Japanese Journal of Comprehensive Rehabilitation Science (2017)

Editorial

Outcome indicators in comprehensive inpatient rehabilitation

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Sonoda S. Outcome indicators in comprehensive inpatient rehabilitation. Jpn J Compr Rehabil Sci 2017; 8: 1−3.

It is important to respond to disability that occurs after an illness or immobilization in order to overcome many of the problems of an aging society. No one denies that one compelling way is rehabilitation. Whether rehabilitation optimally works or not is critical. Donabedian proposed to divide the quality of medicine into structure, process, and outcome [1]. In relation to rehabilitation, the number of therapists and the size of gyms are considered as structures; the flow of decision-making on exercise content and the implementation of conferences are designated as processes; and changes in ADL score from admission to discharge or recovery rate at home are examples of outcomes.

Outcome evaluation has been introduced to the medical service fee system concerning Kaifukuki Rehabilitation Wards (KRW) where comprehensive inpatient rehabilitation is carried out. For example, the degree of improvement in the care-need assessment has been used as a criterion for the KRW admission fee. In addition, the medical fee revision in fiscal 2016 required that the KRW achievement index (KRW-AI) be used to judge whether hospitals can charge a rehabilitation fee for more than 2 hours per day for a patient. I will discuss merits and disadvantages of outcome indexing using the KRW-AI as an example.

The Functional Independence Measure (FIM) [2] is used to calculate the KRW-AI. The FIM motor (FIM-M) efficiency score, which is computed by dividing the gain in the motor subscore of the FIM by length of stay (LOS), has been used. When using the FIM-M efficiency scale as a tool for some outcome comparisons, we must take into consideration the characteristics of the group to which the patient belongs [3]. The examples use the Annual Survey for KRW 2015.

Box plots of the FIM-M efficiency scores for patients with cerebrovascular diseases (16,101 patients), orthopedic disorders (14,971 patients), and disuse syndrome (2,508 patients) are shown in Figure 1a. Box plots for patients with the admission FIM-M of 13, 14, … , and 91 are linked from left to right. Generally speaking, data on orthopedic patients showed higher median values than those for the other two patient groups. Comparison among wards with different coexistence rates of diseases using the average or median value for FIM-M efficiency is meaningless if FIM-M efficiency scores vary in relation to the kind of disorders among the groups examined.

Furthermore, we must be aware that FIM-M efficiency scores will be low both in patients with low and high admission FIM scores. Needless to say, providing rehabilitation to severely disabled patients is important and the evaluation of outcome in wards in which those patients were intensely managed must not be low. When we employ FIM-M efficiency scores for group comparisons, patients' characteristics must be similar among groups.

Standard days of LOS differ among diseases, which causes differences in FIM-M efficiency scores among diseases. KRW-AI is the adjusted version of the FIM-M efficiency scale related to this point. Dividing the value of LOS by the prescribed standard days of LOS (150 or 180 days in case of stroke and 90 days in case of femur fracture with operation, for example) is used instead of LOS when KRW-AI is calculated. When the actual KRW-AI is computed for a hospital, the sum of the FIM-M gain of all admitted patients is divided by the sum of the adjusted LOS of all admitted patients. In addition, patients with lower FIM-M or higher FIM-M or elderly patients can be eliminated before the calculation if that patient's value differs by 30% of that of the total patient population. In this editorial, instead of using the actual computation of KRW-AI, an individual patient's value (adjusted FIM-M efficiency) that is calculated like the KRW-AI was employed to provide the information below.

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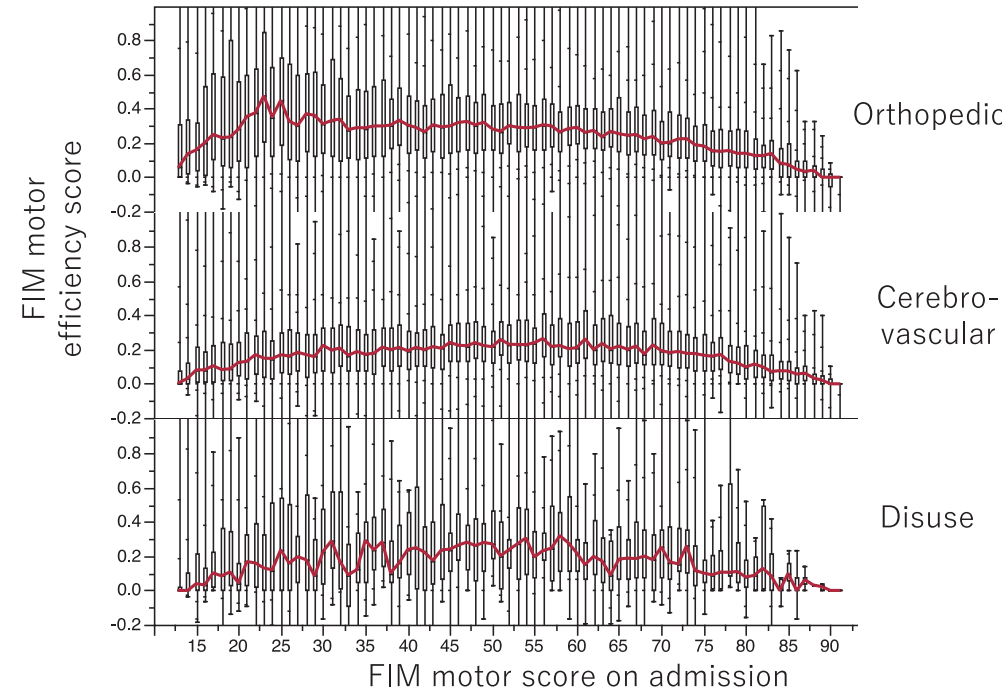
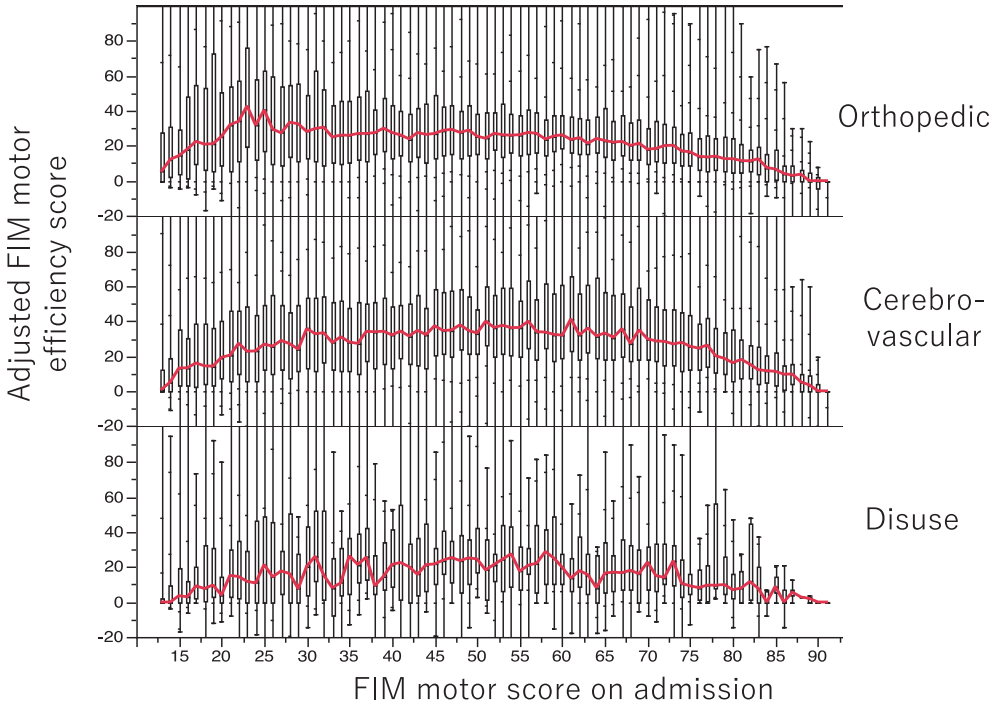
Accepted: November 19, 2016.
No benefits in any form have been or will be received from any commercial party related directly or indirectly to the subject of this manuscript.

doi.org/10.11336/jjcrs.8.1



(a)



(b)

Figure 1.(a) Median value and quartile score on the FIM motor efficiency scale.(**b**) Median value and quartile score on the adjusted FIM motor efficiency scale.
Upper and lower border of the box indicate quartile points and the horizontal line in the box denotes the median value. Median values are connected with red lines.

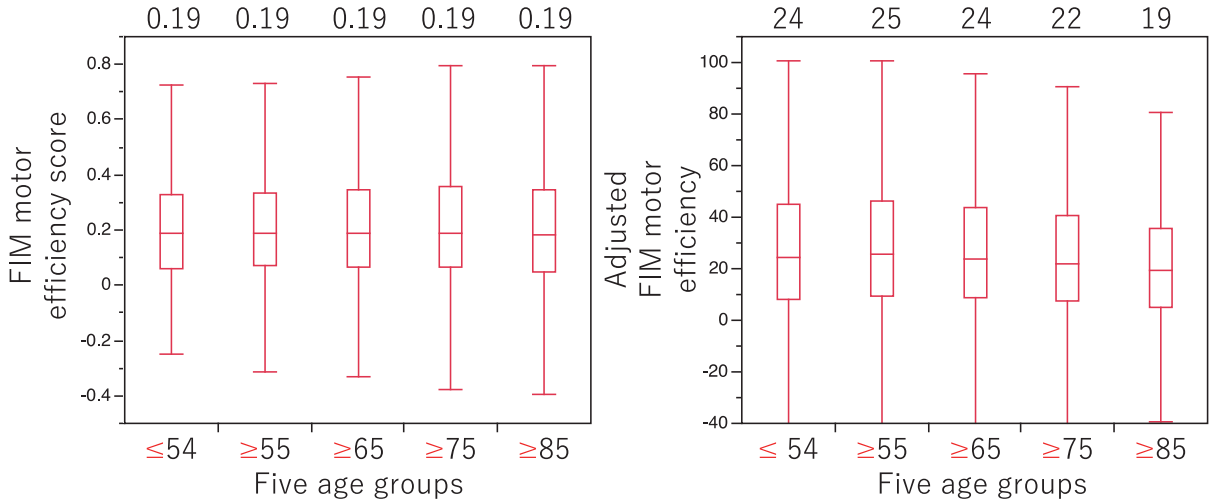


Figure 2. Effect of age on outcome index.
Upper and lower borders of the box indicate quartile points and the horizontal line in the box denotes the median value. Adjusted FIM-M efficiency scores fit the assumption that "The higher the age, the lower would be the outcome of rehabilitation."

Figure 1(b) is a box plot of adjusted FIM-M efficiency scores under the same conditions as for Figure 1(a) The difference in the pattern of the adjusted FIM-M efficiency scores between cerebrovascular patients and orthopedic patients almost disappeared in comparison with the pattern of FIM-M efficiency. This means that the adjusted FIM-M efficiency scale makes it possible to acquire a representative value of ADL efficiency even in wards where patients with various diseases coexist. There are still some problems to be solved. One is the validity of the standard days of LOS. One piece of evidence supporting validity is that almost all patients in the KRW are discharged within those days. However, considering the possibility of arbitrary discharges to avoid reductions in medical service fees, we must look for other grounds to validate the standard days of LOS.

Another way is to validate the adjusted FIM-M efficiency scale itself. The higher the patient's age, the lower would be the outcome of rehabilitation. I will discuss which is more valid, the FIM-M efficiency scale or the adjusted FIM-M efficiency scale, using this relationship. Figure 2 shows the median value and quartile points of FIM-M efficiency scores and adjusted FIM-M efficiency scores for patients stratified by age into five groups. Adjusted FIM-M efficiency scores were lower in the high-age group, which fits the assumption above. Miyai reported a positive relationship between the dose of rehabilitation exercise and the KRW-AI and between obtaining hospital accreditation of the Japan Council for Quality Health Care and the KRW-AI using the Annual Survey for KRW 2015 [4], findings that indicate the usefulness of the adjusted FIM-M efficiency scale.

In summary, although KRW-AI has some reasonable validity even now, not all issues regarding the characteristics of patients have been resolved. The first priority for KRW assessment should be process evaluation, and simultaneously we should improve the adjusted FIM-M efficiency scale to enhance tools for improving the quality of rehabilitation.

Abbreviations
FIM: Functional Independence Measure
FIM-M: Motor subscore of the Functional Independence Measure
KRW: Kaifukuki Rehabilitation Ward
KRW-AI: Kaifukuki Rehabilitation Ward achievement index
LOS: length of stay

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