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Original article

Validation of the French version of two on high-activity knee questionnaires

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A B S T R A C T

Introduction: Self-administered quality-of-life questionnaires are valuable evaluation tools in orthopedic surgery. The conventional questionnaires are limited by a substantial ceiling effect. We wished to validate a French translation of two English questionnaires for high-activity patients: the High-Activity Arthroplasty Score (HAAS) and the Activity Scale for Arthroplasty Patients (ASAP). One hundred patients operated on for knee replacement were selected. The answers to both questionnaires were analyzed and compared to the Oxford Knee Score (OKS) and to the scoring system of the American Knee Society (AKS).
Hypothesis: There is no correlation between the results of both high-activity questionnaires and of the two conventional scoring systems.
Results: All questions were easily understood. The mean scores of the HAAS and ASAP questionnaires were 8.2 ± 3.0 and 30.7 ± 9.6, respectively. The distributions were not considered normal. There was no floor effect, but there was a limited ceiling effect (0% and 14%, respectively). The internal coherence of both questionnaires was satisfactory. There was a significant correlation between the high-activity scores and the conventional scores.
Discussion: Both high-activity questionnaires in our French translation can potentially measure the overall function of a patient after knee replacement as accurately as the index English version. It is self-administered, easy to use, can collect patients' answers by postage mailing, and involves no ceiling effect. All these points should allow its routine use for evaluation after knee replacement. The HAAS evaluation seems to be superior to the ASAP evaluation.
Level of evidence: Case-control study, level III.

1. Introduction

The evaluation of the clinical and functional condition of patients is fundamental in assessing the quality of treatment. In surgery for knee osteoarthritis, many scores have been proposed [1–5]. However, it has been shown that self-administered questionnaires, i.e., completed by the patient with no assistance on the part of healthcare personnel, are described as being more objective [6,7], because they reflect the patient's experience more faithfully. As a complement to the "generic" quality-of-life questionnaires (WOMAC [8] and SF36 [9]), ubiquitous but difficult to implement in routine clinical practice [10,11], specific scores such as the Oxford Knee Score (OKS) have been developed [12,13] in knee arthroplasty. It has been demonstrated, however, that this score was insufficiently discriminatory after surgery, raising doubts as to the power

of this questionnaire's ability to detect subtle differences in the surgery's results, notably in patients with results considered to be favorable [14]. Therefore, new stricter scores have been proposed for the detailed analysis of the results of knee arthroplasty, such as the functional part of the American Knee Society's new score [5], the High-Activity Arthroplasty Score (HAAS) [15,16] and the Activity Scale for Arthroplasty Patients (ASAP) [17]. An earlier study on the same cohort has recently been published in English [16], with the specific objective of generically analyzing the discriminatory potential of the HAAS, with no influence of the language used for the questionnaire. The present study seeks to shed light on specific aspects of the French version of this questionnaire.

The objective of this study was to validate the French translation of these two questionnaires by comparing the French translation of these questionnaires with the conventional reference scores (the OKS and the American Knee Society (AKS) [4]). The hypothesis was the following: there is no correlation between the scores of high-activity questionnaires and conventional questionnaire scores.

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2. Material and methods

2.1. The HAAS questionnaire [15]

The HAAS questionnaire is a self-administered questionnaire comprising four questions on daily life: walking, running, stair climbing, and activity level (online Appendices S1 and S2). Each question has different response levels, from normal function (scored 3–6 depending on the question) to major limitations (scored 0). The overall score is calculated by adding the four subscores. The highest possible score is 18 points and the lowest 0 points.

2.2. The ASAP questionnaire [17]

The ASAP is a self-administered questionnaire with 10 questions on daily life and sports activity (Appendices S3 and S4). Each question has four response levels, from normal function (scored 4) to major limitations (scored 1). The overall score is calculated by adding the 10 subscores. The highest possible score is 40 points and the lowest 10 points.

2.3. The Oxford Knee Score questionnaire [12]

The OKS is a self-administered questionnaire composed of 12 questions on daily life. For better comprehension, the original negative scale was inverted. Each question has five response levels, from normal function (scored 5) to major limitations (scored 1). The overall score is calculated by adding the 12 subscores. The highest possible score is 60 points and the lowest 12 points.

2.4. The AKS score [4]

The AKS questionnaire is filled out by healthcare personnel after questioning and examining the patient. It comprises two subscores: the clinical score and the functional score, each graded from 0 to 100 points: the higher the score the better the knee condition.

2.5. Study population

One hundred patients were consecutively selected for this study during 2010. They were patients with a total or unicompartmental knee prosthesis seen consecutively during a routine follow-up visit more than 1 year after the intervention. Age, sex, left or right side, weight, height, and body mass index were recorded.

2.6. Methods

The high-activity knee questionnaires in English were translated by one of the team members, an orthopaedic surgeon specializing in knee surgery, who spoke English fluently (Appendices S1 and S2).

The HAAS, ASAP, and OKS questionnaires were distributed to the patient during the surgical consultation. The patients were informed on the need to complete the questionnaire themselves or eventually with the assistance of a family member. The questionnaire was collected after the consultation, during which the surgical team filled in the AKS score questionnaire.

All the data were entered into an Excel spreadsheet, then transferred to Statview 9.0 software for analysis (SAS Institute France, Grégy-sur-Yerre, France).

The questionnaire's reliability was studied through the percentage of patients who could not complete it. The subscore data were studied through standard descriptive statistics (mean, standard deviation, maximum, and minimum). The normality of the distributions was analyzed using the Shapiro-Wilk test. The existence of floor and ceiling effects was studied through the percentage of responses between the maximum score and that reduced by one standard deviation (ceiling effect) and the percentage of responses between the minimum score and that increased by one standard deviation (floor effect). Internal consistency was analyzed using the Cronbach alpha coefficient.

The relation between the two high-activity scores was analyzed by calculating the linear correlation coefficient of the Spearman correlation. The consistency between the two scores was analyzed using the Bland-Altman technique.

The relation between the high-activity scores and the Oxford and AKS scores was analyzed by calculating the linear correlation coefficient of the Spearman correlation. The floor and ceiling effects were compared between the different scores using the Chi^2 test with a posteriori Bonferrini correction.

All the statistical tests were analyzed with the 5% threshold.

3. Results

The study included 40 males and 60 females, mean age, 72 years (range, 57–91 years, SD 8 years). The prosthesis was implanted on the right side in 50 cases. The mean postoperative follow-up was 3 years (range, 1–7 years, SD 2 years). The mean weight was 80 kg (range, 48–137 kg, SD 18 kg). The mean height was 166 cm (range, 152–185 cm, SD 8 cm). The mean body mass index (BMI) was 28.8 kg/m^2 (range, 19.7–40.0 kg/m^2, SD 5.2 kg/m^2).

We did not encounter any problems with patients not understanding the questions. All patients were able to respond to all the questions, sometimes assisted by a family member.

The mean HAAS and ASAP scores were, respectively, 8.2 (range, 3–14, SD 3.0) and 23.70 (range, 10–37, SD 7.6). They were not distributed in a normal manner ($P < 0.001$) (Figs. 1 and 2). Only the ASAP questionnaire showed a floor effect (30%). There was a slight ceiling effect: 0% for the HAAS score and 14% for the ASAP score. The internal consistency of the HAAS and ASAP scores was good, with a 0.58 and 0.90 Cronbach alpha coefficients, respectively.

We found a statistically significant correlation between the HAAS and ASAP scores ($P < 0.001$; Fig. 3). The consistency between the two scores was poor ($r^2 = 0.64$).

The respective correlations between the high-activity scores and the conventional scores are reported in Table 1. The correlations between the high-activity scores and the conventional scores were statistically significant but low. The floor effect was null, except for the ASAP score (Table 2). The ceiling effect was significantly higher for the conventional scores (Tables 2 and 3) and absent for the HAAS score.

Table 1
Correlations between the high-activity and conventional scores.

	HAAS	ASAP	Oxford	AKS
HAAS		$r^2 = 0.33$ $P < 0.001$	$r^2 = 0.19$ $P = 0.02$	$r^2 = 0.06$ $P = 0.02$
ASAP			$r^2 = 0.18$ $P < 0.001$	$r^2 = 0.05$ $P = 0.02$

HAAS: High-Activity Arthroplasty Score; ASAP: Activity Scale for Arthroplasty Patients; AKS: American Knee Society.

Table 2
Floor and ceiling effects: values.

	Floor (%)	Ceiling (%)
HAAS	0	0
ASAP	30	14
Oxford	0	31
AKS	0	51

HAAS: High-Activity Arthroplasty Score; ASAP: Activity Scale for Arthroplasty Patients; AKS: American Knee Society.