Poor health reporting:
Do poor South Africans underestimate their health needs?

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6 August, 2014
Context: Differences in health outcomes by wealth status

• Wealth and income is distributed unequally in South Africa.

• There are differences in the health outcomes of the affluent and the poor (Ataguba, Akazili & McIntyre, 2011; Zere & McIntyre, 2003; Myer et al. 2008, Ataguba & McIntyre, 2013; Cockburn et al., 2012; Ataguba, 2013).
  – 16% of the population is covered by medical schemes.
  – Membership is concentrated amongst the affluent (Burger et al., 2013).

• The poorer population has to rely on public healthcare, which is of worse quality.
  – Financial strain: because of the poor quality and long waiting times, the less well-off often pay for private health care out of pocket.
  – A fifth of healthcare utilization by the persons in the poorest quintile is from private providers (Burger et al., 2013).

• Since 1994: Public health spending has become significantly more pro-poor. Despite the improved access to healthcare, the quality of public healthcare remains inadequate (Burger et al., 2013).

• Measure health using self reported health.
Motivation (1) Reporting behaviour of vulnerable sub-groups

• **Self-reported** vs. **Objective health**
  – Reporting heterogeneity
  – E.g. Aboriginals in Australia (Mathers & Douglas, 1998)
  – Self-reported chronic conditions?

• **Vulnerable sub-groups underreport** their ill-health.
  – Previous papers have found that the vulnerable subgroups tend to underreport their own health:
  – Ren Mu (China), **poor province**; Etile & Milcent (France), D’Uva, Van Doorslaer *et al.* (Indonesia, India & China), **low income groups**; Lunde & Locken (Norway); Bago d’Uva, O’Donnel & Van Doorslaer (EU) **low education levels**
Motivation (1) Reporting behaviour of vulnerable sub-groups

- Vulnerable sub-groups underreport their ill-health continued...
  - Different comparison groups (Harris et al., 2011; Boyce & Harris, 2008)
  - Inability to cope with the economic costs involved with being ill.
    - Burkina Faso (Sauerborn et al., 1996).

Coping strategies

<table>
<thead>
<tr>
<th>Preventative</th>
<th>Managing</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Modifying illness perceptions (ignoring disease).</td>
<td></td>
</tr>
<tr>
<td>2. Continue work despite illness perception.</td>
<td></td>
</tr>
<tr>
<td>3. Allow illness to go untreated.</td>
<td>1. Strategies to minimize production lost.</td>
</tr>
<tr>
<td>2. Coping strategies to cover healthcare costs.</td>
<td></td>
</tr>
</tbody>
</table>

Source: adapted from Sauerborn et al. (1996)
## Motivation (1) Reporting behaviour of vulnerable sub-groups

<table>
<thead>
<tr>
<th>Per capita household expenditure quintile</th>
<th>Prevalence of reported illness and injury over the last month (%)</th>
<th>Proportion of those ill/injured who reported consulting a health worker over the last month (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poorest 20%</td>
<td>10.8</td>
<td>7.2</td>
</tr>
<tr>
<td>Quintile 2</td>
<td>13.5</td>
<td>8.5</td>
</tr>
<tr>
<td>Quintile 3</td>
<td>16.7</td>
<td>9.3</td>
</tr>
<tr>
<td>Quintile 4</td>
<td>18.9</td>
<td>11.4</td>
</tr>
<tr>
<td>Most affluent 20%</td>
<td>24.2</td>
<td>12.1</td>
</tr>
<tr>
<td>Total</td>
<td>16.8</td>
<td>9.7</td>
</tr>
</tbody>
</table>

Sources: 1993 PSL SD, 1995 IES/OHS and 2003 GHS

Source: Burger et al. (2012)
The implications for health disparities

- If vulnerable sub-groups underreport their ill-health
  Underestimate health disparities.
  - Bago d’Uva et al. (2008), Bonfrer et al. (2013), Dowd and Todd (2011).
- Focus on reporting behaviour according to wealth status.
- Steps:
  - Is wealth reporting heterogeneity present amongst South Africans? (are the poor and the non-poor reporting their health differently)
  - In what direction is this bias? (if yes, are the poor over-reporting or under-reporting their ill-health relative to the non-poor).
Methodology – The anchoring vignettes approach

• Data: WHO’s study on global ageing and adult health (SAGE)
  – 2008; 3200 observations; >50 years of age
• Data contains:
  – Asked to rate their own health for a range of health domains. These include mobility, appearance, anxiety, pain/discomfort, cognitive abilities, interpersonal relationships, sleeping/resting ability and vision.

<table>
<thead>
<tr>
<th>Overall in the last 30 days, how much difficulty did you have …</th>
<th>NONE</th>
<th>MILD</th>
<th>MODERATE</th>
<th>SEVERE</th>
<th>EXTREME / CANNOT DO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q2002 … with moving around?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

– Asked to rate vignettes in these health domains.
Table 3: Summary of covariates

<table>
<thead>
<tr>
<th></th>
<th>Non poor</th>
<th>Poor</th>
<th>Diff.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proportion female</td>
<td>.55</td>
<td>.55</td>
<td>-.0</td>
</tr>
<tr>
<td>Age in years</td>
<td>62.61</td>
<td>62.3</td>
<td>.33</td>
</tr>
<tr>
<td>Never married</td>
<td>.11</td>
<td>.18</td>
<td>.04***</td>
</tr>
<tr>
<td>Married</td>
<td>.54</td>
<td>.36</td>
<td>.18***</td>
</tr>
<tr>
<td>Widowed</td>
<td>.27</td>
<td>.28</td>
<td>-.01</td>
</tr>
<tr>
<td>Years of education</td>
<td>8.53</td>
<td>6.2</td>
<td>2.32***</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>.50</td>
<td>.81</td>
<td>-.31***</td>
</tr>
<tr>
<td>Coloured</td>
<td>.23</td>
<td>.17</td>
<td>.06***</td>
</tr>
<tr>
<td>Asian/Indian</td>
<td>.14</td>
<td>.01</td>
<td>.13***</td>
</tr>
<tr>
<td>White</td>
<td>0.13</td>
<td>0.01</td>
<td>.12***</td>
</tr>
</tbody>
</table>

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.

Moving around for moderate health vignette

Data source: SAGE
Estimation

- **HOPIT model (King et al. (2004))**
  Code provided by Jones et al. (2007)

- **Assumptions:**
  Response consistency; Vignette equivalence; Previous studies have tested the validity of these assumptions (Salomon, Tandon & Murray, 2004; Bago d’Uva et al., 2011)

- **Reporting behaviour equation**

  \[ H_{T_{ij}} = \alpha_j + \varepsilon_{ij} \]  
  \( \ldots (1) \)

  \[ AH_{ij}^v = m \text{ if } s_i^{m-1} \leq H_{T_{ij}}^v \leq s_i^m \]
  \( \text{for } s_i^0 = -\infty, s_i^5 = \infty \& m = 1, \ldots, 5 \)
  \[ \text{And } s_i^1 < s_i^2 < s_i^3 < s_i^4 < s_i^5 \]  
  \( \ldots (2) \)

  \[ AH_{ij}^v = m \text{ if } X_i'\beta^{m-1} + \text{Poor } \beta^{m-1} \leq H_{T_{ij}}^v \leq X_i'\beta^m + \text{Poor } \beta^m \]  
  \( \ldots (3) \)

  Tandon et al., 2003; Rice et al., 2012
• **Health equation:**
  
  – Allow vignettes to drive the cut-point estimation
  – Similar to interval regression: an ordered probit with known cut-points

\[
H_{Ti}^S = \beta_i X_i + \varepsilon_2 \tag{4}
\]

\[
SAH_i^S = m \text{ if } s_i^{m-1} \leq H_{Ti}^S \leq s_i^m \tag{5}
\]

Tandon *et al.*, 2003; Rice *et al.*, 2012

• Cut-points are dependent on wealth status + other individual characteristics.
  
  – SAH is purged of differences in reporting behaviour.

• Test for reporting heterogeneity between poor and non-poor respondents:
  

\[
\beta_P^1 = \beta_P^2 = \beta_P^3 = \beta_P^4 = 0
\]
Results. Test 1: Test for reporting heterogeneity

Table 4: Test for reporting heterogeneity and parallel cut-point shift in vignettes severity ratings—p-values

<table>
<thead>
<tr>
<th>Health Domain</th>
<th>p-values</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moving around</td>
<td>0.0101</td>
<td>Reject</td>
</tr>
<tr>
<td>Vigorous activity</td>
<td>0.0249</td>
<td>Reject</td>
</tr>
<tr>
<td>Depressed</td>
<td>0.0274</td>
<td>Reject</td>
</tr>
<tr>
<td>Body pains</td>
<td>0.0372</td>
<td>Reject</td>
</tr>
<tr>
<td>Farsighted</td>
<td>0.0601</td>
<td>Reject</td>
</tr>
<tr>
<td>Nearsighted</td>
<td>0.0084</td>
<td>Reject</td>
</tr>
<tr>
<td>Grooming</td>
<td>0.0029</td>
<td>Reject</td>
</tr>
<tr>
<td>Appearance</td>
<td>0.0001</td>
<td>Reject</td>
</tr>
</tbody>
</table>

Homogeneity rejected at a 10% significance level
## Test 2: Direction of bias

**Table 5: Coefficients of poor variable from ordered probit and HOPIT**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Ordered probit</th>
<th>HOPIT</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moving around</td>
<td>-0.0324</td>
<td>0.0924</td>
<td>0.1248</td>
</tr>
<tr>
<td></td>
<td>(0.0542)</td>
<td>(0.0822)</td>
<td></td>
</tr>
<tr>
<td>Vigorous activity</td>
<td>-0.112**</td>
<td>-0.0366</td>
<td>0.0754</td>
</tr>
<tr>
<td></td>
<td>(0.0492)</td>
<td>(0.0886)</td>
<td></td>
</tr>
<tr>
<td>Depressed</td>
<td>-0.127***</td>
<td>0.00213</td>
<td>0.12913</td>
</tr>
<tr>
<td></td>
<td>(0.0492)</td>
<td>(0.0762)</td>
<td></td>
</tr>
<tr>
<td>Body pains</td>
<td>-0.0428</td>
<td>0.0505</td>
<td>0.0933</td>
</tr>
<tr>
<td></td>
<td>(0.0467)</td>
<td>(0.0761)</td>
<td></td>
</tr>
<tr>
<td>Farsighted</td>
<td>-0.0273</td>
<td>0.0907</td>
<td>0.118</td>
</tr>
<tr>
<td></td>
<td>(0.0481)</td>
<td>(0.0631)</td>
<td></td>
</tr>
<tr>
<td>Nearsighted</td>
<td>-0.0500</td>
<td>0.0920</td>
<td>0.142</td>
</tr>
<tr>
<td></td>
<td>(0.0485)</td>
<td>(0.0649)</td>
<td></td>
</tr>
<tr>
<td>Grooming</td>
<td>0.0284</td>
<td>0.235**</td>
<td>0.2016</td>
</tr>
<tr>
<td></td>
<td>(0.0664)</td>
<td>(0.110)</td>
<td></td>
</tr>
<tr>
<td>Appearance</td>
<td>0.0634</td>
<td>0.262**</td>
<td>0.1986</td>
</tr>
<tr>
<td></td>
<td>(0.0668)</td>
<td>(0.113)</td>
<td></td>
</tr>
</tbody>
</table>
Discussion: Health perceptions and need for care

• Indications that using SRH indicators to calculate health inequalities across income groups, the results may be biased and underestimated.
  – Includes self-reported chronic conditions.
  – Policy initiatives that aim to remove barriers to access on the supply side will help to realize unmet health needs.

• Costing model for NHI should include anticipation of increased health demand.
  – Social solidarity: health services should be distributed within a country by healthcare need, as opposed to their ability to pay (Wagstaff & Van Doorslaer, 1993; McIntyre & Ataguba, 2011).
References


Ataguba, J. E., McIntyre, D. 2012. Paying for and receiving benefits from health services in South Africa: is the health system equitable?. *Health policy and planning*, 27(suppl 1), i35-i45.


Hirve, S., Gómez-Olivé, X., Oti, S., Debpuur, C., Juvekar, S., Tollman, S., Blomstedt, Y., Wall, S., Ng, N 2013. Use of anchoring vignettes to evaluate health reporting behavior amongst adults aged 50 years and above in Africa and Asia - testing assumptions *Glob Health Action 2013, 6.*


