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VIEWPOINT

Integrating neuroscience in clinical psychiatry: a paradigm shift

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Abstract

The field of psychiatry is witnessing debates over the diagnostic nosology that is used to understand and treat psychopathological conditions. Recent findings from the field have highlighted the lack of objective specificity that is required to comprehensively understand, delineate, and treat psychopathological manifestations. Studies in human neuroscience, on the other hand, have expanded our understanding of the brain and how it regulates human cognition, emotion, and behaviour. Considering these advances, it is evident that there is an insistent need for the reappraisal of current diagnostic standards and criteria, and the inclusion of a dynamic and translational clinical neuroscientific approach to study psychopathology. The present viewpoint comments on the challenges facing psychiatric diagnostic nosology and calls for the integration of neuroscientific approaches in clinical psychiatry.

Keywords: Neuroscience, Psychiatry, Diagnosis, Nosology, Translational research.

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Introduction

Psychiatric illnesses are characterized by changes in homeostatic levels of psychological and physiological functioning that cause significant distress and affect operational effectiveness. The Diagnostic and Statistical Manual of Mental Disorders (DSM-5) [1] defines psychiatric disorder as a syndrome characterized by clinically significant disturbances in an individual's cognition, emotion, and/or behavior that results in dysfunction in the psychological, biological, or developmental processes underlying mental function.

Recent findings in genetics, neuroscience, pharmacology, and psychotherapy are presenting an array of challenges regarding psychiatric diagnostic nosology forcing the need for transformative understanding of the aetiology, conceptualization, and treatment of psychiatric manifestations in patients. The categorical and syndromic diagnoses that have been developed in the field so far still lack the objective measures of pathology and markers that can distinctly and reliably delineate normal or adaptive functioning from discrete psychiatric illnesses or disorders. These diagnostic systems are based on presenting signs and symptoms and may not accurately capture the fundamental dysfunction and mechanisms underlying disordered presentations. For instance, the correlation, causality, and consequences of certain symptoms (e.g., anhedonia, excessive worry, and negative ruminations in major depression and anxiety disorders) may manifest as unitary clinical presentation or comorbid conditions or even appear clinically distinct whilst stemming from the same aetiology.

Therefore, there is an insistent need to understand the bearings of antecedent pathopsychophysiological mechanisms of human suffering. A reclassification of psychiatric disorders, under the Research Domain Criteria (RDoC) initiative, has been proposed where disorders are classified based on underlying pathopsychophysiological similitudes rather than the propensity to rely on observational reports [2]. To build on the traditional methodologies towards diagnosis, the RDoC multi-dimensional approach examines the role of neural networks, systems, and processes (from appraisal and cognitive processing systems to social determinants) that are intertwined across multiple layers of expression (from genomics and molecular biology to physiology and behaviour). It is, therefore, important to examine brain processes in order to understand adaptive and maladaptive human functioning.

Latest developments in neuroscience

Advances in contemporary human neuroscience have conceptualized the human brain as an integrated and dynamic network of systems and processes that characterize mental function as the synergy of functional specialization, regional activation, and network integration. It has been proposed that mental disorders be considered as brain disorders with dysfunctional distributed brain systems that are mediated by developmental and social experiences [3].

Neuroscientific approaches have made it possible to conduct genetic epidemiological studies to examine variations in and effects of gene expression. Furthermore, studies in neurogenesis and synaptic plasticity also provide an insight into the pathology of psychiatric disorders. For instance, clinical studies have shown links between major depressive disorder and reduced hippocampus volume, and acquisition of fear to be associated with lateral amygdala [4,5].

Furthermore, neuroimaging techniques have been utilized in numerous studies to understand the human brain structure, function, composition, and interconnections with the aim of examining differences in regional activity and identifying abnormal functioning in the brain. These techniques include anatomical techniques (e.g., computed tomography and magnetic imaging resonance), functional techniques (e.g., electroencephalography, magnetoencephalography, positron emission tomography, and near-infrared spectroscopy), and other related techniques (e.g., optical brain imaging such as event-related optical signal technique). However, despite identifying the potential advantages of neuroscientific approaches in classifying psychiatric conditions, a comprehensive and systematic methodology to achieve this still remains elusive [6,7].

Challenges in translational psychiatry and neuroscience

While the potential advantages of a neuroscience-based approach to psychiatric classification are widely appreciated, the field faces a number of challenges. The discipline of psychiatry, from its inception, has witnessed ongoing debates over diagnostic schemas. The difficulty of arriving at standardised classification of mental disorders that is both biologically accurate and psychologically relevant highlights the ambiguity that still pervades the nexus and boundaries of psychophysiological processes.

Despite the evolution of diagnoses from rather broad to more categorical constructs that have formed the basis of modern psychiatric classification system, the chasm between existing clinical standards and the advances in cognitive and behavioural neuroscience continues to expand. Given the role neuroscience plays in psychiatric conditions, it is of paramount importance that future mental health practitioners need to be brain and behaviour scientists. They need to incorporate clinical neuroscience into their biopsychosocial model of therapy and treatment. Consequently, training establishments need to modify existing pedagogic and practice policies in order to incorporate neuroscientific modules in graduate training. This will not only provide graduate students and practitioners the opportunity to add neuroscientific literacy to their arsenal, but will also encourage them to conceptualize, execute, and accelerate novel treatment methods that would be effective, brief, evidence-based, non-pharmacological,

and hopefully without the stigma that still permeates in this domain.

Another challenge in translational psychiatry and neuroscience is the lack of understanding and awareness that still prevails amongst the general public. Mental health professionals must work collaboratively and recognize the need to communicate consistent and tailored messages to key stakeholders (e.g., patients, public, policy makers, and scientific community) in order to relay information that they would 'want-to-know' rather than what the scientists feel they 'ought-to-know'. This may involve conducting regular, coordinated, and strategic workshops to inform stakeholders of the advances in brain sciences. More importantly, contrary to traditional approaches, such translational endeavours would bring the lab to the patients who need them. This will not only enhance psychiatric literacy, but will also provide a forum for various stakeholders to collaborate and discuss relevant issues, thereby creating more awareness and support.

Understanding the neural mechanisms and manifestation of psychiatric conditions would also involve understanding different areas of the brain and the associated functions. We, therefore, need to create, maintain, and regularly update interlinked datasets (utilizing data mining and synthesis techniques) that would increasingly provide a comprehensive and unified summation of the various regions of the brain at different levels of organization, both for functional and dysfunctional patterns. This would greatly enhance our understanding of the brain and its configuration, functions, and anomalies - and how they operate to affect the human psyche.

It is evident that recent advances in the field of psychiatry and neuroscience highlight the limitations of conventional wisdom regarding the understanding and treatment of psychopathological conditions, and calls for the need to reappraise and reposition a new and dynamic field of integrative and translational clinical neuroscience within the current healthcare model. The accelerated pace of findings that we have witnessed thus far challenges the current scientific model that has existed in the past four to five decades and promises the emergence of a profoundly fascinating and evolving paradigm that has the potential to transform our understanding of psychopathology.

Competing interests

The author declares no conflict of interest.

References

1. American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders. 5th ed. Arlington, VA: American Psychiatric Association; 2013.
2. Insel T, Cuthbert B, Garvey M, Heinssen R, Pine DS, Quinn K, et al. Research Domain Criteria (RDoC): Toward a New Classification Framework for Research on Mental Disorders. Am J Psychiatry 2010; 167(7):748-751. https://doi.org/10.1176/appi.ajp.2010.09091379
3. Insel TR, Quirion R. Psychiatry as a clinical neuroscience discipline. JAMA 2005; 294(17):2221- 2224. https://doi.org/10.1001/jama.294.17.2221
4. Duman RS. Depression: a case of neuronal life and death?. Biol Psychiatry 2004; 56(3):140-145. https://doi.org/10.1016/j.biopsych.2004.02.033
5. Rumpel S, LeDoux J, Zador A, Malinow R. Postsynaptic receptor trafficking underlying a form of associative learning. Science 2005; 308(5718):83–88. https://doi.org/10.1126/science.1103944
6. Ross DA, Travis MJ, Arbuckle MR. The future of psychiatry as clinical neuroscience: why not now? JAMA Psychiatry 2015; 72(5):413-414. https://doi.org/10.1001/jamapsychiatry.2014.3199
7. Kupfer DJ, Regier DA. Neuroscience, Clinical Evidence, and the Future of Psychiatric Classification in DSM-5. Am J Psychiatry 2011; 168(7):672-674. https://doi.org/10.1176/appi.ajp.2011.11020219