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RESEARCH

Development and validation of the isiZulu quality of recovery score

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Background: Recovery from anaesthesia and surgery is an important marker of the quality of perioperative care. One extensively validated score in assessing this is the Quality of Recovery–15 items (QoR-15) score. This study aimed to translate the QoR-15 score into isiZulu and validate both the original and translated version on an isiZulu speaking population.
Methodology: A randomised quantitative observational study was performed testing the original and the translated version of the QoR-15 score. In a crossover format, patients were asked to complete both questionnaires with 40 minutes allowed between each questionnaire. A 100 mm visual analogue score (VAS) was completed by each participant as a comparative tool for overall quality of recovery.
Results: There was good correlation between the English and isiZulu score 0.91 ($p < 0.001$) and substantial agreement between the scores (mean weighted kappa: 0.69). There was a negative correlation between duration of surgery and total QoR-15 scores for both the English (–0.3; $p < 0.001$) and isiZulu (–0.29; $p < 0.001$) questionnaires, and a positive correlation between VAS scores and total QoR-15 scores for both the English (0.38; $p < 0.001$) and isiZulu (0.38; $p < 0.001$) questionnaires.
Conclusion: This study demonstrates that the QoR-15 score is suitable to use in an isiZulu speaking patient population. The translated isiZulu version is comparable to the English QoR-15 score and should be used to assess the QoR to improve patient care.

Keywords: isiZulu, QoR-15, quality of recovery, recovery, Zulu

Introduction

Recovery from anaesthesia and surgery is an important marker of the quality of perioperative care. While clinical and physiological end-points can be easily measured, it is more challenging to quantify a patient's subjective experience of his/her recovery. Multiple tools have been developed to assess health-related outcomes but none has been named the gold standard in assessing quality of recovery. One of these, the Quality of Recovery-15 items (QoR-15) score has been extensively validated.[1,2] Developed by consolidating the strongest performing items from the Quality of Recovery-40 items (QoR-40) score, the QoR-15 assesses the five recovery dimensions of: pain, physical comfort, emotional state, psychological support and physical independence.[3–6]

South Africa is a multicultural and multilingual country where 22.7% of the population are isiZulu first-language speakers. Some 68% of isiZulu speakers reside in the province of KwaZulu Natal.[7] The QoR-15, which is available in English, has been translated into other languages in various countries. However, it has never been translated into any of the local languages spoken in South Africa.[8–10] In this study we translated the QoR-15 score into isiZulu and aimed to validate both the original and the translated version on an isiZulu speaking population in KwaZulu Natal.

Methods

This quantitative observational study to translate and validate the isiZulu QoR-15 score was done after obtaining ethics approval from the Biomedical Research Ethics Committee (BE329/15). Site permission was obtained from the KwaZulu-Natal Department of Health, Grey's Hospital, King Edward VIII hospital (KEH) and Inkosi Albert Luthuli Central Hospital (IALCH).

The QoR-15 score assesses patient's perspectives on postoperative pain, physical comfort, emotional state, psychological support and physical independence. The first 10 questions are scored from 0 (none of the time) to 10 (all of the time) based on a patient's positive response, while the last five questions are scored from 10 (all of the time) to 0 (none of the time) based on a patient's negative response. All the items on each completed QoR-15 questionnaire are scored against a total score of 150 (Appendix 1). A panel of six first-language IsiZulu speaking individuals were involved in translating the QoR-15 score from English into isiZulu. The first three members translated all 15 items of the QoR-15 questionnaire from English into IsiZulu. This translated version was then back-translated into English by the other three members who were blinded to the original English version and supervised by a first-language English speaker. The entire panel then corrected and approved the final version of the translated questionnaire. This translated score, as well as the original score, was then used in the study population.

Patients were eligible for inclusion into the study if they were ≥ 18 years of age, presented for elective or semi-urgent surgery at Grey's, IALCH or King Edward VIII Hospital, and were literate in both isiZulu and English. Patients with severe debilitating medical or surgical disease who would require prolonged hospital admission or those who were admitted to the Intensive Care Unit were excluded from the study. Further exclusions included obstetric patients, visually impaired patients and patients with a history of drug abuse. Eligible patients were approached for enrolment in the surgical wards on the first postoperative day (D1). The patient's self-professed literacy in both languages was used and educational background was not assessed. If patients were agreeable, written consent was obtained and patients were randomly allocated to one of two

groups. In Group A, patients first completed the English QoR-15 questionnaire, which was then followed 40 minutes later by the IsiZulu QoR-15 questionnaire. In Group B, patients first completed the isiZulu QoR-15 questionnaire, which was then followed by the English QoR-15 questionnaire 40 minutes later. The ideal time between various questionnaires in a crossover study has not been defined in the literature; therefore in this study we used 40 minutes. To provide an objective measure of postoperative recovery not related to the QoR-15 score, each patient was asked to evaluate his/her overall postoperative recovery by using a 100 mm visual analogue score (VAS). Since quality of recovery after surgery has not been assessed in this population, all patients were requested to comment in writing on their individual recovery process. The volunteered responses were recorded in any language preferred by the patient. Study researchers or nursing staff provided assistance for patients with physical limitations impeding their ability to write and complete the questionnaires.[11]

The following data were captured: demographic details, type of anaesthetic administered, ASA classification, duration of anaesthesia, duration of post-anaesthesia recovery room stay, type of surgery and any documented or verbally reported early postoperative complications. The magnitude of surgery was classified as either minor for minimally invasive procedures (e.g. skin lesion removal), intermediate for moderate to significantly invasive procedures (e.g. thyroidectomy) and major for surgery involving major organs, posing a significant risk to life, or risk of a major complication (e.g. oesophagectomy). The study aimed to recruit 160 patients as informed by previous validation studies. Data were presented as frequency (%) or mean with standard deviation.[12–14] Agreement was expressed as raw concordance rate between scores as well as by weighted kappa statistic. We defined poor agreement as a kappa of 0–0.20; fair agreement as 0.21–0.40; moderate agreement 0.41–0.60, substantial agreement as 0.61–0.80; and exceptional agreement as 0.81–1. To determine whether the order of scale administration affected patient responses to the questionnaire, we calculated the language (English vs. Zulu), period (Period 1 vs. Period 2), and carryover (treatment x period interaction) effects for a two-period crossover study using the method proposed by Hills and Armitage.[15] Multiple comparisons were adjusted using the Bonferroni correction and a corrected *p*-value of 0.05 was considered significant.

Reliability testing of the individual items from each of the questionnaires was tested using polychoric correlation. Internal consistency was calculated using Cronbach's alpha statistic. To determine the convergent validity of the QoR-15 scores we compared the total scores with the patient satisfaction score using Spearman's rank correlation. Similarly, we measured the association between QoR-15 scores and the duration of stay in the recovery room as alternative indices of QoR-15. We evaluated the divergent validity of the QoR-15 scores to distinguish patients with poorer QoR-15. Specifically, we compared the QoR-15 scores in women with those in men using the Mann–Whitney U-test. We evaluated feasibility of the translated QoR-15 score by reporting the successful completion rate, the number of patients who required help to complete the score and the time required to complete the initial tests.

Results

A total of 187 patients were recruited of whom 177 patients completed both the English and IsiZulu version of the questionnaire; 10 completed only the English questionnaire.

Table 1: Study group demographic data

Factor	Total (*n* = 177)	Group A (*n* = 93)	Group B (*n* = 84)
Gender:			
Female	111 (63%)	63 (56%)	48 (43%)
Male	66 (37%)	30 (45%)	36 (55%)
Average age (range)	38 (18–79)	37 (18–79)	40 (20–77)
ASA: *			
ASA 1	78 (44%)	44 (56%)	34 (44%)
ASA 2	84 (47%)	42 (50%)	42 (50%)
ASA 3	15 (8%)	7 (47%)	8 (53%)
Type of surgery:			
Gynaecology	39 (22%)	18(46%)	21(54%)
General surgery	47 (27%)	28 (60%)	19(40%)
Maxillo-facial	6 (3%)	2(33%)	4 (67%)
Orthopaedics	49 (28%)	25 (51%)	24 (49%)
Plastics	8 (5%)	4(50%)	4 (50%)
Vascular	6 (3%)	3 (50%)	3 (50%)
ENT⁺	5 (3%)	2 (40%)	3(60%)
Urology	11 (6%)	8 (73%)	3 (27%)
Ophthalmology	1 (< 1%)	0 (0)	1(100%
Cardiothoracic	5(3%)	3(60%)	2 (40%)
Magnitude of surgery:			
Minor	79 (45%)	39 (49%)	40 (51%)
Intermediate	59 (33%)	31 (53%)	28 (47%)
Major	39 (22%)	23 (59%)	16 (41%)
Type of anaesthesia:			
General anaesthesia	145 (82%)	74 (51%)	71 (49%)
Regional anaesthesia	32 (18%)	19 (59%)	13 (41%)

Notes: * = American Society of Anaesthesiologists' classification of physical state.
⁺ = Ear Nose and Throat surgery.

Ninety-three patients were randomised to Group A and 84 patients to Group B. The demographics of the patients are shown in Table 1.

The majority of patients completing the questionnaire were female (63%) and the average age was 38 years. Most patients were classified as either ASA 1 (44%) or ASA 2 (47%)—there were no ASA 4 patients. Most patients (72%) were able to complete both questionnaires without assistance.

Reliability

The reliability of the English scale was 0.759 and 0.764 for the isiZulu scale for the individual QoR-15 components as tested by Cronbach's alpha (Table 2). The correlation between the English and isiZulu scores (using Spearman's correlation) was 0.91 ($p < 0.001$) and the mean weighted kappa of 0.69 demonstrated substantial agreement.

Table 2: Weighted kappa agreement between scores

Items	Proportion of agreement	Weighted kappa
Able to breathe easily	85.6%	0.65
Been able to enjoy food	92.7%	0.73
Feeling rested	92.1%	0.56
Have had a good sleep	92.3%	0.68
Able to look after personal toilet and hygiene unaided	93.0%	0.71
Able to communicate with family or friends	98.1%	0.81
Getting support from hospital doctors and nurses	95.7%	0.59
Able to return to work or usual home activities	89.0%	0.75
Feeling comfortable and in control	93.2%	0.73
Having a feeling of general well-being	86.8%	0.61
Moderate pain	81.7%	0.53
Severe pain	90.6%	0.76
Nausea or vomiting	94.3%	0.75
Feeling worried or anxious	93.3%	0.72
Feeling sad or depressed	92.6%	0.69

Validity

The construct validity of the questionnaire was explored by comparing QoR-15 scores and patient gender, duration of surgery and VAS scores between the two questionnaires (isiZulu and English) using Spearman's rank correlation coefficient. There was a negative correlation between the duration of surgery and QoR-15 scores for both the English (–0.3; $p < 0.001$) and isiZulu (–0.29; $p < 0.001$) questionnaires. There was a positive correlation between VAS scores and QoR-15 scores for both the English (0.38; $p < 0.001$) and isiZulu (0.38; $p < 0.001$) questionnaires. There was no difference in total QoR-15 scores between male and female patients for both the English ($p = 0.242$) and Zulu (0.762) questionnaires. This was also similar when VAS scores were compared by sex ($p = 0.561$).

Acceptability and feasibility

Patient recruitment rate in this study was 94.2% and the successful completion rate of both questionnaires was 96%. The time to successful completion of the questionnaires was assessed in a subset of 30 patients: median time for completion of the isiZulu questionnaire ($n = 15$) was 3 minutes 37 seconds (range: 48 seconds to 13 minutes 34 seconds), and the median time for completion of the English questionnaire ($n = 15$) was 3 minutes 11 seconds (range: 1 minute 25 seconds to 11 minutes 15 seconds). There was no statistically significant difference between these times ($p = 0.604$; 95% confidence interval –2 minutes 31 seconds to 2 minutes 20 seconds).

Patient comments

All patients were asked to comment on their postoperative experience and the quality of their recovery. In total, 35% of the 187 patients made comments in the survey. Common complaints after surgery included pain and postoperative nausea and vomiting (PONV). Some 12% of patients stated that inadequate postoperative pain control was the main cause of their discomfort. Seven patients experienced PONV of whom four had received PONV prophylaxis intraoperatively. Patients were appreciative when physicians and nurses took their complaints seriously by reassuring them and timeously attending to their symptoms. Perioperative starvation was regarded as a negative feature in the recovery phase. Postoperative oral intake was often delayed due to surgical factors or secondary to complications like a sore throat or PONV. Patients expressed a desire to resume their meals immediately after surgery. Effective communication between patients and their healthcare providers was an important factor for patients. This included preoperative anaesthetic and surgical consultation, together with obtaining consent and informing them about postoperative results. They experienced anxiety due to an uncertainty regarding procedural outcomes and the expected healing process. There was eagerness to discuss these issues with clinicians timeously after surgery.

Discussion

It is important for clinicians to understand what patients perceive as a good quality of recovery. The list of postoperative assessment tools is exhaustive and multi-dimensional scales like the Postoperative Quality of Recovery Scale, Postoperative Recovery Profile, Functional Recovery Index, QoR-40 and QoR-15 demonstrate comprehensive postoperative outcome results.[16–19] In a recent systematic review, the QoR-15 fulfilled the requirements for a patient-reported outcome questionnaire in the assessment of postoperative quality of recovery.[20]

The province of KwaZulu Natal hosts the second largest population in South Africa and has an adult literacy rate of above 70%. A comprehensive clinical tool like the QoR-15 would assist in assessing and improving our patients' postoperative experience, in a language our patients understand. This study aimed to create an isiZulu version of the QoR-15 items score and compare it with the English QoR-15 score by means of psychometric testing in adult postoperative patients presenting for surgery at Grey's Hospital, King Edward VIII Hospital and IALCH Hospital in KwaZulu-Natal. The translated isiZulu version of the QoR-15 showed substantial agreement with the English version (Cronbach's alpha 0.7) thereby demonstrating reliability and internal consistency. Construct and convergence validity was also demonstrated between the two questionnaires. The QoR-15 is a feasible and acceptable tool for assessment of postoperative quality of recovery, with a patient recruitment rate of 94.2% and a successful completion rate of 96%. The average time to complete both the IsiZulu and English QoR-15 was 2.5 minutes and 2.3 minutes respectively. This is comparable to that of other studies in the field. The average time required to complete the Chinese QoR-9 score was 2.3 minutes and the average time to complete the English QoR-15 in an Australian cohort was 2.4 minutes.

There was no statistically significant difference in total QoR-15 scores and the VAS scores between male and female patients for both the English and isiZulu questionnaires. This was an interesting finding as previous studies reported worse postoperative quality of recovery scores for female patients when compared with their male counterparts. However, the original QoR-15 score was formulated and validated in high-income countries. Therefore, this particular finding could be explained by the difference in the cultural and socio-economic background of our patient population. The QoR-15 score, in both

its English and IsiZulu version, is a suitable clinical assessment tool to use in our patient population in KwaZulu Natal.

Limitations

While the QoR-15 has previously been validated to assess responsiveness, in this study we did not test its ability to detect change over time (responsiveness), as the QoR-15 scores were not repeated from the first day of surgery for individual patients. We did not measure baseline preoperative QoR-15 values in this population, which may be a limitation in using a quality assessment tool. The time required between the two QoR-15 scores to avoid cross-referencing between the IsiZulu and English version has not been clearly defined in current literature; in our study we used 40 minutes.

In our study, healthcare workers assisted patients with acute physical limitations in completing the questionnaires. Healthcare practitioner assisted questionnaires have been used in the literature, but the QoR-15 has not been validated for this specific use. This study was done in referral hospitals, which accommodate patients from both rural and urban areas. However, only patients who were literate in both English and isiZulu were eligible for the study. These bilingual patients are more likely to come from urbanised areas and are likely to have a higher level of education. The results of this study might be different if applied to patients of purely rural or purely urbanised backgrounds. Cultural mapping was not done in this study. We also included patients that had neuraxial anaesthesia, which has not been widely done in previous studies. Postoperative recovery data are still scarce in paediatrics, obstetrics and patients undergoing emergency surgery, whom we had also excluded in this study.

Conclusion

This study demonstrates that the QoR-15 items score is a suitable tool to use in our patient population and that the translated IsiZulu version of the score is comparable to the validated English QoR-15 items score. The isiZulu QoR-15 should be used to assess the quality of recovery for isiZulu speaking patients in order to improve patients' standard of care.

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Appendix 1

Quality of Recovery 15-items score

QoR-15 Patient Survey

Date: _ _ / _ _ / _ _ Study #: _____ ____

Preoperative ☐ Postoperative ☐

PART A

How have you been feeling in the last 24 hours?

(0 to 10, where: 0 = none of the time [poor] and 10 = all of the time [excellent])

1. Able to breathe easily	None of the time	0	1	2	3	4	5	6	7	8	9	10 All of the time
2. Been able to enjoy food	None of the time	0	1	2	3	4	5	6	7	8	9	10 All of the time
3. Feeling rested	None of the time	0	1	2	3	4	5	6	7	8	9	10 All of the time
4. Have had a good sleep	None of the time	0	1	2	3	4	5	6	7	8	9	10 All of the time
5. Able to look after personal toilet and hygiene unaided	None of the time	0	1	2	3	4	5	6	7	8	9	10 All of the time
6. Able to communicate with family or friends	None of the time	0	1	2	3	4	5	6	7	8	9	10 All of the time
7. Getting support from hospital doctors and nurses	None of the time	0	1	2	3	4	5	6	7	8	9	10 All of the time
8. Able to return to work or usual home activities	None of the time	0	1	2	3	4	5	6	7	8	9	10 All of the time
9. Feeling comfortable and in control	None of the time	0	1	2	3	4	5	6	7	8	9	10 All of the time
10. Having a feeling of general well-being	None of the time	0	1	2	3	4	5	6	7	8	9	10 All of the time

PART B

Have you had any of the following in the last 24 hours?

(10 to 0, where: 10 = none of the time [excellent] and 0 = all of the time [poor])

11. Moderate pain	None of the time	10	9	8	7	6	5	4	3	2	1	0 All of the time
12. Severe pain	None of the time	10	9	8	7	6	5	4	3	2	1	0 All of the time
13. Nausea or vomiting	None of the time	10	9	8	7	6	5	4	3	2	1	0 All of the time
14. Feeling worried or anxious	None of the time	10	9	8	7	6	5	4	3	2	1	0 All of the time
15. Feeling sad or depressed	None of the time	10	9	8	7	6	5	4	3	2	1	0 All of the time