the risk of forgetfulness and improving adherence.
2. **Continuous Monitoring and Personalised Adjustments** The ability of wearables to provide real-time data means that healthcare

professionals can continuously monitor a patient's condition and make necessary adjustments to the treatment. This is particularly important in conditions like heart failure, where changes in symptoms may require quick adjustments in medication or condition management.

3. **Patient Empowerment** Access to information and the ability to monitor their own health empowers patients, making them more active in managing their condition. This can lead to a better understanding of the disease and greater motivation to follow treatment recommendations. Patients using apps like CardioManager report feeling more in control of their health, which can lead to better long-term outcomes.

4. **Cost Reduction for the Healthcare System** Using technologies like CardioManager can also generate significant savings for healthcare systems. A study conducted in the Castilla y León community in Spain demonstrated that introducing this app could reduce heart failure management and treatment costs by 33%, translating into savings of more than 9,000 euros per patient. This alleviates the financial burden on the healthcare system and allows for better resource allocation to other aspects of healthcare.

How to Implement a Hybrid Approach in Clinical Practice

To effectively implement a hybrid approach, healthcare professionals and patients must collaborate to integrate these new methods into existing treatment regimens. This includes educating patients on how to use wearables and mobile applications and training healthcare professionals to interpret the data provided by these devices. Moreover, applications and devices must be designed to be accessible and easy to use for a wide range of patients, including those unfamiliar with the technology. Personalisation also plays a key role, as each patient has unique needs to be considered when designing a treatment plan.

Despite the clear benefits, implementing a hybrid approach also faces challenges. One of the main obstacles is ensuring the security and privacy of patient data. With the increasing amount of information collected by wearables and mobile applications, it is vital to implement robust measures to protect this sensitive data. Another challenge is integrating these new approaches into existing healthcare systems. Healthcare professionals must be prepared to interpret and use the data provided by wearables effectively, which may require changes in clinical processes and continuous training of medical staff. Finally, it is important to consider equity in access to these technologies. Not all patients may have access to wearable devices or smartphones, which could create disparities in treatment. Healthcare systems must work to ensure that all patients, regardless of their economic situation or level of technological knowledge, can benefit from these advancements.

Future Considerations and Key Success Factors

The hybrid approach that combines traditional treatments with complementary technologies such as wearables and mobile applications has the potential to transform the management of chronic diseases. By integrating the proven effectiveness of traditional methods with the innovation and personalisation offered by new technologies, this approach can significantly improve health outcomes, increase treatment adherence, and reduce healthcare systems' costs.

The success of this integration depends on effective collaboration between patients and healthcare professionals and investment in education, technological infrastructure, and security measures. As we continue exploring the possibilities of this hybrid approach, we will likely see ongoing transformation in how health conditions are managed, with lasting benefits for both patients and global healthcare systems.

Case Study: CardioManager and Heart Failure

Context and Problems

According to the World Health Organisation (WHO), cardiovascular diseases are the leading cause of death globally, with a total of 17 million deaths per year. Among these, heart failure (HF) is one of the most critical conditions, affecting millions of people worldwide. In Spain, more than 1,200,000 people suffer from severe heart failure, with key risk factors including hypertension and ischemic heart disease. Traditional HF management involves a series of challenges, including high costs associated with treatment and frequent hospitalisations due to patient condition decompensation. These costs are not only economic but also social, as HF can significantly reduce the quality of life for patients.

Introduction of CardioManager

CardioManager is a mobile application developed to help heart disease patients self-manage their condition. This app includes several key features, such as an information section with medical details about diseases, a patient guide offering tips and recommendations, and a section recording health activities and measurements, such as blood pressure, glucose levels, and cholesterol. Moreover, CardioManager allows users to log their medication and set alarms to remind them to take their medications at the indicated times. These features not only facilitate better disease control by the patient but also provide valuable information to doctors about treatment adherence and patient progress.

Economic and Health Impact

The study conducted in the Castilla y León community, Spain, evaluated the economic impact of introducing an app (CardioManager) as a complementary treatment into the public health system. Using a cost-effectiveness analysis based on a Markov model, the study compared the costs associated with managing HF patients before and after the app's implementation. The results were significant. The introduction of CardioManager could generate a 33% reduction in disease management and treatment costs, translating into savings of more than €9000 per patient for the local healthcare system. At the regional level, this could represent total savings of approximately €6 million, equivalent to 0.31% of the total healthcare expenditure in Castilla y León.

These savings are derived from several key areas:

- **Reduction in Hospitalisations:** CardioManager allows better monitoring and management of the patient's condition, reducing the need for frequent hospitalisations.
- **Improvement in Treatment Adherence:** The app's alarms and reminders help patients follow their medication regimens more strictly, improving treatment outcomes.
- **Decrease in Travel:** Recording and monitoring symptoms and activities from home reduces the need for hospital or clinic visits, lowering patient transportation and time costs.

Cost-Effectiveness Analysis

The cost-effectiveness analysis of the study used the Incremental Cost-Effectiveness Ratio (ICER) to measure the cost-utility of introducing CardioManager compared to the scenario without the app. The results showed that the ICER indicated that the cost per additional quality-adjusted life year (QALY) achieved with the app was significantly lower than the willingness-to-pay threshold, suggesting that CardioManager is not only effective but also cost-efficient. Moreover, a univariate sensitivity analysis confirmed the robustness of these results, demonstrating that even with variations in certain key variables, the introduction of CardioManager remained highly cost-effective.

Additional Benefits of the Hybrid Approach Improved Control and Quality of Life

One of the most notable benefits of the hybrid approach is the improvement in disease management by the patient. Wearable technologies and mobile applications allow patients to constantly monitor their health, giving them a better understanding of their condition and enabling them to make informed decisions about their lifestyle and treatment. This not only improves treatment adherence but can also prevent serious complications by identifying issues before they worsen.

Patient Empowerment

The use of technological tools also empowers patients, giving them a more active role in managing their health. This empowerment can increase patient satisfaction, as they feel they have more control over their treatment and daily life. In the case of chronic diseases, where long-term management is crucial, this factor can be especially beneficial.

Savings for the Healthcare System

In addition to patient benefits, the hybrid approach offers significant advantages for healthcare systems. The reduction in hospitalisations, the decrease in unnecessary medical visits, and the improvement in treatment efficiency contribute to an overall reduction in healthcare costs. In a context where healthcare budgets are limited, these savings can be reinvested in other critical areas of the healthcare system.

Personalised Treatment

The integration of wearable technologies allows for greater personalisation of treatment. Wearable devices can collect specific patient health data, enabling doctors to tailor treatments to individual needs. This personalisation not only improves treatment efficacy but also reduces side effects and enhances the patient's quality of life.

Challenges and Considerations

- Data Privacy and Security Data privacy and security are key challenges when implementing wearable technologies and mobile applications. Wearable devices collect a large amount of sensitive health data, raising concerns about how this data is stored, shared, and protected. It is crucial that applications and devices comply with data privacy regulations, such as the General Data Protection Regulation (GDPR) in Europe, to ensure the security and confidentiality of patient information.

- Accessibility and Digital Divide Another important challenge is the accessibility of these technologies. Although the use of smartphones and wearables is increasing, there is still a digital divide, particularly among older populations or in regions with less access to technology. For the hybrid approach to be truly effective, it is necessary to address these disparities and ensure that all patients can benefit from these tools.

- Education and Training Introducing new technologies in disease treatment also requires education and training for both patients and healthcare professionals. Patients must be trained to use the apps and devices correctly, while healthcare professionals must understand how to interpret the data and adjust the treatment accordingly.

Conflicts of Interest

None.

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