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Evaluation of the Functional Capacity of a Group of Patients Aged over 65 Years: A Cross-Sectional Study at the Yaoundé Central Hospital

Ndobo-Koe Valérie[1,2*], Nganou-Gnindjio Chris Nadège[1,2], Kemnang Yemele Honoré[1#], Biatu Nestor[1], Ba Hamadou[3], Kingué Samuel[1,2]

[1]Faculty of Medicine and Biomedical Sciences, University of Yaoundé I, Yaoundé, Cameroon
[2]Yaoundé Central Hospital, Yaoundé, Cameroon
[3]Faculty of Medicine and Biomedical Sciences, University of Garoua, Garoua, Cameroon
Email: #ndobo86@gmail.com, kemyh937@gmail.com

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Abstract

Background: The functional capacity of elderly patients decreases with age due to a combination of age-related decline in physiologic functions and chronic diseases. A severe decrease leads to an inability to carry out activities of daily living leading to a loss of autonomy and increased dependence. The aim of this study was to evaluate the functional capacity of the elderly followed at the Yaoundé Central Hospital. **Methods:** We carried out a non-probabilistic consecutive sampling of elderly patients that consulted in Yaoundé Central Hospital during a five-month' period. Data was taken concerning their chronic conditions, use of medication, and presence of depressive symptoms (evaluated using the Geriatric Depression Scale (GDS) questionnaire). The presence of any cognitive impairment was evaluated using the Mini-Mental State Examination (MMSE). Cardiac ultrasonography and electrocardiograms were done to evaluate the cardiac morphology and physiology. Their functional capacity was assessed with the WHO Global Physical Activity Questionnaire and the six-minute walk test. A self-paced step test was equally done to estimate the maximum oxygen consumption during aerobic exercise. We carried out a univariate, and then multivariate analyses to identify factors associated with an altered functional status. Statistical analysis was performed using the SPSS software 23.0. The threshold of significance was set at 0.05. **Results:** 66 participants were included (35 women) with a median age of 70 (IQR: 67 - 75) years. Among them, 39.4% were found to have an altered functional capacity, about 87.8% had at least one chronic condition and 47% had two or more. The

*First author.
#Corresponding author.

most prevalent chronic condition was hypertension (71.2%) followed by heart failure (24.2%) and osteoarthritis (12.1%). Mild depressive symptoms were present in 1.5% of our study population. The factors associated with an altered functional capacity include age ≥ 75 years (OR = 2.9 $p < 0.05$), heart failure (OR: 3.2, $p < 0.05$), osteoarthritis (OR: 5.1, $p < 0.05$), and poor gait and balance (OR: 3.7, $p < 0.05$). **Conclusion:** There is a high prevalence of altered functional capacity among elderly patients consulting at the Yaoundé Central Hospital. Heart failure, osteoarthritis, and an increased risk of falls are associated with an altered functional capacity.

Keywords

Functional Capacity, Elderly, Physical Activity, Cameroon

1. Background

The aging population is poised to increase this century, attributed to a better understanding and management of the factors affecting mortality and birthrates [1]. The functional capacity of elderly patients decreases with age due to a combination of age-related decline in physiologic functions and chronic conditions [2]. A severe decrease leads to an inability to carry out activities of daily living leading to a loss of autonomy and an increased dependence [3] [4]. Therefore, understanding the functional capacity of older individuals is essential for creating appropriate strategies to implement effective interventions in order to prevent, treat or rehabilitate them [5]. Several tools have been described to evaluate the functional capacity of older adults by their abilities to carry out activities of daily living and instrumental activities of daily living or by subjective methods or objective methods, which entails measuring directly or indirectly their maximum oxygen consumption [6] [7] [8]. The subjective tools are available in the form of questionnaires that assess the ability to carry out activities of daily living while those that assess functional capacity in an objective manner revolve around the measurement of maximal oxygen consumption during aerobic exercise [6] [9]. We observed that only a few studies have been carried out in our context to evaluate this decline. Our aim was to evaluate the functional capacity of the elderly followed up at the Yaoundé Central Hospital.

2. Methods

2.1. Study Design and Setting

We carried out a cross-sectional study, over a period of 7 months (1 December 2021 to 29 May 2022) in the geriatric and cardiology department of the Yaoundé Central Hospital.

2.2. Participants

We carried out a non-probabilistic consecutive sampling among elderly patients

who consulted in the geriatric and cardiology outpatient units during our study period. This is due to the high number of elderly patients who consult in these units.

Eligibility criteria:

Inclusion criteria

- At least 65 years of age.
- Having given their willful and informed consent.

Non-inclusion criteria

- Patients less than 65 years.
- Current infections.
- Recent myocardial infarction.
- Orthopedic limitations.
- People with Alzheimer's.

Exclusion criteria

- Severe arrhythmias.
- Severe hypertension.
- Incomplete data.

We included consenting patients at least 65 years of age. Patients with current infections, recent myocardial infarction, severe arrhythmias, severe hypertension, and with orthopedic limitations were excluded.

2.3. Sample Size

We carried out a non-probabilistic consecutive sampling among patients who consulted in the geriatric and cardiology outpatient units during our study period. This is due to the high number of elderly patients who consult in these units.

2.4. Data Collection

The data was collected using a pre-established data collection sheet. For all the participants, we reported sociodemographic characteristics (age, gender, level of education, professional status, marital status, ethnic origin) and past history which includes chronic conditions, history of falls within the previous 12 months, total number of medications consumed daily, smoking and drinking habits. We then administered questionnaires to evaluate depression level and level of physical activity. The functional capacity was assessed subjectively using the WHO Global Physical Activity Questionnaire (GPAQ), which was answered by each participant.

- It was developed by WHO for physical activity surveillance in countries. It collects information on physical activity participation in three settings (or domains) and sedentary behavior. These domains are:
  - Activity at work.
  - Travel to and from places.
  - Recreational activities.
- Weekly energy expenditure is assessed by summing the answers from the

various sections and expressed in Metabolic Equivalents (METs) as recommended in the guidelines of the Compendium of Physical Activities.

- MET (Metabolic Equivalent) is the ratio of the work metabolic rate to the resting metabolic rate. One MET is defined as 1 kcal/kg/hour and is equivalent to the energy cost of sitting quietly.
- A MET is also defined as oxygen uptake in ml/kg/min with one MET equal to the oxygen cost of sitting quietly, around 3.5 ml/kg/min.
- Level of total physical activity was divided into three groups depending on their total weekly METs. Participants with MET less than 600 are considered to have a low physical; participants with MET equal to or greater than 600 are considered to have a moderate level of physical active and a MET greater than or equal to 3000 was considered high.

A six-minute walk test for objective measure of their functional capacity: After the morphological and physiological assessments, a six-minute walk test was performed in a 30 long corridor in the Cardiology service. This was done according to the guidelines established by the American thoracic Society. A timer was set to 6 minutes and the track prepared. The participant was prepared for the test using the scribe, "The object of this test is to walk as far as possible for 6 minutes. You will walk back and forth in this hallway. Six minutes is a long time to walk, so you will be exerting yourself. You will probably get out of breath or become tired. You are permitted to slow down, to stop, and to rest as necessary. You may lean against the wall while resting, but resume walking as soon as you are able. You will be walking back and forth around the cones (or poles). You should walk around the cones (or poles) and continue back the other way without hesitation. Now I'm going to show you. Please watch the way I turn without hesitation." A lap was done on the track for demonstration. The participant was then positioned at the starting line and the timer was started. A worksheet was used to keep tract of the laps. The rate of perceived dyspnea and exertion were evaluated using the Borg scale and were recorded at the beginning and end of the exercise.

The self-paced step test: Step tests are tests which are used to estimate the maximal oxygen uptake during exercise (VO_{2max}). They are easy to realize and can provide a close estimate the VO_{2max} using submaximal exercises. For our study we used the model implemented by Petrella *et al.*: We let the participants select their own stepping pace for slow, normal and fast stages. The time to complete 20 step-ups for each stage, as well as an immediate post-exercise heart rate were recorded. The stepping height was set to 20 cm and the VO_{2max} was estimated using the formula:

estimated VO_{2max} = 129.6 + (−3.82 O_2 pulse) + (−5.32 STTime) + (−0.22 age) + (−0.24 BMI + (−0.12 heart rate), for women.

estimated VO_{2max} = 116.4 + (−5.10 O_2 pulse) + (−2.81 STTime) + (−0.12 age) + (−0.24 BMI + (−0.14 heart rate), for men.

A standard 12-lead resting ECG was then done to record the electrical activity

of the heart using a Mac 1200 ST electrocardiograph and for morphological assessment, a transthoracic echocardiography was done using a Philips IE33 ultrasound machine.

2.5. Statistical Analysis

All the data collected were analyzed using the software SPSS version 23.0. The qualitative variables were expressed in frequency and percentages. The quantitative variables were expressed in terms of means and standard deviation in the case of a Normal distribution, or medians and interquartile ranges when this was not the case. The measurement of the strength of associations between different variables was carried out using binary logistic regression with multivariate analysis. The threshold of significance was set at 0.05.

3. Results

3.1. Sociodemographic and Clinical Characteristics of the Sample

Overall 66 participants were included in the study. Among them, 35 (53%) were females. Their median age was 70 years (IQR: 67 - 75) ranging from 65 to 100 years. The most represented age group was those with ages from 65 - 75 years old. Most of our participants (80.3%) lived in an urban setting. A majority of patients were married (54.5%), and there was equally a preponderance of retired individuals (72.7%). The most prevalent cardiovascular risk factor was hypertension (71.2%) followed by abdominal obesity (40.9%). In our study population 24.2% had heart failure and 12.1% osteoarthritis. The median drug consumption per day was 2 (1 - 3) ranging 0 medications to 7 medications. The prevalence of polypharmacy was 7.6%.

The sociodemographic and clinical characteristics are summarized in **Table 1**.

3.2. Standard 12 Lead ECG and Transthoracic Echocardiogram Findings

The majority of our patients had a sinusal rythm (94%). A majority equally had a normal heart rate (73.8%), and most of the participants had a normal QTc interval.

On transthoracic echocardiogram, the LVEF was determining with the Simpson Biplane method which revealed a mean of 63.3% ± 8.2% ranging from 37% to 79%. Also, majority of patients had preserved LVEF (95.4%). in addition, a majority did not show left ventricular hypertrophy (70.8%).

3.3. Evaluation of Fragility (TUG), Falls and Depression

The Median time taken to perform the Timed Up and Go test (TUG) was 12 s (11 - 14) with a range from 9 s to 23 s. a majority of the study population had a normal TUG (78.8%). The majority of the participants reported no falls within the last 12 months (90.9%). These are illustrated in **Table 2**.

Table 1. Sociodemographic and clinical characteristics of the study population.

Variables	Frequency (N = 66)	Percentage (%)
Age (in years)		
[65 - 70[	32	48.5
[70 - 75[	16	24.2
[75 - 80[	14	21.2
≥80	4	6.1
Residence		
Urban	53	80.3
Rural	13	19.7
Occupation		
Unemployed/Housewife	10	15.2
Civil servant	2	3.0
Private sector worker	6	9.1
Retired	48	72.7
Chronic conditions/CVRF		
Respiratory diseases	2	3.0
Heart failure	16	24
Neoplasms	5	7.6
Rheumatologic diseases	11	16.7
Neurologic disorders	2	3.0
Hypertension	47	71.2
Diabetes	8	12.1
Smoking history	3	4.5
Alcohol consumption	15	22.7
Abdominal obesity	27	40.9
Polypharmacy		
Yes	5	7.6
No	61	92.4

Table 2. TUG, falls and depression in study population.

Variables	Frequency (N = 66)	Percentage (%)
TUG		
Normal	52	78.8
Increased	14	21.2

Continued

Any falls		
Yes	6	9.1
No	60	90.9
Depressive symptoms		
No	1	1.5
Yes	65	98.5

The mean **GDS**, 30 score was 25.1 ± 2.4 ranging from 19 to 30. A majority of participants had symptoms of depression (see **Table 2**).

3.4. Functional Capacity of Study Population

- **Subjective evaluation:** A majority of the study population had a low level of physical activity (81.8%) with a median weekly energy expenditure of 370 METs (330 - 491.3) and ranged from 230 METs to 690 METs
- **Objective evaluation:** The mean distance covered during the 6 MWT was 353.2 ± 72.2. The median RPE at the end of the test was 2 (1 - 4) and the median RPD at the end of the test was 2 (1 - 2). Among the participants, 39.4% had an altered Functional capacity with respect to distance covered. The mean estimated VO_{2max} was 27.7 ± 8.3 ml/kg/min ranging from 12.4 to 43.1 ml/kg/min. This is shown in **Table 3**.

3.5. Factors Associated to an Altered Functional Capacity

On multivariate analysis, factors found to be independently associated to an altered functional capacity were age ≥ 75 years (OR = 2.9, $p < 0.05$), heart failure (OR = 3.2, $p < 0.05$), Osteo-arthritis (OR = 5.1, $p < 0.05$), and TUG < 15 s (OR = 39, $p < 0.05$) (see **Table 4**).

4. Discussion

The Functional capacity of older adults decreases with age, this is due to the combination of genetic factors, biological factors, environmental factors, lifestyle and chronic conditions [10] [11]. A severe decrease below physiological thresholds lead to increasing difficulties in carrying out activities of daily living which leads to a decrease in their independence and decrease in quality of life [3] [4]. Assessment of functional capacity is therefore necessary while screening for individuals at risk and in diagnosing elderly patients with debilitating chronic conditions [12]. Our objective in this study was to evaluate the functional capacity of community dwelling adults using both subjective and objective tools.

About 81% of our study populations were found to have a low physical activity from the Global Physical Activity Questionnaire. This is different from the results obtained by Alves *et al.* who found that 51.3% of elderly Brazilians in dwelling community had a low level of physical activity [13]. This disparity may

Table 3. Exercise capacity and Estimated VO_{2max}.

Variables	Min - Max	Mean ± standard deviation	Median (interquartile interval)
Distance covered in the 6 MWT	104 - 532	353.2 ± 72.2	
Borg RPD	0 - 7		2 (1 - 2)
Borg RPE	0 - 7		2 (1 - 4)
Estimated VO_{2max}	12.4 - 43.1	27.7 ± 8.3	

Table 4. Factors associated to an altered functional capacity on multivariate analysis.

Variables	Altered functional capacity		OR [95% CI]	p-value
	Yes N = 26 (39.4%)	No N = 40 (60.6%)		
Age ≥ 75 years	11 (16.6)	8 (23.7)	2.92 (1.22 - 9.41)	**0.03**
Heart failure	10 (15.2)	6 (9.1)	3.2 (2.4 - 9.28	**0.02**
Osteo arthritis	6 (9.1)	2 (3)	5.1 (2.1 - 15.3)	**0.03**
TUG < 15 s	13 (19.7)	39 (59.1)	39.0 (4.6 - 327.7)	**0.03**

be due to the fact that the population in our study mainly lived in an urban setting, compared to the study carried out by Alves *et al.* in which was done with elderly people in a rural setting. This high prevalence indicates low physical activity amongst the elderly especially in urban settings. The mean distance covered during the six-minute walk test was 355.7 ± 72 and 39.4% covered a distance indicative of an altered functional capacity. The mean estimated VO_{2max} was 29.3 ± 10.2 ml/kg/min. This is indicative of an average aerobic capacity level and functional capacity. The median energy expenditure per week was 370 METs (330 - 491.3), 81.8% having a low weekly energy expenditure. This is indicative of a low level of physical activity and by extension a low functional capacity. Essomba *et al.* found a prevalence of 38% of adults with a decreased functional capacity. This discrepancy might be attributed to the lower median age of patients recruited by Essomba *et al.* [14].

The factors documented to influence functional capacity in the elderly which were evaluated in this study include: the age, comorbidities, depression, cognitive impairment, physical activity and polypharmacy [15] [16] [17]. On univariate analysis, age, heart failure, osteoarthritis and an elevated TUG was found to be associated to an altered functional capacity. We observed an association between age and an altered functional capacity in our study population. This is similar to results obtained by Benefice *et al.* in a 2005 study to evaluate the relationship between anthropometry, cardiorespiratory fitness indices and physical activity levels in different age and sex groups in rural Senegal [18]. In a study carried out Arnett *et al.* to evaluate the aerobic reserve and physical functional

performance in older adults in San Jose, California, age was found to have a negative correlation to VO_2 PEAK [2]. The association between increasing age and decreasing functional capacity can be explained by the fact that ageing is accompanied with a decrease in muscle mass and strength which leads to a steady drop in the maximal oxygen consumption during aerobic exercises [18]. In addition to that we had an association between heart failure and an altered functional capacity. Masoudi *et al.* [19] equally observed a similar trend between heart failure and an altered functional capacity (OR = 2.35, $p < 0.001$) in a large multicenter study. Furthermore, we observed an association between osteoarthritis and an altered functional capacity (OR = 5.7, $p < 0.05$). This results compares to that observed by Essomba *et al.* had a similar association while evaluating geriatric syndromes in Yaoundé in 2019 between osteoarthritis and a decreased functional status (OR 3.3, $p = 0.055$) [14]. The relationship between osteoarthritis and an altered functional capacity can be explained by the fact that osteoarthritis is due to degeneration of joint cartilage, which causes pain after usage, thus limiting functional use of the joint causing sarcopenia which leads to a decrease in the ability to carry out activities of daily living [20].

The results presented here should be interpreted in the light of some study limitations. This was a cross-sectional study and therefore, any causal relationship cannot be established from our results. The small size of our sample did not permit an overall assessment of the Functional Capacity of Older Cameroonian Adults. Also, the measure of aerobic fitness lacked the precision that could be obtained from using a cardiopulmonary testing exercise.

5. Conclusion

The functional capacity of the elderly reflects their ability to carry out activities of daily living. In this study, we found 39.4% of older adults had an altered functional capacity when self-reported. Age, heart failure, osteoarthritis, and poor balance are associated with an altered functional capacity in older patients. More studies and resources need to be invested in the amelioration of the functional capacity of older adults as this age group is poised to constitute an important number of our population in the coming decades.

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Authors' Contribution

Conception and Design:

Data collection: NKV.

Data analysis and interpretation: NKV.

Manuscript drafting: KYH.

Manuscript revision: NKV.

Approval of the final manuscript: All the authors.

Availability of Data and Materials

The datasets used for this study are available from the corresponding author upon request.

Ethical Approval and Consent to Participate

The study was approved by the Institutional Ethical Review Board of the University Yaoundé I (Cameroon). All the participants read and signed informed consent before their inclusion in the study.

Conflicts of Interest

The authors declare that they have no competing interests.

References

[1] Canudas-Romo, V., Shen, T. and Payne, C. (2021) The Role of Reductions in Old-Age Mortality in Old-Age Population Growth. *Demographic Research*, **44**, 1073-1084. https://doi.org/10.4054/DemRes.2021.44.44

[2] Arnett, S.W., Laity, J.H., Agrawal, S.K. and Cress, M.E. (2008) Aerobic Reserve and Physical Functional Performance in Older Adults. *Age Ageing*, **37**, 384-389. https://doi.org/10.1093/ageing/afn022

[3] McPhee, J.S., French, D.P., Jackson, D., Nazroo, J., Pendleton, N. and Degens, H. (2016) Physical Activity in Older Age: Perspectives for Healthy Ageing and Frailty. *Biogerontology*, **17**, 567-580. https://doi.org/10.1007/s10522-016-9641-0

[4] Clegg, A., Young, J., Iliffe, S., Rikkert, M.O. and Rockwood, K. (2013) Frailty in Older People. *The Lancet*, **381**, 752-762. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4098658/

[5] Motamed-Jahromi, M. and Kaveh, M.H. (2021) Effective Interventions on Improving Elderly's Independence in Activity of Daily Living: A Systematic Review and Logic Model. *Front Public Health*, **8**, Article ID: 516151. https://doi.org/10.3389/fpubh.2020.516151

[6] Hills, A.P., Mokhtar, N. and Byrne, N.M. (2014) Assessment of Physical Activity and Energy Expenditure: An Overview of Objective Measures. *Frontiers in Nutrition*, **1**, Article 5. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4428382/

[7] Halter, J.B. and Reuben, D.B. (2001) Indicators of Function in the Geriatric Population. In: Finch, C.E., Vaupel, J.W. and Kinsella, K., Eds., *Cells and Surveys*: *Should Biological Measures Be Included in Social Science Research*?, National Academies Press, Washington DC, 11. https://www.ncbi.nlm.nih.gov/books/NBK110056/

[8] Calabro, M.A., Kim, Y., Franke, W.D., Stewart, J.M. and Welk, G.J. (2015) Objective and Subjective Measurement of Energy Expenditure in Older Adults: A Doubly-Labeled Water Study. *European Journal of Clinical Nutrition*, **69**, 850-855. https://doi.org/10.1038/ejcn.2014.241

[9] Sylvia, L.G., Bernstein, E.E., Hubbard, J.L., Keating, L. and Anderson, E.J. (2013) A Practical Guide to Measuring Physical Activity. *Journal of the Academy of Nutrition and Dietetics*, **114**, 199-208. https://doi.org/10.1016/j.jand.2013.09.018

[10] Franceschi, C., Garagnani, P., Morsiani, C., Conte, M., Santoro, A., Grignolio, A.,

Monti, D., Capri, M. and Salvioli, S. (2018) The Continuum of Aging and Age-Related Diseases: Common Mechanisms but Different Rates. *Frontiers in Medicine* (*Lausanne*), **5**, Article 61. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5890129/

[11] Colloca, G., Di Capua, B., Bellieni, A., Fusco, D., Ciciarello, F., Tagliaferri, L., *et al.* (2020) Biological and Functional Biomarkers of Aging: Definition, Characteristics, and How They Can Impact Everyday Cancer Treatment. *Current Oncology Reports*, **22**, Article No. 115. https://doi.org/10.1007/s11912-020-00977-w

[12] Lee, L., Patel, T., Hillier, L.M., Locklin, J., Milligan, J., Pefanis, J., *et al.* (2018) Frailty Screening and Case-Finding for Complex Chronic Conditions in Older Adults in Primary Care. *Geriatrics*, **3**, Article 39. https://doi.org/10.3390/geriatrics3030039

[13] Alves, V.M.C., Soares, V.N., De Oliveira, D.V. and Fernandes, P.T. (2020) Sociodemographic and Psychological Variables, Physical Activity and Quality of Life in Elderly at Unati Campinas, São Paulo. *Fisioterapia em Movimento*, **33**, e003310. http://www.scielo.br/j/fm/a/8VmkVJg5LBF5BsWhpcBgFCv/ https://doi.org/10.1590/1980-5918.033.ao10

[14] Essomba, M.J.N., Atsa, D., Noah, D.Z., Zingui-Ottou, M., Paula, G., Nkeck, J.R., *et al.* (2020) Geriatric Syndromes in an Urban Elderly Population in Cameroon: A Focus on Disability, Sarcopenia and Cognitive Impairment. *Pan African Medical Journal*, **37**, Article 229. https://doi.org/10.11604/pamj.2020.37.229.26634

[15] Canouï-Poitrine, F., Martinez-Tapia, C., Paillaud, E., Mathoulin-Pelissier, S., Pamoukdjian, F., Frasca, M., *et al.* (2022) Geriatric Impairments Were Directly and Indirectly Associated with Mortality in Older Patients with Cancer: A Structural Equation Analysis. *Journal of Clinical Epidemiology*, **148**, 17-26. https://www.sciencedirect.com/science/article/abs/pii/S0895435622000877#

[16] Melo Filho, J., Moreira, N.B., Vojciechowski, A.S., Biesek, S., Bento, P.C.B. and Gomes, A.R.S. (2020) Frailty Prevalence and Related Factors in Older Adults from Southern Brazil: A Cross-Sectional Observational Study. *Clinics*, **75**, e1694. https://doi.org/10.6061/clinics/2020/e1694

[17] Caçador, C., Teixeira-Lemos, E., Martins, S.O. and Ramos, F. (2021) The Role of Nutritional Status on Polypharmacy, Cognition, and Functional Capacity of Institutionalized Elderly: A Systematic Review. *Nutrients*, **13**, Article 3477. https://doi.org/10.3390/nu13103477

[18] Bénéfice, E. and Ndiaye, G. (2005) Relationships between Anthropometry, Cardiorespiratory Fitness Indices and Physical Activity Levels in Different Age and Sex Groups in Rural Senegal (West Africa). *Annals of Human Biology*, **32**, 366-382. https://doi.org/10.1080/03014460500097336

[19] Masoudi, F.A., Rumsfeld, J.S., Havranek, E.P., House, J.A., Peterson, E.D., Krumholz, H.M., *et al.* (2004) Age, Functional Capacity, and Health-Related Quality of Life in Patients with Heart Failure. *Journal of Cardiac Failure*, **10**, 368-373. https://doi.org/10.1016/j.cardfail.2004.01.009

[20] Sacitharan, P.K. (2019) Ageing and Osteoarthritis. *Sub-Cellular Biochemistry*, **91**, 123-159. https://doi.org/10.1007/978-981-13-3681-2_6

Appendix

Data Collection Sheet

Serial code: | | | | |

Section 1: Identification

S1Q1	Date of interview	dd/mm/yy	|_|_|/|_|_|/|_|_|
S1Q2	Sex	Male = 1 Female = 2	|__|
S1Q3	Age		
S1Q4	Marital status	1 = Married, 2 = Single 3 = Divorced, 4 = Widow 5 = Cohabiting	|__|
S1Q5	Region of origin	1 = Adamawa, 2 = Centre 3 = East, 4 = Far north 5 = Littoral, 6 = North 7 = North west, 8 = West 9 = South, 10 = South west	|__|
S1Q6	Occupation	1 = Student 2 = Unemployed/Housewife 3 = Civil servant 4 = Private sector worker 5 = Retired	|__|
S1Q7	Level of education	1 = None 2 = Primary 3 = Secondary ($6^{ème}$ – $3^{ème}$) 4 = High school (2^{nd} – Tle) 5 = University	|__|
S1Q8	Town of residence		

Section 2: Comorbidities

S2Q1	Chronic medical condition	Heart failure = 1 Diabetes = 2 Hypertension = 3 HIV = 4 Hepatitis B = 5 Hepatitis C = 6 Osteo arthritis = 7 Parkinson = 8 Alzheimer = 9 CKD = 10 Other (specify)	
S2Q2	Tobacco	No = 1 Yes = 2 *If yes* Packet - years	/__/__/

Continued

S2Q3	Alcohol consumption	No = 1 Yes = 2 *If yes* Duration Daily intake
S2Q4	Previous surgery	No = 1 Yes = 2 (specify)
S2Q5	Falls	No = 1 Yes = 2 If yes frequency
S2Q6	Medications/day	0 = 1, 1 = 2 2 = 3, 3 = 4 4 = 5, >5 = 6 Frequency 1 = 1, 2 = 2, >3 = 3

Section 3: Physical examination

PE-1	Blood pressure	__ __ __ mmHg
PE-2	Pulse (bpm)	__ __ __bpm
PE-3	Respiratory rate	__ __ __cpm
PE-4	Temperature	__ __ __˚C
PE-5	SpO_2	__ __ __ %
PE-6	Weight	__ __ __ kg
PE-7	Height	__ __ __ cm
PE-8	BMI	__ __ __ $kg{\cdot}m^{-2}$
PE-9	Mid abdominal circumference	__ __ __ cm
PE-10	**TIME TO GET UP AND Go**	__ __ __ s

Section 4: Paraclinical examination

1) Echocardiogram

Date done	
LVEF	__ __ __ %
Left ventricular hypertrophy: yes = 1 no = 2	
LV dilation: yes = 1 no = 2	
LA dilation: yes = 1 no = 2	
Valvulopathy: yes = 1 no = 2	
Any cardiopathy yes = 1 no = 2	

2) Electrocardiogram

Date done	
Rhythm: Sinusal = 1, Not sinusal = 2	
Heart rate	__ __ __bpm
QRS axis: Deviated = 1, Not deviated = 2	
QT interval	__ __ __s
Auricular fibrillation: Yes = 1, No = 2	
ST segment anomaly: Yes = 1, No = 2	
Left ventricular hypertrophy: Yes = 1, No = 2	

Global Physical Activity Questionnaire (GPAQ)

Physical Activity

Next I am going to ask you about the time you spend doing different types of physical activity in a typical week. Please answer these questions even if you do not consider yourself to be a physically active person.

Think first about the time you spend doing work. Think of work as the things that you have to do such as paid or unpaid work, study/training, household chores, harvesting food/crops, fishing or hunting for food, seeking employment. [*Insert other examples if needed*]. In answering the following questions "vigorous-intensity activities" are activities that require hard physical effort and cause large increases in breathing or heart rate, "moderate-intensity activities" are activities that require moderate physical effort and cause small increases in breathing or heart rate.

	Questions	Response			Code
	Activity at work				
1	Does your work involve vigorous-intensity activity that causes large increases in breathing or heart rate like [*carrying or lifting heavy loads, digging or construction work*] for at least 10 minutes continuously? [*INSERT EXAMPLES*] (*USE SHOWCARD*)	Yes No	1 2	*If No, go to P 4*	P1
2	In a typical week, on how many days do you do vigorous-intensity activities as part of your work?	Number of days	|__|		P2
3	How much time do you spend doing vigorous-intensity activities at work on a typical day?	Hours: minutes	|__||__|:|__||__| hrs. mins		P3 (a-b)
4	Does your work involve moderate-intensity activity that causes small increases in breathing or heart rate such as brisk walking [*or carrying light loads*] for at least 10 minutes continuously? [*INSERT EXAMPLES*] (*USE SHOWCARD*)	Yes No	1 2	*If No, go to P 7*	P4

Continued

5	In a typical week, on how many days do you do moderate-intensity activities as part of your work?	Number of days	|__|	P5
6	How much time do you spend doing moderate-intensity activities at work on a typical day?	Hours: minutes	|__||__|:|__||__| hrs mins	P6 (a-b)
	Travel to and from places			
	The next questions exclude the physical activities at work that you have already mentioned. Now I would like to ask you about the usual way you travel to and from places. For example, to work, for shopping, to market, to place of worship. [insert other examples if needed].			
7	Do you walk or use a bicycle (*pedal cycle*) for at least 10 minutes continuously to get to and from places?	Yes No	1 2 *If No, go to P 10*	P7
8	In a typical week, on how many days do you walk or bicycle for at least 10 minutes continuously to get to and from places?	Number of days	|__|	P8
9	How much time do you spend walking or bicycling for travel on a typical day?	Hours: minutes	|__||__|:|__||__| hrs mins	P9 (a-b)
	Recreational activities			
	The next questions exclude the work and transport activities that you have already mentioned. Now I would like to ask you about sports, fitness and recreational activities (leisure), [insert relevant terms].			
10	Do you do any vigorous-intensity sports, fitness or recreational (*leisure*) activities that cause large increases in breathing or heart rate like [*running or football*,] for at least 10 minutes continuously? [*INSERT EXAMPLES*] (*USE SHOWCARD*)	Yes No	1 2 *If No, go to P 13*	P10
11	In a typical week, on how many days do you do vigorous-intensity sports, fitness or recreational (*leisure*) activities?	Number of days	|__|	P11
12	How much time do you spend doing vigorous-intensity sports, fitness or recreational activities on a typical day?	Hours: minutes	|__||__|:|__||__| hrs mins	P12 (a-b)
13	Do you do any moderate-intensity sports, fitness or recreational (*leisure*) activities that cause a small increase in breathing or heart rate such as brisk walking, (*cycling*, *swimming*, *volleyball*) for at least 10 minutes continuously? [*INSERT EXAMPLES*] (*USE SHOWCARD*)	Yes No	1 2 *If No, go to P16*	P13

Continued

14	In a typical week, on how many days do you do moderate-intensity sports, fitness or recreational (*leisure*) activities?	Number of days	|__|	P14
15	How much time do you spend doing moderate-intensity sports, fitness or recreational (*leisure*) activities on a typical day?	Hours: minutes	|__||__|:|__||__| hrs mins	P15 (a-b)

Sedentary behavior

The following question is about sitting or reclining at work, at home, getting to and from places, or with friends including time spent [sitting at a desk, sitting with friends, travelling in car, bus, train, reading, playing cards or watching television], but do not include time spent sleeping. [*INSERT EXAMPLES*] (*USE SHOWCARD*).

16	How much time do you usually spend sitting or reclining on a typical day?	Hours: minutes	|__||__|:|__||__| hrs min s	P16 (a-b)

Total in METs

Interpretation: <600 METs sedentary, >600 METS moderate

Section 7: Six minute walk test worksheet (Before exercises)

Medications taken before the test (dose and time)

_____

_____

Supplemental O_2: no yes ____ L/min Assistive device: No Yes _____

Pre Test/Baseline End of Test

BP_____ BP_____

HR _____ HR _____

SpO_2_____ SpO_2_____

Dyspnea (Borg) _____ Dyspnea (Borg) _____

Fatigue (Borg) _____ Fatigue (Borg) _____

Stopped or paused before 6 minutes completed?

No Yes, reason_____

Other symptoms at the end of test:

Angina, dizziness hip, knee, calf pain, other _____

Number of laps_____ (×100 meters) + final partial lap_____meters

Total distance walked in 6 minutes: _____ meters

Section: Self-paced step test

Height of step:

Resting heart rate:

	Number of steps	Time taken to complete steps (s)	Frequency f (s^{-1})	Post-stepping heart rate (s)
Slow pace				
Normal pace				
Fast pace				

VO_{2max}————————

RATE OF PERCEIVED DYSPNEA	RATE OF PERCEIVED EXERTION
1) Not at all	1) Not at all
2) Very Slight	2) Very light
3) Slight	3) Light
4) Moderate	4) -
5) Somewhat Hard	5) Somewhat Hard
6) Severe	6) -
7) -	7) Hard
8) Very severe	8) Very hard
9) -	9) -
10) -	10) Extremely hard
11) Very very severe	11) Maximum exertion

Abbreviations

CVRF: Cardiovascular Risk Factor
ECG: Electro Cardio Gram
GDS: Geriatric Depression Scale questionnaire
GPAQ: Global Physical Activity Questionnaire
IQR: InterQuartile Range
LVEF: Left Ventricular Ejection Fraction
METs: Metabolic Equivalent for Tasks
MMSE: Mini Mental State Examination
SPSS: Statistical Package for the Social Sciences
TUG: Timed Up and Go test
WHO: World Health Organization