

## Social and Cultural determinants of Brain health in Pakistan

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Brain health encompasses the optimal functioning of the brain throughout life, enabling overall physical, mental, social, and spiritual well-being. Brain health is important as it ensures individuals to live a content, meaningful life and can contribute to society for its social and economic growth. Neurologic disorders are a major liability with a lifetime prevalence of around 40% worldwide. It is important to have an estimate of the neurologic disease burden in a country to understand how crippling it can be for individuals, people, and a nation. We analysed the causes of growing neurologic disease burden by studying the social, cultural, and spiritual determinants of brain health and how to address health disparities and promote equitable care. Socioeconomic status influenced by one's education, income and job has a positive correlation with healthcare access. Impoverished countries with a majority population living under lower socioeconomic circumstances suffer far more from Neurologic diseases due to limited access to healthcare, stress, and general neglect to health. Urban dwellers have greater access to sub-specialised doctors and imaging equipment, as well as easier access to medications. As a result, the neurologic disease burden may be more concentrated in industrialised cities due to greater recorded data and greater life expectancy with stroke and epilepsy due to better care than in impoverished regions of the country. Spirituality is an important aspect that should be considered when treating patients with terminal or chronic illness as it gives individual strength and purpose to face their ailments and be more accepting towards their disease outcome.

Neurological disorders lead to more deaths and disabilities globally than any other health condition. Lower income countries (LIC) like Pakistan have lower burden of Neurological diseases. The lower prevalence in LIC can be attributed to fewer Neurologic healthcare facilities and lack of proper epidemiological studies.<sup>1</sup> Epidemiological data are essential to have a better glimpse of disease patterns within communities and find causation factors of Neurologic disorders in developing

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countries like Pakistan. However, available data on the prevalence and types of neurological diseases (ND's) in Pakistan remain limited. Pakistan is ranked first globally for diabetes prevalence according to the 11th Diabetes Atlas of the International Diabetes Federation-2025. Diabetes is a major risk factor for Neurological diseases including stroke and neuropathies. Most existing data are hospital-based and may not represent the entire population, underscoring the need for comprehensive studies to better assess NDs in Pakistan.<sup>2</sup>

Brain health encompasses the optimal functioning of the brain throughout life, enabling overall physical, mental, social, and spiritual well-being.<sup>3</sup> Brain health is important as it ensures individuals to live a content and meaningful life and can contribute to society for its social and economic growth. In this editorial we try to understand the social and cultural determinants that may have contributed to the neurologic burden as this can help address health disparities and promote equitable care. The social determinants of health (SDH), as defined by WHO, are the non-medical factors that affect health outcomes. They are the conditions in which people are born, grow, work, live, and age, and the wider set of forces and systems shaping the conditions of daily life. These forces and systems encompass economics, social norms and policies and political systems. Burden of Neurological diseases is decreasing in high income countries and increasing in low and middle income countries. According to a systematic review of population-based study there was a 42% decline in stroke incidence in high income countries (HIC) over 4 decades, a >100% increase in stroke incidence occurred in LMIC during the same period.<sup>4</sup>

Socioeconomic status (SES) influenced by one's education, income and job has a positive correlation with healthcare access. People with low SES have limited access to healthcare and they are less likely to seek preventive services, screening tests and more likely to ignore health concerns. Moreover, people with lower income exhibit higher levels of stress which can lead to chronic neurologic diseases. In rural areas and villages where literacy rate is low people adopt superstitious ideology and thoughts and do not consider neurologic diseases such as epilepsy and schizophrenia as illnesses and the neglect and delay in seeking medical expertise

only worsens the disease process and the health outcome. A study done in rural settings in Pakistan found that neurologic diseases were more prevalent in individuals above 40 years of age, which they attributed to the aging process and accumulation of risk factors over time. This emphasises the need for preventive services and early intervention to address the growing health concerns among the elderly population.<sup>5</sup>

The geographical location of people's homes contributes to the social disparity. In comparison to less developed areas of the country, urban inhabitants have greater access to sub-specialised doctors and imaging equipment, as well as easier access to medications. As a result, the neurologic disease burden may be more concentrated in industrialised cities due to greater recorded data and the prognosis of disorders such as stroke and epilepsy due to better care than in impoverished regions of the country. If research were conducted, people in rural regions would suffer more from neurologic sequel due to limited access to health-care facilities and have a greater mortality rate from diseases such as stroke.

Around 40% of dementia cases could potentially be prevented or delayed by addressing modifiable risk factors like hypertension, obesity, diabetes, depression, physical inactivity, and smoking. Policy makers should take this into account and recommend lifestyle changes to lower dementia risk. With no cure for dementia, risk reduction has become a critical focus in research and public health strategies to address the growing prevalence of dementia driven by an aging global population. Most individuals with dementia have additional health conditions, making it challenging to manage their overall health. They need consistent family and social support to help minimize the risk of hospitalization and support daily needs. Some risk reduction strategies to prevent dementia include limiting alcohol consumption, smoking cessation, maintaining frequent exercise, reducing air pollution, and treating DM and hypertension. Treating hearing impairment, maintaining social contact, and getting higher education all maintain and increase cognitive reserve.<sup>6</sup>

Adequate housing, clean drinking water and food security are important in curbing neurologic diseases and infections. Neurologic infections with Taeniasis can be reduced with proper hand washing and sanitary food preparation.<sup>6</sup> A study showed higher rates of Alzheimer's disease and dementia in veterans with housing insecurity, while homeless individuals experience more strokes than the general population. Despite the link between housing and health overall, more research is needed to

understand its impact on neurological diseases and whether improving housing can improve neurological health.<sup>7</sup>

Cultural alignment is also important; individuals are more likely to agree to recommendations from doctors coming from the same cultural background and spoken language. Several randomized controlled trials aimed at reducing stroke inequities have incorporated care teams that align with patients' racial, ethnic, cultural, and language backgrounds and used culturally specific resources, though outcomes have varied.<sup>7</sup> Individuals who are mindful of spirituality are better adapted to cope with neurologic disability. According to the research included in systematic mapping review, spirituality/religiosity is strongly associated with improved quality of life and emotional well-being in individuals suffering from neurological disorders. Yoga has demonstrated favourable results in the therapy of neurologic disorders.<sup>8</sup> According to Smith investigation, religiosity has been linked with decreased symptoms of depression and anxiety.<sup>9</sup> Spirituality gives people hope and strength to overcome fear, anxiety and sadness when facing chronic neurologic disorder such as Multiple Sclerosis and Parkinson's disease. Therefore, spiritual care should be provided to individuals battling with terminal illness or chronic disease as it will give them the sense of purpose and faith to deal with their ailments, resulting in a more acceptable disease outcome.

Individuals who experience adverse life experiences such as abuse, neglect, or family dysfunction face an increased risk of health problems, along with higher rates of morbidity and mortality.<sup>9</sup> On the other hand, strong social support from friends and family can lessen the stress level and neighbourhood social cohesion has been associated with reduced stroke mortality.<sup>10</sup> In Pakistan, where it is common for individuals to live with extended family members, this cultural norm may serve as a protective factor against neurological diseases, due to the increased social support it provides. Social support within extended families can help reduce stress, improve emotional well-being, and offer practical assistance, all of which are essential for better health outcomes. Loneliness is a strong risk factor for mental illness and suicide. Social support by extended family can reduce burden of loneliness and associated depression and suicide.

The American Heart Association's seven cardiovascular health metrics—smoking, physical activity, body mass index, diet, blood pressure, cholesterol, and fasting blood glucose—are linked to better cognitive health in midlife when managed early.<sup>12</sup> This highlights the importance of healthy habits from an early age. Although factors like

socioeconomic status, culture, environment, social networks, and individual lifestyle habits, together should be considered in determining overall health of a person. Smoking, poor nutrition, and substance use disorders have been associated with low socioeconomic status.<sup>13</sup> Neuroplasticity, which is the brain's ability to adapt to changes in the environment is increased by physical activity which is strongly shaped by social factors. Epidemiological studies have shown that individuals who acquire education or engage in complex work have higher mental reserve due to greater synaptic density or cognitive strength and this can help delay disease symptoms.<sup>14</sup> Growing evidence suggests that social engagement is linked to better cognitive functioning in later life and people who are physically and socially inactive are at risk for early dementia.<sup>15</sup>

To accurately assess the neurologic disease burden in a developing country like Pakistan, a comprehensive national health survey is essential. This would provide insight into regional variations in neurologic health, allowing targeted interventions to address specific challenges in different areas. At the state and federal level, policy makers must be more initiative-taking and establish systems that deal with social and cultural disparities at ground level. The whole community needs to be engaged and needs to recognize the seriousness of neurologic disease, the toll it takes on the individual and caregivers. Going for regular check-ups, following the doctor's recommendation, and maintaining a healthy lifestyle can limit the negative impact disease can have on an individual's health and increase life expectancy.

**Key words:** Brain health, social, cultural, spiritual, determinants, Pakistan, stroke, dementia, advocacy

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