



CROATIAN VERSION OF THE QUALITY OF RECOVERY QUESTIONNAIRE (QoR-40): TRANSCULTURAL ADAPTATION AND VALIDATION

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SUMMARY – The Quality of Recovery-40 (QoR-40) questionnaire is a psychometric instrument designed to quantify postoperative recovery. It has been translated and validated in several countries but not in Croatia. The aim was to translate, cross-culturally adapt, and validate Croatian version of the QoR-40. The QoR-40 was translated from English by two independent translators, back-translated by a native speaker, and approved by an expert committee. The questionnaire was administered to 106 patients who underwent general anesthesia before elective spinal surgery, post-surgery in the operating room, and 30 days after surgery. Internal consistency was assessed using the Cronbach's alpha coefficient. Construct validity was assessed by evaluating correlation between the QoR-40 and hand grip strength. The mean preoperative global QoR-40 score was 177.6 (95% CI 174.9-180.3) and postoperative 168.9 (95% CI 165.8-171.9); the mean change was -8.8 (95% CI -11.9 to -5.6). Internal consistency was good for global QoR-40 score (Cronbach $\alpha=0.896$), acceptable across all domains ($8 > \alpha \geq 7$). There was a significant correlation between grip strength and total QoR-40 score, pain, and physical independence, but not with other domains. In conclusion, the Croatian version of the QoR-40 has acceptable properties and can be used in the assessment of postoperative recovery in Croatian patients.

Key words: *Anesthesia; Croatian; QoR-40 questionnaire; Validation*

Introduction

Technological advancements coupled with medical progress have forwarded patient care and recovery after anesthesia and surgery. Anesthetic procedures are becoming ever safer owing to developing anesthetic concepts and technical solutions. Therefore, new benchmarks of patient care evolve as well, and postoperative recovery is important in measuring the quality of care¹. Traditional parameters used to assess postop-

erative recovery quality, such as length of stay, morbidity, mortality, pain, nausea and vomiting, have been perceived as insufficient in measuring the quality of patient recovery. Therefore, the new metric integrates physical, emotional and social aspects of patient recovery and is considered a relevant outcome measure in modern practice. Due to its multidimensionality, the quality of patient recovery is efficient in early detection of patients who have a less-than-optimal recovery and tailoring individual therapy in order to optimize the clinical course². To this end, new instruments for measuring quality of recovery after anesthesia and surgery are continuously developed.

The Quality of Recovery-40 (QoR-40) questionnaire is an instrument designed to assess quality of re-

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Received April 27, 2020, accepted September 29, 2020

covery of patients undergoing anesthesia due to surgery³. The instrument has been translated into several languages; however, it has not been translated, validated, and used in Croatian patients. The aim of this study was to translate, cross-culturally adapt, and validate the Croatian version of the QoR-40.

Subjects and Methods

One-hundred-and-six patients that underwent general anesthesia for elective spinal surgery (microdiscectomy, laminectomy, spinal fusion) at the Zagreb University Hospital Centre were included in the study after signing their informed consent. According to the American Society of Anesthesiologists (ASA) classification, all patients were class I or II. There were 53 female and 53 male patients aged 18-65. All patients filled out the questionnaire before and after (24 hours and 30 days) anesthesia and surgery. With approval from Prof. Myles, the author of QoR-40, it was translated into Croatian according to the standard translation protocol based on Beaton and Bullinger's guidelines^{4,5}. In the first step, the QoR-40 was translated into Croatian by two independent native Croatian speaking translators. One of them was familiar with the aim of the study. After both translated versions were compared, a consensus was reached on the final version. In the next step, a native English speaking translator with medical education made a backward English translation. Finally, an expert team constituted of an anesthesiologist, surgeon, the translators, health psychologist, and a nurse reviewed all translations, verified the translation procedure, and decided on the final version of the questionnaire.

The QoR-40 was introduced by Paul Myles and it is used to assess patient recovery through 40 items (five-point Likert scale questions) across 5 domains: pain, emotional state, physical comfort, psychological support, and physical independence³. It is the most widely used self-reporting psychometric instrument for postoperative quality of recovery used in all surgical areas. The score ranges from 40 (poor) to 200 (excellent quality of recovery).

Psychometric validation of the QoR-40 was performed before and after general anesthesia/surgery and 30 days after general anesthesia and surgery. Internal consistency was assessed using the Cronbach's α coefficient; values >0.65 were considered acceptable.

Construct validity was assessed by evaluating correlation between the QoR-40 and hand grip strength. Correlation was assessed using the Pearson correlation coefficient. Correlations were considered strong (coefficient >0.5), moderate (0.35-0.5), or weak (<0.35). We expected that the QoR-40 score would have a weak or moderate positive correlation with hand grip strength. SPSS software (version 26.0, SPSS, Inc.) was used for analyses.

The study was approved by the institutional Review Board and all patients signed informed consent to participate in the study.

Results

The mean patient age was 49.9 ± 12.2 years; there were 53 female (50%) and 53 male (50%) patients, all ASA class I or II. The average anesthesia time was 160 min and average surgery time 120 min. All patients enrolled in the study filled out the questionnaire completely at all administrations (i.e. there were no missing data), and reported the instrument to be easy to comprehend.

The mean global QoR-40 score was 177.6 ± 13.8 before surgery and 168.9 ± 15.6 at 30 days postoperatively (Table 1). Internal consistency was good for global QoR-40 score (Cronbach $\alpha=0.896$), acceptable across all domains ($8 > \alpha \geq 7$) (Table 1). There was a significant correlation between grip strength and total QoR-40 score, pain, and physical independence, but not with other domains (Table 2).

Discussion

Quality of recovery after anesthesia and surgery is a wide encompassing concept reflecting patient general state by integrating multiple domains, including potential complications resulting from surgery or anesthesia itself, as well as many other patient-related factors⁶. Although physician-rated quality of patient recovery after anesthesia and surgery is an important estimate in clinical practice, ever more attention is given to patient-oriented quality of recovery and disability-free survival^{7,8}.

The QoR-40 questionnaire is widely used as a quality of recovery assessment tool in everyday clinical practice across diverse specialties, including cardiac, neurosurgical, gynecologic, orthopedic, and one-day

Table 1. Quality of Recovery-40 (QoR-40) scores

Score	Preoperative	α	24 h postoperatively	30 days postoperatively
Global QoR-40	177.6±13.8	0.896	168.9±15.6	183.3±14.1
Physical comfort	50.3±3.6	0.718	46.9±4.5	51.5±3.4
Emotional state	37.8±4.1	0.746	33.6±4.5	38.3±4.7
Psychological support	31.9±3.0	0.728	32.3±3.2	33.3±2.2
Physical independence	21.4±2.9	0.756	20.2±3.6	22.8±2.7
Pain	31.3±3.2	0.744	31.4±3.5	32.6±3.4

Numbers are mean ± SD

Table 2. Correlation matrix of Quality of Recovery-40 (QoR-40) postoperatively and hand grip strength

		Emotional state	Physical comfort	Physical support	Physical independence	Pain	Total
Hand grip strength (kg)	r	0.186	0.209	0.189	0.351	0.315	0.321
	p	0.250	0.195	0.242	0.026*	0.047*	0.044*

r = Pearson correlation coefficient; p = level of statistical significance; *statistically significant

procedures⁹⁻¹⁴. It has been translated and validated in Japanese, Turkish, Portuguese, and Persian languages, and was shown to be a valid and reliable tool in assessing postanesthetic and postoperative recovery in those languages¹⁵⁻¹⁸. According to some studies, it is among the most reliable and most widely reported tools for measuring patient-assessed quality of recovery after anesthesia and surgery^{19,20}.

The subjects in our study reported the mean global preoperative QoR-40 score of 177.6±13.8, which is comparable to the scores reported in adaptation studies to Korean (168.4±21.4) and Japanese (187±13), and an observational study from Brazil (mean 180, range 157-190)^{15,21,22}. Comparable mean scores across different populations support the validity of the QoR-40. In our sample, the mean change in the mean score at 24 hours postoperatively was 4.9%, which is lower than that reported in the Korean study (10%) and higher than the one in the Brazilian study (3.3%), yet all these values are within a narrow range^{15,21}. A plausible explanation for the differences observed is that the patients in other studies had different characteristics (sociodemographic, type and severity of disease, etc.) and underwent different types of procedures with regard to extent and duration. However, in all of the studies, including ours, the 24-h postoperative QoR-40 scores decreased, as expected and reported in other previous studies²². Internal consistency of the Croatian

version of the QoR-40 is excellent and falls within the range reported in the meta-analysis of 19 adaptation studies¹⁹. The Croatian version of the QoR-40 was shown to be valid, as the correlation analysis between the hand-grip strength and the score confirmed prior expectation, namely, that there should be a positive weak or moderate correlation between the two. The rationale for the hypothesis was that, as patients recovered and regained strength, their hand grip strength would improve.

Our study had two important limitations. First, power analysis was not conducted and the sample size fell toward the lower end of the spectrum when compared to other adaptation studies. Second, not all psychometric properties were assessed and factor analysis (to evaluate the latent structure of the instrument) was not performed.

In conclusion, the Croatian version of the QoR-40 has acceptable psychometric properties and can be considered as a valid and reliable instrument for assessment of the quality of patient recovery in Croatian patients. The Croatian version of QoR-40 questionnaire is enclosed in Appendix 1.

Acknowledgment

The authors thank Hrvoje Barić, MD PhD, for his support and help in editing the text.

Appendix 1

Datum: __ / ___ / _

Upitnik za bolesnika (QoR – 40)

DIO A

Kako ste se osjećali u protekla 24 sata?

(1 do 5, gdje je 1 = vrlo loše, a 5 = odlično)

Primjerice: Ako ste cijelo vrijeme mogli lako disati, trebate to naznačiti tako da zaokružite odgovor broj 5 = *cijelo vrijeme*, kako je prikazano u nastavku:

	Nimalo vremena	Neko vrijeme	Obično	Veći dio vremena	Cijelo vrijeme
Mogao/la sam lako disati	1	2	3	4	5

	Nimalo vremena	Neko vrijeme	Obično	Veći dio vremena	Cijelo vrijeme
Fizička uroda					
Mogao/la sam lako disati	1	2	3	4	5
Dobro sam spavao/la	1	2	3	4	5
Mogao/la sam uživati u jelu	1	2	3	4	5
Osjećao/la sam se odmorno	1	2	3	4	5
Emocije					
Općenito sam se dobro osjećao/la	1	2	3	4	5
Osjećao/la sam da imam kontrolu	1	2	3	4	5
Osjećao/la sam se ugodno	1	2	3	4	5

Kako ste se osjećali u protekla 24 sata?

(1 do 5, gdje je 1 = vrlo loše, a 5 = odlično)

	Nimalo vremena	Neko vrijeme	Obično	Veći dio vremena	Cijelo vrijeme
Fizička neovisnost					
Normalno sam govorio/la	1	2	3	4	5
Mogao/la sam se prati, prati zube ili brijati	1	2	3	4	5
Mogao/la sam se brinuti o svom izgledu	1	2	3	4	5
Mogao/la sam pisati	1	2	3	4	5
Mogao/la sam se vratiti na posao ili uobičajenim kućnim aktivnostima	1	2	3	4	5
Podrška bolesnicima					
Mogao/la sam komunicirati s bolničkim osobljem (kad ste bili u bolnici)	1	2	3	4	5
Mogao/la sam komunicirati s obitelji ili prijateljima	1	2	3	4	5
Dobivao/la sam podršku od bolničkih liječnika (kad ste bili u bolnici)	1	2	3	4	5
Dobivao/la sam podršku od bolničkih medicinskih sestara (kad ste bili u bolnici)	1	2	3	4	5
Dobivao/la sam podršku od obitelji ili prijatelja	1	2	3	4	5
Mogao/la sam razumjeti upute i savjete	1	2	3	4	5

DIO B***Jeste li u protekla 24 sata osjetili nešto od sljedećeg?*****(5 do 1, gdje je 5 = odlično, a 1 = vrlo loše)**

	Nimalo vremena	Neko vrijeme	Obično	Veći dio vremena	Cijelo vrijeme
Fizička uroda					
Mučnina	5	4	3	2	1
Povraćanje	5	4	3	2	1
Suho povraćanje	5	4	3	2	1
Nemir	5	4	3	2	1
Drhtanje ili trzanje mišića	5	4	3	2	1
Tresavica	5	4	3	2	1
Osjećaj da Vam je hladno	5	4	3	2	1
Omaglica (vrtoglavica)	5	4	3	2	1
Emocije					
Ružni snovi	5	4	3	2	1
Osjećaj zabrinutosti	5	4	3	2	1
Osjećaj ljutnje	5	4	3	2	1
Osjećaj depresije	5	4	3	2	1
Osjećaj usamljenosti	5	4	3	2	1
Problem da zaspate	5	4	3	2	1

Jeste li u protekla 24 sata osjetili nešto od sljedećeg?

(5 do 1, gdje je 5 = odlično, a 1 = vrlo loše)

	Nimalo vremena	Neko vrijeme	Obično	Veći dio vremena	Cijelo vrijeme
Podrška bolesnicima					
Bili ste smeteni	5	4	3	2	1
Bol					
Umjerena bol	5	4	3	2	1
Jaka bol	5	4	3	2	1
Glavobolja	5	4	3	2	1
Bolovi u mišićima	5	4	3	2	1
Bolovi u leđima	5	4	3	2	1
Grlobolja	5	4	3	2	1
Ranice u ustima	5	4	3	2	1

Zahvaljujemo Vam na suradnji.

Molimo, provjerite jeste li odgovorili na sva pitanja.

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Sažetak

HRVATSKA INAČICA UPITNIKA *QUALITY OF RECOVERY* (QoR-40):
TRANSKULTURALNA PRILAGODBA I VREDNOVANJE

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Upitnik *Quality of Recovery-40* (QoR-40) je psihometrijski instrument dizajniran za kvantificiranje poslijeoperacijskog oporavka. Preveden je i vrednovan u nekoliko zemalja, ali ne i u Hrvatskoj. Cilj je bio prevesti, transkulturalno prilagoditi i vrednovati hrvatsku inačicu upitnika QoR-40. Upitnik QoR-40 preveden je s engleskog na hrvatski od dva nezavisna prevoditelja, potom s hrvatskog na engleski od strane izvornog govornika i odobren od stručnog odbora. Upitnik je podijeljen uzorku od 106 bolesnika koji su bili podvrgnuti općoj anesteziji zbog elektivne operacije na kralježnici: prije operacije, nakon operacije u operacijskoj dvorani i nakon 30 dana. Unutarnja konzistencija procijenjena je pomoću koeficijenta Cronbach alfa. Validnost konstrukta procijenjena je računanjem korelacija između QoR-40 i snage stiska šake. Srednji prijeoperacijski globalni zbroj QoR-40 bio je 177,6 (95% CI 174,9-180,3), a poslijeoperacijski 168,9 (95% CI 165,8-171,9); srednja promjena bila je -8,8 (95% CI -11,9 do -5,6). Unutarnja konzistentnost bila je dobra za globalni zbroj QoR-40 (Cronbach $\alpha=0,896$), prihvatljiva za sve domene ($8 > \alpha \geq 7$). Utvrđena je značajna korelacija između snage stiska šake i ukupnog zbroja QoR-40, boli i fizičke samostalnosti, ne i s drugim domenama. Hrvatska inačica upitnika QoR-40 ima prihvatljiva svojstva i može se rabiti u procjeni poslijeoperacijskog oporavka kod hrvatskih bolesnika.

Ključne riječi: *Anestezija; Hrvatski; Upitnik QoR-40; Vrednovanje*