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NEURODEGENERATIVE DISEASES AND THE HOLISTIC APPROACH

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Abstract: Neurodegenerative diseases affect a significant number of people globally, with a growing prevalence that accompanies the increase in life expectancy. However, care strategies are still centered on pharmacological approaches and invasive therapies, often to the detriment of early diagnosis, holistic treatment, and adequate patient care that ensures quality of life. This article seeks to understand neurodegenerative diseases from a holistic perspective, given their growing prevalence and impact on society, highlighting their characteristics, diagnosis, treatment, care, and preventive measures. This is a critical review of current scientific literature, using PubMed as the search database with the descriptors "holistic neurodegenerative disease." The inclusion criteria were review and systematic review articles available in full from the last 10 years, comprising a total of 28 incorporated manuscripts. The literature presents two categories of analysis: the etiology and conventional treatment of neurodegenerative diseases, and multidisciplinary care and quality of life with early identification of risk factors. It was observed that, although there has been progress in the traditional approach to neurodegenerative diseases, the holistic approach guarantees more effective care when multidisciplinary teams and empathy are adopted in the doctor-patient relationship.
Keywords: Diagnosis, Neurodegenerative Diseases, Quality of Life, Treatment.

INTRODUCTION

Neurodegenerative diseases (NDD) represent a group of debilitating conditions that affect the nervous system and progressively compromise brain function and/or nerve cells. Among the most well-known and impactful are Alzheimer's Disease, Parkinson's Disease, Epilepsy and Amyotrophic Lateral Sclerosis (ALS). What all these diseases have in common is the progressive and irreversible deterioration of nerve cells, resulting in a series of devastating symptoms, including memory loss, motor difficulties and cognitive dysfunction, which together affect the individual's quality of life and social interaction.

According to X-X Zhang et al. (2021), neuropsychological rehabilitation has been shown to be a promising approach in the treatment of memory deficits in patients with Alzheimer's dementia. This research focuses on the importance of therapeutic strategies aimed at cognitive enhancement and quality of life for these patients.

The definition of these diseases involves a complex interaction of genetic, environmental and molecular factors that contribute to their development. Kandel, Koester and Mack (2023) provide a comprehensive overview of the neuroscientific basis of neurodegenerative diseases, addressing the underlying mechanisms and clinical implications.

The relevance of the topic is related to the life expectancy of the world's population, which is increasing despite the Covid-19 pandemic, contributing to an increase in the prevalence of these diseases. As pointed out by the American Psychiatric Association (APA, 2014), population aging is one of the main factors associated with the increase in the incidence of neurodegenerative diseases, which implies a significant impact on health systems and the quality of life of patients and their families.

The general aim of this article is to understand neurodegenerative diseases from a holistic perspective, given their growing prevalence and impact on society, highlighting their characteristics, diagnosis, treatment, care and preventive measures.

In search of a complete understanding of these pathologies, it is crucial to delve into the nuances of each of them and the complexities that surround them. In this context, this

article sets out to provide a solid basis for understanding the diseases neurodegenerative diseases from two perspectives: the traditional, biomedical approach to the disease and multidisciplinary care that promotes quality of life.

METHODOLOGY

This is a critical review of the scientific literature, using the universally known Pubmed database, which brings together publications from various journals with significant impact factors in the field of health and medicine. Initially adopted as descriptor the words "neurodegenerativediseases", through which 425,144 results appeared. In order to filter these results, the inclusion criterion was full-length, free articles, of which 149,254 publications appeared. The second filter was to choose reviews and systematic reviews, which generated 30,030 publications. A third filter was applied to look for publications that presented a holistic approach to users, including the word "holistic" in the descriptors, generating 84 publications, which were read and analyzed. those whose focus met the objective of this study were chosen (Table 1).

Descriptors	Neurodegenerative diseases
425,144 publications	
Filters 1	Full and free articles
149,254 publications	
Filters 2	Literature review and systematic review
30,030 publications	
Filter 3	Incorporation of the descriptor "Holistic"
84 publications	
Filter 4	Reading the abstracts and selecting those that responded to the objective of this study
24 publications	

Table 1 - Bibliographic search flow in Pubmed

The data collected was organized in such a way as to identify, through the objectives of the selected studies and/or their abstracts, similarities that would bring them together in categories that would help to discuss the topic. Two categories of analysis were defined, the conventional and biomedical approach to neurodegenerative diseases (1) and multidisciplinary care and quality of life with early identification of risk factors (2), as shown in Table 2. Category 1 involved publications based on the biomedical understanding of diseases neurodegenerative diseases, while category 2 brought together publications with a more comprehensive understanding of the care of these diseases.

Some publications straddled both understandings of neurological illness and, although the descriptor "Holistic" was used to filter the publications, biomedical approaches to the care of neurodegenerative diseases prevailed quantitatively, demonstrating the predominance of these practices in medical care.

LITERATURE REVIEW

Understanding the etiology and clinical picture of neurodegenerative diseases is fundamental to a comprehensive analysis of these debilitating conditions. Neurodegenerative diseases are characterized by a wide range of underlying mechanisms that lead to the progressive degeneration of the nervous system. In this section, we will explore the contributions of various authors in different neurodegenerative contexts:

	Authors	Title	Year of publication	Journal	Summary/Main objective	Category
1	Brittany N Dugger, Dennis W Dickson	Pathology of Neurodegenerative Diseases	2017	Cold Spring Harb Perspect Biol.	Details of selected neurodegenerative diseases, focusing on their main protein aggregates.	1
2	Hao Chi, Hui-Yun Chang, Tzu-Kang Sang	Neuronal Cell Death Mechanisms in Major Neurodegenerative Diseases	2018	Int J Mol Sci.	Description of evidence of cell death in the context of individual common neurodegenerative diseases for their current understanding	1
3	Sally Temple	Advancing cell therapy for neurodegenerat ive diseases	2023	Cell Stem Cell.	The ability to generate different types of CNS cells from stem cells with a deeper understanding of cell type-specific functions and pathologies. Promotion dpre-clinical product development cells for the treatment of neurodegenerative diseases.	1
4	X-X Zhang et al.	The Epidemiology of Alzheimer's Disease Modifiable Risk Factors and Prevention	2021	J Prev Alzheimer s Dis.	Overview of current epidemiological advances related to modifiable risk factors for Alzheimer's disease, highlighting the concept of early prevention.	2
5	Akira Nakajima, Yasushi Ohizumi	Potential Benefits of Nobiletin, A Citrus Flavonoid, against Alzheimer's Disease and Parkinson's Disease	2019	Int J Mol Sci.	Searching for new types of treatment for neurodegenerative diseases	2
6	Ahmad Elkouzi, Vinata Vedam- Mai, Robert S Eisinger, Michael S Okun	Emerging therapies in Parkinson's disease - repurposed drugs and new approaches	2019	Nat Rev Neurol.	Treatment options for Parkinson's disease (PD) have focused on dopamine replacement and providing symptomatic relief. Current treatments cause undesirable adverse effects. Advances in screening methods for drugs with high yield for small molecules, Developments in disease modeling and improvements in analytical technologies have collectively contributed to the emergence of new compounds. Cell therapies and repurposed drugs, such as nilotinib, inosine, isradipine, iron chelators and anti-inflammatories, and their success in pre-clinical models through clinical trials. Immunotherapies and vaccines. Review of non-pharmacological interventions targeting motor symptoms, including gene therapy, adaptive deep brain stimulation (DBS) and optogenetic-inspired DBS.	1/2
7	Farzane Sivandzade, Luca Cucullo	Regenerative Stem Cell Therapy for Neurodegenerative Diseases: An Overview	2021	Int J Mol Sci.	Review of the various types of stem cells, current knowledge of stem cell-based therapies in neurodegenerative diseases and recent advances in this field.	1
8	David M Wilson 3rd , et al.	Hallmarks of neurodegenerat ive diseases	2023	Ceo Leading Edge	Identification of genetic factors and biochemical pathways involved in neurodegenerative diseases (NDDs). 8 characteristics of NDDs: pathological aggregation of proteins, dysfunction of synaptic and neuronal networks, aberrant proteostasis, cytoskeletal abnormalities, altered energy homeostasis, DNA and RNA defects, inflammation and neuronal cell death. Use of biomarkers and their interactions as a framework to study NDDs using a holistic approach.	1/2
9	Brenowitz, W. D.; Vaffe, K	Observational studies in Alzheimer's disease: bridging preclinical studies and clinical trials.	2022	Nature Review Neurology	Failures in the treatment of Alzheimer's disease in the clinical trial phase have led to renewed efforts to identify and test new interventions. In this Perspective, observational studies combined with data from pre-clinical studies and randomized clinical trials lead to the development of effective interventions.	1

10	Mertens, J.; Marchetto, M. C.; Bardy, C.; Gage, F. H	Evaluating cell reprogramming, differentiation, and conversion technologies in neuroscience.	2016	Nature Reviews Neuroscience	The scarcity of live human brain cells for experimental access has long limited our ability to study complex human neurological disorders and elucidate basic neuroscientific mechanisms. A decade ago, the development of methods to reprogram somatic human cells into induced pluripotent stem cells enabled the *in vitro* generation of a wide range of neural cells from virtually any human individual. The growth of methods to generate more robust and defined neural cell types through reprogramming and direct conversion into induced neurons has led to the establishment of various reprogramming-based neural disease models human.	1
11	Nabbout, R; Kuchenbuch, M	Impact of predictive, preventive, and precision medicine strategies in epilepsy	2020	Nature Reviews Neurology	In the last decade, advances in genetics, neuroimaging and EEG have allowed the etiology of epilepsy to be identified earlier. By At the same time, progress has been made in the study of experimental models of epilepsy provided a better understanding of the mechanisms underlying the condition and allowed identifying therapies that target etiologies specific. There is a change of paradigm in the treatment of epilepsy of a reactive attitude (with symptoms), to an attitude of proactive (without symptoms) which is more widely integrated into a "P4 medicine" approach. This P4, personalized, predictive approach, preventive and participatory, puts the patient at the center of the process. center of their own care and, ultimately analysis, aims to prevent the appearance of epilepsy.	2
12	Jeffrey Sheung Ching Ng	Palliative care for Parkinson's disease	2018	Ann Palliat Med.	Palliative care that provides holistic approach to satisfy your multifaceted needs, including control of symptoms, communication needs and caregiver support.	2
13	Marcos Serrano-Duenas, Luis Masabanda , Maria- Rosario Luquin	A holistic approach to evaluating Parkinson's disease, using the Delphi method: a linear evaluation index	2022	Arch Neuropsiquiatr.	To reach a consensus on the values that must be assigned to the different motor and non-motor manifestations of the disease Parkinson's disease, an evaluation index was created (LEI). Subsequently, the metric properties of this index.	1
14	Burcin Aktar , Birgul Balci , Beril Donmez Colakoglu	Physical activity in patients with Parkinson's disease: A holistic approach based on the ICF model	2020	Clin Neurol Neurosurg.	The International Classification of Functionality, Disability and Health (ICF) is a table that provides information on disability and health. The behavior of physical activity is complex and affected by various factors. Our aim was to examine the ICF domains in patients with Parkinson's disease (PD); compare them in patients with sedentary and non-sedentary PD and their association with activity level.	1
15	Seyed-Mohammad Fereshtehn ejad	Strategies to maintain quality of life among people with Parkinson's disease: what works?	2016	Neurodegener Dis Manag	A holistic strategy to maintain QoL in people with PD should consist of a multidisciplinary, personalized and patient-centered administration timely palliative care and involvement efficient caregivers and family members.	2
16	Bart De Strooper, Eric Karran	The Cellular Phase of Alzheimer's Disease	2016	Cell.	We review evidence that supports a long and complex cell that consists of feedback and feedforward responses of astrocytes, microglia and vasculature. The field should incorporate this holistic vision and take advantage of advances in single--cell approaches to solve the critical moments in which disturbances initially subject to feedback compensatory become progressive and irreversible neurodegeneration.	1

17	Naomi Massetti et al.	A Machine Learning- Holistic Based Approach to Predict the Clinical Course of Patients within the Alzheimer's Disease Spectrum	2022	J Alzheimer's s Dis.	Evaluating the use of machine learning (ML) in a wealth of data offered by the bank data from Alzheimer's Disease Neuroimaging Initiative (ADNI) and the Alzheimer's Disease Metabolomics Consortium (ADMC) in predicting the conversion of MCI to AD.	1
18	Yu Wei et al.	A network pharmacologic al approach to investigate the pharmacologic al effects of CZ2HF decoction on Alzheimer's disease	2021	Ibrain.	Investigating the pharmacological effects on diseases such as Alzheimer's	1
19	Javier Riancho, Lucía Paz-Fajardo, Adolfo López de Munaín	clinical and preclinical evidence of somatosensory involvement in amyotrophic lateral sclerosis	2021	Br J Pharmacol.	To discuss the current literature on the involvement of the sensory system in ALS. Human studies have reported intradermal loss of small fibers, predominantly axonal sensory neuropathy, as well as hyperexcitability of the somatosensory cortex. In line with this, animal studies with ALS demonstrated the involvement of several sensory components.	1
20	Ana Catarina Pinho, Edna Gonçalves	Are Amyotrophic Lateral Sclerosis Caregivers at Higher Risk for Health Problems?	2016	Acta Med Port.	To understand whether caring for patients with amyotrophic lateral sclerosis increases illnesses and health problems in caregivers.	2
21	Mireia Herrando-Grabulosa et al.	Novel Neuroprotectiv e Multicompone nt Therapy for Amyotrophic Lateral Sclerosis Designed by Networked Systems	2016	PLoS One.	Using a repositioning analysis based on the systems biology approach (TPMS technology), we identified and validated the neuroprotective potential of two new drug combinations: Aliretinoin and Pranlucaste, and Aliretinoin and Mefloquine. In addition In addition, we estimated their molecular mechanisms of action in silico and validated some of these results in a well-established in vitro model established amyotrophic lateral sclerosis based on bone marrow culture sections spinal cord.	1
22	André Maier et. al.	Use and subjective experience of the impact of motor-assisted movement exercisers in people with amyotrophic side sclerosis: a multicenter observational study	2022	Sci Rep.	Observing a beneficial effect on the preservation and improving muscle strength during treatment with MME ($p < 0.05$).	1
23	Hikari Ando et. al.	Experience of telehealth in people with motor neuron disease using noninvasive ventilation	2021	Disabil Rehabil Assist Technol.	Examine the experiences of using telemonitoring in patients with MND in non-invasive ventilation (NIV).	1
24	Arlene J Astell et al.	Technology and Dementia: The Future is Now	2019	Dement Geriatr Cogn Disord.	Summarize the main areas of technological development in dementia and identify future directions and implications.	1

Table 2 - Sources consulted and included in the study, considering authors, year of publication, abstract/ objective and category of analysis

CONVENTIONAL AND BIOMEDICAL APPROACH TO NEURODEGENERATIVE DISEASES

Bart De Strooper, Eric Karran (2016) emphasized the importance of evaluating cell reprogramming technologies, which support a long and complex cell phase and consist of feedback and feedforward responses from astrocytes, microglia and vasculature. These techniques have been crucial for modeling neurodegenerative diseases *in vitro* and understanding the molecular bases underlying these conditions. This research has focused on reprogramming cells to study the pathogenesis of these diseases, allowing the identification of potential therapeutic targets.

With specific regard to Alzheimer's disease, Brenowitz and Yaffe (2022) highlighted the importance of observational studies to bridge the gap between pre-clinical studies and clinical trials, in which the complex etiology of this neurodegenerative disease involves the accumulation of beta-amyloid plaques and tau tangles, leading to progressive cognitive dysfunctions such as memory loss, confusion and behavioral changes.

Yu Wei et al. (2021) and Noemi Massetti et al. (2022) investigated the positive pharmacological effects of drugs in the treatment of Alzheimer's disease and the use of machine learning (ML) on a wealth of data offered by the Alzheimer's Disease Neuroimaging Initiative (ADNI) database and the Alzheimer's Disease Metabolomics Consortium (ADMC) in predicting the conversion of MCI to AD, respectively.

Elkouzi, Vedam-Mai and Eisinger (2019) provided valuable *insights* into the treatment of Parkinson's Disease, characterized by the degeneration of dopaminergic cells. They discussed emerging therapies, including drug repurposing in addition to dopamine, and novel approaches such as deep brain stimulation. These strategies aim to alleviate motor symptoms and improve patients' quality of life, taking into account the side effects of the drugs indicated.

Repurposing drugs for these cases is an innovative strategy that involves using drugs originally developed for other purposes in the treatment of Parkinson's Disease. This could result in more accessible and effective treatments for patients. In addition, deep brain stimulation is an advanced surgical technique that involves implanting electrodes in specific areas of the brain. This intervention is particularly effective in controlling advanced motor symptoms and has shown promise in improving patients' quality of life (ELKOUZI ET al., 2019).

For Serrano-Duenas M, Masabanda M, Luquin MR (2022), the diagnosis of Parckison's disease is linked to the values that should be assigned to the individual's different motor and non-motor manifestations, using a linear assessment index and its metric properties. In Cartesian fashion, the patient is classified using the scores achieved in the linear assessment.

Similarly, Burcin Aktar, Birgul Balci, Berril Donmez Colakoglu (2020) used a numerical assessment to classify the severity of the disease, using the International Classification of Functioning, Disability and Health (ICF), a parameter that provides information on disability and health. The present study examined the ICF domains in patients with Parkinson's disease (PD) and compared the values in sedentary and non-sedentary PD patients and their association with activity level.

Accurate diagnosis of neurodegenerative diseases is a critical challenge in contemporary medicine, as the scarcity of living human brain cells for experimental access has long limited the ability to study complex human neurological disorders and elucidate basic neuroscientific mechanisms. A decade ago, the development of methods to reprogram

somatic human cells into induced pluripotent stem cells enabled the *in vitro* generation of a wide range of neural cells from virtually any human individual. These neurobiological processes are the key to understanding the neurochemical changes that occur over the course of these conditions (Mertens, J.; Marchetto, M. C.; Bardy, C.; Gage, F. H, 2016).

Arlene J Astell et al, 2019 pointed out that it would be necessary to summarize the main areas of technological development in dementia in order to identify future directions and implications for its diagnosis and treatment. Similarly, but for different reasons, Hikari Ando et. al. 2021 noted the importance of examining the experiences of using telemonitoring in patients with NDD on non-invasive ventilation (NIV), from which it would also be possible to redirect future diagnoses and treatments. André Maier et. al. (2022) observed in their study a beneficial effect on the preservation and improvement of muscle strength during the treatment of patients with NDD with assisted motor movement, i.e. the study reinforced the importance of exercise.

assisted physical therapy for patients with the disease.

Mireia Herrando-Grabulosa et al. (2016), using a repositioning analysis based on a systems biology approach (TPMS technology), identified and validated the neuroprotective potential of two new drug combinations: Aliretinoin and Pranlucast, and Aliretinoin and Mefloquine. *In vitro* studies of this combination have been well established in the case of amyotrophic lateral sclerosis (ALS), based on spinal cord culture sections. Similarly, in 2021, Javier Riancho, Lucía Paz-Fajardo, Adolfo López de Munaín, concerned with the same disease, discussed the involvement of the sensory system in ALS in the light of the scientific literature. Studies in humans have reported intradermal loss of small fibers, predominantly axonal sensory neuropathy, as well as hyperexcitability of the somatosensory cortex. In line with this, studies in animals with ALS have demonstrated the involvement of various sensory components.

David M Wilson 3rd , et al. (2023) described 8 characteristics present in NCDs: pathological aggregation of proteins, dysfunction of synaptic and neuronal networks, aberrant proteostasis, cytoskeletal abnormalities, altered energy homeostasis, DNA and RNA defects, inflammation and neuronal cell death.

Farzane Sivandzade, Luca Cucullo (2021) carried out a review of the various types of stem cells, which served as the basis for current knowledge on the latest therapies for neurodegenerative diseases.

Ahmad Elkouzi, Vinata Vedam-Mai, Robert S Eisinger, Michael S Okun (2019) studied cell therapies and repurposed drugs, such as nilotinib, inosine, isradipine, iron chelators and anti-inflammatory drugs, and their success in preclinical models through clinical trials. They also studied immunotherapies and vaccines that could prevent the development of NDD, as well as reviewing non-pharmacological interventions aimed at motor symptoms, including gene therapy, adaptive deep brain stimulation (DBS) and optogenetic-inspired DBS.

Sally Temple's (2023) studies on the ability to generate different types of Central Nervous System cells for NCD sufferers, from stem cells with a deeper understanding of cell type-specific functions and pathologies, have raised expectations of treatment for such diseases, since Hao Chi, Hui- Yun Chang, Tzu-Kang Sang, in 2018, already described evidence of cell death in the context of neurodegenerative diseases.

Brittany N Dugger, Dennis W Dickson (2017) pointed out in their study that any treatment for NCD should primarily target the cellular protein aggregates responsible for the effects of the disease.

MULTIDISCIPLINARY CARE AND QUALITY OF LIFE WITH EARLY IDENTIFICATION OF RISK FACTORS

In their study on epilepsy, Nabbout and Kuchenbuch (2020) explored the impact of predictive, preventive and precision medicine strategies. The etiology of epilepsy is multifaceted, involving genetic and environmental factors, so its treatment should not be restricted to the pathophysiological aspects of the disease. Advances in genomics and neuroimaging have enabled a better understanding of the origins of epilepsy and the development of personalized therapeutic approaches that consider the individual in their context. Progress in the study of experimental models of epilepsy has led to a better understanding of the mechanisms of epilepsy.

This has led to a paradigm shift in the treatment of the disease, from a reactive attitude (with symptoms) to a proactive attitude (without symptoms), which is more broadly integrated into a holistic approach. This personalized, predictive, preventive and participatory approach puts the patient at the center of their own care and ultimately aims to prevent the onset of epilepsy. This study also illustrates how the identification of genetic and clinical markers can enable personalized interventions to reduce the risk of developing the disease.

Elkouzi, Vinata Vedam-Mai, Robert S Eisinger, Michael S Okun (2019) highlighted the importance of a multidisciplinary approach in the care of patients with Parkinson's disease. In addition to pharmacological and surgical therapy, follow-up by a team of healthcare professionals, including physiotherapists, occupational therapists and speech therapists, plays a crucial role in maintaining functional independence. These specialists help patients to manage their motor symptoms and improve their quality of life.

In the context of Alzheimer's dementia, neuropsychological rehabilitation, as suggested by Elkouzi, Vinata Vedam-Mai, Robert S Eisinger, Michael S Okun (2019), plays a significant role in promoting quality of life. Through cognitive and behavioral techniques, patients are empowered to face the cognitive challenges imposed by the disease. Emotional and psychosocial support is key to ensuring that patients feel supported and understood in their journey. Current drug treatments cause undesirable adverse effects, and advances in high-throughput drug screening methods for small molecules, developments in disease modeling and improvements in analytical technologies have collectively contributed to the emergence of new compounds to overcome these effects.

Seyed-Mohammad Fereshtehnejad (2016) state that a holistic strategy should be established for the treatment of NCDs in order to maintain the quality of life of the individual, who should be assisted by a multidisciplinary team, personalized and with a patient-centered approach, with timely administration of palliative care and efficient involvement of caregivers and family members.

Jeffrey Sheung Ching Ng (2018) reaffirms what Seyed-Mohammad Fereshtehnejad had already stated in 2016, that palliative care, when implemented, should provide a holistic approach to meeting the multifaceted needs of patients, including symptom control, communication needs and caregiver support.

Akira Nakajima, Yasushi Ohizumi (2019) already signaled the need to invest in new treatments for patients with NDD, considering that exclusive drug care was no longer able to provide functional quality survival.

In 2021, X-X Zhang et al., based on epidemiological advances related to modifiable risk factors for Alzheimer's disease, highlighted the importance of the concept of early preven-

tion and risk factors to be controlled. A crucial aspect of prevention is the identification of risk factors associated with neurodegenerative diseases, and in this context, secondary neuronal degeneration needs to be understood to enable the development of early interventions aimed at interrupting or slowing down the neurodegenerative process.

The study by Ana Catarina Pinho, Edna Gonçalves (2016) concluded that caring for patients with amyotrophic lateral sclerosis (ALS) increases illnesses and health problems in caregivers, especially when this treatment is not provided by a multidisciplinary team.

DISCUSSION

Promoting healthy lifestyles plays a central role in preventing neurodegenerative diseases (Elkouzi, Vinata Vedam-Mai, Robert S Eisinger, Michael S Okun. (2019); Seyed-Mohammad Fereshtehnejad 2016). This includes adopting a balanced diet, exercising regularly and reducing risk factors such as smoking and excessive alcohol consumption (X-X Zhang et al, 2021).

Public awareness of the importance of these measures has become essential in the care of people with NCDs, as they need to be seen in their whole context, since exclusive drug treatment is no longer able to effectively control the effects of the disease (Akira Nakajima, Yasushi Ohizumi 2019).

Prevention and awareness play significant roles in mitigating neurodegenerative diseases, especially by identifying risk factors of the disease, with the possibility of acting before symptoms appear (X-X Zhang et al, 202; Akira Nakajima, Yasushi Ohizumi 2019). Disseminating accurate information and promoting healthy lifestyles are essential strategies for reducing the incidence of these conditions and improving the quality of life of those affected (Jeffrey Sheung Ching Ng 2018; Seyed-Mohammad Fereshtehnejad, 2016).

Addressing neurodegenerative diseases requires an in-depth and integrated understanding of diagnostic methods, treatment options and management strategies. These complex conditions, such as Alzheimer's disease, Parkinson's disease and epilepsy, affect millions of individuals worldwide, imposing a significant burden on society and health systems.

Therefore, providing care and promoting quality of life are crucial elements in the management of NCDs such as Parkinson's disease and Alzheimer's dementia. These progressive conditions significantly affect the functionality and well-being of patients, making a holistic approach that takes into account physical, emotional and social aspects essential (2021, X-X Zhang et al; Elkouzi, Vinata Vedam-Mai, Robert S Eisinger, Michael S Okun (2019); Nabbout and Kuchenbuch (2020).

However, it is important to recognize that the diagnosis of neurodegenerative diseases remains a constantly evolving field. Biomedical research and the application of advanced techniques are expanding the ability to identify early markers and differentiate disease subtypes. These advances are essential for improving diagnostic accuracy, allowing for more timely and effective interventions (Mertens, J.; Marchetto, M. C.; Bardy, C.; Gage, F. H, 2016); Arlene J Astell et al, 2019).

Thus, the diagnosis of neurodegenerative diseases represents a complex challenge that requires an integrated approach, combining knowledge of neural physiology, cutting-edge imaging techniques and the identification of specific biomarkers. In addition to these factors, it becomes necessary to adopt multidisciplinary and personalized approaches, with patient-centered care to improve their quality of life (de Ana Catarina Pinho, Edna Gonçalves 2016).

Therapeutic approaches for neurodegenerative diseases such as Parkinson's disease and Alzheimer's dementia continue to evolve. In addition to traditional pharmacological therapies, Elkouzi, Vinata Vedam-Mai, Robert S Eisinger, Michael S Okun (2019) highlight emerging therapies that promise to offer new treatment prospects. Such innovations are crucial, as neurodegenerative diseases represent a growing burden on society, with significant medical, economic and social implications.

Neuroscience research, as presented in "Principles of Neuroscience" by Kandel, Koester and Mack (2023), has contributed to a paradigm shift and the development of more effective rehabilitation methods, providing hope for patients and their families. These principles reinforce the holistic idea of care and the multidisciplinary approach in the therapeutic protocol.

The multidisciplinary approach, suggested by Elkouzi, Vinata Vedam-Mai, Robert S Eisinger, Michael S Okun. (2019) and Kandel, Koester and Mack (2023), favors recognizing the complex needs of NCD patients, beyond the motor effects. These conditions affect not only physical health, but also cognition and the emotional well-being of individuals. Therefore, holistic care involving doctors, therapists, psychologists and social workers is essential to address all the dimensions of these diseases and the actors involved (caregivers).

Cell reprogramming technology, as highlighted by Mertens et al. (2016), has revolutionary potential in neuroscience. This approach offers new possibilities for the study of neurodegenerative diseases, allowing the creation of cellular models that can be used to investigate pathological mechanisms and develop new individualized therapies.

Although the studies by Ahmad Elkouzi, Vinata Vedam-Mai, Robert S Eisinger, Michael S Okun 2019 addressed dopamine replacement for the immediate relief of Parkinson's disease (PD) symptoms, it also highlights its adverse effects, and proposes more holistic treatment strategies, understood as disease-modifying therapies, reviewing the adoption of non-pharmacological interventions targeting motor symptoms, including gene therapy, adaptive deep brain stimulation (DBS). Likewise, David M Wilson 3rd , et al. 2023 describe the characteristics of NCDs and their drug strategies, but also point to the use of biomarkers and their interactions with a holistic approach.

FINAL CONSIDERATIONS

Even with all the medical advances in the areas of diagnosis, treatment and prevention, NCDs continue to challenge the academic community and society. The impact of these conditions transcends the boundaries of medicine, profoundly affecting people's lives and their social connections.

As these complexities are explored in the search for solutions, this journey needs to be shared between science, health professionals, and above all, patients and their families

The study showed that neurodegenerative diseases are complex challenges that affect millions of people, and that palliative care is the way to control them and ensure their well-being. However, it does not take into account the risk factors that can be combated in order to prevent the disease from developing. Although there has been progress in the traditional approach to neurodegenerative diseases, the holistic approach guarantees more effective care when multidisciplinary teams and empathy are adopted in the doctor-patient relationship.

It is important to emphasize that the treatment of NCDs is not limited to the pharmacological sphere, and non-pharmacological interventions play an equally significant role, such as occupational therapy, physiotherapy and psychosocial support.

Although most of the articles found in this study fall into the category of conventional treatment, the importance of multidisciplinary care and promoting quality of life guides more effective practices with longer-lasting treatments. One of the causes of this quantitative imbalance between the categories analyzed is the predominance of the biomedical conception of NCDs and, consequently, the lower interest in more holistic scientific publications.

However, this numerical expression does not reproduce the best way forward, since education and support for families and caregivers are equally essential to ensure continuity of care and promote quality of life. Understanding patients' needs and constantly adapting care strategies are fundamental to meeting the evolving demands of neurodegenerative diseases.

Prevention and awareness is a powerful tool in preventing neurodegenerative diseases by tackling risk factors. Disseminating accurate information about symptoms, risk factors and preventive measures can empower individuals to adopt a healthier lifestyle and seek medical help when necessary.

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