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REVIEW ARTICLE

The Definitions of Multimorbidity and Multiple Disabilities(MMD) and the Rehabilitation for MMD

Masahiro KOHZUKI ¹⁾

1) Department of Internal Medicine and Rehabilitation Science, Tohoku University
Graduate School of Medicine

ABSTRACT

Japan has already become the world's first super-aged society. The advent of super-aged society has increased the possibility that the elderly population may have more than one or multiple disabilities. Multiple disabilities generally refer to the state that people have two or more disabilities, but has not clearly defined yet. In other words, there is no standardized definition of the multiple disabilities in the whole world including Japan, because they can be differently defined according to the types of disabilities and pertinent laws or systems. This study aimed to define the multiple disabilities by introducing the ways to define it and trying to produce the standardized definition as Multimorbidity and Multiple Disabilities (MMD). Since the ways to define MMD including the types and degrees of disabilities may make the future for persons with MMD greatly different, they should be taken seriously. Furthermore, to respond with the rehabilitation needs of persons with MMD, the human resources need to be cultivated and the scientific basis needs to be built.

< Key-words >

super-aged society, definitions, multimorbidity, multiple disabilities, rehabilitation

kohzuki@med.tohoku.ac.jp(Masahiro KOHZUKI)

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I . Background

Japan has already become the world's first super-aged society; the average life expectancy, the rate of elderly population (65 years and over) and the speed of aging of Japan stand first in the world (WHO, 1981; Kohzuki, Sakata, Kawamura et al., 2012). The improvement of public hygiene, the advancement of medicine and health care and the improvement of the standard of living have contributed to the extension of the average life expectancy by decreasing the infant mortality, the death rate by tuberculosis and infectious diseases and the diseases by the life habit factors; in particular, the decrease of the cerebrovascular diseases has reduced the mortality of the middle aged.

The advent of super-aged society has increased the possibility that the elderly population may have more than one or multiple disabilities. Multiple disabilities generally refer to the state that people have two or more disabilities, but has not clearly defined yet. In other words, there is no standardized definition of the multiple disabilities, because they can be differently defined according to the types of disabilities and pertinent laws or systems. This study aimed to define the multiple disabilities by introducing the ways to define it and trying to produce the standardized definition as Multimorbidity and Multiple Disabilities (MMD).

II . Research Overview

1. The Ways to Approach the Multiple Disabilities in Other Countries

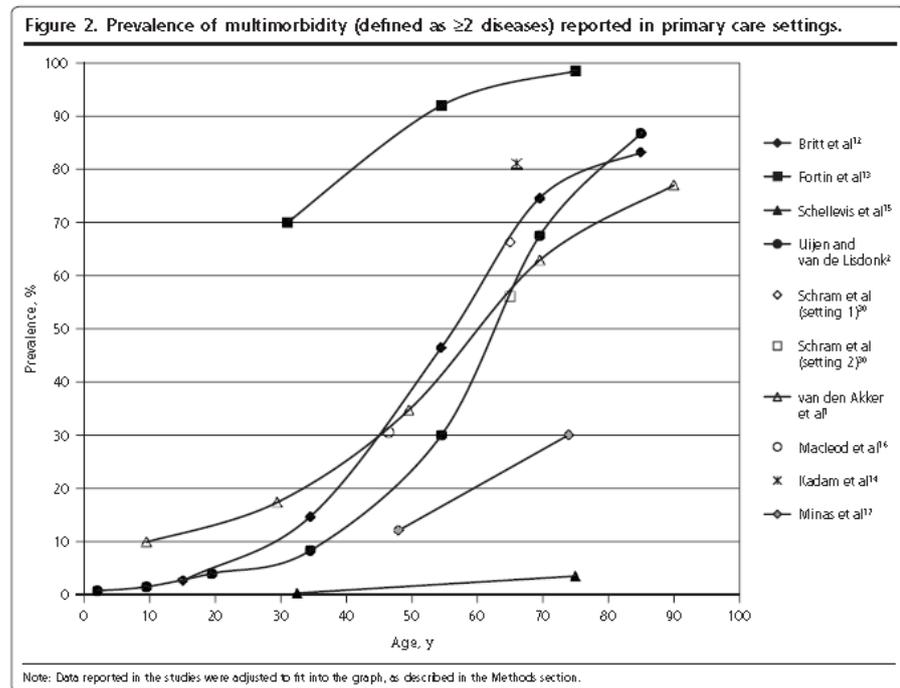
Since the term of multiple disabilities in English has often considered as profound intellectual and multiple disabilities (PIMD) or cerebral palsy, it is somewhat different from the concept that refers to the state of the coexistence of more than one disabilities that may happen to anybody (Hostyn & Maes, 2009; Lancioni, O'Reilly, Sigafos et al., 2008; Lancioni, Singh, O'Reilly et al., 2009; Foster & Iacoco, 2014).

In the meantime, a variety of diseases cause the multiple disabilities that may be called as multimorbidity, which is also called as comorbidity and has been prevalently used. Even though multimorbidity refers to the coexistence of two or more diseases and comorbidity is defined as the coexistence of just two or more diseases as well as that of mutually related diseases (van den Akker, Buntinx, Knottnerus et al., 1996), the two terms have often used as the identical concept.

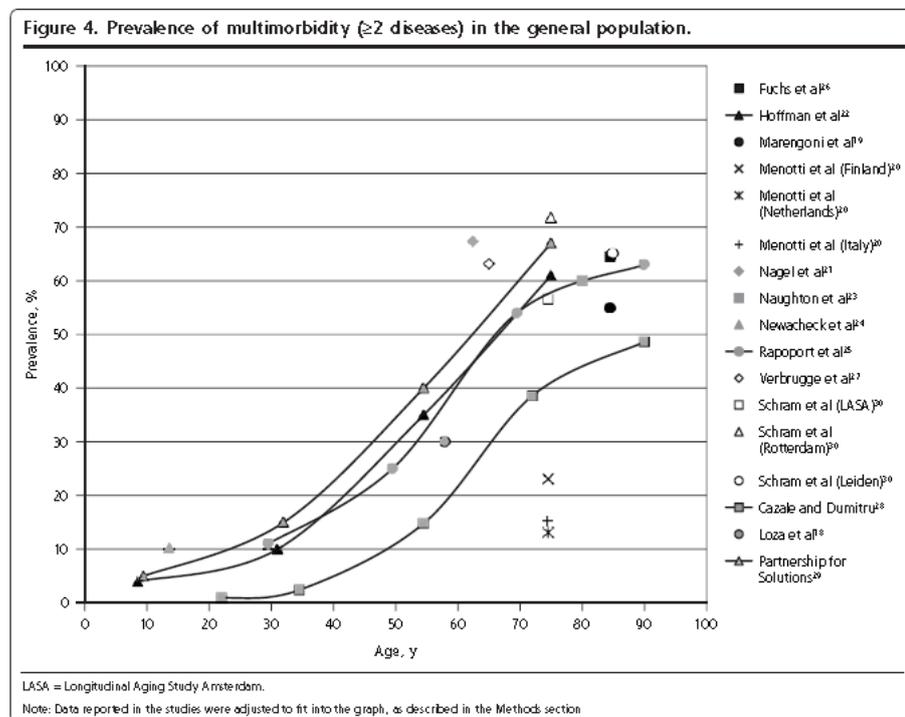
Patients with multimorbidity are more likely to experience the obstructions of the activities of daily living, frequent hospitalization, the long hospitalization period, the low quality of life, severe psychological burden, frequent complications after surgery and the high hospital cost (Agborsangaya, Lau, Lahtinen et al., 2013; van den Akker, Buntinx, Metsemakers et al., 1998; Fortin, Bravo, Hudon et al., 2006; Gijzen, Hoeymans, Schellevis et al., 2001; Wolff, Starfield, Anderson et al., 2002). The scientific basis for the treatment for the patients with multimorbidity has not been sufficient (Mangin, Heath &

Jamouille, 2012) and the clinical guidelines for the various diseases have not dealt with the multimorbidity seriously (Tinetti, Bogardus Jr, Agostini et al., 2004; Prados-Torres, Calderon-Larranaga, Hanco-Saavedra et al., 2014). In this situation, the clinicians have argued that it is difficult to apply the clinical guidelines for patients with multimorbidity, which resulted in the lack of the distribution of the clinical guidelines for the examination of patients with multimorbidity (Luijks, Loeffen, Largo-Janssen et al., 2012).

According to the systematic review of Fortin et al., the prevalence of multimorbidity seemed to vary greatly; the prevalence of multimorbidity of 75 years old people varied from 3.5 percent to 98.5 percent in primary care setting and that of general population varied from 13.1 percent to 71.8 percent (Figure1 and Figure2) (Fortin, Stewart, Poitras et al., 2012). It is assumed that this great variation may be caused by the types of diseases to be diagnosed as the multimorbidity, the expertise of the clinicians to examine the patients, the age or economic conditions of patients and geographical conditions (Prados-Torres, Calderon-Larranaga, Hanco-Saavedra et al., 2014; Fortin, Stewart, Poitras et al., 2012; Oruenta, García-Álvarez, García-Goñi et al., 2014; Islam, Valderas, Yen et al., 2014). The term of multimorbidity usually refers to the state that the patients chronically have two or more diseases among the twenty diseases of COPD (chronic obstructive pulmonary disease), diabetes mellitus, hypertension, cancer, stroke, dementia, depression, joint diseases, anxiety, congestive heart failure, coronary artery diseases, asthma, arrhythmia, thyroid disease, anemia, hearing impairment, dyslipidemia, obesity, prostatic hypertrophy and osteoporosis (Prados-Torres, Calderon-Larranaga, Hanco-Saavedra et al., 2014). However, it is not the fixed list of the diseases to be diagnosed to have the multimorbidity; since obesity may be excluded or Parkinson's disease and AIDS may be included, the number of diseases varies from seven to 25 diseases (Prados-Torres, Calderon-Larranaga, Hanco-Saavedra et al., 2014; Fortin, Stewart, Poitras et al., 2012; Oruenta, García-Álvarez, García-Goñi et al., 2014).



<Figure1> Prevalence of Multimorbidity Reported in Primary Case Settings (Fortin, Stewart, Poitras et al., 2012)



<Figure2> Prevalence of Multimorbidity in the General Population (Fortin, Stewart, Poitras et al., 2012)

The prevalence of multimorbidity are more likely to be higher, when the patients are older, have higher level of education, have more income, are examined by not specialized medical doctor, but general practitioner(GP) and are staying at the facilities for the elderly (van den Akker, Buntinx, Metsemakers et al., 1998). In addition, when the patients are obese, the probability to be diagnosed to have the multimorbidity increases by two times (Agborsangaya, Ngwakongnwi, Lahtinen et al., 2013). It has been reported that 97.7 percent of the patients with COPD may have one or more diseases and 53.5 percent may have four or more diseases (Vanfleteren, Spruit, Groenen et al., 2013). Moreover, Rutten et al. reported that 20.5 percent with COPD who are 65 years or over also have the heart failure without detectable symptoms (Rutten, Cramer, Grobbee et al., 2005).

The response to the comorbidity is critical to predict the diseases that may easily coexist and to provide proper treatment or rehabilitation when examining patients. Whether to have comorbidity may be analyzed by the cluster analysis of statistical data from the diseases of many patients or by survey. In recent, the cluster analysis has been often used. For example, in Australia, it has been conducted for the elderly based on the three clusters: 1) asthma, bronchitis, arthritis, osteoporosis and depression, 2) hypertension and diabetes mellitus and 3) cancer, heart disease and stroke (Islam, Valderas, Yen, et al., 2014). In Netherlands, the cluster analysis has been conducted for the patients with COPD based on the five clusters: 1) almost no coexisting diseases, 2) cardiovascular diseases (hypertension, arteriosclerosis), 3) cachexia (underweight, sarcopenia, osteoporosis, chronic kidney disease), 4) metabolic diseases (obesity, arteriosclerosis, dyslipidemia, hyperglycemia, hypertension), and 5) psychological diseases (anxiety and depression) (Vanfleteren, Spruit, Groenen et al., 2013). The most representative questionnaires to determine whether to have comorbidity may include the Charlson Index (Charlson, Pompei, Ales et al., 1987), the Cumulative Illness Rating Scale(CIRS) (Linn, Linn & Lee, 1968), the Index of Coexisting Disease (ICED) (Kaplan & Feinstein, 1974) and the Kaplan-Feinstein Classification (KFC) (Cleary, Greenfield, Mulley et al., 1991; Hall, 2006; de Groot, Beckerman, Lankhorst et al., 2003).

For the rehabilitation treatment, rather than each disease such as hypertension or diabetes mellitus, the disorders of organs caused by those diseases including stroke, heart diseases, renal failure, visual impairment and sensory disturbances have come into question. Unfortunately, since the ways to approach the multimorbidity or comorbidity that have been used in Europe or the U.S.A. have not been such useful for the rehabilitation treatment in Japan, different ways need to be developed.

2. The Ways to Approach the Multiple Disabilities in Japan

There is no definition of multiple disabilities in Japan, either; the definition of multiple disabilities differs from the pertinent laws or systems. In this section, the unified definition of multiple disabilities will be given after reviewing several definitions that

have been used in Japan. There are three laws for the welfare for persons with disabilities that have become the basis of the welfare policy for persons with disabilities; the Law for the Welfare of Persons with Physical Disabilities, the Law for the Welfare of Persons with Intellectual Disabilities and the Law on Mental Health and Welfare of Persons with Mental Disorders. Based on those laws, various measures such as the issuance of certification notebook and the surveys on the actual conditions of persons with physical and intellectual disabilities and mental disorders have been implemented.

a) The Multiple Disabilities in the Welfare Administration

The multiple disabilities are prescribed as shown on Table 1 based on the three laws for the welfare for persons with disabilities and the Law for Employment Promotion, etc., of Persons with Disabilities.

According to the Table of the Grades of Physical Disabilities that shows the seven grades of physical disabilities, physical disabilities refer to the disabilities among the Grade 1 to Grade 6 or/and the state of the coexistence of two or more disabilities among the disabilities of Grade 7. The severe level of physical disabilities refers to the disability of Grade 1 or Grade 2 or/and the state of the coexistence of two or more disabilities of Grade 3; when two or more disabilities of Grade 3 coexist, the Grade 3 is considered as Grade 2.

When issuing certificate notebook of persons with physical disability, medical certificate or doctor's note, the coexistence of two or more disabilities may be prescribed as the combined state based on the criteria as follows;

- ① The state of the coexistence of two or more disabilities among the disabilities of the same grade is considered as one grade higher except the cases of the multiple disabilities that are specifically prescribed in the Table of the Grade of Physical Disabilities.
- ② As to the mobility impairment, when two or more disabilities among the disabilities of Grade 7 coexist, the Grade 7 becomes the Grade 6.
- ③ When two or more disabilities coexist and the grades of each disabilities are different, considering the degrees of disabilities, the grade may be determined to be a higher grade.
- ④ When two or more disabilities among physical disabilities coexist, the certificate of disabilities for the combined state may be issued. However, for the state of the coexistence of two or more disabilities among both physical and intellectual disabilities or both intellectual disabilities and mental disorders, the certificate of the combined state may not be issued.

<Table1> Prescription of the Multiple Disabilities in the Welfare Administration

Physical Disabilities	When more than one disability coexist, the grades of disabilities are determined by adding the scores of each disability, but there is no consideration of the coexistence of the disabilities from intellectual and mental disabilities.
Intellectual Disabilities	When the degrees of the disabilities are determined to be in severe levels, the possibility that particular disabilities may coexist will be taken into account, but other than that there is no rules on the multiple disabilities.
Mental Disorders	There is no rules on the multiple disabilities.

b) The Multiple Disabilities in the School Education Act

In the School Education Law, multiple disabilities was defined as the state of the coexistence of two or more disabilities among the five disabilities of visual impairment, hearing impairment, intellectual disabilities, mobility impairment and infirmity (the Enforcement Ordinance of School Education Act, Article 22, Section 3); in addition, the cases that one or more of aforementioned five disabilities are added by one of the learning disability, ADHD (attention deficit hyperactivity disorder) and high functional PDD (pervasive developmental disorder) are considered as multiple disabilities. Hyper function refers to the state that persons who have the IQ of 70 or more and developmental disorder, even though they don't two or more disabilities. In the curriculum of study for teaching profession to obtain the teaching license for special needs schools, the courses that deal with developmental disorders have been included in the parts of multiple disabilities and learning disability (National Institute of Vocational Rehabilitation web site).

c) The Multiple Disabilities in the Disability Subsidy System

In the Disability Subsidy System, based on the extent of the needs of benefits, the degrees of disabilities are classified into the three levels; Level A (severe level), Level B (moderate level) and Level C (mild level). Based on the levels of disabilities of the users of the facilities for persons with disabilities, the subsidy for the facilities for persons with disabilities is determined (National Institute of Vocational Rehabilitation web site).

According to the Criteria to Estimate the Subsidy for the Facilities Established pursuant to the Act on the Welfare for Persons with Physical Disabilities (Announcement No.28, Ministry of Health, Labour and Welfare), when determining the subsidy, the subsidy for persons with severe and middle levels of disabilities is included to that for persons with multiple disabilities (National Institute of Vocational Rehabilitation web site).

In the section of rehabilitation facilities for persons with physical disabilities of the same Announcement, users with Level A refer to the persons who have three or more

disabilities among the impairments of masticatory function, physical disabilities, internal organ impairment, intellectual disabilities and mental disorders. The amount of the subsidy may differ from the services that the users with Level A of the facilities for persons with disabilities choose; when users with severe and multiple disabilities choose to reside in the facilities, the facilities get the subsidy of 30,700 yen every month for each user; and when they choose to be outpatients, the facilities get that of 10,200 yen every month for each user (The amount of subsidy may be subjected to change by the types of facilities) (National Institute of Vocational Rehabilitation web site).

3. New Definition of Multiple Disabilities: Multimorbidity and Multiple Disabilities (MMD)

As aforementioned, the ways to determine the scopes of multiple disabilities may differ from the perspectives of medicine, education or welfare, but it may be considered as problem that no perspectives included the higher brain dysfunctions. The state of the coexistence of internal organ impairments such as cardiac and respiratory dysfunctions that may be caused by smoking should not be overlooked. Furthermore, the efforts to deal with the multiple disabilities beyond the categorized frames of physical disabilities, intellectual disabilities or mental disorders have not been taken sufficiently and the efforts to include the mild level of disabilities to the scopes of multiple disabilities have not been done sufficiently, either.

The scopes of multiple disabilities should be expanded, the services for persons with multiple disabilities should be improved in quality and the realistic measures for them should be taken beyond the current laws.

In this context, the multiple disabilities should be newly defined as Multimorbidity and Multiple Disabilities (MMD). The definition of MMD is as follows; the state of the coexistence of two or more disabilities among visual impairment, hearing or balance impairment, voice/speech impairment, impairment of masticatory function, mobility impairment, internal organ impairments, intellectual disabilities, mental disorder and higher brain dysfunction; and the state of the coexistence of two or more disabilities among the seven internal organ impairments including cardiac disorder, renal disorder, liver function impairment, respiratory disorder, bladder or anorectal disorder, small intestinal disorder and AIDS by HIV.

4. The Definition of the Rehabilitation of Persons with MMD

The WHO defined the rehabilitation as follows: Rehabilitation includes all measures aimed at reducing the impact of disabling and handicapping conditions, and at enabling the disabled and handicapped to achieve social integration. Rehabilitation aims not only at training disabled and handicapped persons to adapt to their environment, but also at intervening in their immediate environment and society as a whole in order to facilitate their social integration. The disabled and handicapped themselves, their families, and

the communities they live in should be involved in the planning and implementation of services related to rehabilitation (WHO, 1981).

The rehabilitation medicine has been proactively implemented to accomplish the concept of "Adding Life to Years (the improvement of living functions and quality of life)" by helping overcome the disabled conditions through the assessment of and intervention in socially disadvantaged functions (Kohzuki M, Sakata Y, Kawamura T et al., 2012). In recent, it was found that the rehabilitations of internal organ impairment such as cardiac or renal rehabilitation have been useful to accomplish the concept of "Adding Years to Life (improvement of vital prognosis) or to prevent diseases.

There is no definition for the rehabilitation for MMD. Considering the results of the survey on disabilities and the report that the death rate of dialysis patients who experienced the cardiac infarction has decreased by 35 percent owing to the rehabilitation treatment, the rehabilitation for MMD may be defined as follows: the rehabilitation for MMD is the comprehensive program that provides medical checkup, response to the disability-related conditions, exercise therapy, dietary therapy, moisture management, medication, education and mental/psychological supports for a long term, aiming to mitigate and control the physical and mental effects of MMD caused by various diseases, to improve the vital prognosis and to improve the social, psychological and occupational conditions.

IV. Conclusions

The MMD need to be responded with not by just providing the services for each disabilities, but by comprehensively considering the state of the coexistence of disabilities. In the broader perspective, the MMD should be stipulated in the laws that become the basis of the administrative work for MMD, because the section of administration as well as the sections of medicine and welfare are responsible for providing persons the MMD. Since the ways to define MMD including the types and degrees of disabilities may make the future for persons with disabilities greatly different, they should be taken seriously. Furthermore, to respond with the rehabilitation needs of persons with MMD, the human resources need to be cultivated and the scientific basis needs to be built.

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