Response shift or recall bias

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My story

I am now 6/10, but I have improved since I started driving

If I had been asked as an 18 year old, I think I would have scored myself 8/10

Accident made me reconsider my rating value system – shifting everything back 4

From my current value system I now think I was a 4/10 back then

Going back in time, I actually gave myself a 10/10

How much did my driving ability change (30y.o. – 18y.o.)?

+2, 0, -2, -4,

This means I now think I was 6/10 back then
Response shift

- Response shift refers to a change in the *meaning* of QoL over time. Visser et al. 2005

- Components
  - Recalibration
  - Reconceptualisation
  - Reprioritisation

- Importance
  - Potential implications for measuring similar clinical outcomes, economic evaluations and resource allocation in healthcare

Response shift

- Measurement
  - Many ways to measure response shift
  - “Then test”
    - Asking patients to rate their previous health state from their current perspective
    - “Tell me how you would *now* rate your health back *then*”
  - Least complicated approach, making it popular
Calculating response shift using “Then test”

- **Response shift**
  - However, what if patient is unable to recall accurately their previous health state?
  - Will the “then test” be biased by poor retrospective recall?
Calculating recall bias and patient perceived response shift

Previous work

  - Used SF36 in cancer patients at pre surgery and 3 months post.
  - “Then test” and structural equation modeling approaches converged
  - Argued that then test results were not affected by recall bias
Aim

- To identify whether subtracting the “then test” from baseline measures response shift, or whether it measures recall bias and patient perceived response shift.

Method

- Design
  - Longitudinal cohort study nested within RCT
  - Measurements at baseline, 3 & 6 months
- Participants
  - Women receiving adjuvant therapy post surgery for breast cancer at PA hospital, Brisbane
Method

- Intervention/control
  - Moderate intensity physical activity program vs sham physical activity program

- Measures
  - Baseline
    - EQ-5D & VAS
  - 3 month
    - EQ-5D & VAS
    - Recall test (RT) of baseline EQ-5D & VAS
    - Then test (TT) of baseline EQ-5D & VAS
  - 6 month
    - EQ-5D & VAS
    - RT of baseline EQ-5D & VAS
    - TT of baseline EQ-5D & VAS

Method

- Procedure
  - Participants provided with verbal and written explanation
    - EQ-5D and VAS
    - RT (EQ-5D and VAS)
    - TT (EQ-5D and VAS)
Method

- Analysis
  - Bland-Altman plots of Limits of Agreement (jitter to expose superimposed points)
  - Calculation of mean (SD) of standardized difference scores for
    • Response shift (TT-baseline)
    • Recall bias (RT-baseline)
    • Patient perceived response shift (TT-RT)
  - At 3 and 6 months for both EQ-5D (Dolan scoring) and VAS components

Results

- Demographics
  • 106 women consented
  • 90 attended baseline assessment
  • 71 attended 3 month assessment
  • 59 attended 6 month assessment
  - Mean (sd)
    • age at baseline = 55 (11) years
    • height = 163 (6) cms
    • weight = 76 (16) kgs
    • body fat % = 39 (8) %
    • distance walked in 6 minutes = 528 (85) metres
    • EQ-5D at baseline = 0.82 (0.17)
    • EQ-5D VAS at baseline = 74 (15)
Response shift
(TT – baseline): 3 months (5D)

Response shift
(TT – baseline): 6 months (5D)
Response shift
(TT – baseline): 3 months (VAS)

Response shift
(TT – baseline): 6 months (VAS)
Recall bias
(RT – baseline): 3 month (5D)

Recall bias
(RT – baseline): 6 month (5D)
Recall bias (RT – baseline): 3 month (VAS)

Mean vs. Difference for 3-month recall bias.

Recall bias (RT – baseline): 6 month (VAS)

Mean vs. Difference for 6-month recall bias.
Patient perceived response shift (TT-RT): 3 months (5D)

Patient perceived response shift (TT-RT): 6 months (5D)
Patient perceived response shift (TT-RT): 3 months (VAS)

![Graph showing patient perceived response shift for 3 months.](image)

Patient perceived response shift (TT-RT): 6 months (VAS)

![Graph showing patient perceived response shift for 6 months.](image)
Results

• Response shift (TT - baseline) is present
  – Median (IQR), mean (sd) of standardized differences
    • 5d 3 month: 0.07 (0.0, 0.20), 0.15 (0.21)
    • 5d 6 month: 0.12 (0.0, 0.20), 0.14 (0.18)
    • VAS 3 month: 5 (1, 10), 9 (9)
    • VAS 6 month: 5 (1, 15), 10 (11)

Results

• However, recall bias (RT – baseline) is also present
  – Median (IQR), mean (sd) of standardized differences
    • 5d 3 month: 0.07 (0.0, 0.19), 0.13 (0.19)
    • 5d 6 month: 0.09 (0.0, 0.20), 0.13 (0.20)
    • VAS 3 month: 5 (1.5, 10), 8 (10)
    • VAS 6 month: 5 (0, 10), 8 (9)
Results

- Is response shift just recall bias?
- No – Patient perceived response shift is also present, though for not as many
  - Median (IQR), mean (sd) of standardized differences
    - 5d 3 month: 0.0 (0.0, 0.07), 0.06 (0.13)
    - 5d 6 month: 0.0 (0.0, 0.09), 0.07 (0.11)
    - VAS 3 month: 0 (0, 5), 4 (8)
    - VAS 6 month: 2 (0, 10), 6 (9)
  - 32%, 42%, 39%, 61% of respondents reported self perceived response shift respectively

Discussion

Response shift (TT – baseline) = Patient perceived response shift (TT – RT) - Recall bias (RT – baseline)
Discussion

- Findings conflict with conclusions of Visser et al 2005
  - Differences
    - Approach to measurement of recall bias
    - Use of VAS and multi-attribute utility index
    - 3 and 6 month follow-up points

Implications

- Three perspectives on change

1) Standard change (STfollow-up – STbaseline) = -4 in example

<table>
<thead>
<tr>
<th>Pro’s</th>
<th>Con’s</th>
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<tr>
<td>- Easy</td>
<td>- Patient disagrees</td>
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<tr>
<td>- Includes RB, patient perceived change and patient perceived RS</td>
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Implications

• Three perspectives on change

2) Patient perceived change (STfollow-up – TT) = +2 in example

- Pro’s
  - Removes response shift
  - Patient thinks change is correct using follow-up perspective

- Con’s
  - Ignores earlier perspective
  - Recall bias can confound
  - Patient disagrees with RS

3) Patient perceived change adjusted for absolute recall bias = 0
   ([STfollow-up – TT] + [RT – STbaseline])

- Pro’s
  - √ both perspectives
  - Eliminates patient self perceived RS

- Con’s
  - Harder to administer
  - Do we want both perspectives?
Limitations

- Single population
- Sample size / attrition
- Only investigated one approach to measuring response shift

Future research

- Replicate in other populations
- Identify which change is valued most by patients / society
- Examine whether providing patients with their baseline scores at follow-up changes the magnitude of response shift observed using then test
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