A UK developed NHS suitable brief patient reported outcome measure: Cat-PROM5

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- **Brighton**
  - Christopher Liu
  - Debbie Horney
  - And many others in the background!

5 Year NHIR Programme Grant for Applied Research £2M
Cataract
Opacification of the lens of the eye
Cataract

• Surgery is the only effective treatment

• Most frequent NHS Surgical Procedure
  – Around 400,000 Cataract Operations Annually

• Visual Acuity (letter chart) a poor indicator of
  – Visual difficulty
  – Benefit from surgery
Cataract Patient Reported Outcome Measure (Cat-PROM)

- Cataract is a **symptomatic condition**
- **Patients are the best judge** of their vision
- Cataract **surgery should improve** patients’ self-reported visual difficulty
Cataract Patient Reported Outcome Measure (Cat-PROM)

- Every day ophthalmologists **informally**
  - Ask their patients how much their vision is affected by Cataracts
  - Ask their patients how much better their vision is after Cataract Surgery
Cataract Patient Reported Outcome Measure (Cat-PROM)

Aim

To develop a brief NHS suitable UK relevant cataract surgery patient reported outcome measure capable of reliably measuring visual difficulty from cataract and its relief from surgery.
Cataract Patient Reported Outcome Measure (Cat-PROM)

- A few key questions can help us to better understand patient’s visual disability from cataract and its relief from surgery
  - A Patient Reported Outcome Measure
  - Structured, repeatable and psychometrically valid instrument which is responsive to surgical intervention

(DH spent a couple of £100k and could not find an NHS suitable Cataract PROM)
Building on Existing Work

• **Construct**
  – Visual difficulty due to cataract

• **2 UK developed Parent VR-QoL Questionnaires**
  – VSQ developed for 2\textsuperscript{nd} eye cataract RCT
  – VCM1 developed for Somerset and Avon Eye Study

• 21 Items (= questions) selected

• **Iterative Cycles** of testing and item reduction
Cataract Patient Reported Outcome Measure (Cat-PROM)

• 4 Centres
  – Bristol (John Sparrow), Torbay (Andy Frost), Cheltenham (Rob Johnston), Brighton (Christopher Liu)

• Cycle 0: Pilot (21 Items, 200 patients, pre-op only)

• Cycle 1: Development (11 Items, 316 patients, pre- & post-op)

• Cycle 2: Confirmation (5 Items, 306 patients, pre- & post-op)

• Cycles Combined
  – 822 Patients
  – 1266 Questionnaires for final analysis
Scales

• Nominal or Categorical
  – Sighted / Blind

• Rank ordered or ordinal
  – Street numbers (order & direction)
  – Questionnaires about visual disability

• Continuous (i.e. Parametric Statistics)
  – Meters or kilometres of distance
  – Underlying latent visual disability scale
Questionnaire Levels are ‘rank ordered’

How would you describe your vision overall in the past month - with both eyes open, wearing glasses or contact lenses if you usually do?

<table>
<thead>
<tr>
<th>Level</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent</td>
<td>0</td>
</tr>
<tr>
<td>Very good</td>
<td>1</td>
</tr>
<tr>
<td>Quite good</td>
<td>2</td>
</tr>
<tr>
<td>Average</td>
<td>3</td>
</tr>
<tr>
<td>Quite poor</td>
<td>4</td>
</tr>
<tr>
<td>Very poor</td>
<td>5</td>
</tr>
<tr>
<td>Appalling</td>
<td>6</td>
</tr>
</tbody>
</table>
Translating Questionnaire Scales

Rank ordered or ordinal question responses

Rasch

Continuous underlying latent scale
How does Rasch help?

• Identifies the **Underlying Latent Trait** being measured by the questionnaire

• Establishes a **Continuous Scale** for the Latent Trait

• **Positions items and** rank ordered item **category levels** along the Continuous Latent Scale

• **Positions Respondents** on the same **Continuous Latent Scale**
  
  – **Very powerful feature** as this allows **parametric statistical analysis** of data collected as rank ordered data
Sample Question 1 - Vision Overall

How would you describe your vision **overall in the past month** - with both eyes open, wearing glasses or contact lenses if you usually do?

- Excellent [ ] 0
- Very good [ ] 1
- Quite good [ ] 2
- Average [ ] 3
- Quite poor [ ] 4
- Very poor [ ] 5
- Appalling [ ] 6
Well functioning Sample Question
Vision Overall
Threshold Probability Curve

Underlying Latent Scale of visual disability in Logits
Sample Question 2 - Lonely

Have you felt lonely or isolated because of your eyesight?

Not at all  0
Very rarely  1
A little of the time  2
A fair amount of the time  3
A lot of the time  4
All the time  5
Poorly Functioning Sample Question
Lonely
Threshold Probability Curve

Underlying Latent Scale of visual disability
Do lots of statistics and pick the best items (questions)

- Short
- Reliable
- Repeatable
- Unidimensional
- Responsive to Surgery
Cat-PROM5
Threshold Probability Curves
Qualitative Elements

• Both original parent Questionnaires involved extensive patient and eye health professional input
  – VSQ (40 interviews)
  – VCM1 (38 + 58 interviews in 2 rounds)

• Cataract Surgery Patients assessing Cat-PROM5
  – Co-researcher patient advisory group input
  – Pre-operative interviews with patients
  – Post-operative interviews with patients
  – Patients with and without ocular co-morbidities
  – Comparison against existing longer ‘best of class’ questionnaire

• Cat-PROM5 favourably received by interviewees
Cat-PROM5

Pre-op & Post-op distributions & Item Locations
Cat-PROM5
Patient Reported Benefits

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small or better (0.2SD or more)</td>
<td>83%</td>
</tr>
<tr>
<td>Medium or better (0.5SD or more)</td>
<td>72%</td>
</tr>
<tr>
<td>Large or very Large (0.8SD or more)</td>
<td>68%</td>
</tr>
</tbody>
</table>
How to use it?
‘Look-up’ Table
Translating Questionnaire Scales

Rank ordered or ordinal question responses

‘Look up’ Table

Continuous underlying latent scale
Cat-PROM5
Implementation

• **Specialty Specific Ophthalmology EMRs**
  – Medisoft EMR in over half NHS cataract services
  – OpenEyes EMR gaining ground and used in one very large flagship eye hospital

• Both EMRs wish to **implement Cat-PROM5** for routine use in **NHS Cataract Surgery Services**
Cat-PROM5

• **Psychometrically robust questions** which work well and are highly **responsive to cataract surgery**
• Has the potential to **empower patients** to express their visual difficulty in a structured format
• Responses can be **calibrated to a continuous** underlying **visual difficulty latent scale**
• Provides opportunity for **patients to express their benefit from surgery**
• **Avoids limitations** of relying only on **monocular visual acuity** to assess surgery
Thank you