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Neuroscience-Based Nomenclature (NbN): the Portuguese version of the new classification for psychopharmacological drugs

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Abstract:

Neuroscience-Based Nomenclature (NbN) is a proposal to provide a nomenclature based on neuroscience and pharmacology instead of the old disease-based classification. NbN is based on the mechanism of action and pharmacological target and aims to assist in rational prescription, reduce stigma, and increase treatment adherence. Currently, NbN is endorsed by many psychiatric associations, adopted by several relevant journals, and included in major psychiatry textbooks. Therefore, it is important that NbN is known to psychiatrists.

Keywords : neuroscience, nomenclature, psychiatry, psychopharmacology, rational prescription.

The discovery of chlorpromazine as a medication able of providing sedation without altering the level of consciousness inaugurated the so-called psychopharmacological revolution[1]. Since then, many other molecules have

been synthesized and classified according to their clinical indications such as antidepressants, anxiolytics, antipsychotics, mood stabilizers, and hypnotics.

Since the 1960s, the World Health Organization (WHO) has been concerned with establishing a globally accepted classification system to standardize studies on drug use. Thus, the Research Group on the Use of Medicines was created, which developed the ATC (Anatomo-Therapeutic-Chemical), classifying it as an emission according to the organ or physiological system in which it works, and its therapeutic properties and chemicals[2]. However, this classification does not reflect neither the advances in neuroscience that took place in the last forty years, nor their current clinical indications. For example, fluoxetine is classified as an antidepressant, but its prescription goes much further, as it is prescribed for the treatment of bulimia nervosa, obsessive-compulsive disorder, panic disorder, PTSD, social phobia, and premenstrual dysphoric disorder. Other examples: lamotrigine, originally an antiepileptic, but it is also prescribed as a mood stabilizer presently; dopamine blockers ("antipsychotics"), like amisulpride and aripiprazole, that are also used (in small doses), as augmentation agents in depression. There is no psychopharmacological drug that has only a single indication, reflecting the complexity of the pathophysiology and treatment of mental disorders.

Currently, good clinical practice recommends sharing the proposed treatment guidelines with the patient, since psychoeducation is an important aspect of the treatment process. Explaining the pathology and the recommended prescription appear to increase patient adherence to treatment. It is not surprising that the current nomenclature is confusing for patients, as we often prescribe "antidepressants" for anxiety disorders or "antipsychotics" for depressed patients who do not have evidence of psychosis. Therefore, a new nomenclature is needed that encompasses current knowledge related to the pharmacology of drugs and their mechanisms of action, relating them to appropriate clinical indications.

The proposition of a new nomenclature was carried out by a task force that included five major international scientific organizations of Neuropsychopharmacology: European College of Neuropsychopharmacology (ECNP), American College of Neuropsychopharmacology (ACNP), Asian

College of Neuropsychopharmacology (AsCNP), International College of Neuropsychopharmacology (CINP), and International Union of Basic and Clinical Pharmacology (IUPHAR)[3]. This task force created the Neuroscience-Based Nomenclature (NbN) aiming to provide a neuroscience and pharmacological based (rather than disease-based) nomenclature that incorporates the understanding of how psychopharmacological drugs work. In addition, NbN also can decrease the stigma of treatment with these agents, increasing adherence by a nomenclature system that establishes the justification for the selection of a specific drug.

The NbN classification is based on two main axes: pharmacology (pharmacological target) and mechanism of action (type of action on the target). Four additional dimensions are also included: (a) approved indication (approved by regulatory agencies such as the Food and Drug Administration and European Medicine Agency); (b) efficacy (indications not formally approved by the agencies but that have authoritative evidence of efficacy) and side effects; (c) practical notes; (d) neurobiology. It is important to stress that our current knowledge about the mechanism of action and pharmacology of many drugs is flawed or incomplete, but describing this contemporary knowledge is better for clinical practice than to wait for a more definitive conclusion[4].

Currently, 146 psychopharmacological agents are included in the NbN, a mobile app that can be freely downloaded from Google Play and Apple Store. Following the idea that NbN will be a common system shared by clinicians and researchers throughout the world, several important journals have adopted it as the nomenclature to cite the psychopharmacological drugs in their articles (e.g., Biological Psychiatry, European Neuropsychopharmacology, and International Journal of Neuropsychopharmacology), and included in relevant books of psychiatry (e.g., next edition of Sadock's Comprehensive Textbook of Psychiatry, Tasman's Textbook of Psychiatry, Oxford Textbook of Psychiatry, and Stahl's Essential Psychopharmacology). NbN is also endorsed by many psychiatric societies, such as the American Psychiatric Association, the European Psychiatric Association, the German Association of Psychiatry, the Spanish Society of Psychiatry, and the Japanese Society of Psychiatry and

Neurology. Moreover, the NbN app was translated and adapted to French, Spanish, and Japanese.

Through the NbN app, clinicians can search the name of the medicine (generic or branded) having access to information about its pharmacology, mode of action, approved indication, effectiveness, and side effects. Moreover, the former nomenclature is also available. An example of the NbN app info about alprazolam can be observed in table 1. Different search strategies are also possible (e.g., by the mechanism of action or former terminology). It is worth mentioning that this application is under constant updating and suggestions from its users for the inclusion of new drugs are welcome.

Table 1 – Information given by NbN app (English version) when typing "alprazolam"

Axis		
Pharmacological target	GABA	*NbN Classification*
Mechanism of action	positive allosteric modulator (PAM)	
Approved indications	Generalized anxiety disorder, Panic disorder, Short-term treatment of anxiety, alcohol withdrawal (France)	
Efficacy	Anxiolytic, muscle relaxant, anticonvulsant, sleep promoter	
Adverse effects	Sedation, drowsiness, ataxia, muscle relaxation, memory deficit	
Committee Notes	Many different benzodiazepine receptor agonists are licensed worldwide, some in most countries and some in only or two. They all act in the same way, and are distinguished only by pharmacokinetics unless otherwise indicated. Half-life 8-15 hours and it is metabolised by the cytochrome 3A4. Inhibitors of 3A4, like fluoxetine, erythromycin, ketoconazole, but also oral contraceptives, reduce its clearance. The herb kava will robustly reduce its clearance, whereas St John's Wort will increase it. Synergistic effects with alcohol can produce severe sedation, behavioural changes, and intoxication.	
Additional Data		
Former terminology	Anxiolytic	
Neurobiology	<u>Pharmacology and mode of action</u> GABA positive allosteric modulator, GABA-A receptor, benzodiazepine site	

	Neurotransmitter effects preclinical Binds to GABA-A receptors Neurotransmitter effects human Non- selective PAM Physiological preclinical Reduces motor activity, conflict Behaviour, and promotes sleep, anti-epilpepsy. Physiological human Increases fast activity on EEG; myorelaxant; anxiolytic; sedating; slows eye saccades; promotes sleep Brain circuits human Broad action across all brain regions
Pregnancy	D- positive evidence of risk
Brand names	Xanax, Alprazolam Intensol, Niravam

Recently Dr Joseph Zohar (NbN task force coordinator and current president of CINP) contacted us to compose the Brazilian committee for the translation of NbN to Brazilian Portuguese, adapting it to medicines available commercially in Brazil. This Portuguese version of NbN 3rd edition was launched recently (https://nbn2r.com/).

Finally, a new nomenclature is not sufficient to change the current picture and, thus, it is fundamental that the NbN be publicized and taught to new psychiatrists and clinicians to achieve its goals[5]. We think that the Portuguese version of NbN will help in this task in Brazil.

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