Original article

Fractures in the framework: limitations of classification systems in psychiatry

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This article examines the limitations of existing classification systems from the historical, cultural, political, and legal perspectives. It covers the evolution of classification systems with particular emphasis on the *DSM* and *ICD* systems. While pointing out the inherent Western bias in these systems, it highlights the potential of misuse of these systems to subserve other agendas. It raises concerns about the reliability, validity, comorbidity, and heterogeneity within diagnostic categories of contemporary classification systems. Finally, it postulates future directions in alternative methods of diagnosis and classification factoring in advances in artificial intelligence, machine learning, genetic testing, and brain imaging. In conclusion, it emphasizes the need to go beyond the limitations inherent in classifications systems to provide more relevant diagnoses and effective treatments.

Introduction

Classification systems are integral to medical practice. They facilitate diagnosis and thereby impact treatment and prognosis. Further, they enable communication with patients as well as amongst clinicians, researchers, training institutions, judicial systems, and insurance companies.[1] In psychiatry, the *Diagnostic and Statistical Manual of Mental Disorders 5 (DSM-5)*[2] and the International *Classification of Disorders 11 (ICD-11)*[3] are the main classification systems in current use. They have evolved over several years and, although not perfect, perform a significant role in psychiatric research and clinical practice.[4]

Psychiatry is probably the only medical specialization to have twice endured a complete discarding of its knowledge, which suggests that the classification of psychiatric disorders is more complex than it seems.[5,6] This review covers some of the limitations of classification systems in psychiatry, focusing on historical and current fissures in the systems.

Historical perspective

Between 1500 and 1000 BC, ancient Indian scriptures, specifically the Atharva-Veda, provided the earliest descriptions of modern psychiatric illness.[7] Illnesses were classified based on an imbalance of three biological energies or doshas: vata, pita, and kapha.[8] In the 2nd century AD, Galen postulated four categories of temperament: choleric, sanguine, melancholic, and phlegmatic. Excess in one of the temperament humours was linked to an associated pathology.[4]

Emil Kraepelin's classification in Compendium and Theodor Meynert's efforts to map mental illness on the brain were important contributions in the development of the current classification systems.[9,10] However, these classifications often mistook isolated symptoms for illnesses, unduly increased the number of categories of disorders, and were primarily based on patient histories. The European nosological tradition which started in the 18th century was primarily symptom-based.[5]

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Within the United States (US), there were four official diagnostic classification systems following World War II. In order to overcome this somewhat chaotic state, the American Psychiatric Association (APA) initiated the creation of a new nosology based on psychoanalytic theory. This effort was influenced by a military manual referred to as Technical Medical Bulletin number 203 of the United States Army, which was issued in 1945. This document, directed by psychoanalyst William Menninger, became the basis of *DSM*.[5,11]

DSM-I and *DSM-II* were developed for the purpose of gathering statistical information on the prevalence of mental disorders. When the first *DSM* was published in 1952, psychoanalytic theory dominated American psychiatry. Although an etiological framework was used to classify mental disorders, they were viewed as "reactions" to stressors implying their psychodynamic causality. The second edition attempted a more atheoretical position; however, the nomenclature was still psychodynamic, with replacement of the term "reaction" with the term "neurosis." [12-14]

In the mid-1970s, the lack of empirical research evidence led to the questioning of the legitimacy of psychiatric diagnosis. Thomas Szasz and the antipsychiatry movement considered mental illness a myth.[15]

In 1970, the US-UK Diagnostic Project found that US clinicians used a broader, more inclusive concept of schizophrenia based on psychoanalytic theory, whereas the British clinicians used more stringent criteria in diagnosis. This led to overdiagnosis of schizophrenia within the US and subsequently greater hospital admissions, resulting in discrepancies in prevalence data amongst the two countries.[16,17]

In view of these criticisms, *DSM-III*, based on the Feighner criteria, took on an atheoretical approach.[18,19] It provided a new hierarchical, multiaxial system for diagnosis utilizing exclusion criteria and introduced the formal operationalization of psychiatric diagnosis with established reliability.[20] The new system stimulated empirical research, which showed flaws in the existing diagnostic criteria. It was seen

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to have low validity, taking on a reductionist and adynamic approach as well as not adequately distinguishing between trait and state.[21,22] *DSM-III-R* was updated to increase the clinical utility of diagnosis based on inputs from practising clinicians and researchers. It also eliminated the diagnostic hierarchy, which, however, resulted in an increasing number of comorbidities being reported.[23] *DSM-III-R* was criticized for being gender-biased, especially for personality disorders.[24,25]

DSM-IV built on the previous criteria, and added "clinically significant distress or impairment" across diagnostic criteria to improvise on the term "dysfunction" used in its previous version, the concept of which was unclear.[26] *DSM-IV-TR* further detailed the associated features of disorders.[27]

DSM-5 aimed to bridge these gaps and is currently the most widely used classification system in psychiatry.[2,28] With this latest update, the multiaxial system has been discarded, many disorders have been reclassified in a dimensional rather than categorical approach, and increased social sensitivity in terminology (intellectual disability instead of mental retardation) can be observed as striking changes.[4,13,29] However, the growing number of disorders outlined in *DSM-5* seems to provide little assistance to clinicians in providing optimal treatment.[30]

The *International Classification of Diseases (ICD)* was first published in 1893 as the International List of Causes of Death. The purpose was to create a comprehensive statistical manual of diseases, including causes of mortality, and to enhance efforts to improve public health.[4] In 1948, when the World Health Organisation (WHO) was entrusted with the update of *ICD*, psychiatric disorders were first included in its 6th edition. However, the classification system was rejected by most countries. A major update was seen in *ICD-8*.[32] With the evolutional change of *DSM-III*, the balance was tipped and *ICD-9* aimed to match *DSM*.[13] Since *ICD-9*, both *DSM* and *ICD* tend to be aligned with some differences. *ICD-11*, published in 2019, aimed at improving clinical utility, global application, identify prevalence, and treatment gap to improve public health.[3,4]

VERSION	YEAR	MAJOR PURPOSE	REVISIONS	CRITICISM RECEIVED
DSM-I	1952	Uniformity in clinical diagnosis and gathering prevalence data.		Strong psychoanalytic influence. Terms used deviated significantly from prevailing definitions.[12-14]
DSM-II	1968	Stabilize diagnostic nomenclature in textbooks and professional literature.	A more atheoretical position by change in nomenclature.[12-14]	Lack of empirical research evidence.[15] No major conceptual update from *DSM-I*, strong influence of psychoanalysis persists.[12-14] Lack of well-defined criteria for diagnosis resulting in overdiagnosis (eg, schizophrenia).[16,17]
DSM-III	1980	Atheoretical approach based on the Feighner criteria.[18,19] To reduce the gap between psychiatry and rest of medicine. Provide valid and reliable diagnosis for empirical research.	It provided a new hierarchical, multiaxial system for diagnosis utilizing exclusion criteria and introduced the formal operationalization of psychiatric diagnosis with established reliability.[20]	The existing criteria had low validity, taking on a reductionist and adynamic approach as well as not adequately distinguishing between trait and state.[21,22]
DSM-III-TR	1987	Improve clinical utility of diagnosis based on inputs from practising clinicians and researchers.[13]	Eliminated diagnostic hierarchy.	Higher rates of comorbidities due to elimination of hierarchy. Gender-biased, especially for personality disorders.[24,25] Lack of conceptual clarity of the term "dysfunction."[26]
DSM-IV	1994	To increase congruence between *DSM* and *ICD-10*. Use empirical data to modify diagnostic criteria.	Modified previous criteria, and replaced the abstract concept of "dysfunction" to "clinically significant distress or impairment."	Lack of clarity in the definition for threshold resulting in overdiagnosis. High rates of comorbidity in personality disorder diagnosis.[27]
DSM-IV-TR	2000	Update research literature.	Detailed the associated features of disorders.[28]	Little revision to criteria was made.[27]
DSM-5	2013	Incorporate neurobiological and etiological research in the criteria of disorders. Improve clinical utility.	Discarded the multiaxial system. Reclassification of some disorders in a dimensional rather than categorical approach. Increased social sensitivity in terminology.[4,13,29]	Low reliability across disorders. Poor validity leading to increased comorbidity and lack of specificity in selection of treatment options. Poor correlation between genetic findings and psychiatric diagnosis. Observed syndromes, especially culture-specific, don't fit any diagnostic criteria. Lowered thresholds and new categories may result in overdiagnosis. Increasing number of disorders provide little assistance to clinicians in providing optimal treatment.[4,30,31]

Table I. Developments in various versions of the *Diagnostic and Statistical Manual of Mental Disorders (DSM)*.

ICD uses short text descriptions of each disorder rather than a list of symptoms. Although used in clinical settings, its main focus is on providing a comprehensive list of all diseases with the aim of public health application.[3,33]

Surveys on utility of classification systems suggest that, although 57% to 89% of clinicians use classification systems, the most common application is for administrative requirements and assigning a diagnosis for billing and insurance purposes. Communication and teaching were other cited reasons. They found the lowest utility in selection of treatment plans and assessing possible prognosis.[30,34,35]

Cultural perspective

Psychiatry relies considerably on patient self-report and clinician judgement.[36] Cultural influences are integral in determining deviations and threshold for illness. For example, in the Japanese culture, *Taijin Kyofusho* is an acceptable presentation of anxiety, associated with offending others.[37,38] *Hikikomori* is another Japanese presentation associated with social withdrawal for a period of over 6 months. It parallels chronic schizophrenia or apathetic depression, as sometimes there is a strong immersion in personal interests. However, these individuals report no psychological distress and lifelong financial dependency. This condition is acceptable in Japan.[39] However, a Japanese immigrant may find it difficult to convey these concerns to a Western clinician who is unaware of this social context.[40-42]

Tseng highlights six different ways in which culture can affect psychiatric syndromes—in the formation of the disorder (pathogenic effect), techniques used to cope with stress (psychoselective effect), modification in clinical presentation (psychoplastic effect), behavioral reactions due to cultural reinforcement (pathoelaborating effect), occurrence (psychofacilitating effect), and perceptions and reactions (psychoreactive effect).[43]

Although culture-specific syndromes by definition can exist in any society, they are typically identified in Eastern cultures as the classification systems are based in Western societies. They were usually observed during colonization and considered as "peculiar" phenomena that did not fit the classification systems developed by Western nations. Even now, most culture bound syndromes parallel disorders seen in Western-based classification systems, eg, Amok, is closely linked to dissociative disorder, Khyâl cap, or wind attack, is related to panic disorder.[44] On the flipside, some disorders such as anorexia nervosa, paranoid schizophrenia, and drug overdose are seen as culture-bound syndromes of the Western cultures.[45] Culture-bound syndromes are identified to be emerging from a particular location or cultural group; however, reports of Dhat syndrome, Amok, Koro, Taijin Kyofusho, and Latah have been found in both Western and Eastern countries.[44]

Current diagnostic criteria are not culture-sensitive, resulting in a 34-fold variation across countries for social anxiety disorder.[46] Prevalence rates for major depression varied between 2% and 19% across countries.[47] Variance across 10 countries is seen in the illness course, outcome and incidence of schizophrenia.[48] Somatization of anxiety and depression is common in Asian patients.[49]

Medical institutions and training institutes worldwide focus on teaching the dominant classification systems like *DSM* and *ICD*, which are influenced by Western illness presentations.[50] This may result in ignorance of local cultural presentations, which may be critical for identification and treatment of mental illness in non-Western cultures.[51,52]

Political perspective

Classification systems are occasionally driven by the prevalent political agendas. In the 19th century, Cartwright diagnosed the defiance and rebellion of African slaves as signs of mental illness and outlined multiple mental disorders he believed Africans were susceptible to. Acts like avoiding work responsibilities or escaping for freedom were considered mental disorders–Dysesthesia Aethiopica and Drapetomania respectively. These so called "diseases" were cured by removing both big toes of the "patients" and thereby making running impossible.[53,54]

In the late 20th century, a classic example of classification systems serving political agendas was seen in the Soviet Union. The Moscow School of Psychiatry expanded on the concept of "sluggish schizophrenia" to classify individuals who had symptoms of "reform delusions," "struggle for the truth," and "perseverance." [55]

Current debates on the political exploitation of psychiatry are contextual to the People's Republic of China, where the magnitude of abuse seems to be even more widespread than what took place in the Soviet Union. It involves the psychiatric confinement of the Falun Gong movement followers, trade union activists, human rights campaigners, and those objecting to injustice carried out by local authorities.[56,57]

Legal perspective

Across the world, with a surge in awareness and parental advocacy, there is an increase in provisions made for children with mental illness such as special schools, intervention programs, and concessions in examinations.[58,59] A multinational longitudinal study found that over the last 20 years, the prevalence of childhood neuropsychiatric disorders has increased. Further, the age of diagnosis of the disorders was higher than the typical age of onset.[60] This may suggest a pattern of misuse by parents and children.[61]

In recent years, with increasing complexity, public awareness of mental illness as well as laws regarding mental health and disability, there is a surge of psychiatric inputs for resolution of legal conflicts.[62]

The dependence of psychiatric diagnosis on self-reported symptoms and witness testification heightens its risk of misuse. In 2011, in Norway, a man was sentenced to 21 years in prison for killing 77 people including children and youth in two separate events. Two separate forensic evaluations, 6 months apart, were conducted, with detailed interviews. The first evaluation posited a psychotic disorder and therefore considered him not accountable for the crime; on the other hand, the second evaluation diagnosed him with a narcissistic personality disorder and therefore accountable.[63]

Premenstrual Dysphoric Disorder (PMDD) has been the centre of controversy, especially in forensic use. In Britain in 1981, several cases of women—one for threatening a police officer and carrying a knife along with 30 other such crimes, and another of a woman who drove into her lover after an argument—were given reduced charge of the quantum of guilt on account of diminished capacity due to severe Premenstrual Syndrome (PMS).[64] Many countries, especially in Europe, accept PMS as a legal defence for diminished capacity or insanity.[65,66] This may be misused by woman with milder symptoms and astute attorneys.[67]

The potential for misuse

Lack of affordability results in a significant treatment gap in mental health services. However, with increasing awareness, most government policies have included provisions for mental health services in health insurance coverage.[68,69] Classification systems can be misused by insurance companies to deny coverage to those who otherwise may have been eligible.

In *DSM-5*, Autistic Disorder, Asperger's Syndrome, and Pervasive Developmental Disorder—Not Otherwise Specified (PDD-NOS) were discarded and reduced to two diagnoses, Autism Spectrum Disorder and Social Communication Disorder. The autism concept was broadened and replaced by only two categories—social communication impairments and restricted and repetitive behaviors, with more stringent criteria for diagnosis to reduce false positives. It was believed that those individuals previously diagnosed as PDD-NOS as per *DSM-IV-TR* would either meet ASD or SCD criteria. However, this reclassification has resulted in underidentification of children with significant impairments. Three groups—those with a milder form of the disease, higher cognitive functioning (Asperger's), and older children are underdiagnosed as a result of the new criteria; and therefore, are denied treatment options. These are also the very same groups for who therapy is found to be most beneficial.[70]

Trends towards increase in disorder categories, lowered threshold, and symptom severity, all result in an increasing number of children and adults being diagnosed, subsequently seeking treatment, and a rise in the sale of pharmaceutical drugs. This, against the backdrop of simultaneous increase in the percentage of individuals on the *DSM* task force who have ties with pharmaceutical companies from 57% to 72% between *DSM-IV* and *DSM-5*, challenges the interests underlying the creation of classification systems.[71]

Misuse of stimulants among college students without diagnosis of ADHD to improve concentration for cognitive and academic enhancement is a growing dilemma, with prevalence rates between 13% and 43%. Furthermore, many of these disorders are ascertained by patient self-report and

clinician's judgment—with increasing access to information on the internet and some training, feigning symptoms may not be as difficult after all.[72,73]

Until the multiaxial system of classification of psychiatric disorders, Axis II diagnoses were often excluded from insurance coverage, being considered as chronic illness. This denied the much-needed treatment that individuals with personality disorders require to cope with their daily issues. Restrictions on therapy to a fixed number of limited sessions may also make it increasingly difficult for patients to work through all their issues and make a full recovery.[74]

Individuals at subthreshold levels of depression and anxiety often experience impairment as significant as those who meet criteria.[75,76] Hence, in an effort to create stringent criteria and reduce false positives, our classification systems may also be serving the interests of insurance companies by excluding individuals from coverage, and denying therapy and treatment to individuals who might benefit from them.

Issues with the current classification systems

Reliability and validity

An overarching problem with many psychiatric disorders is that validity and reliability research originally carried out for a few groups of disorders in *DSM* has not been carried out for most of the remaining diagnoses in the manual.[31] Even for *DSM-5*, field trials yielded low reliability, with nonexpert clinicians diagnosing patient groups based on checklists rather than standard diagnostic interviews.[77-79]

Multiaxial system

Introduced in *DSM-III*, the multiaxial system was created to help clinicians ensure a holistic diagnosis. However, concerns regarding overlap in symptoms between Axis I and II disorders were raised.[80] Significant comorbidities have been observed between social anxiety disorder and avoidant personality disorder (PD),[81] schizophrenia and schizotypal PD,[82] and substance-use disorders and antisocial PD.[83] Segregation of medical illnesses on Axis III implied that mental disorders did not have a medical status.[84] *DSM-5* discarded the multiaxial system in an effort to do away with the above limitations.[2] It extensively expanded on possible stressors under Z codes; however without the multiaxial system, they may be dismissed or ignored.[85]

Comorbidity

Comorbidities increased dramatically when the exclusion system was eliminated from *DSM-III-TR* and disorders were divided into discrete categories.[23] Presence of any *DSM-III-TR* disorder increased the odds of having almost any other disorder.[86] Comorbidity affects the specificity with which diagnosis directs treatment. It is also associated with more severe outcomes, impairment, poorer quality of life, higher chronicity rates, resistance to treatment, and a greater suicide risk than any condition alone.[87-89] Epidemiological studies revealed high rates of comorbidity —not only within diagnostic groups but also between disorders.[90-92]

Furthermore, current psychopharmacological treatments are effective for multiple disorders. Selective serotonin reuptake inhibitors are effective in the treatment of depression, eating disorders, and anxiety disorders.[93] Likewise, second-generation antipsychotic medications are effective alone or as adjunctive treatments for nonpsychotic mood disorders.[94] Psychotherapy has also been successfully generalized to treat multiple disorders.[95]

Thus, high rates of comorbidity, and nonspecificity of both pharmacological and psychosocial treatments question the specificity of the disorders and their purported underlying mechanisms.[4]

Categorization or dimensional approach?

Several attempts have been made at classifying psychiatric disorders based on various criteria, including etiology, phenomenology, onset age, longitudinal course, and prognosis.[4,96-98] However, these categories are not mutually exclusive and the overlap of symptoms and presentations are common. Currently, *DSM* adopts both categorical as well as dimensional approaches in classifying disorders. Schizophrenia and autism are two examples of a dimensional approach, and perhaps future shifts in this direction are likely.[2,99]

Heterogeneity within diagnoses

Heterogeneity is seen across persons and across symptoms. Within individuals, for instance, Borderline Personality Disorder (BPD) consists of nine diagnostic criteria of which a minimum of five need to be present for the diagnosis. This results in a staggering 256 distinct presentations of BPD.[100] Strikingly, this number is relatively small when compared with other conditions—there are 636 120 ways to have post-traumatic stress disorder.[101]

Future directions

Alternative methods of diagnosis

Diagnosis in psychiatry relies heavily on clinical interview and clinician judgment. Psychometric tests are used to aid the diagnosis; however there are no internationally standardized tests that are reliable and valid in measuring disorders.[102] With advances in artificial intelligence, imaging, and genetic testing, there may be a way forward towards alternative methods of diagnosis which in turn would result in alternative classification systems.[103-105]

Artificial intelligence has aided the classification of diseases using techniques such as expert systems, artificial neural networks, linear programming, database systems, evolutionary algorithms, and swarm intelligence.[106,107] Within psychiatry, machine learning has shown promising results in stratification based on symptom type,[108] symptom severity as well as behavior within a single diagnosis,[109] in predicting those at risk,[110] course and prognosis of illnesses,[111] in its ability to differentiate between diagnostic categories,[112] understanding correlations between structural and functional alterations through its application in neuroimaging data,[113] as well as in transdiagnostic studies clustering symptoms across diagnosis.[114]

Meta-analysis indicates that structural imaging has 80% sensitivity and specificity in distinguishing between schizophrenic subjects and normal adults.[115] Similar results have been found for Major Depressive Disorder.[116] Functional magnetic resonance imaging (fMRI) studies have not only be able to accurately distinguish schizophrenia, bipolar disorder, and unipolar disorder, but have also shown evidence for overlapping anatomical changes in schizophrenia and bipolar disorder.[117,118]

Alternative methods of classification

Current dissatisfaction with the categorical classification systems have emerged predominantly from lack of support for the current nosology in biomarker research. In this chaos, Research Domain Criteria (RDoC) has been seen as a frontrunner for an alternative method of classification.[119] Established in 2009, the goal of this research initiative is precision medicine for psychiatric disorders—to facilitate the modification of current diagnosis, improvement of treatment and prevention of mental illness. Its dimensional approach views basic behavior, cognitive domains, and brain circuits on a continuum of functionality from normal to abnormal. It integrates neurobiological data, observable behaviors, and self-reports.[120,121]

The Hierarchical Taxonomy of Psychopathology (HiTOP) is an alternative classification system suggested by Kotov and colleagues.[122] Based on a four-level hierarchical structure, it is composed of broad spectra of internalizing pathology, externalizing pathology, thought disorder, and detachment at the top of the hierarchy. These are divided into factors which are further divided into syndromes or traits. Signs and symptoms form the base of the structure. Using multivariate factor analysis, the goal is to create an empirically based dimensional classification system. It reduces heterogeneity by grouping related symptoms, reduces comorbidity by combining syndromes into spectra, and it has a dimensional approach which eliminates issues regarding categorization.[123]

Conclusion

While classification systems are essential and do indeed serve important functions in the practice of psychiatry, their inherent limitations result in errors on both sides of the diagnostic spectrum, from overdiagnosis to underdiagnosis. It is important to recognize the fissures in the framework of our contemporary classification systems. Beyond our theoretical constructs, the patient in front of us expects effective treatment. Our goal should be to go beyond the limitations of our classification systems to fulfil the expectations of our patients, as well as those of ourselves as humane and effective psychiatrists. ∎

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