

Rehabilitation in older people: know more, gain more

CME

James KH Luk 陸嘉熙

Functional decline is common among older patients during or even prior to hospitalisation, in spite of treatment of acute illnesses. An effective rehabilitation programme is vital to improve the motor and functional states of the older patients. Knowing factors affecting rehabilitation of older persons is important for their effective and efficient rehabilitation. This article, with special reference to local studies, examines age, gender, cognitive function, and serum albumin levels as to how they influence rehabilitation in the elderly. The conclusion is that we should not exclude patients of advanced age from rehabilitation programmes, based on poor cognitive function and low serum albumin levels as they can achieve similar gains in motor and functional outcomes. A nutritional programme to improve the albumin level of older persons could speed up the rehabilitation progress, rendering it more efficient. A gender-specific rehabilitation programme is needed to improve functional outcome in men and motor outcome in women. Moreover, knowing the factors influencing residential care home placement affords an opportunity to reduce reliance on institutionalisation after rehabilitation.

Introduction

In Hong Kong, due to the increase in the elderly population, hospitals are now crowded with older patients. Previous local reports showed that nearly half of the patients admitted to the general medical ward were aged 70 years or more.¹ Older patients tend to have multiple organic, psychological, cognitive, and social problems.^{2,3} Hence, the use of a holistic approach and multidisciplinary geriatric assessment are necessary to manage them.⁴ In addition, functional decline is common among older patients during or even prior to hospitalisation in spite of treatment of the acute illnesses.^{5,6} They have high chance of readmission after discharge and a significant proportion needs to move into nursing homes.^{7,8} An effective rehabilitation programme is therefore vital to improve motor and functional states of the older persons so that they can go back to live in their own homes. It follows that knowing the important factors affecting rehabilitation of such elderly is pivotal for their effective and efficient reconditioning. This article examines the influence of age, gender, cognitive function, and albumin levels on the rehabilitation of older persons, with special reference to local studies. In addition, the predictors for institutionalisation are discussed.

Age and rehabilitation

The influence of age on rehabilitation remains controversial. Previous studies showed a negative correlation between age and functional outcomes after rehabilitation.⁹ Other studies also found age to be a poor prognostic factor for functional status and discharge destination.¹⁰ Recent studies have not confirmed this, however.¹¹ One large-scale study on Hong Kong stroke patients showed that total Functional Independence Measure (FIM) scores both upon admission and at discharge were lower in older age-groups.¹² However, no significant difference was observed in the changes of FIM scores across age-groups, which confirmed that age was not an independent predictor for a good outcome (discharge FIM ≥ 90). The study concluded that admission functional status (odds ratio [OR]=1.14; 95% confidence interval [CI], 1.11-1.16), together with employment (OR=2.6; 95% CI, 1.07-6.27) and living at home before stroke (OR=4.17; 95% CI, 1.7-10), but not age per se were good predictors. The authors suggested that as older patients show comparable improvements during rehabilitation, intensive rehabilitation should not be withheld simply because of advanced age.

Gender and rehabilitation

In most geriatric units, male and female patients receive essentially the same rehabilitation programme and are expected to achieve similar progress and outcomes. Studies in stroke

Key words

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Department of Medicine and Geriatrics,
Fung Yiu King Hospital, 9 Sandy Bay
Road, Pokfulam, Hong Kong
JKH Luk, FHKCP, FHKAM (Medicine)

Correspondence to: Dr JKH Luk
Email: lukkh@ha.org.hk

survivors show that women tend to have worse outcomes than men and endure more disability and institutionalisation.¹³ Regarding cardiac rehabilitation, men and women appear to benefit equally, but men perceive better quality of life than women.¹⁴ However, few studies have explored whether there is a gender difference following rehabilitation of older persons. Recently, a retrospective study in Hong Kong investigated the relationship between gender and rehabilitation outcomes of a large group of older Chinese patients recovering from common medical illnesses.¹⁵ The study included 1795 older patients admitted to geriatric wards. Compared to men, women had a higher Barthel index (BI) but lower Elderly Mobility Scale (EMS) score on admission and discharge. Both EMS and BI efficacy (absolute gain in the outcome scores) and efficiency (absolute gain in the outcome scores divided by length of stay in hospital for rehabilitation) were similar in both sexes. It found that female gender was a significant independent negative predictor for satisfactory motor outcome (OR=0.56; 95% CI, 0.42-0.76) but a positive predictor for functional outcome (OR=1.75; 95% CI, 1.27-2.43). The study concluded that there were no gender differences in motor and functional efficacy and efficiency in rehabilitation. Women achieved a better functional outcome but a poorer motor outcome on discharge compared to men. The authors suggested gender-tailored rehabilitation to foster motor and functional independence of older men and women.

Cognitive function and rehabilitation

In-patient setting

During rehabilitation, older patients may be required to learn skills in exercise and in remembering instructions; impaired memory could affect the success of rehabilitation.¹⁶ Thus, cognitive impairment has been regarded as a barrier and a negative influence on rehabilitation success. To date, many studies, mostly in stroke and femoral fracture patients, have reported that patients who are cognitively impaired have poorer rehabilitation outcomes.^{17,18} Cognitive status also associates with the post-rehabilitation ability to return to independent living in the community.² Yet some studies have shown that cognitive impairment does not affect rehabilitation success of older stroke patients. In practice it is important for clinicians and health care administrators to know whether patients with cognitive impairment may benefit from rehabilitation. A study was therefore performed in Hong Kong to examine the effect of cognition on gain in functional and motor performance in older Chinese patients undergoing rehabilitation in geriatric ward settings.¹⁹ Both absolute and relative gain in the rehabilitation outcomes were analysed. In addition, independent

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老年人患上急病經醫治後，其身心功能衰退，健康狀況往往會走下坡，這情況在住院期間甚至在住院前都會出現。一個有效的復康方案對於改善老人的運動及活動功能相當重要。認識影響老人復康的因素能更有效及更快地幫助復康的過程。本文根據本地相關的研究，探討年齡、性別、認知功能及血清白蛋白水平幾方面如何影響老人復康。得出的結論是不可以因為病人年紀大、認知功能差及血清白蛋白水平低，而拒絕替他們安排復康治療。原因是老人也可以和其他病人一樣，經復康治療的過程而在運動及活動功能方面得到改善。此外，替老人擬定營養計劃可以改善他們的白蛋白水平，從而加快復康的速度。進一步來說，有須要建立一個針對性別的復康方案，從而改善男性的活動功能及女性的運動功能。另一方面，加深認識安老院安置的因素亦有助減少老人在復康治療後對院舍的依賴。

predictors for satisfactory functional and motor outcomes were examined. The results showed a strong association between admission cognition and relative change in functional and motor efficacy and efficiency. However, cognitive function was not associated with an absolute functional and motor gain, suggesting that patients with impaired cognitive function could still benefit from rehabilitation. Cognitive function was an independent predictor for satisfactory motor outcome (OR=1.04; 95% CI, 1.02-1.07) but not for functional outcome. This study supported the provision of rehabilitation services to older patients with different cognitive ability, as even the severely demented (Chinese Mini-Mental State Examination [C-MMSE] <10) could demonstrate functional and motor gain.

Geriatric day hospital setting

In Hong Kong, the first geriatric day hospital (GDH) was opened in 1975.²⁰ At present, there are 14 GDHs serving different parts of Hong Kong. Although a GDH can play a number of roles in the provision of geriatric services, traditionally its most important task was to rehabilitate older patients.²¹ Whether a GDH is suitable for patients of poor cognitive function is an important question to answer. They have to be fairly cooperative and at least moderately motivated before they can benefit from the rehabilitation training in a GDH. To address this question, a local study was performed to examine the effect of cognition on gain in functional and motor performance in 547 older patients undergoing such rehabilitation.²² It showed that there was strong association between C-MMSE on admission and FIM at discharge. Cognitive function was also an independent predictor for satisfactory discharge FIMs (discharge FIM ≥ 90 ; OR=1.08; 95% CI, 1.0-1.15). However, cognitive function was not associated with FIM efficacy and efficiency, suggesting that selected patients with impaired cognitive function could still benefit from GDH rehabilitation. This study supported the provision of GDH services to selected older patients with differing cognitive function, as even

TABLE. Summary of independent predictors for satisfactory rehabilitation outcomes*

Predictor	Rehabilitation outcome
Age	Not a predictor for satisfactory discharge FIM (stroke patients)
Female gender	Negative predictor for satisfactory discharge EMS Positive predictor for satisfactory discharge BI
Cognitive function (MMSE)	
In-patient	Positive predictor for satisfactory discharge EMS Not a predictor for satisfactory discharge BI
GDH	Positive predictor for satisfactory discharge FIM Not a predictor for drop of FIM 6 months after discharge from GDH
Admission albumin levels	Not a predictor for satisfactory discharge EMS Not a predictor for satisfactory discharge BI

* FIM denotes Functional Independence Measure, EMS Elderly Mobility Scale, BI Barthel Index (100), MMSE Mini-Mental State Examination, and GDH geriatric day hospital

the severely demented could demonstrate significant improvements in FIM, with efficacy and efficiency being comparable to those with higher cognitive function. Another study looking at FIM scores 6 months after discharge from a GDH also showed that cognitive function was not an independent predictor for drop of FIM after GDH training.²³

Albumin levels and rehabilitation

Serum albumin level is traditionally regarded as a marker of nutritional status.²⁴ It is also an important negative acute-phase protein affected by subclinical inflammation.²⁵ Low serum albumin relates to increase in cardiovascular mortality, cancer mortality, and all-cause mortality.²⁶ The relationship between serum albumin level and rehabilitation outcomes of older persons remains controversial. Several studies have shown a relation between low serum albumin level and poor functional outcomes in the older persons,²⁷ and is reportedly associated with poorer activity of daily living in community-dwelling elderly.²⁸ In older people, low serum albumin level is also associated with muscle breakdown and weaker muscle strength and future decline in muscle strength.²⁹ To date, most such studies were performed on serum albumin and rehabilitation outcomes in patients with femoral fractures,³⁰ and confirmed that low levels were associated with poorer outcomes. According to some studies, however, after controlling for possible confounders, albumin was not a significant predictor of rehabilitation outcome in hip fracture patients.³¹ Recently a study was performed in Hong Kong to investigate the relationship between admission serum albumin level and rehabilitation outcome in a large group of older Chinese who were recovering from common medical illnesses.³² The absolute gains of EMS and BI scores were the same among patients with different albumin levels, but the EMS and BI efficiency were higher in the high-albumin groups. Multivariate analysis showed that the serum albumin

level on admission was not an independent predictor of satisfactory motor and functional outcome. The authors therefore concluded that irrespective of their admission albumin levels, older patients could be benefited in a rehabilitation programme after suffering from medical illnesses. There was also the potential to speed up rehabilitation efficiency by improving the nutritional state of these patients.

Factor affecting institutionalisation after recovering from acute medical illnesses

One of the important outcomes after rehabilitation is the rate of institutionalisation, which to a certain extent, reflects the success of any rehabilitation programme. Numerous studies have evaluated the risk factors for nursing home placement, including those focused on community-dwelling elderly, patients with stroke, hip fracture, and dementia.^{33,34} The attitudes of older people in Hong Kong towards residential care homes have also been reported.³⁵ Recently, a Hong Kong study looked at the change of accommodation upon hospital discharge from home to nursing homes after convalescence and rehabilitation in a geriatric ward.³⁶ In all, 535 older patients living at home prior to admission were studied. Among them, 116 (21.7%) moved into nursing homes upon discharge. When the latter were compared to those discharged back to their homes, they were significantly older and more commonly single, divorced, or widowed individuals. Moreover, they had longer stays in the ward, more pressure sores, more urinary incontinence, and more were discharged with urinary catheters. They were more frequently admitted due to falls and dementia as the chief problems. They also had significantly poorer functional, motor, and cognitive ability on admission and on discharge. Multivariate analysis showed that being single/divorced/widowed (OR=2.74; 95% CI, 1.36-5.53), having urinary incontinence on discharge (OR=5.13; 95% CI, 2.66-10.6), and an admission due to falls (OR=2.4; 95% CI, 1.03-5.57) were risk factors for institutionalisation. Higher admission EMS (OR=0.91; 95% CI, 0.84-0.97), admission C-MMSE (OR=0.93; 95% CI, 0.87-0.98), and discharge albumin levels (OR=0.93; 95% CI, 0.88-0.99) were independent protective factors against institutionalisation. To reduce the rate of institutionalisation of older patients, the authors recommended the development of intervention strategies during the course of in-patient rehabilitation, such as mobility training, management of continence problems, and improvement in nutritional status.

Conclusion

A summary of the important factors in relation to satisfactory rehabilitation outcomes is shown in the Table. Knowledge of the factors affecting

rehabilitation can foster better motor and functional outcomes in older patients. We should not exclude older patients from rehabilitation programmes due to advanced age, poor cognitive function, and low albumin levels, as they can achieve similar gains in motor and functional outcomes. A nutritional programme to improve the serum albumin level in older patients could potentially speed up

rehabilitation progress, rendering it more efficient. Gender-specific rehabilitation seems to be needed to improve functional outcome in men and motor outcome in women. Moreover, knowing the factors influencing residential care home placement provides a golden opportunity to decrease the reliance of older people on institutionalisation after rehabilitation.

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