



Assessment and reliability of the World Health Organisation quality of life (WHO QOL-BREF) questionnaire in total hip replacement patients

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ABSTRACT

Background: Several functional scoring tools are available to evaluate the outcomes of total hip replacements (THRs) for diseased or damaged hips. Majority of these scores were devised in western countries and their cross-cultural compatibilities are rarely demonstrated. The World Health Organisation quality of life (WHO QOL-BREF) questionnaire with 4 domains, is one of the best known multilingual instruments for such assessment. Its reliability has never been demonstrated for THRs and the present study was conceptualised for the same.

Methods: THRs done over 6 years were followed up retrospectively. Revision THRs and hemiarthroplasties were excluded. All the cases were done by a single senior arthroplasty surgeon. Clinical examination was done and questionnaires for WHO QOL-BREF and Harris Hip scores were given to the patients.

Results: The number of patients included in the study was 96 with 115 operated hips. The average age of these patients was 41.40 years ranging from 17 to 80 years. There was strong male preponderance in our series of patients with 90 THRs. The mean score of domain 1 was 70.8 (SD 21.6), domain 2: 72.4 (SD 18.8), domain 3: 74.7 (SD 16.8) and domain 4: 75.4 (SD 14.8); showed significant functional improvement post THR in domain 2 ($P = 0.0001$), domain 3 ($P = 0.0010$) and domain 4 ($P = 0.0001$), when compared to scores of general healthy population. Similarly, the scores were significantly improved in all domains as compared to cohorts of post-operative acetabular and hip fractures. The score was found to be a reliable tool with Cronbach's alpha of 0.912 and strong correlation was present with the standard Harris hip scores ($p = 0.000$).

Conclusion: WHO QOL-BREF is a potent tool to assess the quality of life in patients undergoing THRs. It can be used as a single index of measurement and it is simple, reproducible and reliable.

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1. Introduction

Functional outcomes and quality of life (QOL) scores are important instruments to assess the efficacy of any surgical intervention.^{1,3} Various scoring tools are available to evaluate the outcomes in hip surgeries; Harris Hip score (HHS), Oxford Hip scores, Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC), and Modified Harris Hip Score.^{2,5} Majority of these scores were devised in western countries and their cross-cultural compatibilities are unclear.⁸ QOL assessment in postoperative

patients is not routinely done, probably due to non-availability of a suitable instrument.⁸

The World Health Organisation QOL-BREF (WHO QOL-BREF) questionnaire is one of the best known multilingual instruments for assessing quality of a patient's life.¹¹ This instrument is cross-culturally valid and is reflected by four domains; physical, psychological, social and environmental.^{6,7,11} It focuses on a patient's own assessment of his overall well-being. Total hip replacement (THR) is a standard procedure for diseased or damaged hips.¹ WHO QOL-BREF has been demonstrated to be a suitable instrument for comprehensively evaluating the QOL in some health care settings, however its reliability and validity has not been assessed in THR patients. Since there is an increasing trend towards using functional outcomes and QOL scores besides the clinico-radiological

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Table 1
Comparison of WHO QOL-BREF domains score of THR with GHP, HF and AF patients.

	Our Study (OS)	General Health Population (GHP) (Sathvik et al. ⁷)	OS vs GHP (p value and confidence interval)	Hip Fractures (HF) (Yao et al. ¹⁰)	OS vs HF(p value and 95% confidence interval)	Acetabular Fractures (AF) (Meena et al. ⁹)	OS vs AF (p value and 95% confidence interval)
D1	70.8 ± 21.6	71 ± 14.2	0.91, -3.95 to 3.55	60.68 ± 15.46	0.0001 , 6.28 to 13.95	63.06 ± 20.31	0.0076 , 2.07 to 13.40
D2	72.4 ± 18.8	63 ± 13.6	0.0001 , 5.93 to 12.86	59.48 ± 13.71	0.0001 , 9.53 to 16.3	58.22 ± 19.57	0.0001 , 8.97 to 19.38
D3	74.7 ± 16.8	68.8 ± 14.6	0.0010 , 2.405 to 9.39	57.02 ± 11.34	0.0001 , 14.81 to 20.55	70.49 ± 17.92	0.08 , -0.51 to 8.93
D4	75.4 ± 14.8	61.26 ± 12.8	0.0001 , 9.07 to 13.68	64.02 ± 8.50	0.0001 , 8.19 to 14.5657	64.48 ± 18.46	0.001 , 6.33 to 15.50

Table 2
Comparison of WHO QOL-BREF scores among different aetiologies and significance (P- value).

AS	AVN	.129
	OA	1.000
	RA	.913
	TB	1.000
	Post-trauma	.119
AVN	AS	.129
	OA	1.000
	RA	1.000
	TB	1.000
	Post-trauma	1.000
OA	AS	1.000
	AVN	1.000
	RA	1.000
	TB	1.000
	Post-trauma	1.000
RA	AS	.913
	AVN	1.000
	OA	1.000
	TB	1.000
	Post-trauma	1.000
TB	AS	1.000
	AVN	1.000
	OA	1.000
	RA	1.000
	Post-trauma	1.000
Post-trauma	AS	.119
	AVN	1.000
	OA	1.000
	RA	1.000
	TB	1.000

WHO QOL - World Health Organisation quality of life; AVN - avascular necrosis; OA - osteoarthritis; AS - ankylosing spondylitis; RA - rheumatoid arthritis; TB - tuberculosis.

assessments for outcome analysis, the present study was conceptualised with an aim to validate WHO QOL-BREF score to assess the quality of life in these patients.

2. Materials and methods

A total of 135 patients underwent THRs at our institution during the period of 6 years, by a single senior surgeon. All the patients were followed up and enrolled after informed consent in this retrospective study. Recruitment of the patients were done through the out patients department (OPD) of our institute and they were evaluated by an independent observer. Revision THRs and the cases of hemiarthroplasties were excluded from the study. Patients with missing records were also excluded. Questionnaires for WHO QOL-BREF were given to all the included patients, and clinical examination was done to evaluate for deformities and measure the range of motion at the hip joints. Patients with more than 20% missing values were excluded from the analysis according to the rule of the WHO QOL Group (the WHO QOL Group, 1995; World Health Organisation, 1996). The obtained raw score was converted to transformed domain scores on a scale from 0 to 100, by using the SPSS software.

Analysis of functional outcome was done by using the HHS (0–100). The results are categorised as excellent 90–100, good 80–89, fair 70–79 and poor if < 70. Follow up period ranged from 6 months to 5 years.

2.1. Statistical analysis

The SPSS software (version 20, SPSS Inc., Chicago, IL, USA) was used. Unpaired *t*-test was used to compare the WHO QOL score and the HHS. Spearman correlation coefficient was used to study the relation between the various domains of the WHO QOL score and HHS.

P value of less than 0.05 was considered as statistically significant. Reliability of the score was evaluated using Cronbach alpha test. Tukey's HSD (Honest Significant difference) test was used for evaluation of the scores among the etiological groups.

3. Results

A total of 135 THR patients were called for follow up. The patients whose preoperative X-rays and other records were not available, and those with <6 months follow up were excluded from the study. Additionally, there were 5 cases of revision THRs which were also excluded. The number of patients included in the study was 96 with 115 operated hips. The average age of these patients was 41.40 years ranging from 17 to 80 years. There was strong male preponderance in our series of patients with 90 THRs. The combined average WHO QOL-BREF score was 73.13 ± 16.09. The mean score of domain one was 70.8 (SD 21.6), of domain two was 72.4 (SD 18.8), of domain three was 74.7 (SD 16.8) and of domain four was 75.4 (SD 14.8); showed significant functional improvements in domains two ($P = 0.0001$), three ($P = 0.0010$) and four ($P = 0.0001$), but not in the domain one ($P = 0.91$), when compared to scores of general healthy population. Similarly, the scores were significantly improved in all domains when compared to patients operated for acetabular and hip fractures [Table 1].

The comparison of scores among the various etiological groups was not significantly different ($p > 0.05$) [Table 2]. Strong correlation was found on comparing this functional score with the HHS and the score was found to be reliable; Cronbach's alpha based on standardised items (4 domains of the WHO QOL- BREF and HHS) was 0.912 [Table 3].

4. Discussion

The aim of modern medicine is not just the treatment of the specific diseases, but to provide an overall upheaval of patients' health, which involves the various aspects of overall well-being; physical, mental and social. The most reasonable method of assessing these domains is for the patient himself to assess the same, by means of patient reported questionnaires.² WHO QOL-BREF scores are individualised scores that encompass every possible aspect of a patient's being, so as to evaluate the ultimate outcome of any intervention for a disease. It has shown cultural adaptability and validity in certain interventions like surgeries for acetabulum fractures and hip fractures.⁴

Table 3
Correlation of WHO QOL-BREF with HHS.

HHS	WHO QOL D1	WHO QOL D2	WHO QOL D3	WHO QOL D4
	<71.1 >71.1	<63.0 >63.0	<68.8 >68.8	<61.26 >61.26
<80	31	20	12	12
≥80	2	13	21	21
	21	7	8	3
	42	56	55	60
Spearman correlation coefficient	0.803	0.758	0.587	0.551
(p)	0.000	0.000	0.000	0.000
Cronbach's alpha	0.912			

HHS, Harris Hip Score; WHO QOL, World Health Organisation quality of life.

In the present study we assessed the WHO QOL-BREF scores in THR patients, which is a very important and routinely done surgical procedure for diseased and painful hip joints.¹ Radiological and functional outcomes have been used to assess the prognosis of these patients by multiple studies.^{1,2,5} Evaluating the multidimensional status of well-being with WHO QOL scores in this important orthopaedic subset was never done previously.

Meena et al. compared these scores in their operated cases of acetabulum fractures with cohorts of general health population and hip fractures, from two other studies.⁵ We also used similar methods to assess the quality of life in our patients. The mean scores in the 4 domains in the present study showed significant improvements in the psychological, social and environmental domains; these were even better than scores in the average general population.⁷ The physical domain score was at par to the general health population. These findings suggest that the overall quality of life, THRs provide to patients is remarkably good. The better results in the three domains could be explained by the fact that these surgeries are mostly done when the hips are increasingly damaged and the patients are debilitated to an extent where they cease to have a fruitful social and environmental life, along with psychological deficits. Therefore, once their pain and debility diminishes post THRs, they report significantly high mental and social improvements. This point is also further proven as the results in THR patients were also better than patients of hip and acetabulum fractures, who underwent fixations.^{4,12} However, there may be a possibility that the patients could have given better responses to the scoring, just to please the surgeon, which is a drawback of all patient reported outcomes. Psychological factors could play a role in these outcome assessing modalities.

Harris Hip score is a validated tool for THR patients and we also calculated the same to correlate it with the quality of life score.¹⁰ The positive correlation suggests that better the functional outcomes, better is the overall quality of life an intervention imparts to the patient. We also assessed the reliability of the WHO QOL-BREF score and found it to be significant and valid for use in THR patients. The fact that it also correlates significantly with a scoring tool (HHS) that has been previously validated and used in multiple studies on THRs, adds to the overall strength and reliability for its clinical application.

The present study included adequate number of THRs by a single surgeon (RKS), over 6 years; it provides a reliable assessment of the strength of WHO QOL-BREF score in evaluating outcomes of THR patients. Despite its limitations due to a retrospective design and short term follow up, the present study suffices the evidence in favour of this score being a good enough tool. These scores do not involve clinical examinations and the added advantage of such a patient reported outcome is that the actual presence of the patient is not even needed and the scoring can be done via a telephonic or video conversation.^{2,9} This saves time for both the patient and the

assessor, latter could not even be a clinical practitioner, who in turn can devote the saved time in clinical practice.² Additionally, this could specially help in follow ups of hip arthroplasty patients in these trying times of the Covid-19 pandemic, where routine OPDs are not functioning and the onus is on audio/video consultations. Although another patient reported and validated tool, the Modified Harris Hip score, also does not need clinical examination, it only assesses pain and functional status of the patients; a score like WHO QOL-BREF, encompasses every possible prognostic domain of well being, be it physical or socio-psychological. It is a more complete indicator for assessing outcomes in THR patients.

5. Conclusion

WHO QOL-BREF score is a reliable tool to assess quality of life in total hip replacement patients and also correlates significantly with standard Harris hip scores. It may be used as a single index for quality of life assessment and we recommend it to evaluate the outcomes in total hip replacements, as it is a simple, valid and reproducible method.

Ethical approval

NOT Applicable.

Declaration of competing interest

The authors declare no conflict of interest and nil funding.

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