Review the Framework of Intellectual Disability from a Physiological / Pathological Perspective in Japan

Chaeyoon CHO 1)  Natsuki YANO 2) 3)

1) Graduate School of Economics, Shimonoseki City University, Japan
2) Graduate School of Medicine, Tohoku University
3) Faculty of Child Education, Baiko Gakuin University, Japan

ABSTRACT

In Japan, in order to realize inclusive education, teachers involved in special education need to have expertise to meet the diverse needs of children. However, as a result of the survey, it has been pointed out that a sufficient cooperation system has not been established with information on children’s disability status is required to be shared reliably by related organizations. Therefore, this study aimed to review the framework of intellectual disability in Japan and to reviews the definition of intellectual disability on a physiology / pathology perspective. According to the classification of ICD-11, one of the neurodevelopmental disorders include intellectual disability and autism spectrum disorder (ASD). Schizophrenia, Epilepsy and Down Syndrome (DS) are separate categories and are not included in intellectual disability. Therefore, the low intellectual function found in some people with DS or Epilepsy should not be equated with intellectual disability as a neurodevelopmental disorder. In conclusion, to promote special education in the future, it is necessary for teachers to understand children’s diseases and disorders physiologically/pathologically.

<Keywords>
intellectual disabilities, physiology, pathology, disorder of intellectual development, ICD-11

chaeyoon.cho.1127@gmail.com (Chaeyoon CHO; Japan)
Asian J Human Services, 2020, 19:101-111. © 2020 Asian Society of Human Services
I. Introduction

In Japan, in order to realize inclusive education, teachers involved in special education need to have expertise to meet the diverse needs of children. In addition, it is required to build a collaborative system with professionals outside the school, including those in the fields of medicine and welfare.

In intellectual disability education, cooperation with the medical field is an issue. A survey on collaboration between special needs education and other occupations also shows that special needs teachers are aware of the need for multidisciplinary collaboration. However, as a result of the survey, it has been pointed out that a sufficient cooperation system has not been established. Teachers may also not understand what advice to seek from out-of-school professionals. Even in such a case, it has been pointed out that the cooperation only in the form causes confusion in the cooperation partner.

Special needs education is education for children with disabilities, and cooperation with the medical field is indispensable. In particular, information on children's disability status is required to be shared reliably by related organizations. Children with intellectual disabilities have the largest number of enrollments in Japanese schools. Intellectual disability has the largest number of children in schools in Japan, and its definition has changed significantly in recent years.

This paper reviews the framework of intellectual disability in Japan and reviews the definition of intellectual disability from a physiology / pathology perspective.

II. Intellectual Disabilities in Japan

Internationally, the definition of intellectual disability has changed significantly. When the International Classification of Diseases was revised from the 10th version (ICD-10) to the 11th version (ICD-11) in 2019, Intellectual disability was classified as Neurodevelopmental disorder under the name of "Disorder of intellectual development". This indicates that intellectual disability was defined as a disorder of neurodevelopment as well as Autism Spectrum Disorder and Attention Deficit / Hyperactivity disorder.

However, in Japan, intellectual disability is regarded as a different framework from developmental disability, which is a peculiar situation by international standards. The Ministry of Education, Culture, Sports, Science and Technology defined intellectual disability as a condition in which the development of intellectual functions such as memory, reasoning, and judgment was significantly delayed, making it difficult to adapt to social life. On the other hand, developmental disorders are autism, Asperger's syndrome and other pervasive developmental disorders, learning disabilities, attention deficit hyperactivity disorder and other similar disorders of brain function, and the symptoms usually develop at a young age. It is defined as being specified by a
government ordinance. This definition is based on ICD-10. With the revision of the law in 2007, special needs education has newly targeted developmental disabilities in addition to intellectual disabilities and physical disabilities, health impairment, visual disabilities, and hearing disabilities. However, the Ministry of Education, Culture, Sports, Science and Technology has stated that the administrative definition of the term developmental disability is different from the academic definition, which is a cause of confusion.

Children with intellectual disabilities are categorized as either general education or special education based on Intelligence Quotient (IQ) and degree of adaptive function. The classification does not take into account the diminished diseases and disorders, physiological and pathological features that cause the decline in intellectual function. However, in recent years, many children with developmental disabilities such as Autism spectrum disorder (ASD) and Attention-Deficit Hyperactivity Disorder (ADHD) who have no delay in intellectual function have been enrolled in special needs schools for intellectual disabilities\(^6\), and the specialization required of teachers has become extremely wide.

### III. Intellectual Disability in Physiology / Pathology

1. Disorders of Intellectual Development: DID (Intellectual disability)

   According to ICD-11\(^4\), change the term [Mental Retardation, ICD-10(2016)] to [Disorders of Intellectual Development (DID)]. Therefore, Intellectual disability is indicated as Disorders of Intellectual Development (DID). Moreover, DID is similar to [Intellectual Developmental Disorder: IDD] used by DSM-5(Diagnostic and Statistical Manual of Mental Disorder-5\(^{th}\) version, 2013). Table 1 shows the description and classification of DID.
Disorders of intellectual development are a group of etiologically diverse conditions originating during the developmental period characterised by significantly below average intellectual functioning and adaptive behavior that are approximately two or more standard deviations below the mean (approximately less than the 2.3rd percentile), based on appropriately normed, individually administered standardized tests. Where appropriately normed and standardized tests are not available, diagnosis of disorders of intellectual development requires greater reliance on clinical judgment based on appropriate assessment of comparable behavioral indicators.

Division for DID

06 Mental, behavioral or neurodevelopmental disorders
  ∞ Neurodevelopmental disorders
    6A00 Disorders of intellectual development
      6A00.0 Disorder of intellectual development, mild
      6A00.1 Disorder of intellectual development, moderate
      6A00.2 Disorder of intellectual development, severe
      6A00.3 Disorder of intellectual development, profound
      6A00.4 Disorder of intellectual development, provisional
      6A00.Z Disorders of intellectual development, unspecified

(WHO, International Classification of Diseases-11th, 2019)

1) Autism Spectrum Disorder: ASD

Autism spectrum disorder (ASD) is a neurodevelopmental disorder characterized by deficits in social interactions and communication, as well as restricted activities, such as repetitive stereotypic behaviors.7

According to ICD-11, there is a description and classification of ASD(Table 2).
### Table 2: ICD-11 (International Classification of Diseases-11th version) for ASD

| Description for ASD | 06 Mental, behavioral or neurodevelopmental disorders |
|---------------------|----------------------------------------------------|
| ASD is characterized  | Neurdevelopmental disorders                       |
| 1) by persistent deficits in the ability to initiate and to sustain reciprocal social interaction and social communication. | 6A02 Autism spectrum disorder                      |
| 2) by a range of restricted, repetitive, and inflexible patterns of behavior, interests or activities that are clearly atypical or excessive for the individual’s age and sociocultural context. | 6A02.0 Autism spectrum disorder without disorder of intellectual development and with mild or no impairment of functional language |
| The onset of the disorder occurs during the developmental period, typically in early childhood, but symptoms may not become fully manifest until later, when social demands exceed limited capacities. | 6A02.1 Autism spectrum disorder with disorder of intellectual development and with mild or no impairment of functional language |
| Deficits are sufficiently severe to cause impairment in personal, family, social, educational, occupational, or other important areas of functioning and are usually a pervasive feature of the individual’s functioning observable in all settings, although they may vary according to social, educational, or other context. | 6A02.2 Autism spectrum disorder without disorder of intellectual development and with impaired functional language |
| Individuals along the spectrum exhibit a full range of intellectual functioning and language abilities. | 6A02.3 Autism spectrum disorder with disorder of intellectual development and with impaired functional language |
| | 6A02.5 Autism spectrum disorder with disorder of intellectual development and with absence of functional language |
| | 6A02.Y Other specified autism spectrum disorder |
| | 6A02.Z Autism spectrum disorder, unspecified |

(WHO, International Classification of Diseases-11th, 2019)
2) Down Syndrome: DS

Down Syndrome (DS) is a disorder caused by trisomy of human chromosome 21 (Hsa21) and presents various anomalies of the cardiovascular, respiratory, organs, hematological, immune, musculoskeletal systems. Therefore, DS is related to congenital heart diseases (CHD), Alzheimer’s diseases (AD), learning and memory disorders, leukemia, cancers and Hirschsprung disease (HD).

| Description for DS | Trisomy 21 is a chromosomal abnormality, characterised by the presence of a third (partial or total) copy of chromosome 21, which clinical manifestations include variable intellectual deficiency, muscular hypotonia and joint laxity, often associated with facial dysmorphism and variable malformations (essentially heart and digestive) and a risk of complications (epilepsy, leukemia, auto-immune and endocrine pathologies, earlier aging and Alzheimer disease.
Inclusions: Down syndrome |
| Division for DS | 20 Developmental anomalies
▶ Chromosomal anomalies, excluding gene mutations
LD40 Complete trisomies of the autosomes
LD40.0 Complete trisomy 21 |

(WHO, International Classification of Diseases-11th, 2019)

3) Epilepsy

Epilepsy is considered the chronic neurological disease characterized by the recurrence of seizures, and associated with stigma, psychiatric comorbidity. Majority of epilepsy people are young age (<18 years), medically intractable epilepsy being present in nearly one-fourth of them.
<Table 4> ICD-11(International Classification of Diseases-11th version) for Epilepsy

| Description for Epilepsy                                                                 | Translation                                                                 |
|-----------------------------------------------------------------------------------------|----------------------------------------------------------------------------|
| The group of conditions characterised as being in or associated with the nervous system. At least 2 unprovoked (or reflex) seizures occurring more than 24 hours apart. |

Division for Epilepsy

- 08 Diseases of the nervous system
  - 8A60 Epilepsy due to structural or metabolic conditions or diseases
  - 8A61 Genetic or presumed genetic syndromes primarily expressed as epilepsy
  - 8A62 Epileptic encephalopathies
  - 8A63 Seizure due to acute causes
  - 8A64 Single seizure due to remote causes
  - 8A65 Single unprovoked seizure
  - 8A66 Status epilepticus
  - 8A67 Acute repetitive seizures
  - 8A68 Types of seizures
  - 8A6Y Other specified epilepsy or seizures
  - 8A6Z Epilepsy or seizures, unspecified

(WHO, International Classification of Diseases-11th, 2019)

4) Schizophrenia

Schizophrenia is a severe mental disorder characterized by multiple psychiatric symptoms (such as, hallucinations, delusions, disorganized speech) and negative symptoms\(^{13}\). Although an exact cause of schizophrenia is unknown, risk factors associated with the development of the disorder include genetic and environmental factors\(^{14}\). Table 5 shows the details of Schizophrenia examined using ICD-11.
### Table 5  
**ICD-11 (International Classification of Diseases - 11th version) for Schizophrenia**

| Description for Schizophrenia |
|--------------------------------|
| Schizophrenia is characterised by disturbances in multiple mental modalities. |
| 1) Thinking (e.g., delusions, disorganisation in the form of thought), |
| 2) Perception (e.g., hallucinations), |
| 3) Self-experience (e.g., the experience that one’s feelings, impulses, thoughts, or behavior are under the control of an external force), |
| 4) Cognition (e.g., impaired attention, verbal memory, and social cognition), |
| 5) Volition (e.g., loss of motivation), |
| 6) Affect (e.g., blunted emotional expression), |
| 7) Behavior (e.g., behavior that appears bizarre or purposeless, unpredictable, or inappropriate emotional responses that interfere with the organization of behavior). |
| 8) Psychomotor disturbances, including catatonia, may be present. |

Persistent delusions, persistent hallucinations, thought disorder, and experiences of influence, passivity, or control are considered core symptoms. Symptoms must have persisted for at least one month in order for a diagnosis of schizophrenia to be assigned. The symptoms are not a manifestation of another health condition (e.g., a brain tumor) and are not due to the effect of a substance or medication on the central nervous system (e.g., corticosteroids), including withdrawal (e.g., alcohol withdrawal).

| Division for Schizophrenia |
|---------------------------|
| 06 Diseases of the nervous system |
| ▷ Schizophrenia or other primary psychotic disorders |
| 6A20 Schizophrenia |

( WHO, International Classification of Diseases-11th, 2019 )
Figure 1 shows the summary results for disease (Epilepsy or seizures) and disorder (DID, ASD, Schizophrenia, Complete trisomies of the autosomes: DS) at ICD-11. In summary, one of the neurodevelopmental disorders include intellectual disability and autism spectrum disorder (ASD). Schizophrenia, Epilepsy and DS are separate categories and are not included in intellectual disability (Figure 1).

IV. Conclusion

According to the classification of ICD-11, intellectual disability as a neurodevelopmental disorder has no physiological or pathological diagnostic criteria and is diagnosed by psychological intelligence tests and behavioral evaluation. Therefore, the
low intellectual function found in some people with Down Syndrome or epilepsy should not be equated with intellectual disability as a neurodevelopmental disorder. Similarly, educating children of different backgrounds in the same way is inconsistent with the idea of special education to provide education tailored to individual educational needs. In order to understand the educational needs of children enrolled in special needs schools for intellectual disabilities, it is necessary to have a physiological / pathological understanding of the causative diseases and disorders that cause the decline in intellectual function. And it will be necessary to provide educational support according to the intellectual and adaptive functions of each child. When special needs education targeted developmental disabilities, Japanese special needs schools changed their policy to accept all types of disabilities. If children with various disabilities are enrolled in one school, their educational needs will also diversify. In Japan, intellectual disability is centrally defined by the decline in intellectual function. In order to promote special needs education in the future, it will be necessary for teachers to understand the diseases and disorders of children physiologically / pathologically.

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Published by
Asian Society of Human Services
Yamaguchi, Japan