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Brain Health as a Public Health Priority: A Commentary on the Future of Neurology

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Commentary

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Abstract

Neurological disorders have emerged as one of the leading causes of disability, cognitive impairment, and mortality worldwide, posing significant challenges to healthcare systems and society. Despite considerable advances in diagnostic technologies and therapeutic interventions, neurological care remains largely focused on managing disease after the onset of symptoms. Increasing evidence suggests that many neurological disorders develop gradually over years or even decades, creating an opportunity for early identification and preventive intervention. At the same time, growing recognition of modifiable lifestyle and vascular risk factors has shifted attention toward preserving brain health throughout the lifespan rather than treating neurological disease alone. This commentary highlights the importance of recognizing brain health as a public health priority and discusses how neurologists, healthcare providers, researchers, and policymakers can collaborate to promote prevention, early detection, and personalized neurological care. Prioritizing brain health has the potential to reduce the global burden of neurological disorders while improving quality of life and supporting healthier aging populations.

Keywords: Brain Health; Neurology; Public Health; Prevention; Early Diagnosis; Neurodegenerative Diseases; Healthy Aging; Precision Medicine

Introduction

Neurological disorders account for an increasing proportion of global morbidity and mortality, affecting millions of individuals across all age groups. Alzheimer's disease, Parkinson's disease, stroke, epilepsy, multiple sclerosis, and other neurological conditions continue to impose enormous clinical, social, and economic burdens worldwide. Although advances in neuroimaging, molecular diagnostics, pharmacological therapies, and rehabilitation have improved patient management, healthcare systems continue to invest predominantly in treating neurological diseases after symptoms have already developed [1].

This reactive model has undoubtedly benefited countless patients; however, it also highlights an important limitation. Many neurological diseases begin years before clinical symptoms become apparent. During this prolonged preclinical period, pathological changes accumulate gradually while opportunities for preventive intervention remain underutilized. Consequently, preserving brain health should become an essential objective of modern healthcare rather than focusing exclusively on disease management.

Brain Health: An Emerging Public Health Challenge

Brain health extends beyond the absence of neurological disease. It encompasses optimal cognitive, emotional, behavioral, and functional well-being throughout life. Maintaining brain health enables individuals to remain independent, productive, and socially engaged while

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reducing the risk of disability associated with aging [1,2].

Population aging has substantially increased the prevalence of neurodegenerative diseases, making brain health an urgent public health concern. The rising incidence of dementia and stroke not only affects patients but also places tremendous emotional and financial burdens on caregivers and healthcare systems. As life expectancy continues to increase globally, the number of individuals living with chronic neurological disorders is expected to rise considerably unless effective preventive strategies are implemented [3].

Importantly, several neurological disorders share modifiable risk factors, including hypertension, diabetes, obesity, smoking, physical inactivity, poor nutrition, sleep disturbances, hearing impairment, depression, and social isolation. Addressing these factors through public health initiatives may significantly reduce future neurological disease burden.

The Evolving Role of Neurology

Neurology is gradually transitioning from a discipline focused primarily on diagnosis and symptom management toward one that incorporates prediction, prevention, and personalized medicine. Advances in blood-based biomarkers, neuroimaging, genomics, digital health technologies, and artificial intelligence have improved the ability to detect early biological changes associated with neurological diseases [4].

These innovations offer clinicians the opportunity to identify high-risk individuals before irreversible neuronal injury occurs. Earlier intervention may allow implementation of lifestyle modification, vascular risk control, cognitive training, rehabilitation, and disease-modifying therapies when they are likely to have the greatest clinical benefit.

Nevertheless, technology alone cannot transform neurological care. Successful implementation requires integration of scientific innovation with patient-centered clinical practice. Neurologists should work closely with primary care physicians, rehabilitation specialists, psychologists, nutritionists, public health professionals, and policymakers to establish comprehensive brain health programs that extend beyond hospital settings [5].

Why Brain Health Should Become a Public Health Priority

Public health has achieved remarkable success in reducing cardiovascular disease through preventive strategies targeting hypertension, smoking, and unhealthy lifestyles. A similar preventive framework should now be adopted for neurological disorders [5,6].

Routine assessment of neurological risk factors during primary healthcare visits could facilitate earlier identification of individuals at increased risk of cognitive decline or stroke. Public awareness campaigns promoting healthy lifestyles, regular physical activity, cognitive engagement, adequate sleep, and cardiovascular health should be recognized as essential components of brain health promotion [7].

Educational institutions, workplaces, and community organizations also have important roles in promoting lifelong brain health. Encouraging healthy behaviors from childhood through older adulthood may reduce the cumulative effects of modifiable neurological risk factors [8].

Challenges and Future Directions

Although considerable progress has been achieved, several challenges remain. Access to advanced diagnostic technologies varies substantially across countries and healthcare systems. Limited healthcare resources, insufficient public awareness, socioeconomic disparities, and workforce shortages continue to hinder implementation of preventive neurological care.

Artificial intelligence and digital health technologies offer promising opportunities for early disease detection and continuous patient monitoring. However, issues related to data privacy, ethical governance, clinical validation, and equitable access require careful consideration before these technologies become routine components of neurological practice.

Future neurological research should increasingly focus on identifying reliable predictive biomarkers, validating preventive interventions, and evaluating cost-effective public health strategies that improve brain health across diverse populations. Multidisciplinary collaboration between neuroscientists, clinicians, epidemiologists, public health experts, engineers, and policymakers will be essential for translating scientific discoveries into meaningful clinical outcomes.

Conclusion

The future of neurology should extend beyond treating neurological disease to actively preserving brain health throughout life. Recognizing brain health as a public health priority offers an opportunity to reduce the growing burden of neurological disorders through prevention, early diagnosis, and personalized care. Although scientific, technological, and healthcare-system challenges remain, integrating preventive strategies into routine clinical

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practice and public health policy represents an important step toward healthier populations and more sustainable neurological care. Continued collaboration among clinicians, researchers, public health professionals, and policymakers will be essential to achieving this vision.

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