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PERSPECTIVE

Brain health and mental health: Common vascular risk factors and practical implications

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Abstract

The pandemic dramatized the close links among cognitive, mental, and social health; a change in one reflects others. This realization offers the opportunity to bridge the artificial separation of brain and mental health, as brain disorders have behavioral consequences and behavioral disorders affect the brain. The leading causes of mortality and disability, namely stroke, heart disease, and dementia, share the same risk and protective factors. It is emerging that bipolar disorders, obsessive compulsive disorders, and some depressions share these risk factors, allowing their joint prevention through a holistic life span approach. We need to learn to focus on the whole patient, not simply on a dysfunctional organ or behavior to mitigate or prevent the major neurological and mental disorders by fostering an integrated approach to brain and mental health and addressing the common, treatable risk factors.

KEYWORDS
brain health, long Covid, mental health, neurology, prevention, psychiatry, risk factors

> "From the brain and from the brain only, arise our pleasures, joys, laughter, and jests as well as our sorrows, pains, griefs and tears. Through it…we think, see, hear, and distinguish the ugly from the beautiful, the bad from the good."
>
> —Hippocrates (c460–c370 BC)

1 | THE CURRENT SITUATION

Hippocrates speaks to the brain's centrality in human experience, reflected in current efforts to understand neurological and psychiatric disorders. However, we could also argue that our joy and suffering arise from our thoughts, bodily experiences, and relationships with each other and the social world through cultural learning, institutions, and practices. Emerging research clarifies how culture, mind, and brain are co-constituted on multiple timescales,[1] which has implications not only for understanding human beings but for diagnosing and treating patients. When thinking of the brain one should consider behavior and social context and vice versa. However, disorders have been long divided into "organic" and "psychogenic," as seen for example in the history of hysteria.[2] This division is misleading: social stressors and psychological conflicts can contribute to any illness, while functional disorders can occur even in the absence of obvious stressors or psychological difficulties. We are beginning to have a more holistic view of these conditions and realize that effective treatment can involve physical, psychological, and social interventions.[3] All medical disciplines have been hampered by a kind of mind–body dualism that does not

reflect reality but is based on constructs rooted in cultural history and maintained by biomedical institutions and practices. This dualism leads to dichotomous thinking that influences the organization of health care and carries the risk of clinical mismanagement.

The compartmentalization of medicine into subspecialties—and the methodological reductionism that is a useful strategy in scientific research—create the illusion that health and ill health can be neatly divided into different systems or organs. However, a person, as a conscious self, is embodied and embedded in a social world. The person is constituted by a biological body that is reconstructed continuously through interactions between all its bio-psycho-socio-cultural components and processes.[4] The challenge for researchers and clinicians is how to conceptualize the interactions between these domains through a shared vocabulary. In current psychiatric research, the biological components often are given priority and this has led to advances in our understanding of the molecular basis of many disorders. Clearly, psychosocial factors exert effects on the body through physiological and molecular processes. Research reveals powerful effects of the social environment and behaviors on health that may occur through epigenetic and other biological mechanisms as well as through psychosocial processes. Modifying individuals' coping behavior and their social environment can affect brain mechanisms associated with pathology. As a result, there is increasing recognition of the need for an integrative perspective in which interactions of brain, individual experience, and the social environment are at the center of our understanding of the mechanisms of health and illness.[5–9]

In practice, the psychosocial components are crucially important because the person is not simply a tenant in the brain and body, but their landlord. Just as our neural machinery serves to maintain the functional integrity of bodily systems, the integrity of brain and body serve the adaptive capacities and goals of the person. And the functional capacities, goals, and aspirations of the person, no less than their experience of health and illness, depend on ongoing interactions with a social environment. Hence, biological, psychological, and social domains must be considered in treatment and prevention and provide more precise and patient-centered care.

Brain health and mental health then are two faces of the same coin, although they are usually viewed only from one side. We need to learn how to hold these two views in binocular vision, for there are no brain disorders without mental health consequences nor mental disorders without brain effects. The clinical challenge is how to realize this integrative view in ways that can guide person-centered care. This paper discusses examples of such an integrative approach drawn from studies of vascular disease and dementia with an emphasis on the implications for prevention. In particular, vascular risk factors are highly prevalent problems that are usually only viewed from one side, whereas they affect both brain and mind and can be treated and prevented.

2 | MENTAL DISORDERS AND VASCULAR DISEASE

Brain correlates of mental disorders and mental consequences of neurological dysfunction have long been documented. While functional changes in neural circuitry may be causative, psychological and social factors may also be involved. For example, bipolar disorders demonstrate compelling associations between brain and mental health. Positron emission tomography (PET) studies show that the volume of the left subgenual prefrontal gray matter is smaller in patients with bipolar disorders and even smaller in unipolar disorders compared to controls.[10] Moreover, this area is consistently underactive in familial depressive disorder and is activated during periods of mania. Cognition, mood, and social interactions are all affected reciprocally in bipolar disorders.

Although we know how behaviour and psychiatric disorders can change the brain and how the brain can alter behaviour and produce psychiatric disorders, the relationship between psychiatric disorders and vascular disease is less clear. For example, a common association in patients with older age bipolar disorder (OABD) are silent cerebral infarctions. Indeed, 59.5% of OADB patients have silent infarcts compared to 20% in healthy older adults.[11] Although called silent, these infarcts are associated with cognitive impairment. Sporadic depression can also be associated with vascular disease. In older adults, depression sometimes manifests as apathy and often occurs concomitantly with gait disorders and executive dysfunction.[12] In older adults with progressive cerebrovascular disease, one encounters the triad of cognitive impairment, lower body Parkinsonism, and depression. A further example of the association between mental and brain health links obsessive compulsive disorder (OCD) with an increased risk of developing an ischemic stroke.[13]

Preventing cardiovascular disease may reduce the risk of both neurological and psychiatric conditions. One challenge is that mental disorders have an earlier onset than vascular disease and it is difficult to motivate behavioral changes for problems that might not happen for decades. However, mental disorders tend to be lifelong, and it is never too early to start prevention. This emphasizes a lifespan approach as advocated by the World Health Organization.[14]

3 | IMPLICATIONS

Interactions between brain and body in mental disorders appear to be bidirectional: cerebrovascular disease predisposes to depression in older adults and depression and possibly bipolar disorder and OCD in early life predispose to cerebrovascular disease developing later.[13] We need to explore the extent to which this association represents shared biological factors, lifestyle, and behaviors, or is secondary to pharmacotherapy. We also need to explore social and cultural variations; research shows more cerebrovascular disease among Asian and African origin immigrants in the UK compared to White individuals.[15] This may reflect the impact of social adversity experienced by migrants, which has been well documented in the literature.[16]

Typically, mental health practitioners have limited expertise in neurological disorders and vascular disease management and neurologists have scant knowledge of mental disorders. To address the many relationships between these disorders, we need to look for concomitant brain health issues in the presence of mental disorders and vice versa. Table 1 summarizes some suggestions for early detection and

TABLE 1 Summary of some suggestions for early detection and intervention.

Opportunities for early intervention	
	Family physician focus
Who?	Older adults presenting with depression, mild cognitive impairment, Parkinsonism.
What?	One or more of the triad symptoms: memory & cognitive decline, depressed & anxious mood without apparent precipitating factors, impaired mobility with a short stepping magnetic gait.
When?	To be considered in all individuals from middle to late life; especially those presenting with one or more of these symptoms. Also, to be considered in all those with one or more risk factors: hypertension, obesity, hyperlipidemia, & diabetes.
Where?	In family practice clinics; in the community including nursing homes and elder care facilities; in hospitals.
Why?	Because efficient connectivity in neural networks is important for intact mood, cognition, and mobility. Diffuse cerebrovascular disease disrupts brain connectivity.
How?	High index of clinical suspicion when one of these symptoms are present followed by • Assessment of gait including tandem walking. • Assessment of cognition using the Montreal Cognitive Assessment.[17] • Assessment of mental health using the Patient Health Questionnaire for anxiety & depression.[18]

intervention.

The myriad associations between the brain and mind, mediated by cerebrovascular disease makes it an important target for prevention. Stroke, heart disease, and dementia share the same treatable risk and protective factors and can be prevented together.[19] It is as important to treat vascular risk factors in psychiatric disorders as it is to address psychiatric disorders to prevent vascular disease. Untreated individuals with psychiatric conditions may be less likely to follow preventive advice before they reach the age of vascular disorders. Treating the psychiatric problem might spare them a future burdened with vascular disease.

The pandemic demonstrated the close links among brain, mental, and social health. Clearly, each affects the other. What remains unclear is precisely how. For example, to what extent is the cognitive slowing with long Covid the cause of depression or vice versa? Could the virus account partially for both? The answers cannot be found by only looking at one causal direction. The pandemic provides a compelling argument for a unitary approach, requiring the willingness of both fields to reach beyond their disciplinary borders and distinct vocabularies and develop joint programs and a common language. Studying the long-term effects of Covid-19 together offers a great opportunity to develop new ways to bring psychiatry and neurology together to combine their complementary strengths and address their respective limitations in collaboration with health professionals, policy makers, and the public.

The overarching goal is achieving health for the whole person and attention to a broad view of integral brain health is central to this effort: "Integral brain health is a state of optimal cerebral/mental/social, in a safe, healthy, and supportive environment."[20] Integral brain health is the key to health, productivity, and well-being.[21]

4 | CONCLUSION

Behaviors have brain consequences and brain changes have behavioral effects. The brain, body, and environment may have similar close links in seemingly disparate health conditions. We need to go beyond the fragmented care that arises from our segmented, specialized medical care to recognize and treat health conditions that are closely related both in their origins and their pathophysiology and their socially mediated course. Conditions that occur together should be prevented together. The association of vascular risk factors with bipolar, obsessive-compulsive disorders, and depression in older adults presents opportunities for prevention. Similarly, recognition and treatment of psychiatric disorders will enhance the prevention of vascular disorders. To achieve this integrated approach, we first need to acknowledge that mental and brain health represent two sides of the same coin, providing the common currency for understanding, treating, and preventing the leading causes of disability and mortality in the world: psychiatric disorders, stroke, heart disease, and dementia.

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CONFLICT OF INTEREST STATEMENT

The authors certify that they have no affiliations with or involvement in any organization or entity with any financial interest (such as honoraria; educational grants; participation in speakers' bureaus; membership, employment, consultancies, stock ownership, or other equity interest; and expert testimony or patent-licensing arrangements), or non-financial interest (such as personal or professional relationships, affiliations, knowledge, or beliefs) in the subject matter or materials discussed in this manuscript. Author disclosures are available in the supporting information.

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SUPPORTING INFORMATION

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