



## Original research

# Content Validity and Reliability of the Persian Version of the Forgotten Joint Score Questionnaire in Patients Undergoing Total Hip Arthroplasty

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## ARTICLE INFO

## Article history:

Received 2 January 2022

Accepted 25 January 2022

Available online xxx

## Keywords:

Arthroplasty

Forgotten joint score

Hip

Patient reported outcome measures

Surveys and questionnaires

## ABSTRACT

**Background:** Forgotten Joint Score (FJS) is a patient-reported outcome measurement that evaluates patients' ability to forget the replaced joint (knee or hip) in everyday activity. This study aimed to evaluate the validity and reliability of the Persian version of this questionnaire in Iranian patients who underwent total hip arthroplasty.

**Methods:** A team of specialists reviewed this questionnaire and voted for its clarity and content validity. Then, the FJS was filled out by 100 randomly selected total hip arthroplasty patients between 2019 and 2021 with at least 6 months of follow-up. The reliability coefficient (Cronbach's alpha) was calculated.

**Results:** A total of 95 patients who met the inclusion criteria, with the mean age  $59.9 \pm 11.6$  years and 26.6% being female, participated in the study. Patients had no difficulty with the content and linguistic format of the Persian FJS-12. The mean FJS for these patients was  $50.8 \pm 4.6$ . The Cronbach's alpha was measured at 0.87. The mean content validity index was 0.93.

**Conclusion:** FJS-12 can discriminate even patients with eximious pain and functional outcomes after joint reconstruction surgery. The Persian format of FJS-12 showed acceptable internal consistency using Cronbach's alpha and acceptable content validity. Therefore, it can be utilized in the Iranian population for future research studies.

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## Introduction

Total hip arthroplasty (THA) is the treatment of choice in severe hip arthritis and complex fractures of the femoral head and neck [1]. THA has helped many patients who were not successfully treated with conservative therapies to walk independently and escape from long-term disability [2]. Owing to the old age of THA candidates, the clinical and functional outcomes and the patient's quality of life following the procedure became paramount [3].

To assess surgical treatment outcomes, subjective or objective methods can be utilized [4,5]. Objective methods are those measured by an expert physician, for example, range-of-motion test, joint stability assessment, or radiological parameters. However, subjective methods focus on how the patient feels after the surgery. These include clinician-reported outcome tools and patient-reported outcome measurements (PROMs) [6,7].

Concerning THA, clinicians utilize several instruments to discriminate between poor and excellent outcomes [8]. One of the goals of arthroplasty surgeons is to get the patient to the point where they forget about having a prosthesis in their joint while doing routine activities. Behrend et al. [9] developed a helpful PROM named Forgotten Joint Score (FJS) to fulfill the aim. It evaluates patients' ability to feel the artificial joint like the healthy contralateral one [10]. The FJS consists of 12 questions rated in a 5-point Likert scale format. The final score ranged from 0 to 100. A

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higher score displays a better outcome. This tool demonstrated a high internal consistency in previous investigations [9].

The FJS questionnaire has been translated and validated in many other languages, including Hindi, Portuguese, Chinese, Italian, German, French, and Dutch [10–19]. The Persian translation is also available, but it was not tested for reliability and validity [20]. This study aimed to prove the validity and reliability of the Persian FJS in the Iranian population.

## Material and methods

The institutional ethics committee of our hospital approved this study. We followed the previous guidelines for self-reported measures' validity and reliability assessment [21]. Permission was obtained from the original developers of the questionnaire.

### Study tool

As mentioned, the FJS questionnaire indicates the number of times a patient thinks about his prosthetic joint during daily life. This instrument consists of 12 items scored on a Likert scale (from 1 to 5). The following formula converts the raw score obtained from summing each item into the final score (ranging from 0 to 100).

$$\text{Forgotten Joint Score} = 100 - ((\Sigma(Q1 \text{ to } Q12) - 12) \div 48 \times 100)$$

Each of these 12 questions addresses a routine activity in human life, such as climbing stairs, walking, standing, sitting, driving, housekeeping, and so on. A higher score displays a better clinical condition, meaning the patients could forget the prosthetic joint more often. As mentioned, this questionnaire had been linguistically validated, and we applied this translated version in our study.

### Study design and subjects

We performed a cross-sectional study in our hospital. In our center, 100 patients were randomly selected from those who underwent THA between April 2019 and March 2021. Inclusion criteria were age over 18; having a unilateral primary THA; no other painful underlying diseases; ability to read and write; no mental or physical disorders interfering with filling out the questionnaire. Considering the COVID pandemic limitations and as the questionnaire items could be asked only by phone, a trusted operator became responsible for interviewing the participants telephonically. He called the patients and asked each item of the FJS questionnaire, then recorded the answers.

### Reliability assessment

The Cronbach's alpha coefficient was calculated to evaluate the internal consistency. A number above 0.8 is considered acceptable, and a number below 0.6 is thought as a poor result.

### Content validity evaluation

A team of 5 academic orthopedic surgeons—all possessing a joint replacement fellowship—and an epidemiologist reviewed this questionnaire and voted for the following items: a clear statement of the objective, appropriateness of the format and font, clear meaning of every item, explicit instructions, and appropriateness of the measurement scale. Each item has 3 options to choose from: acceptable, somehow acceptable, and not acceptable. The first 2 options earned 1 point, and the latter reached zero. After all, the mean content validity index (CVI) rated by the 6 specialists was calculated.

## Statistical analysis

For the analysis, we applied IMB SPSS Statistics 21 (SPSS Inc., Chicago, IL). The final scores of each patient were calculated using the mentioned formula. We calculated Cronbach's alpha for internal consistency. Values between 0.7 and 0.95 are considered sufficient [22].

## Results

Between 2019 and 2021, 95 patients who met the study criteria, mean age  $59.9 \pm 11.6$  years and 26.6% being female, were agreed to be included in the study. The mean follow-up time was 14.4 months (ranging from 6 to 18 months). The mean FJS was  $50.8 \pm 4.6$ . The patients were also asked about the clarity of the questionnaire. They all stated that they fully understood the questions and answered with no trouble.

### Internal consistency

The internal consistency was determined using Cronbach's alpha with a measure of 0.87. Item-total statistics were also calculated and summarized in Table 1.

### Content validity

The average CVI obtained from each surgeon of the experts' committee were 1.00, 1.00, 0.83, 0.83, 1.00, and 0.83. The mean CVI of the FJS questionnaire was 0.915 (Table 2).

## Discussion

With the constantly increasing number of THA and total knee arthroplasty surgeries worldwide, the need for measuring tools for assessing clinical outcomes tends to rise rapidly [8]. However, none of the existing methods has proven to be better than others. There are multiple factors in evaluating a medical intervention [23], but clinical outcomes always come first, so the requirement for accurate evaluating tools keeps rising. One of the most mattering instruments is PROMs, which measure the quality of the health-care service from the patients' aspect. PROMs can help the managers and the doctors to see the result of their work directly and decide better for the future; moving on, PROMs become much more essential in future evaluations. FJS is a PROM that evaluates patients' ability to forget the replaced joint (knee or hip) in everyday activity. In this paper, we demonstrated that the FJS-12 Persian format is valid and reliable in Iranian patients who underwent THA.

**Table 1**  
Item-total statistics for each item of the questionnaire.

Item	Scale mean if item deleted	Scale variance if item deleted	Corrected item-total correlation	Cronbach's alpha if item deleted
1	20.09	110.563	0.307	0.875
2	20.05	97.950	0.804	0.840
3	19.86	104.600	0.520	0.860
4	21.14	119.933	0.116	0.878
5	19.73	96.684	0.782	0.841
6	19.00	109.143	0.475	0.862
7	19.18	105.108	0.665	0.851
8	19.77	108.279	0.368	0.871
9	20.00	108.190	0.438	0.865
10	20.09	104.087	0.646	0.852
11	19.91	99.801	0.791	0.842
12	20.18	100.251	0.771	0.843

**Table 2**  
Content validity index results of the FJS Persian format.

Expert	Clear statement of the objective	Clear meaning of every item	Appropriateness of the format	Appropriateness of the font	Explicit instructions	Appropriateness of the measurement scale	Mean CVI
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00
3	1.00	0.00	1.00	1.00	1.00	1.00	0.83
4	1.00	1.00	0.00	1.00	1.00	1.00	0.83
5	1.00	1.00	1.00	1.00	1.00	1.00	1.00
6	1.00	0.00	1.00	1.00	1.00	1.00	0.83
Mean							0.915

Behrend et al. [9] demonstrated that this 12-question form (FJS-12) could help the clinicians find out the success rate of the THA and total knee arthroplasty surgeries and discriminate between good and excellent results. To forget the artificial joint, it is necessary to have a complete range of motion and maintain its stability during daily activities, aside from being pain-free [15]. FJS-12 could be very helpful in estimating the frequency of this important outcome during routine activities.

FJS-12 is translated into many languages and has high internal consistency with acceptable reliability and validity. This questionnaire also showed a low floor and ceiling effect compared with other PROMs, showing its discriminatory power [10,23]. Therefore, FJS-12 can discriminate even patients with eximious pain and functional outcomes after joint reconstruction surgery.

The FJS-12 is not free of drawbacks. About 70% of the selected patients left the twelfth question ("Are you aware of your artificial joint while playing your favorite sport?") empty, mainly because they quit sports after the surgery. Suggesting an alternate question/activity may be the solution.

In sum, the Persian format of FJS-12 showed acceptable internal consistency using Cronbach's alpha and good validity using the CVI. Patients have no difficulty with the content, and the results distinguished the good and excellent outcomes of THA. Thus, we encourage the researchers in the field of arthroplasty to take the FJS-12 tool into account for future studies.

## Conclusions

FJS has been translated into several languages as a practical tool in assessing the clinical outcome of THA. In this study, the validity and reliability of the Persian FJS questionnaire were successfully proved using Cronbach's alpha and the CVI.

## Conflicts of interest

The authors declare there are no conflicts of interest.

For full disclosure statements refer to <https://doi.org/10.1016/j.artd.2022.01.031>.

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