

Original Article



Assessment of Activities of Daily Living in Post-cardiac Care Unit Using Barthel and Katz Indexes: A Cross-sectional Study

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Abstract

Introduction: Activities of daily living (ADL) refer to the ability to perform the essential self-care activities that are necessary to have a life without dependency. Development of chronic diseases such as heart disease, as age progresses, can affect ADL. Facilitating the return of patients to the ADL and determining the level of care is one of the responsibilities of nurses. Therefore, using Barthel and Katz indexes, this study aimed to assess ADL dependency after discharge from cardiac care unit (CCU).

Methods: In this descriptive cross-sectional study, 180 patients were selected by the available sampling method. Data were analyzed before and after admission to the CCU using SPSS software version 13.

Results: The mean score of the Barthel and Katz indexes, before admission to the CCU, was 92.96 and 5.37, respectively, which changed to 82.85 and 4.57 post-cardiac care unit (P-CCU). Accordingly, ADL dependency increased after discharge from CCU.

Conclusion: After discharge from the CCU (in P-CCU), patients do not return to the same level of activities before hospitalization, and the functional status and ability of patients to perform daily activities decrease.

Introduction

Cardiovascular diseases (CVDs) are on the top of the list of debilitating diseases affecting a large population of aging people.¹ CVDs are one of the most common chronic diseases known as the major cause of death throughout the world.² In Iran, cardiac diseases are progressing in the process of changing the population pyramid toward aging, so that 3500 per 100 000 will be added to the elderly population.³

Given the prevalence of cardiac disease and its negative effects on quality of life (QOL), attention to proper care and promotion of health status to improve QOL in these patients is important.⁴ Most patients in a cardiac care unit (CCU) have a high age average and, with the increase of age, the incidence of cardiac disease and failure increases.⁵ According to the European Union report in 2014, the dependence on assistance in doing activities of daily living (ADL) would range from 30% to 100% in 2050; therefore, attention to physical activity plays an important role in clinical outcomes and ultimately affects the QOL of the elderly individuals.⁶ Facilitating the return of patients to maximum capacity in mobility and performing ADL in a way that would increase the QOL of patients and to determine the level of care of patients according to functional status, are among nursing measures.⁷

ADL, or basic self-care activities, include personal care,

mobility, and eating.⁸ The purpose of personal activities is to take care of oneself and to be independent in performing ADL.⁹ These activities include three levels as follows: 1- Basic activities of daily living (BADL), such as bathing, dressing, going to toilet, ambulation, bowel and bladder control; 2- Instrumental activities of daily living (IADL), or organized level, such as using the phone, public transportation and driving, preparing meals, washing clothes, shopping, doing housework; 3- Advanced activities of daily living (AADL), including going to work, leisure, and traveling, requiring a high level of cognitive function and having social roles.¹⁰

ADL are a proper identifier for showing functional dependence.¹¹ Therefore, assessing the functional status with the nurse during the hospitalization period is important for the use of measures to prevent a considerable reduction of functional status.¹² Two indexes of Barthel and Katz are used to assess the ability to perform ADL.¹³

To predict the progress of the functional status of patients during hospitalization, implement interventions to improve recovery and sense of independence, and reduce hospitalization time and stay in the intensive care unit (ICU), basic functional status is important.

In this study, because of the increase in cardiac disease due to growth in aging population, the growth of the population pyramid towards aging, as well as the increasing

importance of the problem, the patients admitted to the post-cardiac care unit (P-CCU) were examined in terms of ADL dependence. To do so, the Barthel and Katz indexes were used and the functional status of the patients was compared before admission to the CCU and after discharge from CCU.

As far as the researchers investigated, no study has evaluated the ADL dependence in P-CCU so far. In addition, due to the importance of the issue in nursing to improve assessment and reduce the length of hospitalization and treatment costs, the current study was carried out.

Materials and Methods

Data form, including age, sex, cause of hospitalization in the CCU, body mass index (BMI), and duration of hospitalization in the CCU. In addition, Barthel and Katz indexes were used to measure the functional status and ADL.

The ADL status were evaluated the population of this descriptive cross-sectional study included all patients admitted to the P-CCU of the Imam Hossein hospital, Shohadaye Tajrish hospital, Taleghani hospital, and Loghman Hakim hospital, Tehran, Iran, from January to April 2019. After data collection and comparing the status of ADL in patients before and after hospitalization, the data were analyzed. The required sample size for this study was 180 patients with 95% confidence interval, 0.8 test power, and assuming that the correlation coefficient is at least 0.3 between of Barthel and Katz indexes of ADL.¹³

The samples were included in the study using the available sampling method. The inclusion criteria for the present study entailed being admitted to the P-CCU ward regardless of age or gender, having a satisfactory ability for participating in interviews, and not having musculoskeletal or mental disorders.¹³ The study exclusion criteria was the lack of a tendency to continue cooperation in the research.

The data collection tool included the demographic using the two indexes of Barthel and Katz at the time of hospitalization in P-CCU. The interview method was selected because it was the easiest and fastest method available; in addition, all patients were interviewed by the same researcher.¹³ Evaluation of patients was done by interviewing and completing the indexes by asking patients about the functional status in two state, their current condition and their status before being to the CCU.

In the present study, the content validity of the Barthel index was assessed through distributing the questionnaire to 10 faculty members of the Faculty of Nursing and Midwifery, Shahid Beheshti University of Medical Sciences (content validity ratio: 0.98, content validity index: 0.93). Moreover, Barthel index reliability was evaluated using Cronbach's alpha (0.94).

The Barthel index contains 10 ADL items and each item

score is based on the level of assistance needed to perform the activity and the lowest score shows the highest dependency. Its scores range from 0 to 100, which include bathing and personal hygiene (0 or 5), eating, dressing, holding urine and stool, using the toilet and climbing the stairs (0, 5, or 10), and moving from the bed to the chair and back (0, 5, 10, and 15). The zero score shows the highest dependence in ADL and the score 100 shows absolute independence.¹⁰ ADL measured by Barthel-Index provides useful, easily accessible and independent information.⁷

Barthel index is the qualitative standard tool for evaluating, treating, and detecting changes in the functional status of elderly patients and those with chronic conditions admitted to hospitals.¹⁴ Katz index includes 6 daily activities, each with score 1 and, in the event of a disability zero, with a total score of 6 that represents complete independence.¹⁵ In this study, the index with a score less than or equal to 2 had the highest dependency, a score between 3 and 5 showed relative dependency, and the score 6 indicated independence. The score zero indicated total dependency and score 6 showed complete independence.¹⁴

Due to the repeated validity and reliability of the Katz index, in this study validity and reliability have not been performed. Data were analyzed using SPSS software version 13. Moreover, the answers to the questions of both indexes were collected at two stages (before admission to the CCU and the current situation in P-CCU) through interviews with patients. To estimate the return of patients to the level of activity before admission, the data of each index were evaluated. Then, the two indexes of Barthel and Katz were compared. Using the non-parametric Wilcoxon test, the Barthel and the Katz indexes were compared before and after hospitalization in three levels of disability, relative dependency, and independence in addition, Spearman's coefficient was used to determine the correlation of each variable with dependence level.

Results

In this study, 180 patients were selected by available sampling method in a period of 3 months. About 50% of patients admitted to P-CCU were in the age range of 60-80 years. The mean (SD) of admission days in the CCU was 2.73 (3.31) and the average of the total admission days in the hospital was 6.92 (5.5) days (Table 1),

Using the Barthel index, the ADL status was assessed before and after admission in three levels of independent, relative dependency, and dependent (Table 2). The results of non-parametric Wilcoxon test indicated that the highest degree of dependency was less than 55, which ranged from 5.6% to 13.3%, and 7.6% of all patients had increased dependence after admission to CCU. The score range of 55 to 90 indicated a relative dependency with a 13.4% increase, and a score above 90 represented the lowest dependence. scores above 90 that represented

the highest independent condition, decreased from 81.1% to 60% showing a 21.1% elevation in the number of dependent patients after discharge from the CCU ($P < 0.001$) (Table 2).

Using the Katz index, the ADL status was assessed before and after admission in three levels of independent, relative dependency, and dependent (Table 3). According to the results of Wilcoxon test, the score of $2 \geq$ showed the highest dependence, which increased by 6.7%; a score between 2 and 5 indicated relative dependency, that had increased by 17.7% compared to pre-admission; and a score of 6 indicated independences, which had decreased from 82.8% to 59.4%. In other words, 23.4% of patients who were independent before being admitted to the CCU, had become dependent. The coefficient between the two indexes before admission was 91%, and the agreement reached 93% in P-CCU.

Discussion

Using Barthel and Katz indexes, this study aimed to assess ADL dependency in P-CCU. Our results showed that the disability rate increased from 5.6% to 13.3% using the Barthel index, and in the Katz index, it increased from

10% to 16.7%. Overall, the results indicated that disability increased among patients after admission to the CCU, and at the same time, scores of activity decreased. The mean score of Barthel index before admission and in the P-CCU was 92.96 and 82.85, respectively. Meanwhile, the mean score of Katz index before admission and in the P-CCU was 5.37 and 4.57, respectively.

The dependence rate by Barthel and Katz indexes was 40.0 % and 41.6%, respectively, indicating a higher dependence of Katz index. Similarly, the Kappa coefficient was used to examine the agreement between the two tools, which was 91% before admission and 93% in the P-CCU; this indicated the highest agreement in both cases.

In a study, through using Barthel and Katz indexes, the results showed that disability increased after discharge from the CCU; however, the Barthel index was better because of the higher number of questions and ratings.¹³ These results were consistent with the present study.

In another study carried out on patients over 60 years of age, the dependence rate in the Barthel index was 28.45% and in the Katz index was 8.25%; in addition, the agreement between the two indices by the Kappa coefficient was 0.57, which showed an average agreement,¹⁶ these results were unlike with the present study.

In a study on the elderly people, 58.1% were completely independent, 18% had a Barthel score of 85-90 and somewhat needed help in doing their daily routine, 19.8% needed help, and 3.2% had the highest dependency.¹⁷ The result of the study was consistent with the present study.

In Watanabe et al study, comparing the two cases of pre-admission with post-admission to the cardiac intensive care unit, meaning that the degree of dependency had increased,¹⁸ which was consistent with the present study.

In the present study, using Spearman's coefficient, an inverse significant relationship was shown between age and the scores of the two indexes. In other words, with increasing age, the scores of the two indicators decreased and the dependency increased, which is in line with the study by Arik et al.¹⁰

In a study on the patients aged ≥ 65 years with diagnosed dementia, ADL were assessing with Barthel Index. Decrease score of Barthel Index is independently associated with mortality among older patients with dementia admitted to hospital. But in the present study, the Barthel and Katz indexes was used to assess disability.¹⁹

One of the limitations of the current study was the variable duration of hospitalization of patients in CCU, which could affect study findings in P-CCU.

Conclusion

in P-CCU, patients do not return to the same level of activities before hospitalization, and the functional status and ability of patients to perform daily activities decrease. Using the findings of this study, nurses can use the studied indicators to determine the degree of dependence, then determine the level of care and identify

Table 1. Demographic characteristics of the participants

Demographic characteristics	Mean (SD)
Gender ^a	
Female	70 (38.9)
Male	110 (61.1)
Age (year)	63.04 (12.67)
Length of CCU stay (day)	3.31 (2.73)
Length of hospitalization (day)	6.92 (5.06)
Body mass index	27.4 1(3.7)

^a Number (percent) was reported.

Table 2. Score of Barthel index in pre and post-CCU stages at three levels

Barthel index	No. (%)		P value
	Pre-CCU n = 180	Post-CCU n = 180	
Indicated disability (<55)	10 (5.6)	24 (13.3)	<0.001 ^a
Indicated relative dependency (55-90)	24 (13.3)	48 (26.7)	
Indicated independent (>90)	146 (81.1)	108 (60)	
Total	180 (100)	180 (100)	

^a Wilcoxon test was used; ^{*} Statistically significant.

Table 3. Score of Katz index in pre and post-CCU stages at three levels

Katz index	N (%)		P value
	Pre-CCU n = 180	Post-CCU n = 180	
Indicated disabilities (≤ 2)	18 (10)	30 (16.7)	<0.001 ^a
Indicated relative dependency (3-6)	13 (7.2)	43 (24.9)	
Indicated independent (6)	149 (82.8)	107 (59.4)	
Total	180 (100)	180 (100)	

^a Wilcoxon test was used; ^{*} Statistically significant.

Research Highlights

What is the current knowledge?

Activities of daily living can be used to assess health and reflects the ability of a person to perform the necessary social and physical activities for self-care and routine daily activities. Assessing functional dependence by the nurses is important to improve the QOL in patients admitted to the P-CCU. Therefore, it is important to assess ADL and examine rehabilitation programs.

What is new here?

Assessment of activities of daily living after discharge from the CCU indicate the decreases of patients' ability to do the daily activities, therefore need for care increases.

the group at risk and plan to implement rehabilitation measures. Considering that the sense of independence in performing daily activities increases self-confidence and creates a sense of well-being in patients, attention to this dimension plays an important role in health.

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Authors' Contributions

MY, FKH, HBD, MN: Contributed to the design of the article; FKH, MY: Has written the first draft of this article; HBD, MN: Advice and assistance in writing an article; MY, FKH: review & editing and all authors have read and agreed to the published version of the manuscript.

Ethical Issues

The research was approved by the research ethics committee of Shahid Beheshti University of Medical Sciences (IR.SBMU.PHARMACY.REC.1397.222) and informed consent was obtained from study participants.

Conflict of Interest

The authors declare no conflict of interest in this study.

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