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The use of digital health services to manage dementia

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ABSTRACT The growing elderly population accelerates age-related pathology and dementia risk, negatively impacting health, social conditions, and economic well-being. Early detection and prevention are crucial, as there is no viable therapy for dementia. Mild cognitive impairment (MCI) can slow dementia progression, but global health systems struggle with access due to shortages of specialists and long travel times. The World Health Organization (WHO) recommends democratizing and expanding health institutions to combat dementias. This article evaluates local and global dementia cases and discusses digital efforts to combat their spread, focusing on the cognitively impaired population.

1. INTRODUCTION

1.1 Dementia, an unsolved Biomedical Problem

Population aging and sociodemographic transformation have significantly impacted health, leading to mild cognitive deficits and dementia in older individuals. Lifestyles play a role in these conditions, which can be preventable or manageable. Recent scientific evidence from epidemiological, clinical, imaging, genetic, and biochemical studies has established a causal relationship between type 2 diabetes mellitus and other cardiometabolic factors, contributing to Diabetes Mellitus Disease and Alzheimer's. Medical and pharmacological control of metabolic diseases like obesity, insulin resistance, and DM2 could potentially reduce dementia epidemics. Metformin, a first-line oral treatment for hyperglycemia, has common adverse effects like decreased vitamin B12 absorption in the gastrointestinal tract, potentially leading to megaloblastic anemia and peripheral nervous system dysfunction. Additionally, its use in elderly populations with impaired renal function raises risks.

Mild cognitive impairment (MCI) is a state of mind and cognitive reserve that does not meet the criteria for dementia but exhibits some degree of brain impairment, distinct from mood or psychiatric disorders. Common causes include age, prodromal symptoms of Alzheimer's disease (AD), and vascular dementia (VaD). The conversion rate from MCI to AD is less established, and it is crucial to consider the sensitivity and specificity of tests used in clinical practice and research planning. The clinical-temporal horizon of dementia type AD includes a preclinical stage, symptomatic phase, and final-mind dementia

1.2 Global Epidemiological

By 2011, there were 35.6 million people around the world with some type of dementia. In 2015, the total cost of dementia worldwide was estimated at $818 billion, equivalent to 1.1% of global gross domestic product (GDP). In relation to Alzheimer's Disease (AD), which is the most common type of dementia, the prevalence among people aged 70-75 years is 2-3% and in people aged 85 years or older, it increases dramatically to 20-3%. 25%, being slightly higher in women over 85 years of age. Currently, it is estimated that there are about 42 million patients with dementia and by 2030, it is projected, around 81 million. In the year 2050, various epidemiological studies worldwide mention that at least 2,000 million people will be over 60 years of age, therefore, considering the age risk factor, a dramatic increase in the number of these patients is expected.

1.3 Multilateral Response and Global Guidelines

A worldwide and coordinated health response to slow the alarming spread of dementia was approved by the World Health Organization (WHO) assembly in May 2017. The following general guidelines are established by this WHO plan in collaboration with other international, regional, and national organizations: i) acknowledgement of dementia as a priority for the world's public health systems; ii) awareness and implementation of initiatives to meet the needs of the affected population; iii) strengthening prevention, early diagnosis, treatment, collection of information systems, epidemiological registration and surveillance, support for caregivers, and iv) early diagnosis and treatment of dementia as a public health priority.

1.4 Digital Health to the rescue of Mental Health

Situation of digital health from the WHO - Digital health efforts are becoming more operational; in fact, 90% of WHO Member States have an 'online' health plan, and 83% of them have already started implementing them. However,

other digital health and technology modalities are available internationally. The large data in healthcare contexts is less often employed than electronic health records, which are more regularly used than telemedicine. Although digital health is a global reality, it is vital to emphasize that different countries have accepted and applied it in different ways.

1.5 Digital Health - Key Concepts

Telemedicine is simply one aspect of the larger notion of digital health. Digital health covers subcategories including wearable technology, telehealth, and telemedicine, according to the US Food and Drug Administration (FDA). It also includes mobile health (mHealth). In general, it entails linking health-related data, including patient-generated data, and utilizing the medicinal potential of frequently used technology tools, such smartphones, apps, social networks, and environmental sensing devices. The majority of these items weren't initially designed for medical use, and they weren't advertised as such, but they now serve that purpose.

The recognition of the necessity for a collaboration between human and digital systems is crucial for transforming healthcare, particularly in primary care, by enhancing worker support. Digital health innovation faces ethical and political challenges. Access to sufficient data is crucial for developing innovative diagnostic, therapeutic, and monitoring tools. Ensuring data protection, security, and privacy is essential for innovation. Responsibility frameworks are necessary for managing information and communicating health information. Security and effectiveness are paramount, as digital health applications must meet high standards to grant trust to individuals and the environment.

1.6 Dementia and Digital Solutions

Digital health has experienced slow but sustained development in the field of dementia, with mobile devices, tablets, smart watches, and suits with sensors and applications (APP) providing opportunities for early diagnosis and remote monitoring of the rapidly aging population. However, there are few innovations in MCI detection, as most developments focus on measuring advanced disease parameters.

A 2019 systematic review published 43 primary studies on the use of technologies in the home for early detection and monitoring of mild cognitive impairment. The reviews systematized experiences into four internationally validated technological solutions. Motion sensors in homes and cars evaluate step speed and nocturnal movements, affecting sleep quality. Significant differences were observed between healthy and MCI (+) patients, indicating potential health issues.

Portable GPS sensors are installed on mobile devices to monitor patients' journeys, potential loss, and generate alarms for family members. These sensors show significant differences between Mobile Centralization (MCI) and controls, reducing the risk of loss. The study evaluated elderly individuals' performance in surveys and games on smart mobile phones using APPs, despite the challenge of digital literacy. Most studies showed good correlation with MCI diagnosis compared to controls.

The study used secondary data from technology 'X' such as mouse movement and remote monitoring of PC usage in older adults, but had limitations and biases, making it difficult to draw precise conclusions due to the lack of designed analysis. Care management should incorporate digital infrastructure and trained human resources into all three levels of care, including the central level, to provide effective care for the adult and older adult population.

2. CONCLUSION

Ethical issues in social work arise from the interaction between social work and research ethics in social sciences, particularly in relation to mission, ethics, and values. Good social work research develops within this framework, requiring specific ethics strategies for research and evaluation. Different stages of the research process include ethical considerations. Early investigation stages involve formulation of research questions, participant protection, selection, informed consent, and institutional review of social work projects. Research design and methodology address ethical questions, confidentiality, privacy, and dual interest social work. Investigation results social work involves reporting, dissemination, and recognizing contributions to research, ensuring effective social work outcomes.

2.1 Contribution of the Author

The global and local epidemiological situation concerning dementia necessitates intensive search for innovative methods to control its overwhelming growth. The COVID-19 pandemic has created a complex health scenario, affecting chronic diseases like hypertension, diabetes, cancer, and dementia. The crisis has also pushed for the consolidation of digital health processes, a health revolution that aims to control communicable diseases and address biological-social pressures. Mental health problems in adults and older adults worldwide face limited access to timely in-person medical care and early specialist evaluation.

Digital health, tailored to specific health problems, is essential for addressing challenges in a world where chronic non-infectious diseases are now impacted by infectious diseases, which were once believed to be almost defeated. It should complement modern medicine.

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