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ORIGINAL ARTICLE / ОРИГИНАЛНИ РАД

Measurement properties of New Mobility Score to evaluate functional recovery in the elderly following total hip arthroplasty

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SUMMARY

Introduction/Objective The aim of this study is to identify and evaluate the use of New Mobility Score (NMS) in estimating functional recovery three months after total hip arthroplasty (THA).

Methods In total, 70 patients, aged > 60 years, underwent THA. Treatment group was subjected to the comprehensive rehabilitation program and control group to the standard one. Primary outcome was assessed with Harris Hip Score (HHS) and NMS, and secondary one by Medical Outcomes Health Survey (Short-Form Health Survey – SF-36). Questionnaires were collected before and three months after hip surgery.

Results Treatment group showed significant improvement three months postoperatively. The correlation in both groups between HHS and NMS was very strong (r > 0.700). Treatment group following surgery showed strong correlation between Recovery through Personal Care Services (PCS) and HHS and NMS (r > 0.700), moderate to strong between pain categories and HHS (r = 0.380; r = 0.583) and NMS (r = 0.424). Control group showed strong correlation between PCS and HHS (r = 0.704), and NMS (r = 0.568) and moderate to pain categories and HHS (r = 0.546; r = 0.466). The area under the curve (AUC) described the inherent validity of all measurement used AUC_{NMS} = 0.724, p = 0.001, AUC_{HHS} = 0.788, p = 0.000 and AUC_{PCS} = 0.747, p = 0.001.

Conclusion The NMS could be successfully used in routine clinical assessment of elderly patients following THA.

The trial is registered in ISRCTN Register with https://doi.org/10.1186/ISRCTN73197506.

Keywords: Harris Hip Score; New Mobility Score; SF-36; outcome assessment; hip arthroplasty; rehabilitation; ROC curve

INTRODUCTION

Total hip arthroplasty (THA) is the most commonly performed surgical procedure undertaken to relieve pain and restore function in elderly people with end-stage hip osteoarthritis [1]. With the projected increase in the number of the elderly undergoing THA over the next two decades, it becomes even more critical to develop effective rehabilitation strategies, individually adapted, which can contribute most benefit. Surgery alone fails to fully restore physical function and address longstanding impairments associated with chronic joint disease [2, 3].

Despite the increased interest in evaluating outcomes following hip arthroplasty, challenges remain in ensuring that such assessments of outcome are accurate, reliable, and relevant [4]. Generic patient-reported outcome measures (PROMs) describe a patient's global health status, and numerous comprehensive specific PROMs instruments are available for patients with hip problems [5]. Health-related quality-of-life data are valuable as they can provide relevant health-status information to health professionals and should be used as rationale for implementing the most adequate standard of health care [6]. There are many different tools available to measure an outcome, each with its advantages and drawbacks. Pain assessment is a crucial component of joint specific and generic self-assessment instruments because it influences physical functioning (PF) [7]. After surgery, outcome measures are generally conveyed as the quality-of-life score, and joint-specific tools focus on disability relating to a particular joint irrespective of the underlying pathology [7, 8]. Therefore, there is a need for guidance in defining criteria for the most useful outcome measures, using the International Classification of Functioning, Disability, and Health (ICF) model to conceptualize joint replacement outcomes [9, 10].

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The meta-analysis from 2019. distinguishes results on patient-reported function, hip-related pain, and health-related quality of life after total hip replacement and suggests focusing on early rehabilitation [11, 12].

The aim of this study is to identify and evaluate the use of New Mobility Score (NMS) together with already confirmed Harris Hip Score (HHS) and the medical outcomes study Short-Form Health Survey (SF-36) in estimating functional recovery three months after primary hip arthroplasty.

METHODS

Study design, participants, and ethics

This study was designed as a prospective randomized controlled study. The data were collected preoperatively and three months after THA to evaluate the effectiveness of a comprehensive rehabilitation program compared to the standard one after hip arthroplasty. Recruited patients were enrolled between 2013 and 2015, prior to surgery at the orthopedic surgery department. The inclusion criteria were older than 60, end-stage primary hip osteoarthritis, and primary unilateral total hip replacement. The exclusion criteria were postoperative complications, cognitive impairment (assessed clinically), history of congenital hip dislocation, bilateral hip disease or inflammatory arthritis, significant neuromuscular disease (e.g., Parkinson's disease), lower extremity fractures, or paralysis.

A randomization sequence was created using a computer-generated list of numbers in block sizes of four. Those who qualified for the trial underwent a hip replacement, by posterior-lateral approach, performed by the same surgery team. Both groups received a standard exercise program guided by a physiotherapist, starting on the first post-surgery day. Participants in the treatment group were given a comprehensive program with additional physical exercises for the arm and upper body. Both program sessions were performed twice a day, five days a week, during a two-week stay at the hospital. The patients were supervised in an inpatient rehabilitation center (for four weeks) and finally at home, unsupervised (for six weeks).

All participants gave their voluntary written consent according to approval by the Regional Committee for Medical Research Ethics (n.29/V-17). The trial is registered in ISRCTN Register with ISRCTN73197506.

Patient characteristics

Before surgery, a questionnaire including anthropometric characteristics (age, sex, body height and weight, comorbidities) was completed for all patients.

Patient assessment

The primary outcome was changed in the lower limbs' hip function and physical performances, assessed by HHS and NMS, from baseline and after three months. HHS is a multidimensional assessment of the results of hip surgery [2, 13]. The domains covered by the HHS are pain and daily living activities, and hip function assessment (limping), absence of deformity, and range of motion. The final score ranges from 100 points (no disability) to 0 (maximum disability).

NMS is a composite score of the patient's ability to perform: indoor walking, outdoor walking, and shopping, providing a score between 0 and 3 (0 – not at all, 1 – with help from another person, 2 – with an aid, 3 – no difficulty) for each function, resulting in a total score from 0 (no walking ability at all) to 9 (fully independent) [14, 15, 16].

Secondary outcomes were estimating and measuring functional physical recovery after primary hip arthroplasty and quality of life by SF-36. The SF-36 is a common general health scale evaluating physical and mental health (MH), which includes one multi-item scale that assesses eight health concepts: 1 – limitations in physical activities because of health problems; 2 – limitations in social activities because of physical or emotional problems; 3 – limitations in usual role activities because of physical health problems; 4 – bodily pain (BP); 5 – general MH (psychological distress and well-being); 6 – limitations in usual role activities because of emotional problems; 7 – vitality (energy and fatigue), and 8 – general health state. It has been tested for its psychometric properties. Each subscale score is converted from 0 to 100; the higher the score, the better the quality of life [4, 17].

Statistical analysis

Baseline data on patients' characteristics were examined for differences between the two groups by chi-square test for categorical variables or Student t-test and Mann–Whitney U test for continuous variables.

In this paper, we used norm-based scoring for all domains of SF-36. Norm-based scoring generates Physical Component Summary (PCS) and Mental Component Summary (MCS) scores, using Scoring Software 4.5™ [18]. The response to 36 questions is transferred to 0–100 worst/best scale, according to which 50 points score corresponds to a generally healthy population.

Correlations between specific and generic tests in two measurement periods were assessed with the Pearson linear correlation coefficient. The degree of correlation was defined as low if the coefficient was less than 0.3, moderate if it was between 0.3 and 0.5, and reliable if it was more significant than 0.5 [19].

Receiver operating characteristic (ROC) curve plots were generated for all used outcome measurements. The point closest to the upper left corner of the curve represents the optimal trade-off between sensitivity and specificity for detecting clinical improvement. The area under the curve can be interpreted as the probability of the test to identify an improvement in patients correctly. An AUC of 1 demonstrates an ideal test with a 100% sensitivity and specificity, while an AUC of less than 0.5 indicates that the test is less useful. Cut-off points are defined by positive-to-negative (P/N) ratios [20].

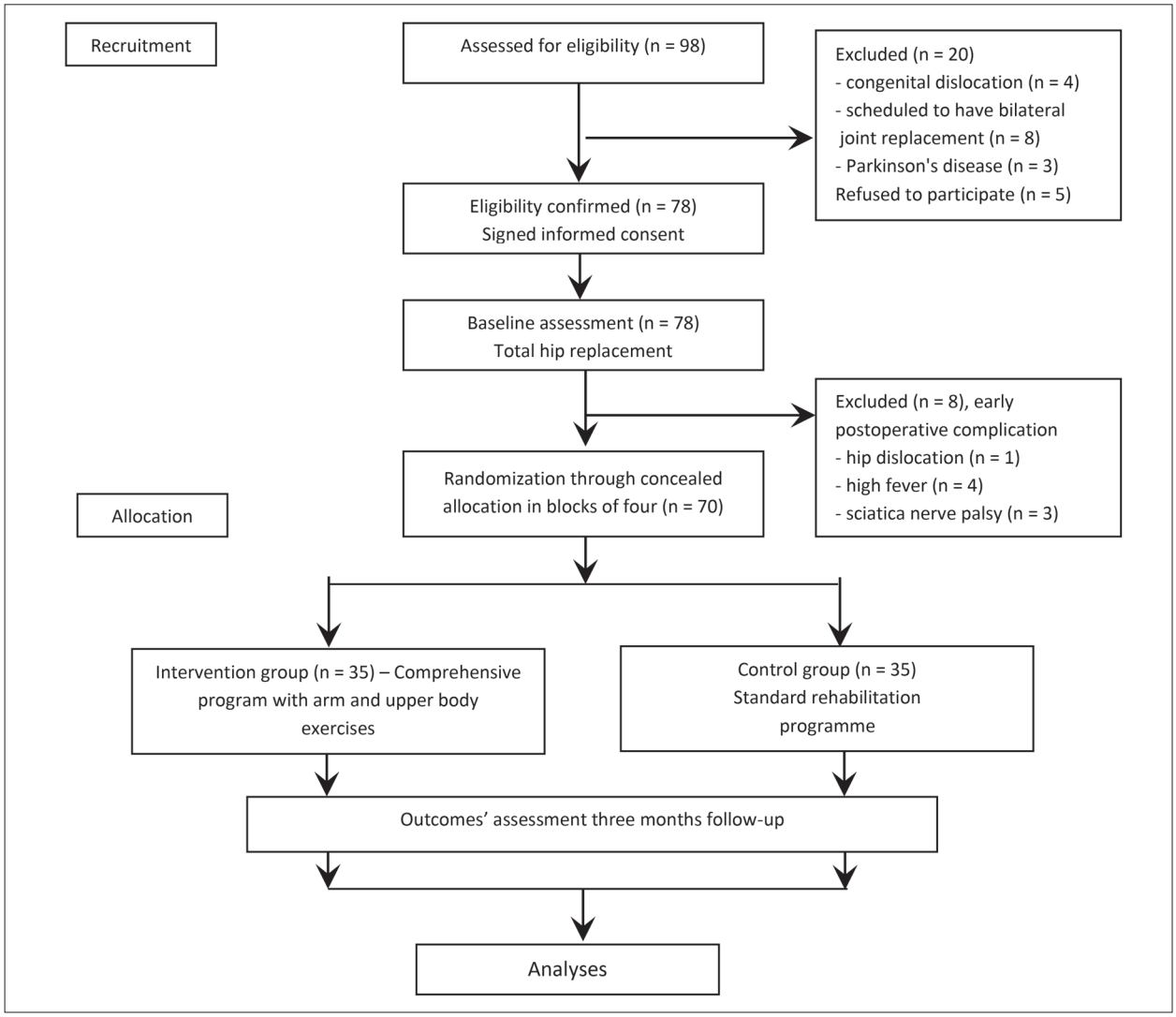

Figure 1. Flow diagram of the randomized clinical trial

IBM Statistical Package for Social Science for Windows (SPSS) version 21.0 (IBM Corp., Armonk, NY, USA) was used for statistical analyses.

RESULTS

In total, 98 patients were eligible for participation in the study from January 1, 2013, to June 30, 2015. After exclusion criteria had been implemented, 70 participants underwent randomization and did not change groups until the end of the research.

The treatment group consisted predominantly of females, 63% (n = 22) as well as in the control group, 77% (n = 27). There were no significant pre-treatment differences between the groups, suggesting that the randomization procedure produced well-balanced and comparable groups at baseline. The average age of participants was 69 (SD = 6.3 years) in both groups.

A flow diagram of the trial progression (recruitment, randomization, intervention allocation, follow-up, and data analysis) is shown in Figure 1. The average baseline characteristics of both groups are listed in Table 1.

Table 1. Socio-demographic and clinical characteristics of the participants

Characteristics	Study group n = 35	Control group n = 35	p
Age in years, mean (SD)	69.2 (6.29)	68.1 (6.35)	0.725
Sex			0.192
Male, n (%)	13 (37.1)	8 (22.9)	
Female, n (%)	22 (62.9)	27 (77.1)	
BMI in categories, n (%)			0.408
Normal, n (%)	7 (20)	11 (31.4)	
Overweight, n (%)	17(48.6)	12 (34.3)	
Obese, n (%)	11 (31.4)	12 (34.3)	
Comorbidities, mean (SD)	2.77 (1.8)	3.34 (2.38)	0.138
ICED score			0.405
Mild, n (%)	1 (2.9)	0 (0)	
Moderate, n (%)	2 (5.7)	2 (5.7)	
Severe, n (%)	30 (85.7)	33 (94.3)	

ICED – Index of Coexistent Disease; BMI – body mass index;
According to χ^2, t-test, or Mann–Whitney U-test where appropriate

The only significant difference between treatment and control study groups before the intervention was detected in the Vitality (VT) domain of the SF-36 questionnaire.

Table 2. Mean scores of NMS, SF36, and HHS questionnaires before and 3 months after the intervention in treatment and standard groups

Time	Questionnaire, mean (SD)	Groups		p*
		Treatment n = 35	Control n = 35	
	HHS	34.6 (10.56)	35.5 (9.3)	0.693
	HHS-pain	11.71(3.82)	12.86(4.58)	0.261
Before intervention	Physical Functioning	25.7 (4.93)	24.0 (3.73)	0.121
	Role-Physical	30.4 (6.95)	28.4 (10.3)	0.362
	Bodily Pain	29.9 (5.52)	27.7 (5.55)	0.106
	General Health	53.9 (9.06)	52.5 (8.84)	0.511
	Vitality	45.7 (10.68)	39.7 (10.29)	**0.019**
	Social Functioning	29.8 (10.63)	27.4 (9.22)	0.309
	Role-Emotional	35.1 (11.1)	36.3 (12.17)	0.670
	Mental Health	38.2 (13.45)	34.1 (12.09)	0.183
	Physical Component summary	32.9 (5.44)	30.4 (4.93)	0.054
	Mental Component summary	41.3 (12.31)	38.8 (12.62)	0.402
	NMS	3.9 (1.82)	3.9 (1.14)	1.000
Time	Questionnaire, mean (SD)	Groups		p*
		Treatment n = 35	Control n = 35	
	HHS	88.3 (4.62)	82.4 (5.51)	**< 0.001**
	HHS-pain	42.6(1.92)	41.1 (1.83)	**0.002**
3 months after intervention	Physical Functioning	49.3 (6.9)	44.2 (7.8)	**0.005**
	Role-Physical	51.9 (5.17)	47.0 (5.42)	**< 0.001**
	Bodily Pain	60.3 (4.54)	55.4 (5.43)	**< 0.001**
	General Health	58.9 (7.04)	56.0 (7.09)	0.096
	Vitality	61.8 (7.04)	56.6 (7.55)	**0.004**
	Social Functioning	55.8 (4.83)	52.2 (5.37)	**0.005**
	Role-Emotional	54.1 (5.88)	51.4 (6.92)	0.086
	Mental Health	56.3 (7.96)	52.4 (7.13)	**0.032**
	Physical Component summary	54.0 (5.70)	49.1 (5.62)	**0.001**
	Mental Component summary	57.9 (7.08)	54.9 (6.37)	0.067
	NMS	8.2 (1.09)	7.1 (1)	**< 0.001**

HHS – Harris Hip Score; NMS – New Mobility Score;
*According to the t-test

A higher score of VT was detected among treatment patients (45.7 *vs.* 39.7).

After the intervention, there were significant differences in favor of treatment group as regards HHS (88.3 *vs.* 82.4), pain category of HHS (42.63 *vs.* 41.14), NMS (8.2 *vs.* 7.1), and SF-36 domains PF (49.3 *vs.* 44.2), Role-Physical (RP) (51.9 *vs.* 47.0), BP (60.3 *vs.* 55.4), VT (61.8 *vs.* 56.6), Social Functioning (SF) (55.8 *vs.* 52.2), MH (56.3 *vs.* 52.4), as well as PCS (54 *vs.* 49.1), but for MCS (p = 0.067) there were no statistically significant differences between groups (Table 2).

Correlations prior to THA were given in Table 3.

In the treatment group, a strong statistically significant correlation was found between HHS and NMS. Moderate to strong positive statistically significant correlation was found between SF-36 domains: PF, RP, BP, SF, RE, PCS, HHS, and NMS. A moderate statistically significant correlation was found between the pain category of HHS and total HHS.

In the control group, a strong statistically significant correlation was found between HHS and NMS. Moderate to strong positive statistically significant correlation was found between SF-36 domains: PF, BP, VT, PCS, pain category of HHS, and total HHS and NMS. A moderate level of statistically significant correlation was found between SF-36 domains: BP, SF, and NMS, as well as VT and HHS.

Correlations three months after THA were given in Table 3.

In the treatment group, a strong significant correlation was found between HHS and NMS. Moderate to strong positive statistically significant correlation was found between SF-36 domains: PF, RP, GH, VT, PCS, pain category of HHS, and total HHS and NMS. A moderate significant correlation was present between BP and HHS.

In the control group, a strong significant correlation was found between HHS and NMS. Moderate to strong positive statistically significant correlation was found between SF-36 domains: PF, RP, GH, VT, and PCS and both HHS, as well as SF-36 domains: BP, SF, RE, MH, MCS, pain category HHS and total HHS. (Figure 2, Table 4)

AUC for NMS was 0.724 (CI 95% 0.598–0.849) p = 0.001, cut-off 7.5, with sensitivity of 80% and specificity of 71%.

AUC for HHS was 0.788 (95% CI 0.683–0.894) p = 0.000, cut-off 85.5, with sensitivity of 71% and specificity of 74%.

AUC for PCS SF-36v2 was 0.747 (95% CI 0.628–0.867) p = 0.001, cut-off 51.8, with sensitivity of 77% and specificity of 77%.

DISCUSSION

Previous studies have found that NMS was only used for functional assessment of patients with hip fractures [14, 15, 16]. In our study, NMS was used for the first time to evaluate physical functional recovery after primary hip arthroplasty in the elderly and recorded the same significant improvement as estimated by HHS and SF-36. Many papers assessed the PF of patients undergoing hip replacement surgery using different PROMs. They provided a shortlist of the most promising generic and joint-specific instruments [4, 5, 11, 12]. In Gagnier et al. [4], seventy-three studies were investigated, and 26 instruments were included, one of the most frequently assessed instruments being HHS. This study opted for physician-administered HHS, a widely used important instrument for evaluating outcomes and predicting early revision surgery after THA [6, 13, 21]. HHS and SF-36 are highly valid and reliable outcome measurement instruments, which we also used in this study. Mariconda et al. [22] presented that HHS was the essential determinant of SF-36 PCS and PF scale scores, showing that hip functionality is critical in determining the patients' general functioning. The most important findings of the systematic review and meta-analysis are that mid-term health-related quality of life following THA is superior to preoperative levels in a broad range of SF-36 domains and results in patient satisfaction and specific functional gains [23]. Our study has proven statistically significant functional

Table 3. Correlation coefficients between HHS, NMS, and SF-36 domains before and three months after the intervention in treatment and control groups

Before intervention				3 months after intervention	
Group		HHS	NMS	HHS	NMS
Treatment group		r = 0.737; p < 0.001		r = 0.718; p < 0.001	
SF-36	Physical Functioning	r = 0.715 **p < 0.001**	r = 0.626 **p < 0.001**	r = 0.733 **p < 0.001**	r = 0.757 **p < 0.001**
	Role-Physical	r = 0.659 **p < 0.001**	r = 0.467 **p = 0.005**	r = 0.543 **p = 0.001**	r = 0.515 **p = 0.002**
	Bodily Pain	r = 0.708 **p < 0.001**	r = 0.454 **p = 0.006**	r = 0.380 **p = 0.024**	r = 0.305 p = 0.079
	General Health	r = 0.201 p = 0.246	r = 0.196 p = 0.259	r = 0.616 **p < 0.001**	r = 0.659 **p < 0.001**
	Vitality	r = 0.321 p = 0.060	r = 0.186 p = 0.284	r = 0.635 **p < 0.001**	r = 0.513 **p = 0.002**
	Social Functioning	r = 0.674 **p < 0.001**	r = 0.470 **p = 0.004**	r = 0.323 p = 0.058	r = 0.263 p = 0.133
	Role-Emotional	r = 0.378 **p = 0.025**	r = 0.146 p = 0.404	r = 0.258 p = 0.135	r = 0.209 p = 0.236
	Mental Health	r = 0.322 p = 0.059	r = 0.125 p = 0.473	r = 0.292 p = 0.089	r = 0.212 p = 0.229
	Physical Component summary	r = 0.567 **p < 0.001**	r = 0.556 **p = 0.001**	r = 0.714 **p < 0.001**	r = 0.757 **p < 0.001**
	HHS-Pain	r = 0.527 **p = 0.001**	r = 0.218 p = 0.208	r = 0.583 **p < 0.001**	r = 0.424 **p = 0.011**
	Mental Composite score	r = 0.396 **p = 0.019**	r = 0.159 p = 0.363	r = 0.214 p = 0.217	r = 0.130 p = 0.463
Control group		r = 0.695; **p < 0.001**		r = 0.733; **p < 0.001**	
SF-36	Physical Functioning	r = 0.676 **p < 0.001**	r = 0.522 **p = 0.001**	r = 0.603 **p < 0.001**	r = 0.519 **p = 0.001**
	Role-Physical	r = 0.319 p = 0.062	r = 0.337 **p = 0.048**	r = 0.608 **p < 0.001**	r = 0.504 **p = 0.002**
	Bodily Pain	r = 0.797 **p < 0.001**	r = 0.603 **p < 0.001**	r = 0.546 **p = 0.001**	r = 0.264 p = 0.125
	General Health	r = 0.243 p = 0.160	r = 0.224 p = 0.195	r = 0.627 **p < 0.001**	r = 0.436 **p = 0.009**
	Vitality	r = 0.398 **p = 0.018**	r = 329 p = 0.053	r = 0.625 **p < 0.001**	r = 0.501 **p = 0.002**
	Social Functioning	r = 0.458 **p = 0.006**	r = 0.380 **p = 0.024**	r = 0.530 **p = 0.001**	r = 0.223 p = 0.198
	Role-Emotional	r = 0.280 p = 0.103	r = 0.195 p = 0.262	r = 0.393 **p = 0.020**	r = 0.263 p = 0.126
	Mental Health	r = 0.280 p = 0.103	r = 0.117 p = 0.503	r = 0.542 **p = 0.001**	r = 0.302 p = 0.077
	Physical Composite score	r = 0.632 **p < 0.001**	r = 0.575 **p < 0.001**	r = 0.704 **p < 0.001**	r = 0.568 **p < 0.001**
	HHS-Pain	r = 0.715 **p < 0.001**	r = 0.474 **p = 0.004**	r = 0.466 **p = 0.005**	r = 0.228 p = 0.187
	Mental Component summary	r = 0.292 p = 0.089	r = 0.175 p = 0.305	r = 0.483 **p = 0.003**	r = 0.249 p = 0.149

HHS – Harris Hip Score; NMS – New Mobility Score

Table 4. Area Under the Curve (AUC) and P/N ratio cut-off points

Test result variable(s)	AUC	p	95% CI lower limit	95% CI upper limit	Cut-off	Sensitivity	Specificity
PCS postoperative	0.747	**0.000**	0.628	0.867	51.8	77	77
HHS postoperative	0.788	**0.000**	0.683	0.894	85.5	71	74
NMS postoperative	0.724	**0.001**	0.598	0.849	7.5	80	71

PCS – Physical Component Summary of SF-36; HHS – Harris Hip Score; NMS – New Mobility Score

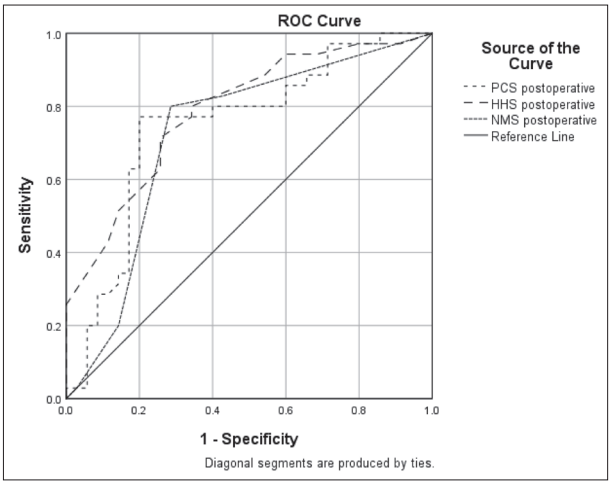

Figure 2. ROC curves three months postoperatively

improvement, predominantly in the treatment group, three months postoperatively, assessed with all used measurements: NMS, HHS and in virtually all domains SF- 36: PF, RP, BP, SF, VT, MH, and physical summary component. We found that correlation in treatment and control groups between HHS and NMS was very strong. The correlation in both groups between preoperative physical performances and pain was strong. Three months after arthroplasty, the correlation between the treatment and control group was strong to very strong between assessed physical performances. Following surgery and both physical exercise programmes (comprehensive and standard), we found a moderate correlation in treatment group and moderate to strong in control one between pain domain SF-36, pain category HHS and functional ability HHS.

Pain and physical function represent different but related health concepts and interventions [7, 23]. Therefore, separate assessments of these attributes were recommended at the Outcome Measures in Arthritis Clinical Trials conference [9, 10]. Results of the Terwee et al. [24] study confirmed that self-report measures of PF are more

influenced by the amount of pain experienced than performance-based measures of PF. We have established a connection between pain and PF following hip replacement measured by specific HHS, NMS, and generic SF-36.

Elibol et al. [25] found moderate to strong correlations between HHS and performance-based tests in evaluating patients with THA. In contrast, our study presented a strong correlation between outcomes assessment HHS and NMS in evaluating patients with THA.

ROC curves synthesized information on the sensitivity and specificity to discriminate significant functional improvement in the treatment group, on the one hand, and functional improvement in the control group. The AUC is an effective and combined measure that describes all measurements' inherent validity used HHS, NMS, and SF-36 [20]. The ROC curves of NMS with HHS and PCS of SF- 36 were located closer to each other in "ROC space," which confirmed validity for NMS. Hoeksma et al. [26] also used ROC curve to determine the ability of HHS and SF-36, walking speed, and pain to measure clinically relevant improvement after exercise therapy. In summary, they showed that HHS could detect a small improvement in hip function and recommended that it be used in rehabilitation interventions that focus on the improvement of functional ability in patients with OA of the hip.

Kristensen et al. [27] suggest that NMS is a valid and easily applicable score that provides a predictive value of the short-term potential of the patient's independence in functional mobility during admission and discharge status. Prieto-Moreno et al. [28] confirmed that NMS is a reliable and valid outcome measure to assess the pre-fracture functional status and cognitive impairment in older patients with hip fracture in Spain. We agreed that the NMS is an easy-to-use and quick-to-complete score that can be used for all patients with hip surgery, based on the information provided by the caregivers for the patients with functional status [28]. We also found that a strong correlation between used outcome measurements confirms that NMS is useful and important instrument for fast and relevant clinical assessment and evaluation of functional recovery after primary hip arthroplasty in the elderly in Serbia.

Consensus on which combination of measures will best assess physical function in people with hip OA still does not exist [9]. We related physical functional performances to "the ability to move around "and "the ability to perform daily activities "in THA patients unified in NMS, HHS, and SF-36. These functional activities were classified using the ICF model WHO [29].

There are potential limitations of this study, the first being using only self-reported generic and specific instruments. The second limitation is that the patients undergoing hip replacement were evaluated for a short follow-up time.

The strong points of this study are that we have created a randomized control study for assessing outcomes three months following primary hip arthroplasty in the elderly and that we have used valid outcome assessment.

Our further research will focus on the correlation between self-reported generic, specific, and performance-based outcome measurements to evaluate the effectiveness of a comprehensive rehabilitation programme over a more extended follow-up period.

CONCLUSION

In conclusion, we strongly support the use of joint self-reported specific and generic measurements in the assessment of impact of pain experience on PF after THA. We believe the findings of a strong correlation with all used outcome measurements confirm that NMS is useful and important for fast and adequate clinical evaluation of functional abilities after primary hip arthroplasty over a short follow-up time. The NMS can be successfully used in routine clinical practice to assess functionality outcomes after hip replacement in elderly patients.

Conflict of interest: None declared.

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Мерна својства Новог упитника за процену мобилности у функционалном опоравку старијих особа после тоталне артропластике кука

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САЖЕТАК

Увод/Циљ Циљ ове студије је да се идентификује и испита употреба Новог упитника скоровања мобилности (НУС) у процени функционалног опоравка три месеца након тоталне артропластике кука.

Методе У истраживање је укључено укупно 70 пацијената, старијих од 60 година, који су били подвргнути тоталној артропластици кука. Испитивана група је подвргнута свеобухватном програму рехабилитације, а контролна група стандардном. Примарни исход функционалног опоравка је оцењен Харисовим упитником за кук (ХУК) и НУС, а секундарни Општим упитником о здрављу (*SF-36*). Упитници су попуњавани преоперативно и три месеца постоперативно.

Резултати Испитивана група је у односу на контролну показала значајније побољшање три месеца после артропластике кука. Корелација у обе групе између ХУК и НУС је била врло јака ($p > 0,700$). У испитиваној групи је три месеца постоперативно показана јака повезаност између укупног физичког опоравка (УФО) *SF-36*, ХУК и НУС ($r > 0,700$), умерена до јака између категорија бола, ХУК ($r = 0,380$; $r = 0,583$) и НУС ($r = 0,424$). У контролној групи је показана јака корелација између УФО *SF-36*, ХУК ($r = 0,704$) и НУС ($r = 0,568$) и умерена између категорија бола и ХУК ($r = 0,546$; $r = 0,466$). Подручје испод криве (*AUC*) показало је валидност свих коришћених мерних инструмената: $AUC_{НУС} = 0,724$, $p = 0,001$, $AUC_{ХУК} = 0,788$, $p = 0,000$ и $AUC_{УФО} = 0,747$, $p = 0,001$.

Закључак НУС може успешно да се користи у рутинској клиничкој процени функционалног опоравка старијих пацијената после тоталне артропластике кука.

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Кључне речи: Харисов упитник за кук; Нови упитник скоровања мобилности; *SF-36*; мерење исхода; артропластика кука; рехабилитација; *ROC* крива