

Editorial**Interpretations and applications of the term, “higher brain dysfunction”****Takashi Hiraoka, MD, PhD¹**¹Department of Rehabilitation Medicine, Kawasaki Medical School, Kurashiki, Okayama, Japan

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Introduction

The terms “higher brain function” and “higher brain dysfunction” are often used in professions involving rehabilitation and medical care. While there may be no clear definitions of function and dysfunction, people who use these terms have at least a vague sense of what they mean. However, while terms like “higher cerebral function” and “higher brain function” are used in several fields such as psychiatry, neurology, and physiology, “higher brain dysfunction” is rarely used [1]. In psychiatry and neurology, the same conditions could be described as “organic mental disorders,” based on the International Classifications of Diseases (ICD)-10; or “neurocognitive disorders,” based on the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5). In addition to the different levels of familiarity with ICD-10 and DSM-5, a deep familiarity with the term “disability,” which is based on concepts from the International Classification of Impairments, Disabilities, and Handicaps, could explain the differences in the use of terms such as “higher brain dysfunction” in various specialties. Within this context, “higher brain dysfunction” may have been created by combining “higher brain functions,” which has long been used as a physiological term, with the familiar term “disorder” [1]. This might explain why “higher brain dysfunction” is commonly used in the fields of rehabilitation and medical care.

Use of the term “higher brain dysfunction” became more widespread following the launch of the Higher Brain Dysfunction Support Model Project by the

Japanese Ministry of Health, Labour, and Welfare in 2001. This is evident from the frequent use of “higher brain dysfunction” in article titles that were searchable in the Igaku Chuo Zasshi database and published during this period [1].

It should be noted that the term discussed in this article, “higher brain dysfunction,” is only one possible translation of a specific Japanese term. Other suitable translations include “higher brain disorder” and “higher brain disturbance.” This article discusses this particular Japanese term, what it means, the role it plays in various settings, and its lack of an exact equivalent in English.

Although the origin and popularization of the term “higher brain dysfunction” in Japan is well known, the conditions it covers remain unknown. Clinicians know well that the term “higher brain dysfunction” is used in several ways. It is a truly ambiguous term that requires careful consideration of the preceding and ensuing context, and it is often the cause of miscommunication between speakers and listeners [2]. The use of “higher brain dysfunction” as both a term and a concept is confusing. Herein, we explore and clarify the use of “higher brain dysfunction.”

What is “higher brain function”?

First, let us explore the term “higher brain function.” The cerebrum has projection and association areas. The projection areas are where the cerebrum connects to other areas. They are also called primary areas, and they include the primary sensory area and primary motor area. The association areas are where nerve communication within the cerebrum takes place. They are also called secondary areas and are involved in processing information. “Higher brain functions” are those that use the cerebral cortex association areas. They can be generally defined as “brain functions that require advanced, complex, and abstract processing.”

Based on this definition, “higher brain functions” can be interpreted as covering everything outside the primary sensory areas and primary motor areas, including language, memory, attention, cognition, thought, and behavioral functions, all of which are indispensable for taking part in social activities [3].

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Kashima [4] noted that "higher" refers to functions "involved in meaning" as opposed to elementary functions. He gave the following examples in plain language, "Vocalization and articulation are functions that are unrelated to the meaning, but uttering words ("higher brain function") is related to the meaning"; also, "motion is unrelated to the meaning, but pantomiming and using tools with one's fingers ("higher brain function") are functions related to the meaning."

What is "higher brain dysfunction"?

Next, consider the term "higher brain dysfunction." As mentioned in the introduction, while "higher brain dysfunction" is used in various ways in different situations, it can be broadly described as having two meanings. First, based on the definition of "higher brain functions," "higher brain dysfunctions" can be considered as "disorders involving a wide range of brain functions that require advanced, complex, and abstract processing" and "disorders involving brain functions related to meaning." This article explores the concepts covered by this definition of "higher brain dysfunction" (hereafter, "clinical higher brain dysfunction") in more detail. "Clinical higher brain dysfunction" can be considered as the broadest interpretation of "higher brain dysfunction," which

Ueda [5] described as follows, "The target range has gradually expanded from initially meaning only aphasia, apraxia, and agnosia. It currently means disorders of memory, attention, and volition, problems maintaining motion and partial or elemental disorders of 'higher brain functions,' and overall brain dysfunctions, including dementia and impaired consciousness." In other words, "clinical higher brain dysfunction" encompasses a wide range of issues, from extremely mild attention disorders to severe dementia [6]. In clinical practice, when "higher brain dysfunction" is used to describe any condition with "higher brain functions," whether mild or severe, it can be considered as a clinical expression that is consistent with Ueda's definition.

The second definition of "higher brain dysfunction" is when it is used as a diagnostic-administrative term that is associated with the Higher Brain Dysfunction Support Model Project launched by the Japanese Ministry of Health, Labour, and Welfare in 2001 (hereafter, "administrative-diagnostic higher brain dysfunction") [7]. This definition is unique to Japan (Table 1). There are clear diagnostic criteria for "administrative-diagnostic higher brain dysfunction." To summarize these diagnostic criteria, "higher brain dysfunction" can be considered as "a condition that makes it difficult to adapt to daily life and social activities, mainly due to cognitive disorders such as

Table 1. Diagnostic criteria of "higher brain dysfunction" (Ministry of Health, Labour, and Welfare).

Diagnostic criteria	
I. Primary symptoms and signs	
1. Injuries or diseases due to accidents owing to definite organic brain lesions	
2. Current limitations in daily activities or social activities primarily caused by cognitive disorders, such as memory disorders, attention disorders, executive dysfunctions, and social behavior disorders	
II. Examination findings	
The presence of organic brain lesions causing cognitive disorders confirmed using magnetic resonance imaging, computed tomography, electroencephalography, or other investigations, or as documented in a medical certificate	
III. Exclusion criteria	
1. Cognitive disorders based on organic brain lesions and symptoms that could be related to physical disabilities, but not the aforementioned primary symptoms (I and II)	
2. Pre-existing injuries, symptoms, or investigational findings	
3. Congenital diseases, perinatal brain injuries, developmental disorders, and progressive diseases	
IV. Diagnosis	
1. Patients who meet all criteria (I–III) are diagnosed with higher brain dysfunction.	
2. The diagnosis of higher brain dysfunction can be made after treating acute symptoms due to injuries or diseases owing to organic brain lesions.	
3. Findings from neuropsychological tests may be referenced.	

Note: Patients who meet criteria I and III, but not examination findings of organic brain lesions described in II may be diagnosed with higher brain dysfunction after a careful assessment. Based on future developments in medical science and care, these criteria should be re-evaluated as needed.

memory disorders, attention disorders, executive dysfunctions, and social behavior disorders caused by organic lesions for which the cause can be ascertained." That is, while conditions such as Alzheimer's disease and mental retardation may be "clinical higher brain dysfunctions," they do not meet the diagnostic criteria of "administrative-diagnostic higher brain dysfunction."

The term "higher brain dysfunction" has two aspects: a general clinical aspect related to brain function and an administrative-diagnostic aspect with an operational definition from an administrative point of view. This factor complicates the understanding of this term.

English expressions for "higher brain dysfunction"

Finally, this article discusses how "higher brain dysfunction" is described in English. Many individuals may struggle with this term when writing journal articles. As described above, it is not an exaggeration to say that in Japan, the term "higher brain dysfunction" in both its clinical and administrative diagnostic aspects has expanded beyond its use in rehabilitation and medical care. Therefore, this term has no English origin. Searching MEDLINE shows that direct translations, such as "higher brain disorder," "higher brain dysfunction," and "higher brain disturbance" are rarely used, while pathologies that are described as "clinical higher brain dysfunctions" in Japanese are referred to as "cognitive dysfunction" or "cognitive disturbance" in English. Since "administrative-diagnostic higher brain dysfunction" is an operationally defined term, it is essentially impossible to express it in English with a term or a phrase of few words; it requires an explanatory note. One example is as follows: "As a diagnostic term used uniquely by the government of Japan, 'higher brain dysfunction' is defined by the Ministry of Health, Labour, and Welfare as 'having limited daily activities and social activities due to cognitive impairment, resulting from an organic pathology in the brain'."

Conclusion

In this article, the term "higher brain dysfunction" was explained. In recent years, the term "higher brain dysfunction" has been widely used not only in medical and welfare settings but also in the media. Consequently, the term is often misunderstood and misused. Hence, the term needs to be clarified to be used appropriately for both clinical and administrative references for patients diagnosed with higher brain dysfunction. To conclude, this article is intended to contribute to medical practice, treatment and research involving "higher brain dysfunction."

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