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## HEBREW TRANSLATION AND VALIDATION OF THE CATQUEST-9SF QUESTIONNAIRE

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### ABSTRACT

**Aims:** The purpose of this study is to translate and validate a Hebrew version of the Catquest-9SF questionnaire, an efficient patient-reported outcome measure (PROM), for the assessment of cataract surgery outcome

**Methods:** This is a prospective questionnaire validation study. The Catquest-9SF questionnaire was translated from English to Hebrew following a standard procedure. The study population included candidates for cataract extraction surgery in both eyes. They were 21 years of age or older, Hebrew-speaking, and had Internet access. They completed the questionnaire in 2 stages, once before the surgery on the first eye and again 4-6 weeks following the surgery on the second eye. A Rasch analysis was performed to validate the Hebrew version of the questionnaire, and a sensitivity analysis was performed for the patients who completed both the preoperative and postoperative questionnaire.

**Results:** Of the 133 patients included in the study, 125 completed the first questionnaire, and 24 also completed the second questionnaire by the time of study closure. The Hebrew translation of Catquest-9SF demonstrated 1-dimensionality, ordered response categories and good person separation. The sensitivity analysis on the 24 paired Catquest-9SF questionnaires showed good effect size (1.85).

**Conclusions:** The Hebrew versions of the Catquest-9SF questionnaire is valid and reliable with psychometric properties of good quality and good effect size. It is applicable to Hebrew-speaking cataract patients for clinical assessment and research purposes.

**Keywords:** cataract surgery, patient-reported outcome, questionnaire, Hebrew translation, validation, Catquest-9SF.

### INTRODUCTION

Cataract is a major cause of blindness worldwide, [1] and the outcome of visual acuity following cataract extraction surgery has become an increasingly important issue for patients [2] Various steps in current surgical approaches are instrumental in achieving the best postoperative visual outcome [3] Several questionnaires have been developed in order to monitor the patients' subjective assessment of their vision in order to determine whether and to what extent their expectations of improving their postoperative quality of life have been met. [4]

The Catquest questionnaire was originally developed in the Swedish language in 1995 [5] and the Catquest-9SF questionnaire is a shorter version which was developed by Lundstrom and Pesudovs in 2009 [6]. The Catquest-9SF questionnaire is designed to measure limitations in the individual's activities of daily living (ADL) due to the presence of cataracts.[6]

The Catquest-9SF questionnaires were developed with the use of a modern test theory (Rasch analysis) [6]. Patient-reported outcome measures (PROMs) assessed the patients' perceptions of their vision, and thereby drive improvement in healthcare. The questionnaire is an efficient PROM tool for the assessment of cataract surgery outcome. [7] It has been validated, and is used by the European Society of Cataract & Refractive Surgeons (ESCRS) in several languages, making them applicable for use in multinational studies and research.

In order to accurately reflect the subjective responses to the questionnaire' items, it is important that it would be written in the patient's commonly used language. Furthermore, different cultures and populations comprehend and relate to the questions according to their cultural, educational, demographic characteristics, and more.[8] It is therefore essential for the questionnaire to be translated and validated for adaptation to each population.[9]

To the best of our knowledge, there is no standardized vision PROM in clinical practice in the Hebrew language. We contend that the translation and validation of the questionnaire in Hebrew will support self-auditing as well as expand the Israeli contribution to national and international clinical studies on the subjective outcomes of cataract surgery. Toward these ends, we translated and validated the Catquest-9SFquestionnaire from English to Hebrew.

## METHODS

### TRANSLATION

This study conformed to the Declaration of Helsinki and was approved by the Shaare Zedek Medical Center Institutional Review Board.

Two translators who are fluent in both English and Hebrew translated the Catquest-9SF questionnaire from English to Hebrew by the protocol "forward translation"[10] . This preliminary version was translated from Hebrew to English by a process known as "backward translation"[10] by 2 other translators who are also fluent in both languages. The translators and the study investigators then reviewed the findings, resulting in a single unified document in the Hebrew language. This draft was administered to 5 patients who had undergone cataract surgery and were attending the Shaare Zedek Medical Center's outpatient eye clinic. They filled in a brief form to provide feedback on the content and ease of understanding the Hebrew questionnaires. Adjustments were made according to their comments, and the translated version of the questionnaire was finalized. The original Catquest-9SF questionnaire is publicly available and a license is not needed for use, through the standard sets for cataract in the International Consortium for Health Outcomes Measurement (ICHOM). In addition, a permission obtained from the questionnaire author (M.L).

### DATA COLLECTION

This was a prospective questionnaire study. The participants were recruited from the Ophthalmology Department at Shaare Zedek Medical Center, Jerusalem, Israel. They all voluntarily entered the study and signed an informed consent form. The inclusion criteria were a diagnosis of cataract in both eyes, a minimum age of 21 years, fluency in Hebrew and access to the Internet. Patients with severe cognitive impairment, pregnancy (current or planned) or lactating, as well as those who were unable to complete follow-up visits were excluded. The data were collected from 133 patients (55 males, 78 females, average age 71.9 years [range 40-94]) from November 2021 to August 2022. The first questionnaire was completed in either an electronic or paper-based form during the preoperative visit. The second questionnaire were completed 4-6 weeks after the second eye surgery, either at the clinic by means of a paper-based form or at home by a digital form returned by e-mail. The authors had access to information that could identify individual participants during the data collection only.

### STATISTICAL ANALYSIS

The Hebrew questionnaire was validated with the Rasch analysis (version 5.3.2 of Winsteps Chicago, IL,

USA), a statistical model commonly used to validate PROM questionnaires.[11]

The Catquest-9SF questionnaire includes 9 items: 7 questions pertaining to ADL and one question pertaining to general sense of difficulty. The 5 choices of responses were "very great difficulty", "great difficulty", "some difficulty", "no difficulty" and "cannot decide". The 9<sup>th</sup> question pertained to satisfaction in postoperative vision, and the choices of responses were "very dissatisfied", "rather dissatisfied", "fairly satisfied", "very satisfied", and "cannot decide".

The Rasch analysis is a statistical model used to differentiate between items according to their level of difficulty, thereby enabling the evaluation of the participants and their separation into different profiles or groups according to their responses. The effect size was based upon the results of the Rasch analysis according to the following formula: the postoperative mean Rasch score minus the preoperative mean Rasch score divided by the standard deviation (SD) of the preoperative score.

## RESULTS

One-hundred and thirty-three consecutive patients were included in the study between November 2021 to August 2022. Of them, 125 (93.98%) completed the questionnaire. Eight patients (6.02%) were excluded, 4 due to technical issues and 4 due to missing answers. Forty-one (30.83%) patients underwent a second-eye surgery, and 24 of them completed the questionnaire for the second time by the time of study closure. The participants' demographic and refraction data are summarized in **[Table 1]**.

*Table 1. Patient demographics and best corrected visual acuity before and after cataract surgery in both eyes*

<b>Filled in both the preoperative and postoperative questionnaires</b>	<b>Filled in only the preoperative questionnaire</b>	
24	133	Number of patients
68.6 ± 12.1 (40-88)	71.9 ± 10.2 (40-94)	Mean age ± SD, yr (range)
13 (54.16%)	78 (58.65%)	Female sex
0.10 ± 0.16	0.33 ± 0.22	BCVA right eye (logMAR) ± SD
0.09 ± 0.15	0.32 ± 0.23	BCVA left eye (logMAR) ± SD

*BCVA = best corrected visual acuity, SD = standard deviation*

## CATQUEST 9SF VALIDATION

Rasch analysis-determined good precision was calculated by a person separation of 2.20 and a person reliability of 0.83. In addition, the infit mean square varied between 1.46–0.68 and the outfit mean square varied between 1.24–0.63. There was no significant misfit, although item 4 showed a slight misfit as an outlier and item 9 showed a slight misfit because of redundancy. The category probability curves indicated that respondents could separate the responses based upon the response options **[Figure 1a]**. A person-item map **[Figure 1b]** determined how well the items had been targeted to the abilities of the survey participants. Based upon the difference in mean values (logit), it was concluded that the participants were more able than the items were difficult, with a difference of 0.93 logits.

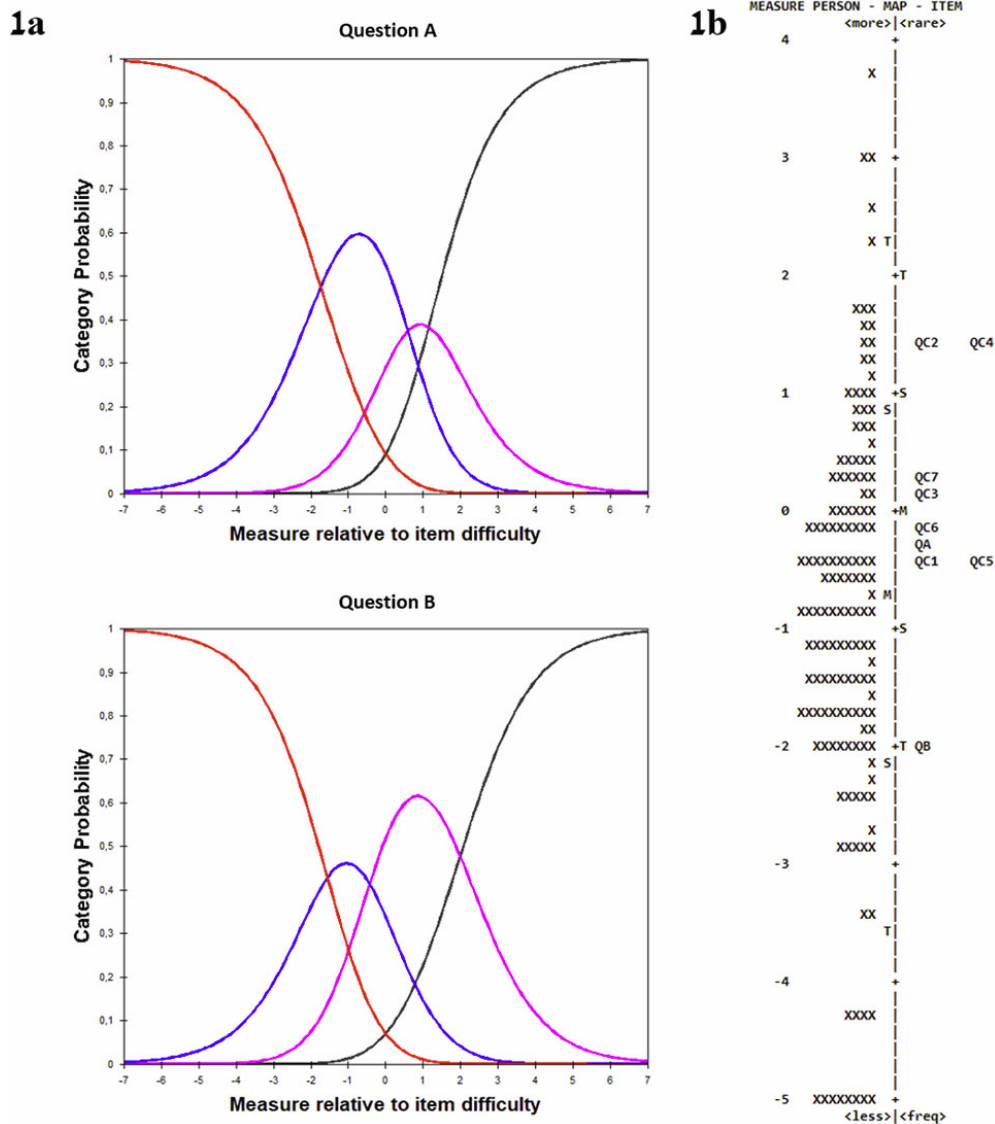


Fig. 1. Catquest-9SF Rasch analysis

1a. Questions A and B probability curves. 1b. Person-item map. The items are on the right and the patients are on the left.

## SENSITIVITY ANALYSIS

The effect size was calculated as postoperative mean Rasch score (-0.91) minus the preoperative mean Rasch score (0.92) divided by the SD of the preoperative score (0.99). The effect size for Catquest-9SF was 1.85 based upon the 24 preoperative and 24 postoperative questionnaires completed by the same 24 individuals.

## DISCUSSION

We translated the Catquest-9SF questionnaire from English to Hebrew following a standard procedure and verified its reliability and validity by means of Rasch analysis. To the best of our knowledge, there is no valid Hebrew questionnaire designed to assess cataract treatment or subjective quality of vision in patients with cataract and following cataract surgery. The Catquest-9SF questionnaire showed good fit with good effect size.

The Catquest-9SF questionnaire had been translated and validated in many languages.[12–16] When designing the Catquest questionnaire, Lundstrom et al. observed that the outcomes of cataract surgery cannot be based solely upon visual acuity, mainly because the patient's assessments, including those of visual perception, ADL and disabilities due to vision are crucial.[7]

There are several aspects that bestow great importance to the validation of the Hebrew Catquest-9SF questionnaire. First, the translation ensures that the questionnaire will be understood by Hebrew speakers both linguistically and culturally. Second, it is beneficial in providing the surgeon with direct knowledge of

various aspects of the patient's quality of life and enabling an open dialogue regarding the patient's expectations for the purpose of planning the surgery. Third, it provides validated tools for auditing and research purposes. Importantly, Israel, like many other countries, will be able to supplement the derived data when conducting multi-institutional studies on cataract surgery involving national and international medical centers.

There are several limitations to our study. By responding to a written questionnaire in the clinic, the patient may be influenced by the presence of the surgeon and the desire to please him/her when answering the questionnaire, thus creating a bias. Therefore, the post-operative PROMs in our study were administered digitally or by an optometrist. In addition, patients may miss a question in the questionnaires due to lack of attention, thereby being excluded from the study. It is also important to note that any questionnaire study includes an element of intermediate situations that may not entirely fit the pattern that is queried, and the patient may be obliged to compromise his/her answer to fit one of the provided answers. Since the sensitivity analysis of the questionnaire was conducted on a small number of postoperative questionnaires ( $n = 24$ ), a repeated sensitivity analysis with a greater number of questionnaires will be required to validate our results.

## CONCLUSION

The Catquest-9SF questionnaire was translated from English into Hebrew and successfully validated. The Rasch analysis demonstrated that it can be used by a Hebrew-speaking population with high reliability and validity. The questionnaire can provide expanded evidence on Israeli patients for use in national studies in the cataract field, as well as in international collaborations in future ophthalmology research.

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## AUTHOR CONTRIBUTIONS

All co-authors meet the requirements for authorship and equal contribution. They have all reviewed and approved the contents of the manuscript.

## STATEMENTS AND DECLARATIONS

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