

Original Article

# Activity performance problems of patients with cardiac diseases and their impact on quality of life

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**Abstract.** [Purpose] To describe the functional consequences of patients with cardiac diseases and analyze associations between activity limitations and quality of life. [Subjects and Methods] Seventy subjects (mean age: 60.1±12.0 years) were being treated by Physical Medicine and Rehabilitation and Cardiology Departments were included in the study. Activity limitations and participation restrictions as perceived by the individual were measured by the Canadian Occupational Performance Measure (COPM). The Nottingham Extended Activities of Daily Living (NEADL) Scale was used to describe limitations in daily living activities. To detect the impact of activity limitations on quality of life the Nottingham Health Profile (NHP) was used. [Results] The subjects described 46 different types of problematic activities. The five most identified problems were walking (45.7%), climbing up the stairs (41.4%), bathing (30%), dressing (28.6%) and outings (27.1%). The associations between COPM performance score with all subgroups of NEADL and NHP; total, energy, physical abilities subgroups, were statistically significant. [Conclusion] Our results showed that patients with cardiac diseases reported problems with a wide range of activities, and that also quality of life may be affected by activities of daily living. COPM can be provided as a patient-focused outcome measure, and it may be a useful tool for identifying those problems.

**Key words:** Activity limitation, Cardiac diseases, Quality of life

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## INTRODUCTION

Cardiac diseases are as the leading cause of death in the modern world and they can result in early death, morbidity and disability of the population making them a serious public health problem in the world<sup>1)</sup>. Cardiac diseases are systemic and progressive diseases, and they are characterized by functional limitations in daily activities that are caused by clinical symptoms, shortness of breath or fatigability. Patients with cardiac diseases report difficulties in a variety of activities<sup>2)</sup>.

In most elderly people who suffer from cardiac diseases, show a gradual loss of ability to perform physical activities resulting in loss of independence in performing daily activities<sup>3–5)</sup>. Functional limitations manifest as difficulty in performing daily activities<sup>6)</sup>. These restrictions of cardiac diseases mostly arise from a combination of physical limitations, symptoms and numerous hospitalizations<sup>6, 7)</sup>. Further-

more, disabilities or activity limitations are important determinants of quality of life<sup>8)</sup>. According to the International Classification of Functioning, Disability and Health<sup>9)</sup>, (ICF, formerly ICIDH-2 <http://www.who.int/classification/icf>), activity limitations are the difficulties that an individual may have in executing a task or an action, while participation restrictions are the problems an individual may experience in involvement in life situations. ICF belongs to the family of international classifications developed by the World Health Organization (WHO) for application to various aspects of health<sup>9–12)</sup>.

Despite the fact that the functional decline in cardiac disease patients reflects disease progression, evidence for functional limitations has not been sufficiently demonstrated. Cieza et al.<sup>13)</sup>, represented ICF core sets for chronic ischemic heart diseases and linked specific conditions or diseases to salient ICF categories of functioning. Several questionnaires have been reported to measure the functional limitations of patients with cardiac diseases<sup>14–17)</sup>. However, these questionnaires were originally developed to measure health-related quality of life (HRQOL) or health status. The factors of functional limitation that are contained in these questionnaires have not been studied independently from the viewpoint of cardiac disease status<sup>7)</sup>. Furthermore, cardiac diseases have not been adequately examined with an objective, condition specific, health status measurement tool.

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The Canadian Occupational Performance Measure (COPM)<sup>18-20</sup> is a client-centred, patient reported outcome measure with which clients evaluate their occupational performance and satisfaction with performance in areas of self-care, productivity and leisure. Occupational therapy has newly developed assessing the occupational performance measurements for patients with cardiac diseases, and it is an important concept to increase the awareness of necessity of occupational therapy for this group of patients. Also we recognized that there is surprisingly little research has identified the activity performance problems and participation restriction of patients with cardiac diseases in the literature<sup>1, 7, 8, 13</sup>. The aim of this study was to determine the client-centred activity performance problems of patients with cardiac diseases. A second objective of the study was to analyze associations between activity performance and satisfaction with quality of life.

## SUBJECTS AND METHODS

Consecutive stable subjects (n: 82), who were diagnosed as having cardiac diseases were recruited and at consulted to the Physical Therapy Department, between the dates March 2013 to March 2014. Twelve subjects were excluded from our study because they had other diseases could have affected our results such as cancer or orthopedically problems, so the interviews conducted with 70 cardiac diseases patients (mean age: 60.1±12.0 years, BMI: 26.0±4.0 kg/m<sup>2</sup>). The study was conducted at the Physical Medicine and Rehabilitation Department. The written informed consent was obtained from the participants. The following cardiac conditions were included in the study: coronary artery diseases (angina pectoris, myocardial infarction), heart failure, and subjects who had been diagnosed as having coronary artery disease after an angiography procedure. Clinical cardiac disease diagnoses were made by a cardiologist and then subjects were referred to the Physical Medicine and Rehabilitation Department for the interviews. The definition of angina pectoris was characterized as a chest pain occurring due to exertion which was alleviated by nitro-glycerine or by rest. Myocardial infarction was defined as previous history or a previous occurrence of it detected by electrocardiography or newly diagnosed myocardial infarction by blood enzyme levels. Heart failure was identified as congestive heart failure according to medical records. The inclusion criteria were the patients who were over 18 years of age, whose native language was Turkish, and who had perceived limitations in more than one activity of daily life. The exclusion criteria of the present study were cognitive deficits affecting the assessments, and functional problems not related to the cardiac diseases, or the patients who were at the beginning or the end stages of the heart failure. All of the subjects were receiving their optimal pharmacological therapy and all of them were clinically stable. The interviews were carried out before the participants were discharged from hospital and were performed at the Physical Medicine and Rehabilitation Department. This study was approved by the University Institutional Review Board and Ethics Committee (Project no: KA14/12).

Socio-demographic and clinical characteristics were col-

lected at admission. The participants completed an interview with an occupational therapist, which addressed activity limitations and participation restrictions. The COPM<sup>18</sup> was used for this objective. COPM is now a widely used and accepted outcome measure for clients with chronic conditions<sup>18, 21-23</sup> and has been validated for the Turkish population<sup>24</sup>. The COPM permits the identification and measurement of problems of particular concern to the patient. It is an individual and a client-centered outcome measure designed according to this perspective to help detect gradual changes in client self-perception of occupational performance and satisfaction in the areas of self care, productivity and leisure times. It is a semi-structured interview, in which a therapist helps the client to identify his or her problems performing daily activities. This outcome measurement is used for various diagnoses and in all developmental stages<sup>18, 21, 25</sup>. All of the COPM interviews in this study took place in the hospital and were conducted by the same trained therapist. During the interviews, the patients were encouraged to identify any daily activity that they would like or need to do but found difficult to complete because of their cardiac diseases. Patients then identified the five most important daily activities and rated, first, their current level of performance, and then, how satisfied they were with this current level of performance. These performance and satisfaction scores were rated by on a 10-point scale, with higher scores indicating better performance and satisfaction<sup>18, 20</sup>.

The Nottingham Extended Activities of Daily Living (NEADL) Scale is another scale that is used for assessing activity limitation in patients with cardiac diseases. The NEADL is frequently used in clinical practice and research in rehabilitation research to assess patients' independence in activities of daily living and has been validated for the Turkish population<sup>26</sup>. Twenty-two activities are considered, which fall into 4 subscales: mobility, kitchen, domestic, and leisure activities. Responses are recorded using 1 of 4 options (not at all=0, with help=1, on my own with difficulty=2, on my own=3)<sup>26, 27</sup>. During the interviews to detect the impact of activity limitations on quality of life, the Nottingham Health Profile (NHP) was used. The NHP is designed to be a standardized and simple measure of subjective health status in the physical, social and emotional domains. The NHP is a questionnaire designed to measure the social and personal effects of illness. It is used as a measure of need of health care and as an outcome measure in evaluation. Among groups of subjects, it correlates well with objective measures of health status and it is sensitive to change with disease severity. It has 38 questions (requiring a yes/no response) on energy, pain, emotion, sleep, social isolation, and physical abilities and the scores of each component are weighted to give a score from 0 to 100<sup>28</sup>. The NHP has been proved to be valid and reliable for several groups of patients<sup>29, 30</sup> and a Turkish validation has been carried out<sup>31</sup>.

The statistical software SPSS 20 (IBM Corp. Released 2011 IBM SPSS Statistics for Windows, Version 20.0 Armonk, NY: IBM Corp.) was used for the analyses. The data are presented as the mean and standard deviation for the continuous variables and percentages for the categorical data. The number of patients identifying each activity as one of their major problems was determined. Ratings of perfor-

**Table 1.** Sociodemographic and clinical characteristics of the participants

Variables		Mean	SD
Age (years)		60.2	12.0
BMI		26.1	4.1
		Frequency	%
Gender	Male	46	65.7
	Female	24	34.3
Level of education	No education	1	1.4
	Primary school	20	28.6
	Secondary school	11	15.7
	High school	15	21.4
	Bachelor	21	30
	Master degree	1	1.4
	Doctoral degree	1	1.4
Occupation	Employee	13	18.6
	Unemployed	7	10
	Retired	45	64.3
	Unemployed because of the disease	5	7.1
Marriage status	Single	2	2.9
	Married	62	88.6
	Divorced	1	1.4
	Widow	5	7.1
Smoking habit	Smoker	12	17.1
	Non-smoker	16	22.9
	Ex-smoker	42	60
Exercise habit	Yes	9	12.9
Diagnosis	Myocardial infarction	20	28.6
	Coronary angiography (CAD)	22	31.4
	Angina pectoris (CAD)	14	20
	Heart failure	14	20

SD: Standard Deviation, BMI: Body mass index, CAD: Coronary artery disease

mance and satisfaction were calculated for each patient as the mean of the scores of the main problem activities of that patient. The variables were tested for normal distribution using the Kolmogorov-Smirnov test. Correlations between the COPM and NHP were examined by using Pearson Correlation Coefficients. The sample size was determined based on statistical power analysis procedures using PASS 2005 software (NCSS, Kaysville, UT, USA). The power analysis indicated that 66 participants were needed for 80% power and a 5% type 1 error. The power analysis of our study showed a power of 80% with activity performance measurement as the primary outcome. In case of dropouts estimated subject's number at least 20% increased.

## RESULTS

The socio-demographic and clinical characteristics of patients are presented in Table 1 ( $p > 0.05$ ). The subjects reported 46 occupational performance problems in the COPM interviews. The most commonly described problems were walking (45.7%), climbing up the stairs (41.4%), bathing (30%), dressing (28.6%) and outings (27.1%). Table 2 shows all of the patients' occupational performance problems.

Patients' performance limitations were scored on the COPM. The correlation coefficients of the COPM performance score and all the subgroups scores of NEADL and NHP (total, energy, and physical ability) subgroup scores were statistically significant ( $p < 0.05$ ). There were significant relations between all subgroups of NEADL and NHP: total, energy, and physical ability subgroup scores ( $p < 0.05$ ). There

**Table 2.** Frequencies of activity performance problems of patients with cardiac diseases

Activities	%	Activities	%
Walking	45.7	Playing tennis	5.7
Climbing stairs	41.4	Playing volleyball	5.7
Bathing	30	Washing hand and face	5.7
Dressing	28.6	Putting on shoes	5.7
Outings	27.1	Nature walking	5.7
Putting on socks	24.3	Cleaning windows	5.7
Speaking	22.9	Working	4.3
Driving	17.1	Breathing	4.3
Playing sports	18.6	Feeding farm-animals	4.3
Shopping at the bazaar	17.1	Going to the restroom	4.3
Cooking	15.7	Painting walls	2.9
Shopping	14.3	Riding a bicycle	2.9
Cleaning	14.3	Meeting with friends or relatives	1.4
Gardening	12.9	Staying in a closed area	1.4
Lifting weights	12.9	Combing hair	1.4
Running	12.9	Peeling eggs	1.4
Reading a newspaper	11.4	Cutting firewood	1.4
Taking pills	8.6	Playing the baglama	1.4
Swimming	8.6	Going to the cinema	1.4
Shaving	8.6	Eating	1.4
Washing dishes	7.1	Reading book	1.4
Washing clothes	7.1	Going to hunting	1.4
Knitting	7.1	Going on holiday	1.4

**Table 3.** Significant correlations between activities of daily living and quality of life measurements

Measurements		COPM		NEADL			
		Performance Score	Total Score	Mobility	Kitchen	Domestic	Leisure Activities
		r	r	r	r	r	r
NHP	Total Score	-0.464*	-0.485*	-0.471*	-0.356*	-0.376*	-0.366*
	Energy	-0.317*	-0.395*	-0.394*	-0.453*	-0.592*	-0.438*
	Physical Abilities	-0.406*	-0.579*	-0.547*	-0.417*	-0.506*	-0.305*
NEADL	Mobility	0.356*					
	Kitchen	0.382*					
	Domestic	0.472*					
	Leisure Activities	0.359*					
	Total Score	0.441*					

\*p<0.05, COPM: Canadian Occupational Performance Measurement, NHP: Nottingham Health Profile, NEADL: Nottingham Extended Activities of Daily Living

was no relationship between COPM satisfaction scores and the other outcome measurements (p>0.05). The significant correlations are shown in Table 3. Descriptive analysis results of these outcome measurements are shown in Table 4.

### DISCUSSION

Recent suggestions for the treatment of the heart diseases focus on increasing the quantity of life (preventing disease and death) and improving the quality of life by reducing the symptoms. The recognition of the importance of system-

atically examining symptoms and functional restrictions to tailor the management of cardiac diseases has led to the use of a number of condition specific, health status measures<sup>13, 16, 17, 32, 33</sup>. Patient-reported outcomes are any report of the status of a patient's health condition that comes directly from the patient, without interpretation of the patient's response by a clinician or anyone else. The outcome can be measured in absolute terms (e.g., severity of a symptom, or impact of a symptom), or as a change over time. Patients report their symptoms/impacts by completing a questionnaire or a diary<sup>34</sup>. There is a growing recognition of the

**Table 4.** Descriptive results of the outcome measurements

Outcome measurements		Mean	SD
COPM performance score		5.50	1.96
COPM satisfaction score		8.54	1.54
NHP	Energy	36.59	33.39
	Pain	18.05	17.41
	Emotion	24.36	21.08
	Sleep	27.58	26.74
	Social isolation	12.37	19.28
	Physical abilities	30.92	26.46
	Total score	149.54	78.0
NEADL	Mobility	4.92	1.83
	Kitchen	4.04	1.80
	Domestic	3.12	1.40
	Leisure activities	4.82	1.68
	Total score	16.94	5.82

SD: Standard Deviation, COPM: Canadian Occupational Performance Measurement, NHP: Nottingham Health Profile, NEADL: Nottingham Extended Activities of Daily Living

importance of a patient perspective on health after medical treatment of cardiovascular disease. Patient-reported outcomes can provide an additional measure complementary to objective biomedical measures<sup>35</sup>. Despite the continued rise in reporting of patient-reported outcomes in cardiovascular trials, such outcomes were still underused in many trials, even after taking account of their relevance to individual trials<sup>36</sup>.

Patient specific measures such as the COPM can act as a tool to encourage patients and professionals to jointly participate in goal-setting in a client centred perspective<sup>37</sup>. There is no study that has used the COPM as an assessment tool for in clients with cardiac diseases. It is mentioned in a review that COPM, which is an open-ended goal-setting tool, may, if administered carefully, provide an opportunity for the patients with cardiac disease to express their desires, both in the present and the future<sup>38</sup>.

The results of this present study confirm that patients with cardiac diseases have considerable functional limitations. The participants reported problems in many areas of activity and participation. The results of this study also suggests that the COPM may be a useful patient-reported assessment tool for measuring activity limitation and participation in cardiac diseases, and permits the determination of the aspects of performance that are of greatest relevant to the cardiac patients. The most commonly reported occupational problems were about self-care and mobility activities. A previous study has mentioned that functional limitations in cardiac diseases primarily arise from clinical symptoms which are due to not only cardiac dysfunction but also systemic factors, such as skeletal muscle dysfunction<sup>4</sup>. Therefore, activity limitations defined by COPM describes the disease specific limitations of cardiac diseases.

Fihn et al.<sup>39</sup> recommended a wide range of tools for monitoring and providing risk stratification of cardiac patients. Clinical markers, such as electrocardiography, echocardiog-

raphy or exercise testing, tend to be expensive and invasive. However, COPM is non-invasive, cost effective and easy to administer. This patient-reported outcome measurement may have an important role in clinical research and disease management programmes for cardiac diseases.

In this study, the most commonly described problem was walking tolerance, which was identified as one of the most important problems by 45.7% of patients, and the other commonly described problems were climbing stairs (41.4%), bathing (30%), dressing (28.6%) and outings (27.1%). On the other hand, other different activity performance problems identified were like knitting, playing the baglama (a music instrument), going to hunting, or peeling eggs, etc. Clinicians can learn from patients traditional activity performance problems such as walking, or stair climbing, but it is important for patients' quality of life to uncover the real problem. When the clinician or therapist knows all of a patient's activity performance problems they can plan more suitable rehabilitation programs. As it has indicated in this study, COPM also describes some cultural differences that could affect the disease progress.

In this study the associations between activity limitation and quality of life were significant, especially the physical ability dimension of the quality of life measurement. The results showed that the systemic and central effects of the cardiac diseases may influence the development of the activity limitation and reduce patients' quality of life. On the other hand there was no relationship between patients' satisfaction about their activity performance and NHP or NEADL. This situation reflects the fact that patients' satisfaction is not exclusively related to performance of daily living activities. Administering the COPM for patients with cardiac diseases is important for evaluating their satisfaction with activity performance.

This study has some potential limitations. All of the interviews were carried in an inpatient hospital department. Out-patient design interviews should be carried out with cardiac patients in further studies. A second limitation is the cross sectional design of our study, which only enables examination of associations between dimensions of functioning. Studies with a longitudinal design are also needed. Another limitation was our context of the patients. Our participants had only coronary artery diseases (angina pectoris, myocardial infarction), heart failure, or were patients who received for angiography. Therefore, more types of cardiac patients should be included in the future studies or different cardiac conditions should be analyzed.

In conclusion, cardiac diseases, their assessment and treatment are major challenges for health care providers throughout the world<sup>40</sup>. In this study, it was found that patients with cardiac diseases reported problems with diverse activities. The COPM could provide information about patient centred management for cardiac diseases. It has considerable merit as a measure of cardiac patients' capacity for engaging in activities which are important to their quality of life.

## REFERENCES

- 1) Stefanac S: Occupational Therapy with people affected by cardiovascular disease. *Kardio List*, 2011, 6: 303.

- 2) Hunt SA, Baker DW, Chin MH, et al. American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Committee to Revise the 1995 Guidelines for the Evaluation and Management of Heart Failure) International Society for Heart and Lung Transplantation Heart Failure Society of America: ACC/AHA guidelines for the evaluation and management of chronic heart failure in the adult: executive summary. *Circulation*, 2001, 104: 2996–3007. [[Medline](#)] [[CrossRef](#)]
- 3) Bartholomew T, Cragg KJ, Hays TJ, et al.: Working with Elders Who Have Cardiovascular Conditions. In: Byers-Connon S, Lohman H, Padilla LR, editors. *Occupational Therapy with Elders*, 2nd ed. St. Louis: Elsevier Mosby 2004, pp 297–305.
- 4) Kim WJ, Chang M, An DH: Effects of a community-based fall prevention exercise program on activity participation. *J Phys Ther Sci*, 2014, 26: 651–653. [[Medline](#)] [[CrossRef](#)]
- 5) Abe T, Suzuki T, Yoshida H, et al.: The relationship between pulmonary function and physical function and mobility in community-dwelling elderly women aged 75 years or older. *J Phys Ther Sci*, 2011, 23: 443–449. [[CrossRef](#)]
- 6) Sato S, Arakawa N, Kamata J, et al.: Relationship between exercise tolerance and respiratory pattern and muscular strength of legs in patients with chronic heart failure. *J Phys Ther Sci*, 2002, 14: 47–50. [[CrossRef](#)]
- 7) Kono Y, Yamada S, Iwatsu K, et al.: Predictive value of functional limitation for disease severity in patients with mild chronic heart failure. *J Cardiol*, 2012, 60: 411–415. [[Medline](#)] [[CrossRef](#)]
- 8) Kattainen A, Koskinen S, Reunanen A, et al.: Impact of cardiovascular diseases on activity limitations and need for help among older persons. *J Clin Epidemiol*, 2004, 57: 82–88. [[Medline](#)] [[CrossRef](#)]
- 9) World Health Organisation: *International Classification of Functioning, Disability and Health (ICF)*. Geneva: WHO, 2001.
- 10) World Health Organization, *International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, Vols. 1–3*. Geneva, 1992–1994.
- 11) World Health Organization: *Towards a Common Language for Functioning, Disability and Health, ICF, The International Classification of Functioning, Disability and Health*, Geneva, 2002.
- 12) Rauch A, Cieza A, Stucki G: How to apply the International Classification of Functioning, Disability and Health (ICF) for rehabilitation management in clinical practice. *Eur J Phys Rehabil Med*, 2008, 44: 329–342. [[Medline](#)]
- 13) Cieza A, Stucki A, Geyh S, et al.: ICF Core Sets for chronic ischaemic heart disease. *J Rehabil Med*, 2004, 44: 94–99. [[Medline](#)] [[CrossRef](#)]
- 14) Green CP, Porter CB, Bresnahan DR, et al.: Development and evaluation of the Kansas City Cardiomyopathy Questionnaire: a new health status measure for heart failure. *J Am Coll Cardiol*, 2000, 35: 1245–1255. [[Medline](#)] [[CrossRef](#)]
- 15) Rector TS, Cohn JN, Pimobendan Multicenter Research Group: Assessment of patient outcome with the Minnesota Living with Heart Failure questionnaire: reliability and validity during a randomized, double-blind, placebo-controlled trial of pimobendan. *Am Heart J*, 1992, 124: 1017–1025. [[Medline](#)] [[CrossRef](#)]
- 16) Gibbons RJ, Abrams J, Chatterjee K, et al. American College of Cardiology American Heart Association Task Force on Practice Guidelines. Committee on the Management of Patients With Chronic Stable Angina: ACC/AHA 2002 guideline update for the management of patients with chronic stable angina—summary article: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Committee on the Management of Patients With Chronic Stable Angina). *Circulation*, 2003, 107: 149–158. [[Medline](#)] [[CrossRef](#)]
- 17) Gibbons RJ, Abrams J, Chatterjee K, et al. American College of Cardiology American Heart Association Task Force on practice guidelines (Committee on the Management of Patients With Chronic Stable Angina): ACC/AHA 2002 guideline update for the management of patients with chronic stable angina—summary article: a report of the American College of Cardiology/American Heart Association Task Force on practice guidelines (Committee on the Management of Patients With Chronic Stable Angina). *J Am Coll Cardiol*, 2003, 41: 159–168. [[Medline](#)] [[CrossRef](#)]
- 18) Law M, Baptiste S, McColl M, et al.: The Canadian occupational performance measure: an outcome measure for occupational therapy. *Can J Occup Ther*, 1990, 57: 82–87. [[Medline](#)] [[CrossRef](#)]
- 19) Kjekken I, Slatkowsky-Christensen B, Kvien TK, et al.: Norwegian version of the Canadian Occupational Performance Measure in patients with hand osteoarthritis: validity, responsiveness, and feasibility. *Arthritis Rheum*, 2004, 51: 709–715. [[Medline](#)] [[CrossRef](#)]
- 20) Wressle E, Lindstrand J, Neher M, et al.: The Canadian Occupational Performance Measure as an outcome measure and team tool in a day treatment programme. *Disabil Rehabil*, 2003, 25: 497–506. [[Medline](#)] [[CrossRef](#)]
- 21) Sewell S, Singh SJ: The Canadian Occupational Performance Measure: is it a reliable measure in clients with chronic obstructive pulmonary diseases. *Br J Occup Ther*, 2001, 64: 305–310. [[CrossRef](#)]
- 22) Dedding C, Cardol M, Eyssen IC, et al.: Validity of the Canadian Occupational Performance Measure: a client-centred outcome measurement. *Clin Rehabil*, 2004, 18: 660–667. [[Medline](#)] [[CrossRef](#)]
- 23) Sewell L, Singh SJ, Williams JE, et al.: Can individualized rehabilitation improve functional independence in elderly patients with COPD? *Chest*, 2005, 128: 1194–1200. [[Medline](#)] [[CrossRef](#)]
- 24) Bumin GM, Huri Z, Kayihan H: Construct validity of Canadian occupational performance measure in children with developmental disorders in Turkey. *Eur J Paediatr Neurol*, 2007, 11: 47. [[CrossRef](#)]
- 25) Eyssen IC, Beelen A, Dedding C, et al.: The reproducibility of the Canadian Occupational Performance Measure. *Clin Rehabil*, 2005, 19: 888–894. [[Medline](#)] [[CrossRef](#)]
- 26) Sahin F, Yilmaz F, Ozmaden A, et al.: Reliability and validity of the Turkish version of the Nottingham Extended Activities of Daily Living Scale. *Aging Clin Exp Res*, 2008, 20: 400–405. [[Medline](#)] [[CrossRef](#)]
- 27) das Nair R, Moreton BJ, Lincoln NB: Rasch analysis of the Nottingham extended activities of daily living scale. *J Rehabil Med*, 2011, 43: 944–950. [[Medline](#)]
- 28) Hunt SM, McKenna SP, McEwen J, et al.: The Nottingham health profile: Subjective health status and medical consultations. *Social Science & Medicine*. Part A. *Med Psychol Med Sociol*, 1981, 15: 221–229.
- 29) Permyer-Miralda G, Alonso J, Antó JM, et al.: Comparison of perceived health status and conventional functional evaluation in stable patients with coronary artery disease. *J Clin Epidemiol*, 1991, 44: 779–786. [[Medline](#)] [[CrossRef](#)]
- 30) Alonso J, Prieto L, Ant JM. The Spanish version of the Nottingham Health Profile: A review of adaptation and instrument characteristics. *Qual Life Res* 1994, 3:385–393.
- 31) Küçükdeveci AA, McKenna SP, Kutlay S, et al.: The development and psychometric assessment of the Turkish version of the Nottingham Health Profile. *Int J Rehabil Res*, 2000, 23: 31–38. [[Medline](#)] [[CrossRef](#)]
- 32) Balady GJ, Ades PA, Comoss P, et al.: Core components of cardiac rehabilitation/secondary prevention programs: A statement for healthcare professionals from the American Heart Association and the American Association of Cardiovascular and Pulmonary Rehabilitation Writing Group. *Circulation*, 2000, 102: 1069–1073. [[Medline](#)] [[CrossRef](#)]
- 33) Hur S, Kim SR: The effects of exercise therapy on CVD risk factors in women. *J Phys Ther Sci*, 2014, 26: 1367–1370. [[Medline](#)] [[CrossRef](#)]
- 34) Guidance for Industry: Patient-Reported Outcome Measures: Use in Medical Product Development to Support Labeling Claims. U.S. Department of Health and Human Services, Food and Drug Administration, Center for Drug Evaluation and Research (CDER), Center for Biologics Evaluation and Research (CBER), Center for Devices and Radiological Health (CDRH) 2009.
- 35) Norekvål TM, Fridlund B, Rokne B, et al.: Patient-reported outcomes as predictors of 10-year survival in women after acute myocardial infarction. *Health Qual Life Outcomes*, 2010, 8: 140. [[Medline](#)] [[CrossRef](#)]
- 36) Rahimi K, Malhotra A, Banning AP, et al.: Outcome selection and role of patient reported outcomes in contemporary cardiovascular trials: systematic review. *BMJ*, 2010, 341: c5707. [[Medline](#)] [[CrossRef](#)]
- 37) Stevens A, Beurskens A, Köke A, et al.: The use of patient-specific measurement instruments in the process of goal-setting: a systematic review of available instruments and their feasibility. *Clin Rehabil*, 2013, 27: 1005–1019. [[Medline](#)] [[CrossRef](#)]
- 38) Imms C: Occupational performance challenges for children with congenital heart disease: a literature review. *Can J Occup Ther*, 2004, 71: 161–172. [[Medline](#)] [[CrossRef](#)]
- 39) Fihn SD, Gardin JM, Abrams J, et al. American College of Cardiology Foundation: 2012 ACCF/AHA/ACP/AATS/PCNA/SCAI/STS guideline for the diagnosis and management of patients with stable ischemic heart disease: executive summary: a report of the American College of Cardiology Foundation/American Heart Association task force on practice guidelines, and the American College of Physicians, American Association for Thoracic Surgery, Preventive Cardiovascular Nurses Association, Society for Cardiovascular Angiography and Interventions, and Society of Thoracic Surgeons. *Circulation*, 2012, 126: 3097–3137. [[Medline](#)] [[CrossRef](#)]
- 40) Moser DK, Worster PL: Effect of psychosocial factors on physiologic outcomes in patients with heart failure. *J Cardiovasc Nurs*, 2000, 14: 106–115. [[Medline](#)] [[CrossRef](#)]