

Validation and Discrimination Analysis of a Novel Patient Satisfaction Questionnaire for Preoperative Fasting in Cataract Surgery

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Introduction

- Pre-operative fasting is routinely performed to prevent anesthesia-related pulmonary aspiration.
- The process of fasting before surgery may cause patient discomfort.
- Fasting guidelines:
 - Nil per os (NPO) after midnight*: traditionally used in cataract surgery, or
 - 6 hours of fasting for light meals, 2 hours for clear liquids*: latest guidelines by the American Society of Anesthesiologists (1).
- A randomized controlled trial has been proposed comparing patient experiences and safety outcomes of these two guidelines (NCT03828500).
- For this trial, a questionnaire to measure fasting-related burden is needed.

Purpose: We report on the development and psychometric validation of the first questionnaire to measure patient fasting-related burden in cataract surgery. We also assess this questionnaire's ability to discriminate between participants with a short versus long duration of fasting and early versus late day surgery.

Methods

Design: Prospective observational study.

Subjects: Consecutive sampling of cataract patients on the surgery day at the Kensington Eye Institute in Toronto, Canada was conducted from February to December 2019.

Methods: A questionnaire evaluating demographics and fasting-related burden was administered.

1) Questionnaire development: An iterative process of questionnaire development was conducted with expert investigators and patients. Once concluded, validation and psychometric evaluation was performed with Rasch analysis.

13- Item Questionnaire Structure

- | | |
|--|--|
| 1. "I am hungry" | 8. "I am nauseous" |
| 2. "I am thirsty" | 9. "I have recently vomited" |
| 3. "My voice is hoarse" | 10. "I am shivering" |
| 4. "I am in pain" | 11. "I am having difficulty concentrating" |
| 5. "I feel weak" | 12. "I have a headache" |
| 6. "I am feeling agitated because of having to fast" | 13. "I am feeling lightheaded or dizzy" |
| 7. "I am feeling anxious because of having to fast" | |

Response Options:

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

Scores:

Raw scores (1-4 per item) and logit scores (based on conversion as determined after Rasch validation) were used.

Methods

2) Discriminative ability was assessed by comparing questionnaire responses in patients belonging to various groups:



3) Diagnostic ability of the 6-item questionnaire relative to the original 13-item questionnaire was assessed with a receiver operator curve (ROC) analysis. Mean logit score on the 13-item questionnaire was chosen as a cutoff to define patients' burden status (at mean or above = 'not having burden'; below mean = 'having burden').

Results

1) Questionnaire development:

- Five iterations of questionnaire development were completed with 186 cataract patients and 10 study investigators.
- Rasch analysis of the 13-item questionnaire demonstrated acceptable psychometric properties except issues with redundancy of items on the person-item map, mistargeting and multidimensionality.
- Thus, 13 separate re-analyses were conducted with removal of certain items.
- One 6-item subset (Figure 1) demonstrated excellent psychometric properties:
 - Ordered category thresholds
 - Acceptable item calibration, fit
 - Acceptable targeting
 - Unidimensionality
 - No redundancy of items
 - Adequate precision (ability to distinguish between low and high burden from fasting)
 - No differential item functioning

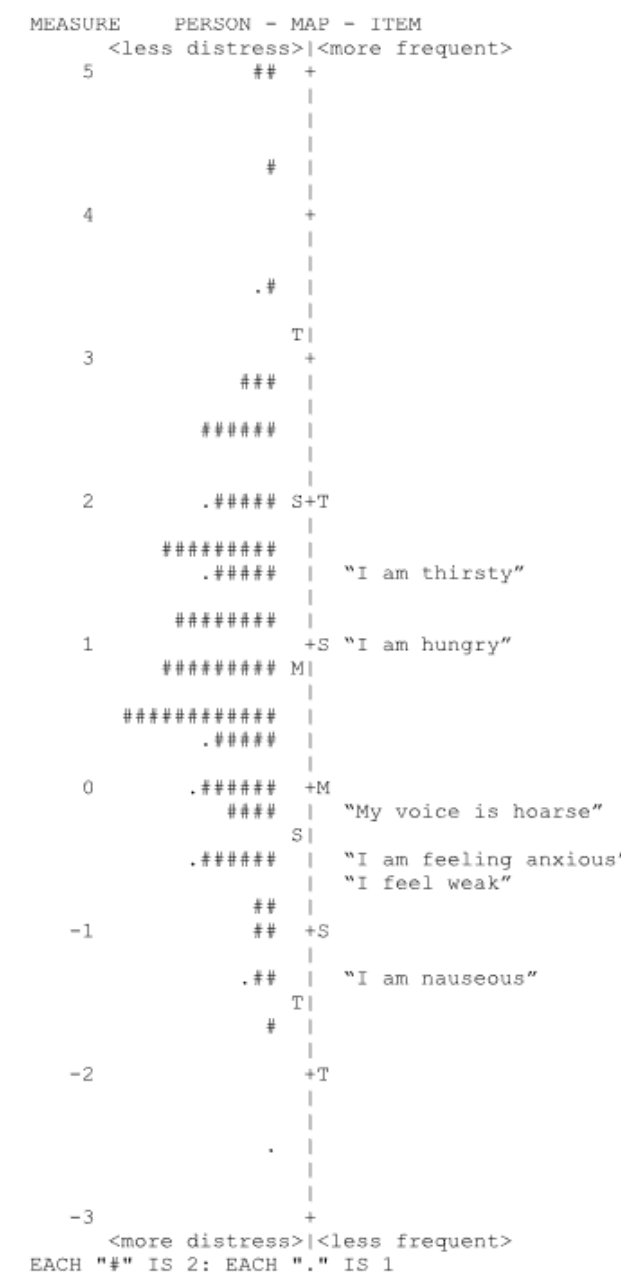
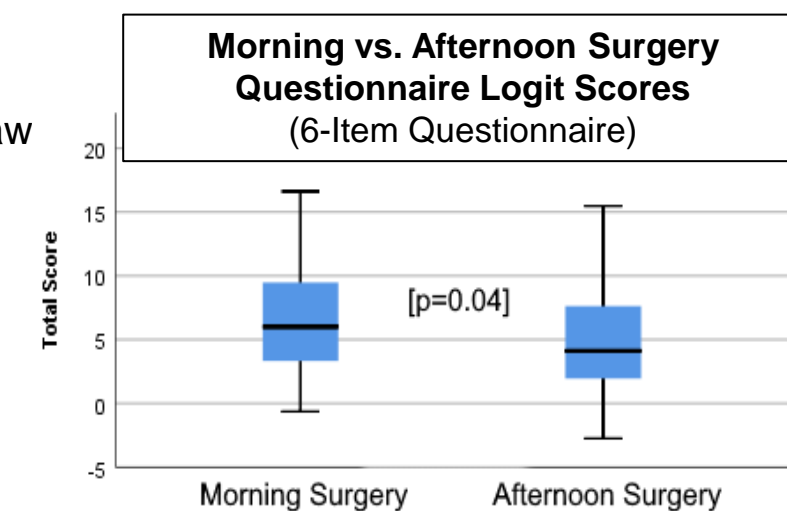


Figure 1: Person-item map for 6-item subset

Results

2) Discriminative ability: Morning vs. Afternoon Surgery: Total logit and raw scores of patients having surgery in the morning were greater (i.e. less fasting-related burden) compared to afternoon (logit score: $p=0.04$, raw score: $p=0.04$).



Short vs. Long Duration of Fasting: There was no significant difference in questionnaire scores between patients fasting for a short versus long duration ($p>0.05$).

3) Diagnostic ability: ROC analysis showed excellent diagnostic ability of the 6-item questionnaire relative to the 13-item version (area under curve=0.964, $p<0.0001$). A cut-off score of 5.76 logits on the 6-item questionnaire had the optimal combination of sensitivity and specificity (sensitivity = 0.89, specificity = 0.92, Youden's J = 0.81).

Conclusions

- A 6-item questionnaire with items on hunger, thirst, hoarseness, weakness, anxiety, and nausea is a psychometrically robust measure of fasting-related burden. It has excellent discriminative ability between early versus late surgery patients.
- The time fasting while awake may be a more relevant predictor of fasting-related burden relative to the total duration of fasting.
- The 13-item questionnaire does not provide additional unique information relative to the 6-item variant.
- Future studies should aim to assess the questionnaire's performance and validate our findings in other populations.

References

- American Society of Anesthesiologists Task Force on Preoperative Fasting. Practice guidelines for preoperative fasting and the use of pharmacologic agents to reduce the risk of pulmonary aspiration: application to healthy patients undergoing elective procedures. *Anesthesiology*. 2017;126(3):376-93.