Scientific Research Publishing

World Journal of Cardiovascular Diseases, 2023, 13, 854-869
https://www.scirp.org/journal/wjcd
ISSN Online: 2164-5337
ISSN Print: 2164-5329

Cardiac Rehabilitation in the Elderly

Aw Fatou[1,2*], Wiam Akif[1], Mame Madjiguene Ka[3], Aimee Mbaye Sy[4], Waly Niang Mboup[3], Aliou Aalassane Ngaide[4,5], Ccherif Mboup[3], Simon Antoine Sarr[1,2], Josep Salvadou Mingou[1,2], Marguerite Tening Diouf[4], Khadim Rassoul Diop[1], Momar Dioum[2,6], Malick Bodian[1,2], Mohamed Leye[7], Alain Désiré Affangla[7], Mouhammadou Bamba Ndiaye[1,2], Alassane Mbaye[2,5], Serigne Mor Beye[8], Adama Kane[8], Maboury Diao[1,2], Abdoul Kane[2,4]

[1]Department of Cardiology, University Hospital Center Aristide Le Dantec, Dakar, Senegal
[2]Medical Department, Cheikh Anta Diop University, Dakar, Senegal
[3]Hopital Principal, Dakar, Senegal
[4]Hopital Dalal Jamm, Dakar, Senegal
[5]Hopital Général Idrissa Pouye, Dakar, Senegal
[6]University Hospital Center Fann, Dakar, Senegal
[7]UFR de Thies, Dakar, Senegal
[8]UFR de Saint Louis, Dakar, Senegal
Email: *fatoukineaw@yahoo.fr

How to cite this paper: Fatou, A., Akif, W., Ka, M.M., Sy, A.M., Mboup, W.N., Ngaide, A.A., Mboup, C., Sarr, S.A., Mingou, J.S., Diouf, M.T., Diop, K.R., Dioum, M., Bodian, M., Leye, M., Affangla, A.D., Ndiaye, M.B., Mbaye, A., Beye, S.M., Kane, A., Diao, M. and Kane, A. (2023) Cardiac Rehabilitation in the Elderly. *World Journal of Cardiovascular Diseases*, **13**, 854-869.
https://doi.org/10.4236/wjcd.2023.1312074

Received: November 10, 2023
Accepted: December 24, 2023
Published: December 27, 2023

Abstract

Introduction: The purpose of cardiac rehabilitation is to improve the effects of aging and maintain a good quality of life for older individuals. This study aims to assess how cardiac rehabilitation affects the autonomy and quality of life of older adults. **Patients and Method:** This was a longitudinal, descriptive and comparative before-and-after cardiovascular rehabilitation study conducted over a two-year period from January 2019 to December 2021. This study was conducted at four cardiac rehabilitation units in Dakar: the Aristide Le Dantec Hospital (HALD), National Dalal Jamm Hospital, and the General Idrissa Pouye Hospital (HOGIP). We compared the degree of autonomy, dependence and quality of life of subjects aged over 65 before and after the cardiac rehabilitation program using the Katz index, the Lowton index and the SF12 quality-of-life questionnaire. **Results:** Over a two-year period, a total of 345 patients had benefited from a complete cardiovascular rehabilitation program in the four cardiovascular rehabilitation units in Dakar, and 86 patients, or 24.92% of the population, were at least 65 years old. The patients were predominantly male (sex ratio M/F = 4.73). The mean age was 70.35 ± 4.55 years for men and 69.27 ± 4.59 years for women. The main pathology motivating cardiac rehabilitation was ischemic heart disease, which was found in 73 patients (84.88%). Initial assessment revealed exertional dyspnea in 35 patients (40.69%), followed by residual exertional angina in 21 patients (4.41%). Mean functional capacity increased from 5.81 ± 2.38 Mets

in pre-cardiac rehabilitation to 8.68 ± 2.28 Mets in post-cardiac rehabilitation ($p < 0.001$). The mean distance covered in the 6-minute walk test increased from 330.42 ± 170.50 m in pre-cardiac rehabilitation to 524 ± 98.54 m in post-cardiac rehabilitation ($p = 0.119$). The Lowton dependency index in pre-cardiac rehabilitation was 44.18% versus 36.04% in post-cardiac rehabilitation ($p = 0.0156$). The mental quality of life score was 42.15 ± 10.27 in pre-cardiac rehabilitation versus 52.94 ± 10.86 in post-cardiac rehabilitation ($p < 0.001$). **Conclusion:** This study demonstrates the effectiveness of the cardiac rehabilitation program in elderly subjects. In fact, this well-managed, well-structured and well-supervised program enables this population to regain their autonomy, improve their quality of life and functional capacities, and consequently their prognosis.

Keywords

Cardiac Rehabilitation, Elderly, Dakar

1. Introduction

Cardiovascular disease (CVD) is becoming increasingly prevalent in sub-Saharan Africa due to an aging population and the emergence of cardiovascular risk factors [1]. With the introduction of cardiovascular rehabilitation (CR) in our cardiology departments in Senegal, more and more elderly patients are being referred for cardiac rehabilitation. According to the WHO, people aged 65 and over are considered elderly. Aging is a normal phenomenon, but it varies from person to person and organs do not age at the same rate in the same person [2]. As their functional reserves decline, the onset of an acute illness brings them closer to the point of decompensation. Elderly patients are often multi-pathological, not very autonomous or even dependent. Chronic pathologies increase with age, leading to over-medicalisation. This over-medicalisation is due to the sometimes large number of drugs prescribed in inappropriate doses and to the dysfunction of certain organs. Advanced age does not exempt patients from the need to correct their risk factors and receive therapeutic education. For patients who have difficulty retaining or understanding instructions, family support is invaluable whenever possible. CR has been shown to have a positive effect on the correction of cardiovascular risk factors, on the cardiovascular, respiratory and muscular systems, on exercise capacity and self-management, on quality of life and on patients' vital prognosis [3]. The incidence of myocardial infarction increases with age and the prognosis is often worse. Exercise involves multiple systems: the pulmonary, cardiovascular and muscular systems. By reducing the capacity of all the systems involved, ageing limits the ability to exercise [2]. Cardiac rehabilitation in the elderly must take into account all the parameters involved in exercise. The rehabilitation programme for able-bodied elderly patients is little different from that for younger patients. For those who are dependent, the main aim of the rehabilitation programme is to restore their autonomy, reintegrate them into

society and enable them to learn to live with their pathology [2]. However, when a cardiac event occurs in the elderly, the disease is generally more severe, with more complications, and therapeutic interventions are more delicate to manage. Cardiovascular rehabilitation must also adapt to these specific conditions and, as in the case of younger patients, allow an increase in physical capacity and, above all, an improvement in psychological state and social autonomy. In fact, when it was first introduced into the therapeutic arsenal, rehabilitation was initially reserved for the younger population. With greater knowledge and mastery of the technique, the age range has widened to include the elderly, who present some specific aspects with regard to the indication and the rehabilitation technique itself [4].

The lack of previous studies and the novelty of the discipline in Senegal are the reasons why we carried out this work.

The general objective of this study was to evaluate the results of cardiac rehabilitation on the autonomy and quality of life of elderly patients admitted to the different CR centres in Dakar.

2. Patients and Methods

This study was conducted at four cardiac rehabilitation units in Dakar: the Aristide Le Dantec Hospital (HALD), National Dalal Jamm Hospital, and the General Idrissa Pouye Hospital (HOGIP). These three units were established in 2021 and have a combined capacity of 40 patients per day. The Principal Hospital of Dakar (HPD), which opened in January 2019, has a capacity of 11 patients per day.

Ours cardiac rehabilitation are equipped with training rooms with bicycles, treadmills coupled with heart rate monitors, emergency kits and defibrillators. The team consists of cardiologists with diplomas in cardiovascular rehabilitation, nurses, physiotherapists and adapted physical fitness instructors.

This is a longitudinal, descriptive and comparative pre and post CR study conducted over a period of two (2) years.

We included in this study all patients over 65 years of age who were enrolled and followed up in the cardiac rehabilitation programme in the 4 units during the period from January 2019 to December 2021, and who completed at least 10 exercise retraining sessions.

We excluded from this study non-consenting patients and patients who started their cardiac rehabilitation programme but did not complete the required 10 sessions.

All patients who met the inclusion criteria were fully and consecutively recruited.

After an initial educational assessment, patients were enrolled in a cardiac rehabilitation programme consisting of three sessions per week for six to seven weeks. Exercise was performed either on a bicycle or on a treadmill, with endurance sessions always preceded by 3 - 5 minutes of warm-up and followed by 3 - 5 minutes of recovery.

All patients underwent a complete initial assessment, including a clinical examination and standard laboratory tests.

In addition to an ECG, a transthoracic echocardiogram, a stress test and a 6-minute walk test, a systolic pressure index (SPI) measurement, a quality of life assessment and a level of autonomy were performed.

In parallel with the training sessions, the patients take part in an educational programme (group sessions) on cardiovascular pathology and its treatment, dietary management with the aim of gaining acceptance for hygienic-dietary measures aimed at correcting cardiovascular risk factors, physical activity, help with smoking cessation and assistance with possible socio-professional reintegration.

Patients were re-evaluated three to six months following cardiac rehabilitation.

The exercise test was re-evaluated, either on a bicycle or a treadmill, to determine maximum HR (heart rate), training level and training HR within a range.

A 6-minute walk test was performed in patients with bicycle or treadmill limitations.

The Girerd questionnaire was used to assess compliance before and after rehabilitation. This questionnaire was developed in 2001 to assess compliance with hypertension treatment in specialised settings [5] and in 2004.

To assess autonomy before and after rehabilitation, we used the Katz index, which is a reference in the international literature [6]. Its aim is to objectively assess the level of autonomy in basic activities of daily living. It consists of six items with a binary score of 1 or 0, depending on whether the patient is independent or not in the corresponding activity. An older person with a score of less than 3 is considered to be highly dependent.

In addition to the activities of daily living described above, it was also necessary to consider other, more complex, daily activities involving cognitive functions, known as instrumental activities. In this context, the Lawton test is the reference in the international literature [7]. A maximum of eight instrumental activities are assessed (8 for women and 5 for men) and scored 1 or 0 depending on whether they are performed independently or not.

To assess quality of life before and after rehabilitation, we used the SF12 quality of life questionnaire, administered or self-administered by the patient. This is a generic questionnaire based on the MOS SF-36 developed by Ware and Sherbourne in 1992, which in turn was developed from the MOS and consists of 149 questions [8].

Data were collected using a pre-designed form. They were entered using Sphinx software version 5.1.0.2. Data analysis was carried out using SPSS version 18.

In the descriptive study, frequencies and proportions were calculated for qualitative variables and means and standard deviations for quantitative variables.

The analytical study was carried out using comparison tables. To compare

frequencies, we used the Wilxon test or the McNemar test for linked data, depending on the conditions of applicability, and to compare means, we used the Student's t-test for linked data, with a significance threshold of $p < 0.05$.

There was no risk to participants in this study. We obtained approval from the heads of the four hospital departments and then obtained informed consent from our patients. Data were anonymised.

3. Results

During our study period, 345 patients had received a complete CR programme in the four CR centres in Dakar, and 86 patients, or 24.92% of the population, were aged 65 years or older.

Our study was conducted on these 86 patients. The mean age was 70.35 ± 4.55 years for men and 69.27 ± 4.59 years for women, with extremes ranging from 65 to 84 years. The most common age groups were 65 to 70 years, followed by 70 to 80 years, with a clear male predominance. The male/female sex ratio was 4.73. The cardiovascular risk factors found in our population were male sex, followed by sedentary lifestyle and hypertension with frequencies of 82.55%, 74.41% and 65.11%, respectively.

Eighty-two patients (96.3%) had at least 2 cardiovascular risk factors. The mean cumulative cardiovascular risk factor was 3.28 ± 0.97.

In our sample, ischaemic heart disease was found in 73 patients (84.88%). Thirty-nine (39) patients (45.34%) had undergone angioplasty with active stent implantation and eight patients (9.30%) had undergone coronary artery bypass grafting. Other pathologies included congestive heart failure and lower limb obliterative arteriopathy.

Pre-rehabilitation comorbidities were dominated by joint pain, which was present in 17 patients (19.76%). Other comorbidities included asthma, glaucoma and cataract.

Initial evaluation revealed dyspnoea (NYHA stage II/III) in 35 patients (40.69%), followed by residual exertional angina in 21 patients (24.41%); the remainder of our cohort was asymptomatic.

The most common complication was arrhythmia, which occurred in 11 patients (12.79%). (Table 1)

During rehabilitation, the mean of exercise training sessions undertaken across the four centres was 19.02. Thirty-eight point seven percent (45%) of patients had accomplished over 20 exercise-training sessions.

Comparison of patient parameters before and after cardiac rehabilitation

Mean weight increased from 74.72 ± 11 kg to 74.41 ± 11.08 kg, waist circumference from 93.92 ± 7.74 cm to 92.46 ± 7.58 cm and BMI from 25.98 ± 2.56 to 24.99 ± 2.04 kg/m^2. LDL cholesterol levels fell from an average of 1.10 ± 0.47 g/L to 0.83 ± 0.42 g/L. HDL cholesterol levels fell from a mean of 0.47 ± 0.13 g/L to 0.55 ± 0.13 g/L as shown in Table 2.

Functional capacity increased from a mean of 5.81 ± 2.38 Mets pre-CR to 8.68

Table 1. Clinical characteristics of study population.

	Numbers	Percentage
Mean Age (years)		
(men)	70.35 ± 4.55	
(Women)	69.27 ± 4.59	
Sedentary	64	74.41%
HTA	56	65.11%
Diabetes	32	37.20%
Dyslipidemia	30	34.88%
Active smoking	4	4.65%
Obesity	5	5.81%
Male gender	71	82.55%
Coronary heredity	03	3.48%
No symptoms	30	34.88%
Exercise-induced angina	21	24.41%
Dyspnea (NYHA stage II-III)	35	40.69%
Indications for rehabilitation		
SCA ST+	24	27.90%
Troponin-positive non-ST+	10	11.62%
Unstable angina	10	11.62%
CSS	29	33.72%
Heart failure	7	8.13%
Post-cure aneurysm	1	1.16%
Post-valvular surgery	2	1.72%
Obliterative arteriosclerosis of the lower limbs.	3	2.58%
Rhythm disorders	10	11.6%

CCS: Chronic coronary syndrome; ACS ST+: Acute coronary syndrome ST+; AOMI: Obliterative arteriopathy of the lower limbs.

± 2.28 Mets post-CR ($p < 0.001$). as shown in Figure 1.

The 6-minute walk test was performed in 12 patients (13.95%) pre-CR and in 4 patients (4.65%) post-CR.

The mean values increased from 330.42 ± 170.50 in pre-CR to 524 ± 98.54 in post-CR ($p = 0.119$). Joint pain present in 17 patients before rehabilitation was present in 5 patients after rehabilitation ($p < 0.001$). Dyspnoea (NYHA stage II), present in 35 patients at baseline was present in 10 patients (11.62%) at final assessment. At the end, 88.37% of the patients in our group did not experience symptoms after completing CR.

Table 2. Distribution of patients according to clinical parameters before and after CR.

	Before RC Mean	After RC Mean	P
Weight in kg	74.72 ± 11.00	74.41 ± 11.08	0.288
BMI in (Kg/m^2)	25.98 ± 2.56	24.99 ± 2.04	0.997
Waist circumference (cm)	93.71 ± 7.74	92.46 ± 7.58	0.102
Heart rate (bpm)	87 ± 6.73	76 ± 6.44	0.076
Blood pressure (mmHg)	109 ± 10.74	106 ± 10.56	0.098
Cholesterol total (g/l)	1.77 ± 0.59	1.54 ± 0.48	0.140
HDL-C	0.47 ± 0.13	0.55 ± 0.13	0.041
LDL-C	1.10 ± 0.47	0.83 ± 0.42	0.093
Triglycéride	0.99 ± 0.62	0.95 ± 0.45	0.033

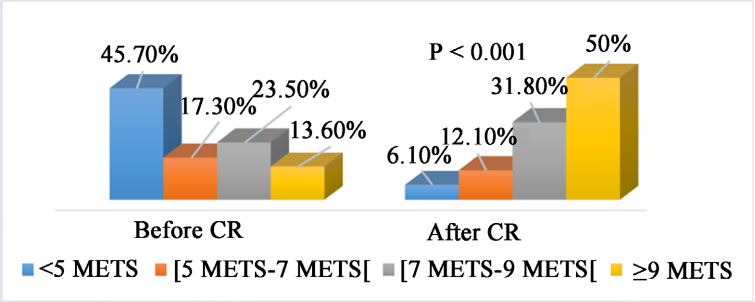

Figure 1. Distribution of patients according to functional capacity before and after re-training sessions (n = 86).

Re-hospitalisation after the CR programme was observed in 3 patients (3.48%). The reasons for this were acute pulmonary oedema, cardiac decompensation due one case of decompensation and due to Covid 19 infection.

The Girerd questionnaire was used to assess compliance. In our sample, we found good compliance with treatment at the final assessment. with a percentage of 96.80% compared to 53.6% at the initial assessment ($p < 0.001$).

Assessment of autonomy before and after CR

The Lowton and Katz indices were used to assess the autonomy of the elderly subjects before and after CR. According to the Katz index, the dependency rate decreased from 37.2% before CR to 20.9% after CR ($p < 0.001$).

According to the Lowton index, our dependency rate decreased from 44.18% pre-CR to 36.04% post-CR ($p = 0.0156$). **Figure 2(a)** and **Figure 2(b)** show the distribution of patients according to the Lowton and Katz indices before and after CR.

Before the CR programme, 10 patients (11.7%) "never" reported any discomfort in their social life as a result of their physical or emotional state of health, and 42 patients (48.8%) "never" reported any discomfort in their social life at the end of the CR programme.

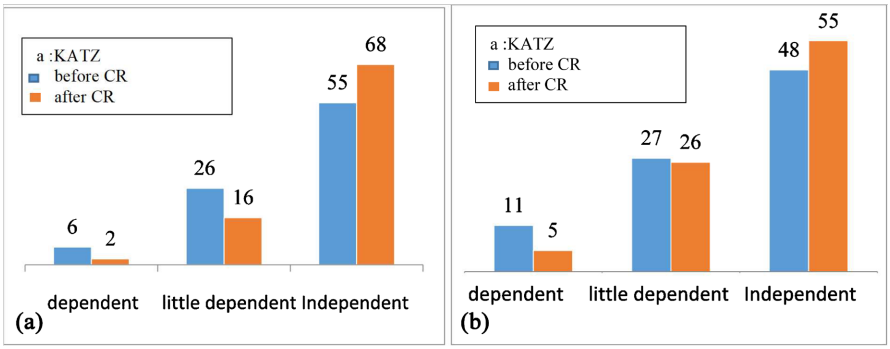

Figure 2. Distribution of patients according to Katz (a) and Lowton (b) index pre- and post-CR (n = 86).

Table 3. Summary table of physical and mental quality of life score.

	Before RC Mean	After RC Mean	P
Perceived health	32.27 ± 20.24	58.43 ± 12.49	<0.001
Physical activity	20.93 ± 12.93	38.52 ± 9.44	<0.001
Physical condition limitation	57.12 ± 19.60	72.38 ± 11.68	<0.001
Physical pain	56.10 ± 21.67	75.87 ± 22.51	<0.001
Physical quality of life score (PCS-12)	41.61 ± 10.69	61.30 ± 7.78	<0.001
Emotional state limitation	56.54 ± 19.24	77.33 ± 7.05	<0.001
Vitality	12.79 ± 20.91	13.95 ± 18.23	0.682
Psychological health	24.56 ± 16.32	33.28 ± 20.79	0.003
Life and relationships with others	74.71 ± 12.42	87.21 ± 12.57	<0.001
Mental quality of life score (MCS-12)	42.15 ± 10.27	52.94 ± 10.86	<0.001

The physical quality of life score (PCS-12) increased from a mean of 41.61 ± 10.69 before CR to 61.30 ± 7.78 after CR ($p < 0.001$). The mental quality of life score (MCS-12) increased from a mean of 42.15 ± 10.27 pre-CR to 52.94 ± 10.86 post-CR ($p < 0.001$). Table 3 summarises the assessment of physical and mental quality of life using the SF12 questionnaire.

4. Discussion

The main objective of our study was to evaluate the results of cardiac rehabilitation on the autonomy and quality of life of elderly patients admitted to the different RC centres in Dakar.

During the period of our study, 345 patients benefited from a complete cardiac rehabilitation programme and 86 patients, *i.e.* 24.92% of the population, were at least 65 years old.

Our findings indicate a significantly lower participation rate among elderly subjects in CR programmes compared to the 50% rate reported by Khadanga *et al.* [9]. In this study, this low rate could be explained by the difficulty of access to

transport to the RC centres in Dakar for this age group of patients and the lack of health insurance.

The mean age was 70.35 ± 4.55 years for men and 69.27 ± 4.59 years for women, ranging from 65 to 84 years. The most common age groups were 65 to 70 years, followed by 70 to 80 years, with a clear male predominance.

Kinic *et al.*, in a comparable Nancy-based study, reported an older population [10]. The truth is, the Senegalese population is comparatively younger and life expectancy is lower in contrast to Europe.

In our sample, we found a male predominance with 71 men compared to 15 women and a sex ratio of M/F = 4.73. The low representation of women in rehabilitation has been reported in many other studies, but in different proportions [11]. Pavy *et al.*, in their study of cardiac rehabilitation in coronary patients, found a male predominance of 93% compared with 7% [12]. Minvielle *et al.* reported a low proportion of women (19.1%) compared with 80.9% of men [13], and Samayoa *et al.* found that women were 36% less likely than men to participate in a CR programme [14]. This lower level of female participation in exercise could result from grandmothers displaying less interest and having fewer opportunities such as the inability to attend frequently due to familial commitments.

Functional capacity is a strong predictor of all-cause mortality and cardiovascular events. Adequate exercise has beneficial effects in both primary and secondary prevention. An increase in functional capacity of 1 metre (3.5 ml/mn/kg oxygen) was associated with a reduction in mortality of almost 15% [15]. In our series, functional capacity improved by 49.39% before and after re-training, with a mean increase from 5.81 ± 2.38 Mets pre-CR to 8.68 ± 2.28 Mets post-CR ($p < 0.001$). Our results are similar with studies that have shown a significant improvement in physical performance in elderly subjects after rehabilitation [16]. This exercise capacity, expressed in metabolic equivalents (Mets), increased by 34% in the first study and by 43% in the second.

In fact, the decline in exercise capacity associated with the ageing of the cardiovascular system is an inexorable fact from which no one can escape. However, the rate of decline is individual and depends on a number of risk factors and pathologies. A sedentary lifestyle (less than 30 minutes of continuous physical activity per week outside work) is certainly one of the main causes of cardiac dysfunction. This modern scourge affects a significant proportion of the population: 35% of the under-34s and 45% of the over-65s [17]. If we want to combat the harmful effects of ageing and practice effective and inexpensive prevention of cardiovascular disease, we need to promote regular physical activity [17] [18]. Heart and Health Clubs in cardiology clinics or other coronary heart disease club structures can provide effective support for long-term motivation.

In our study, the 6-minute walk test was performed in 12 patients (10.32%) pre-CR and in 4 patients (3.44%) post-CR. There was a clear improvement in the results of this test, with mean values increasing from 330.42 ± 170.50 m pre-CR to 524 ± 98.54 m post-CR ($p = 0.119$). Despite the low rate of performance of

this test in our population, our results are consistent with those of Peneroni *et al.* [19] who found a significant increase in maximal aerobic capacity during the 6-minute walk test with an increase in distance covered and a reduction in Borg symptom scores for dyspnoea after cardiac rehabilitation in elderly patients with chronic heart failure.

The assessment of independence in older people is usually based on several types of tools. In our study, we found a significant improvement ($p = 0.001$) in the degree of autonomy in our population before and after the CR programme, both in activities of daily living, as shown by the Katz index, and in those involving instrumental functions, as shown by the Lawton index.

Elderly patients are fragile and, as they age, they approach the threshold of dependence and loss of autonomy. This threshold can be reached in the event of an acute illness, particularly heart disease, or surgery.

We chose to assess quality of life using the SF12 questionnaire, administered or self-administered before and after the CR programme. In our study, the physical quality of life score (PCS-12) improved from a mean of 41.61 ± 10.69 before CR to a mean of 61.30 ± 7.78 after CR ($p < 0.001$). Our results were in agreement with those of Corone *et al.*. [20] who showed a significant reduction in anxiety from 9.3 ± 5.1 to 6.6 ± 4.2 ($p < 0.05$), depression from 6.5 ± 7.7 to 3.8 ± 6.3 ($p < 0.001$), fatigue from 6.3 ± 5.3 to 4.2 ± 4.3 ($p < 0.001$) and confusion from 5.9 ± 3.3 to 5.2 ± 2.9 ($p < 0.001$) after rehabilitation. In our study, the mental quality of life score (MCS-12) also improved significantly from a mean of 42.15 ± 10.27 before CR to a mean of 52.94 ± 10.86 after CR ($p < 0.001$). Our results are in agreement with those of Choo *et al.* [21], who found a significant improvement in MCS-12 in Asian patients, with the mean increasing from 49.95 ± 7.89 pre-CR to 52.48 ± 5.90 post-CR ($p < 0.001$). Elderly patients admitted for CR are aware of the benefits of this programme, both physically and psychologically.

There are some limits in this study, we did not find a specific scale in the literature to assess the autonomy of older people in CR, which explains our use of the Katz and Lawton scales and the collection of these results during a clinical interview and a telephone survey. This may open the debate on the interest of developing in the future a specific grid that is simpler, more sensitive to the African population and more suitable for use in CR to assess the autonomy of the elderly [22] [23]. Furthermore, in the absence of a control group, it is not possible to conclude that it is our cardiac rehabilitation programme that is the determining factor in the improvement of the patients compared with another treatment or compared with the time elapsed.

5. Conclusion

Our study has demonstrated the value of cardiac rehabilitation in older people. In fact, this programme, which is well managed, structured and supervised, allows this population to regain their autonomy, improve their quality of life and functional capacity, and thus their prognosis. However, the number of patients

enrolled in this programme remains limited due to a lack of information or knowledge among physicians about the benefits of cardiac rehabilitation, inadequate prescribing and a lack of resources.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

[1] World Health Organizations (2018) Noncommunicable Diseases (NCD) Country Profiles.

[2] Ghannem, M., Ghannem, L., Hamdi, K., *et al.* (2018) Réadaptation cardiaque du sujet âgé. *Annales de Cardiologie et d'Angéiologie*, **67**, 493-501. https://doi.org/10.1016/j.ancard.2018.09.019

[3] Iliou, M.C. (2020) Réadaptation cardiaque: Les preuves scientifiques récentes de ses bénéfices. *Archives des Maladies du Coeur et des Vaisseaux*, **2020**, 2-6. https://doi.org/10.1016/j.amcp.2020.04.001

[4] Burri, M. (1994) La personne âgée et la réadaptation cardiovasculaire. *Revue Medicale de la Suisse Romande*, **114**, 689-690.

[5] Girerd, X., Hanon, O., Anagnostopoulos, K., *et al.* (2001) Evaluation de l'observance du traitement antihypertenseur par un questionnaire: Mise au point et utilisation dans un service spécialisé. *Presse Médicale*, **30**, 1044-1048.

[6] Katz, S., Ford, A.B., Moskowitz, R.W., *et al.* (1963) Studies of Illness in the Aged. The Index of ADL: A Standardized Measure of Biological and Psychosocial Function. *JAMA*, **185**, 914-919. https://doi.org/10.1001/jama.1963.03060120024016

[7] Lawton, M.P. and Brody, E.M. (1969) Assessment of Older People: Self-Maintaining and Instrumental Activities of Daily Living. *Gerontologist*, **9**, 179-186. https://doi.org/10.1093/geront/9.3_Part_1.179

[8] Ware, J., Kosinski, M., Turner-Bowker, D., *et al.* (2002) How to Score SF-12 Items. SF-12 v2: How to Score Version 2 of the SF-12. Health Survey. 29-38.

[9] Khadanga, S., Savage, P.D. and Ades, P.A. (2019) Resistance Training for Older Adults in Cardiac Rehabilitation. *Clinics in Geriatric Medicine*, **35**, 459-468. https://doi.org/10.1016/j.cger.2019.07.005

[10] Kinic, B. (2004) La réadaptation cardiaque chez les sujets âgés: Etude rétrospective d'une série de 200 patients âgés de 75 à 91 ans. Thèse Med. Nancy, Universite Henri Poincaré, Nancy, N˚5, 152.

[11] Ekblom, Ö., Cider, Å., Hambraeus, K., *et al.* (2022) Participation in Exercise-Based Cardiac Rehabilitation Is Related to Reduced Total Mortality in both Men and Women: Results from the SWEDEHEART Registry. *European Journal of Preventive Cardiology*, **29**, 485-492. https://doi.org/10.1093/eurjpc/zwab083

[12] Pavy, B., Tisseau, A. and Caillon, M. (2011) Le patient coronarien six mois après la réadaptation cardiaque: Recherche sur l'évaluation de la réadaptation (étude RER). *Annales de Cardiologie et d'angeiologie*, **5**, 252-258. https://doi.org/10.1016/j.ancard.2011.08.004

[13] Minvielle, C., Corré, J. and Douard, H. (2017) Barriers to Prescription of Cardiac Rehabilitation after Acute Myocardial Infarction in France. *Archives of Cardiovascular Diseases Supplements*, **9**, 100.

https://doi.org/10.1016/S1878-6480(17)30298-7

[14] Samayoa, L., Grace, S.L., Gravely, S., *et al.* (2014) Sex Differences in Cardiac Rehabilitation Enrollment: A Meta-Analysis. *Canadian Journal of Cardiology*, **30**, 793-800. https://doi.org/10.1016/j.cjca.2013.11.007

[15] Lavie, C.J. and Milani, R.V. (2001) Benefits of Cardiac Rehabilitation and Exercise Training Programs in Elderly Coronary Patients. *The American Journal of Geriatric Cardiology*, **10**, 323-327. https://doi.org/10.1111/j.1076-7460.2001.00636.x

[16] Pavy, B., Iliou, M.C., Vergès, *et al.* (2011) Recommandations du Groupe Exercice Réadaptation Sport (GERS) de la Société Française De Cardiologie concernant la pratique de la réadaptation cardiovasculaire chez l'adulte.

[17] Bounhoure, J.P. (1999) Les effets du vieillissement sur le système cardio-vasculaire. Éditions Frison-Roche, Paris, 45.

[18] Ghannem, M. (2018) Paris manuel pratique de prévention et de réadaptation cardiovasculaire. Éditions Frison-Roche, Paris, 312-325.

[19] Paneroni, M., Scalvini, S., Corrà, U., *et al.* (2021) The Impact of Cardiac Rehabilitation on Activities of Daily Life in Elderly Patients with Heart Failure. *Frontiers in Physiology*, **12**, Article ID: 785501. https://doi.org/10.3389/fphys.2021.785501

[20] Corone, S., Dromard, N., Lacor, C., *et al.* (2017) Amélioration de l'état émotionnel après réadaptation cardiaque. Évaluation par le POMS: Profile of Mood States. *Annales de Cardiologie et d'Angéiologie*, **66**, 357. https://doi.org/10.1016/j.ancard.2017.09.025

[21] Choo, C.C., Chew, P.K.H., Lai, S.M., *et al.* (2018) Effect of Cardiac Rehabilitation on Quality of Life, Depression and Anxiety in Asian Patients. *International Journal of Environmental Research and Public Health*, **15**, Article No. 1095. https://doi.org/10.3390/ijerph15061095

[22] Oasi, C., Maman, S., Baghéri, H., *et al.* (2008) GABI, une évaluation simplifiée et informatisée de la perte d'autonomie en gériatrie: Une étude de validation. *La Presse Médicale*, **37**, 1195-1203. https://doi.org/10.1016/j.lpm.2007.12.013

[23] Rubenstein, L.Z., Schairer, C., Wieland, G.D., *et al.* (1984) Systematic Biases in Functional Status Assessment of Elderly Adults: Effects of Different Data Sources. *The Journals of Gerontology*, **39**, 686-691. https://doi.org/10.1093/geronj/39.6.686

Patient Name:_____ **Date:**_____
Patient ID #_____

Katz Index of Independence in Activities of Daily Living

Activities Points (1 or 0)	**Independence** (1 Point) **NO** supervision, direction or personal assistance.	**Dependence** (0 Points) **WITH** supervision, direction, personal assistance or total care.
BATHING Points: _____	**(1 POINT)** Bathes self completely or needs help in bathing only a single part of the body such as the back, genital area or disabled extremity.	**(0 POINTS)** Need help with bathing more than one part of the body, getting in or out of the tub or shower. Requires total bathing
DRESSING Points: _____	**(1 POINT)** Get clothes from closets and drawers and puts on clothes and outer garments complete with fasteners. May have help tying shoes.	**(0 POINTS)** Needs help with dressing self or needs to be completely dressed.
TOILETING Points: _____	**(1 POINT)** Goes to toilet, gets on and off, arranges clothes, cleans genital area without help.	**(0 POINTS)** Needs help transferring to the toilet, cleaning self or uses bedpan or commode.
TRANSFERRING Points: _____	**(1 POINT)** Moves in and out of bed or chair unassisted. Mechanical transfer aids are acceptable	**(0 POINTS)** Needs help in moving from bed to chair or requires a complete transfer.
CONTINENCE Points: _____	**(1 POINT)** Exercises complete self control over urination and defecation.	**(0 POINTS)** Is partially or totally incontinent of bowel or bladder
FEEDING Points: _____	**(1 POINT)** Gets food from plate into mouth without help. Preparation of food may be done by another person.	**(0 POINTS)** Needs partial or total help with feeding or requires parenteral feeding.
TOTAL POINTS: _____	**SCORING:** 6 = High (*patient independent*) 0 = Low (*patient very dependent*	

Source:
try this: Best Practices in Nursing Care to Older Adults, The Hartford Institute for Geriatric Nursing, New York University, College of Nursing, www.hartfordign.org.

try this:®
general assessment series
Best Practices in Nursing Care to Older Adults
From The Hartford Institute for Geriatric Nursing, New York University, College of Nursing

Issue Number 2, Revised 2007

Series Editor: Marie Boltz, PhD, GNP-BC
Series Co-Editor: Sherry A. Greenberg, MSN, GNP-BC
New York University College of Nursing

Katz Index of Independence in Activities of Daily Living (ADL)

By: Meredith Wallace, PhD, APRN, BC, Fairfield University School of Nursing, and Mary Shelkey, PhD, ARNP, Virginia Mason Medical Center

WHY: Normal aging changes and health problems frequently show themselves as declines in the functional status of older adults. Decline may place the older adult on a spiral of iatrogenesis leading to further health problems. One of the best ways to evaluate the health status of older adults is through functional assessment which provides objective data that may indicate future decline or improvement in health status, allowing the nurse to intervene appropriately.

BEST TOOL: The Katz Index of Independence in Activities of Daily Living, commonly referred to as the Katz ADL, is the most appropriate instrument to assess functional status as a measurement of the client's ability to perform activities of daily living independently. Clinicians typically use the tool to detect problems in performing activities of daily living and to plan care accordingly. The Index ranks adequacy of performance in the six functions of *bathing, dressing, toileting, transferring, continence, and feeding*. Clients are scored yes/no for independence in each of the six functions. A score of 6 indicates full function, 4 indicates moderate impairment, and 2 or less indicates severe functional impairment.

TARGET POPULATION: The instrument is most effectively used among older adults in a variety of care settings, when baseline measurements, taken when the client is well, are compared to periodic or subsequent measures.

VALIDITY AND RELIABILITY: In the thirty-five years since the instrument has been developed, it has been modified and simplified and different approaches to scoring have been used. However, it has consistently demonstrated its utility in evaluating functional status in the elderly population. Although no formal reliability and validity reports could be found in the literature, the tool is used extensively as a flag signaling functional capabilities of older adults in clinical and home environments.

STRENGTHS AND LIMITATIONS: The Katz ADL Index assesses basic activities of daily living. It does not assess more advanced activities of daily living. Katz developed another scale for instrumental activities of daily living such as heavy housework, shopping, managing finances and telephoning. Although the Katz ADL Index is sensitive to changes in declining health status, it is limited in its ability to measure small increments of change seen in the rehabilitation of older adults. A full comprehensive geriatric assessment should follow when appropriate. The Katz ADL Index is very useful in creating a common language about patient function for all practitioners involved in overall care planning and discharge planning.

MORE ON THE TOPIC:

Best practice information on care of older adults: www.ConsultGeriRN.org.
Graf, C. (2006). Functional decline in hospitalized older adults. *AJN*, *106*(1), 58-67.
Katz, S., Down, T.D., Cash, H.R., & Grotz, R.C. (1970) Progress in the development of the index of ADL. *The Gerontologist*, *10*(1), 20-30.
Katz, S. (1983). Assessing self-maintenance: Activities of daily living, mobility and instrumental activities of daily living. *JAGS*, *31*(12), 721-726.
Kresevic, D.M., & Mezey, M. (2003). Assessment of function. In M. Mezey, T. Fulmer, I. Abraham (Eds.), D. Zwicker (Managing Ed.), *Geriatric nursing protocols for best practice* (2nd ed., pp 31-46). NY: Springer Publishing Co., Inc.
Mick, D.J., & Ackerman, M.H. (2004, Sept). Critical care nursing for older adults: Pathophysiological and functional considerations. *Nursing Clinics of North America*, *39*(3), 473-93.

Patient Name:_____ **Date:**_____
Patient ID #_____

LAWTON - BRODY
INSTRUMENTAL ACTIVITIES OF DAILY LIVING SCALE (I.A.D.L.)

Scoring: For each category, circle the item description that most closely resembles the client's highest functional level (either 0 or 1).

A. Ability to Use Telephone		**E. Laundry**	
1. Operates telephone on own initiative-looks up and dials numbers, etc.	1	1. Does personal laundry completely	1
		2. Launders small items-rinses stockings, etc.	1
2. Dials a few well-known numbers	1	3. All laundry must be done by others	0
3. Answers telephone but does not dial	1		
4. Does not use telephone at all	0		
B. Shopping		**F. Mode of Transportation**	
1. Takes care of all shopping needs independently	1	1. Travels independently on public transportation or drives own car	1
2. Shops independently for small purchases	0	2. Arranges own travel via taxi, but does not otherwise use public transportation	1
3. Needs to be accompanied on any shopping trip	0	3. Travels on public transportation when accompanied by another	1
4. Completely unable to shop	0	4. Travel limited to taxi or automobile with assistance of another	0
		5. Does not travel at all	0
C. Food Preparation		**G. Responsibility for Own Medications**	
1. Plans, prepares and serves adequate meals independently	1	1. Is responsible for taking medication in correct dosages at correct time	1
2. Prepares adequate meals if supplied with ingredients	0	2. Takes responsibility if medication is prepared in advance in separate dosage	0
3. Heats, serves and prepares meals, or prepares meals, or prepares meals but does not maintain adequate diet	0	3. Is not capable of dispensing own medication	0
4. Needs to have meals prepared and served	0		
D. Housekeeping		**H. Ability to Handle Finances**	
1. Maintains house alone or with occasional assistance (e.g. "heavy work domestic help")	1	1. Manages financial matters independently (budgets, writes checks, pays rent, bills, goes to bank), collects and keeps track of income	1
2. Performs light daily tasks such as dish washing, bed making	1	2. Manages day-to-day purchases, but needs help with banking, major purchases, etc.	1
3. Performs light daily tasks but cannot maintain acceptable level of cleanliness	1	3. Incapable of handling money	0
4. Needs help with all home maintenance tasks	1		
5. Does not participate in any housekeeping tasks	0		
Score		**Score**	
		Total score_____	

A summary score ranges from 0 (low function, dependent) to 8 (high function, independent) for women and 0 through 5 for men to avoid potential gender bias.

Source: *try this:* Best Practices in Nursing Care to Older Adults, The Hartford Institute for Geriatric Nursing, New York University, College of Nursing, www.hartfordign.org.

try this: Best Practices in Nursing Care to Older Adults
from The Hartford Institute for Geriatric Nursing
New York University, College of Nursing

Issue Number 23, Revised 2007

Series Editor: Marie Boltz, PhD, APRN, BC, GNP
Managing Editor: Sherry A. Greenberg, MSN, APRN, BC, GNP
New York University College of Nursing

The Lawton Instrumental Activities of Daily Living (IADL) Scale

By: Carla Graf, MS, APRN, BC, University of California, San Francisco

WHY: The assessment of functional status is critical when caring for older adults. Normal aging changes, acute illness, worsening chronic illness, and hospitalization can contribute to a decline in the ability to perform tasks necessary to live independently in the community. The information from a functional assessment can provide objective data to assist with targeting individualized rehabilitation needs or to plan for specific in home services such as meal preparation, nursing care, home-maker services, personal care, or continuous supervision. A functional assessment can also assist the clinician to focus on the person's baseline capabilities, facilitating early recognition of changes that may signify a need either for additional resources or for a medical work-up (Gallo, 2006).

BEST TOOL: The Lawton Instrumental Activities of Daily Living Scale (IADL) is an appropriate instrument to assess independent living skills (Lawton & Brody, 1969). These skills are considered more complex than the basic activities of daily living as measured by the Katz Index of ADLs (See *Try this*: Katz Index of ADLs). The instrument is most useful for identifying how a person is functioning at the present time, and to identify improvement or deterioration over time. There are eight domains of function measured with the Lawton IADL scale. Women are scored on all 8 areas of function; historically, for men, the areas of food preparation, housekeeping, laundering are excluded. Clients are scored according to their highest level of functioning in that category. A summary score ranges from 0 (low function, dependent) to 8 (high function, independent) for women, and 0 through 5 for men.

TARGET POPULATION: This instrument is intended to be used among older adults, and can be used in community or hospital settings. The instrument is not useful for institutionalized older adults. It can be used as a baseline assessment tool and to compare baseline function to periodic assessments.

VALIDITY AND RELIABILITY: Few studies have been performed to test the Lawton IADL scale psychometric properties. The Lawton IADL Scale was originally tested concurrently with the Physical Self-Maintenance Scale (PSMS). Reliability was established with twelve subjects interviewed by one interviewer with the second rater present but not participating in the interview process. Inter-rater reliability was established at .85. The validity of the Lawton IADL was tested by determining the correlation of the Lawton IADL with four scales that measured domains of functional status, the Physical Classification (6-point rating of physical health), Mental Status Questionnaire (10-point test of orientation and memory), Behavior and Adjustment rating scales (4-6-point measure of intellectual, person, behavioral and social adjustment), and the PSMS (6-item ADLs). A total of 180 research subjects participated in the study, however, few received all five evaluations. All correlations were significant at the .01 or .05 level. To avoid potential gender bias at the time the instrument was developed, specific items were omitted for men. This assessment instrument is widely used both in research and in clinical practice.

STRENGTHS AND LIMITATIONS: The Lawton IADL is an easy to administer assessment instrument that provides self-reported information about functional skills necessary to live in the community. Administration time is 10-15 minutes. Specific deficits identified can assist nurses and other disciplines in planning for safe discharge.
Limitations of the instrument can include the self-report or surrogate report method of administration rather than a demonstration of the functional task. This may lead either to over-estimation or under-estimation of ability. In addition, the instrument may not be sensitive to small, incremental changes in function.

FOLLOW-UP: The identification of new disabilities in these functional domains warrants intervention and further assessment to prevent ongoing decline and to promote safe living conditions for older adults. If using the Lawton IADL tool with an acute hospitalization, nurses should communicate any deficits to the physicians and social workers/case managers for appropriate discharge planning.

MORE ON THE TOPIC:

Best practice information on care of older adults: www.ConsultGeriRN.org.
Gallo, J.J., & Paveza, G.J. (2006). Activities of daily living and instrumental activities of daily living assessment. In J.J. Gallo, H.R. Bogner, T. Fulmer, & G.J. Paveza (Eds.), *Handbook of Geriatric Assessment* (4th ed., pp. 193-240). MA: Jones and Bartlett Publishers.
Graf, C. (2006). Functional decline in hospitalized older adults. *AJN, 106*(1), 58-67.
Lawton, M.P., & Brody, E.M. (1969). Assessment of older people: Self-maintaining and instrumental activities of daily living. *The Gerontologist, 9*(3), 179-186.
Pearson, V. (2000). Assessment of function. In R. Kane, & R. Kane (Eds.), *Assessing Older Persons. Measures, Meaning and Practical Applications* (pp. 17-48). New York: Oxford University Press.