



Reliability of Modified Harris Hip Score as a tool for outcome evaluation of Total Hip Replacements in Indian population



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ARTICLE INFO

Article history:

Received 3 November 2017
Received in revised form 23 November 2017
Accepted 30 November 2017
Available online 6 December 2017

Keyword:

MHHS
Harris hip score
Modified HHS
HHS
THR
Total hip replacement
Reliability
Validity

ABSTRACT

Background: Standard Harris Hip Score (HHS) is a validated tool, to measure the functional status of an individual and has been traditionally used to assess the condition of a patient with hip pathologies. Harris hip score in its standard form includes a physician's physical examination component which has a high inter-observer variability. A modified version of HHS (MHHS) was devised and brought into use, but has not been validated as an outcome measure, post total hip replacement (THR) in Indian population.

Methods: 101 patients with 122 hips for whom THR was done, were followed up, and HHS and MHHS were recorded at a minimum followup of 6 months.

Results: The mean MHHS was 78.97 with a standard deviation of 15.017. There was positive correlation between the two functional outcome scores with a p value of 0.001. MHHS was found to be reliable with a significant intraclass correlation coefficient ($p = 0.001$).

Conclusion: MHHS is a reliable and valid tool to measure functional outcome in patients undergoing Total Hip Replacements.

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1. Background

Sir John Charnley invented Total hip replacement (THR), that has evolved as an effective surgery, used commonly around the world for treatment of a spectrum of hip pathologies.¹ Standard Harris Hip Score (HHS) is a validated tool to measure the functional capacity of an individual and has been the most common scoring technique used traditionally, to assess the condition of a patient with hip pathology, before and after a surgical procedure.^{2,3} It has been used previously in many studies for evaluating outcomes of THRs.^{4–7} Harris hip score includes a physical examination component which has a high inter-observer variability.⁸ The clinical examination part of HHS was found by Western researchers to not be of much significance.⁹

This component of physical examination was removed and a modified version of HHS was devised and brought into use. But this modification has not been validated for use as an outcome measure, post total hip replacements in Indian population. This is

the first Indian study that tries to establish MHHS as an adequate tool to measure functional outcome after THR, by assessing reliability of MHHS, and comparing it with standard HHS.

2. Materials and methods

A total of 101 patients with 122 hips for whom THR was done, were followed up in this retrospective study, on the basis of predefined inclusion and exclusion criteria. We included patients operated by a single surgeon, between June 2007 to May 2013 with minimum followup of 6 months. Cases of revision THRs and hemiarthroplasties were not included. All patients were recruited through Outpatient Department (OPD) of our institute and evaluated at follow up, by an independent observer, other than the one who performed all the surgeries. Questionnaires for HHS and MHHS were given to the patients in the OPD, and clinical examination was also done to evaluate for deformities and measure the range of motion at hip joints.

3. Statistical analysis

Paired *t*-test was used to assess the data, comparing MHHS with HHS. Pearson's correlation coefficient was used to study the relation between HHS and MHHS. Reliability of the scores was

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Table 1
Results.

| DIAGNOSIS | AGE (yrs) | SEX (M/F) | HHS | MHHS |
|-----------|-----------|-----------|-------|-------|
| AVN | 39.32 | 38/12 | 87.04 | 80.36 |
| TRAUMA | 46.08 | 32/4 | 84.25 | 76.17 |
| OA | 55.53 | 10/7 | 78.12 | 69.00 |
| RA | 41.56 | 3/6 | 86.00 | 77.44 |
| AS | 33.50 | 6/0 | 66.50 | 54.50 |
| TB | 30.50 | 4/0 | 93.25 | 90.50 |

Table 2
Correlation between HHS & MHHS.

| | | HHS |
|------|-------------------------|-------|
| MHHS | Pearson's correlation | 1 |
| | Significance (2-tailed) | 0.002 |
| | NO. of Hips | 122 |

Table 3
Paired sample correlation.

| | MEAN | Std. Dev. | Std. Error of Mean | Correlation | Sig. (P) |
|------|-------|-----------|--------------------|-------------|----------|
| MHHS | 78.97 | 15.017 | 1.494 | 0.945 | 0.001 |
| HHS | 86.83 | 11.191 | 1.114 | 0.945 | 0.001 |

Table 4
Measure of Reliability.

| Reliability statistics | |
|--|-------|
| Cronbach's Alpha | 0.951 |
| Cronbach's Alpha based on standardised scores. | 0.972 |
| No. of scores | 2 |

evaluated using Cronbach's alpha and intraclass correlation coefficient. P value of less than 0.05 is considered statistically significant.

4. Results

The mean age of 101 patients is 43.16 years with a standard deviation of 14.542 and range between 17 and 80 years. Out of 122 hips under study, 29 belong to females and 93 to males. There were 50 atraumatic AVN cases, 36 trauma sequelae, 17 cases of primary osteoarthritis, 9 rheumatoid arthritis, 6 ankylosing spondylitis and 4 tuberculosis hip sequelae [Table 1].

The mean HHS of the 101 patients was 86.83 with a standard deviation of 11.191. The mean MHHS was 78.97 with a standard deviation of 15.017. There is positive correlation between the two functional outcome scores, with p value of 0.001 [Tables 2 and 3]. MHHS is found to be reliable with a significant intraclass correlation coefficient (p = 0.001) [Tables 4 and 5].

Table 5
Measure of Reliability.

| | Intraclass Correlation | 95% confidence interval | | F value | Sig. (P) |
|-----------------|------------------------|-------------------------|-------------|---------|----------|
| | | Lower Bound | Upper Bound | | |
| Single Measures | 0.906 | 0.864 | 0.936 | 20.256 | 0.000 |
| Avg. Measures | 0.951 | 0.927 | 0.967 | 20.256 | 0.000 |

5. Discussion

THR is one of the most successful and cost-effective Orthopaedic procedures and remains the treatment of choice for long term pain relief and functional restoration in patients with diseased or damaged hips.¹⁰

The functional outcome of THR depends on various factors; patients' profile, surgical technique, and the implants used, all of which have roles to play in the ultimate quality of life patients get to achieve. There are plenty of hip scoring systems like Western Ontario and McMaster Universities Arthritis Index (WOMAC score), Oxford 12-item questionnaire, and the standard HHS. WOMAC score and the Oxford score were validated by Ostendorf et al. in 2004.¹¹

Even the HHS has been validated by Soderman et al. and Hoeksma et al.^{2,12} But it was found that HHS has a high ceiling effect, and also a high inter-observer bias due to the clinical evaluation part of its.^{8,13} Subsequently to minimise the latter, MHHS came into being where that clinical evaluation part was removed. In the past it has been used in assessing post arthroscopy outcomes.¹⁴

Edwards et al. concluded that there is no clinical importance of the range of movement part of the HHS and it hardly adds to the overall score in the patient.⁹ MHHS was also used in 2005 to assess outcomes of THR in 100 patients over telephone.¹⁵ Sandesh et al. used it for assessing functional outcome in non traumatic indications of THR.¹⁶

The use of MHHS has not been validated in literature for assessing functional outcome of THR in Indian patients and this is the first study to do the same.

We used MHHS and standard HHS both, to assess the outcome in a relatively large group of THR patients and established strong correlation between the two. They gave a similar fair to good functional outcome in the patients. The MHHS had a strong validity for usage in such patients with significant reliability.

The omission of clinical examination part has its own set of advantages especially in Indian scenario. Firstly a patient based questionnaire is relatively simpler process, to assess the functional status, instead of additionally subjecting the patients to clinical examination of hips; more so in the Indian females having social issues. There is also no need of a medical professional to calculate the score based on this clinical examination and a non medical trainee can easily get the MHHS. This saves much time and energy on part of the clinical practitioner, who can dedicate the same in his clinical practice in the overloaded OPDs in India.

Also since MHHS involves answering a simple questionnaire, the actual presence of the patient is not needed and this can be done over a phone call or by correspondence.¹⁵ This is specially of significance in our Indian scenario where patient compliance is seldom apt and followups are not streamlined.

The outcome evaluation and scoring by an independent observer and all surgeries by a single surgeon helped to minimise bias in the present study. The study, though has its limitations in the form of being retrospective, nevertheless gives a strong evidence about the strength of MHHS, as a measure of functional

outcome in Indian patients undergoing THR. Further large scale prospective studies are warranted to provide more substance to our observations.

6. Conclusion

Modified Harris Score is a reliable and valid tool for assessment of functional outcome, post total hip replacement in Indian patients, with a positive correlation with the standard Harris Hip Score. So it may be used for such evaluations in the future, as a single index of functional outcome. We recommend the use of Modified Harris Hip score to evaluate the functional status of patients with hip pathologies by researchers, for its simplicity, reliability and reproducibility.

Funding

None.

Conflict of interest

The authors declare no conflict of interests.

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