Psychometric Development of a New Patient-Reported Outcome Measure to Assess Recovery After Abdominal Surgery: The Recovery After Abdominal Surgery (RAAS) Questionnaire

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KEY MESSAGE: As surgery enters the era of patient-centered care, **PROMs** have become essential for measuring postoperative recovery. Our study supports that the **RAAS questionnaire** provides a psychometrically sound measure of symptom experience, physical, and mental recovery after abdominal surgery.

Introduction

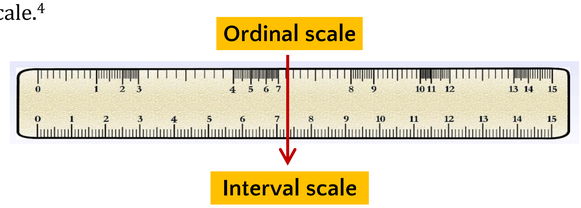
- In keeping with the principles of patient-centered care, **recovery after abdominal surgery** should be assessed using **patient-reported outcome measures (PROMs).**[1]
- Research supports that the PROM questionnaires currently used in this field have limited evidence supporting their measurement properties.[2]
- To address this research gap, we initiated an international research program to develop a conceptually relevant and psychometrically sound PROM to measure recovery after abdominal surgery; **the Recovery After Abdominal Surgery (RAAS) questionnaire**.
- Our preliminary qualitative works[3] led to the development of a conceptual framework and pool of 59 recovery-related items/questions based on the International Classification of Functioning, Disability and Health (ICF).

Study Aim

Further refine the **Recovery After Abdominal Surgery (RAAS)** item pool using **Rasch measurement theory (RMT)** to assess underlying domains, modify items, and optimize scoring procedures.

Methods

- **100 adult patients undergoing abdominal surgery** at 3 university-affiliated hospitals completed an electronic survey containing the preliminary RAAS 59-item pool preoperatively and at postoperative days (PODs) 1, 7, 30, and 90.
- Item responses were assessed using **RMT,** a statistical method that uses various diagnostic criteria (item/person fit residuals, threshold ordering, reliability, differential item functioning, targeting and local dependency) to select the best items and create scoring algorithms that reflect an interval (rather than ordinal) scale.[4]



- RMT analysis was performed using a partial credit model (RUMM2030 software) with repeated measures addressed via anchoring.

Results

- Between October 2021 and September 2022, 192 patients were screened for eligibility, 151 met inclusion criteria, and 100 consented participation (mean age 57±14.7, 49% female, 59% laparoscopic, 66% major procedures).
- Response rates were 97% preoperatively, 93% on POD1, 91% POD7, 91% POD30, 87% POD90.
- After adjusting and/or eliminating misfit items, RMT supported that three distinct RAAS domains, including 43 items, adequately fit the Rasch model.

Overall recovery (43 items)	**Symptom experience** (11 items)	Pain
		Visceral/Organ function
	Physical recovery (19 items)	Physical function
		Role participation
	Mental recovery (13 items)	Mental health
		Energy and drive
		Sleep function

Future Directions

- Further assessment of measurement properties (i.e., construct validity, responsiveness).
- Development of user-friendly electronic platforms for data collection using computer adaptive testing (RAAS web portal and mobile app).

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* The opinions expressed in this paper are those of the authors and do not necessarily represent those of Merck Canada Inc.