The relationships of health literacy, health behavior and health status regarding infectious respiratory diseases: a latent variable model

Xinying Sun, PhD
School of Public Health, Peking University
University of North Carolina at Chapel Hill
xysun@bjmu.edu.cn
Background

What is health literacy?

Health literacy is the degree to which individuals can obtain, process, understand and communicate about health related information needed to make informed health decisions.
**Health outcomes**

- Preventive behavior
- Access and utilization of health care\(^1,2\)
- Self-care\(^1\)
- Patient-provider interaction\(^1,2\)
- Management of health and illness\(^2\)

**Health status**

- Increase mortality
- Increase hospitalization
- Poorer control of chronic diseases

**Health literacy**

- Obtain
- Process
- Communicate
- Understand

**Socioeconomic characteristics**

- Age
- Education
- Language barrier
- Occupation and income
- Prior knowledge\(^3\)
- Capabilities\(^3\)

---

1, Paasche-Orlow 2007; 2, von Wagner 2009; 3, McCormack 2012

---

5th Annual Health Literacy Research Conference
Methods

- Sample
- Measurement
- Data analysis

- Latent variable analysis was used by Lisrel 8.70.
Multi-stage stratified cluster sampling (3222 residents)

Survey setting
- communities, factories, government organizations, other institutions
- hotels, building sites, assembly shops, employment medical examination centers

Area
- City (local residents)
- Village (migrant population)

Region
- Beijing
- Shanxi
- Guangdong
Questionnaire

Socio-demographic characteristics
- Age, gender, ethnicity, marital status
- Education, occupation, income

Prior knowledge
- Different types of infectious respiratory diseases
- Prevention methods

Behaviors and actions
- Preventive behaviors (washing hands, wearing a face mask, sneezing, room ventilation)
- Treatments for infectious respiratory diseases

Health status
- Frequency of sickness and seeing a doctor due to upper respiratory infection
- Degree of severity for each sickness and the duration
Skill-based health literacy measurement

- 16 stimuli materials (including 3 pieces of audio or video to test communication literacy)
- WHO, China CDC, Chinese Center of Health Education
- Involving the distribution of epidemics, immunization programs, early symptoms, means of disease prevention and individual’s preventative behavior, use of medications and thermometers, treatment plans, etc
治疗疼痛 自行用药不可靠

亚洲首个针对慢性疼痛患者自我用药习惯的调查显示，大约60%的慢性疼痛患者在自行使用止痛药。大多数受访者表示，疼痛干扰了他们的日常生活，并导致他们无法集中精力完成某项工作，甚至不能享受日常爱好与其他休闲活动。在从未寻求医生协助的接受调查者中，超过30%的受访者选择不看医生的原因，是他们相信可以自行处理疼痛。只有5%的受访者使用处方药。

《京华时报》2010.09.21 杨凤丽 文
Print-document literacy

Picture of pill case for question about expiry date
### Table for print-quantitative literacy

<table>
<thead>
<tr>
<th>Hospital level</th>
<th>Starting pay line</th>
<th>Reimbursement ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Designated hospitals at township/village-level (first level)</td>
<td>80 RMB</td>
<td>80%</td>
</tr>
<tr>
<td>Local designated hospitals at district/county-level (second level)</td>
<td>200 RMB</td>
<td>60%</td>
</tr>
<tr>
<td>Nonlocal designated hospitals at district/county-level (second level)</td>
<td>500 RMB</td>
<td>60%</td>
</tr>
<tr>
<td>Designated hospitals at municipality-level (third level)</td>
<td>1000 RMB</td>
<td>50%</td>
</tr>
</tbody>
</table>

5th Annual Health Literacy Research Conference
## Reliability of the instrument

<table>
<thead>
<tr>
<th>Variables</th>
<th>Items</th>
<th>Cronbach α</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prior knowledge</td>
<td>12</td>
<td>0.662</td>
</tr>
<tr>
<td>Health behavior</td>
<td>23</td>
<td>0.688</td>
</tr>
<tr>
<td>Health status</td>
<td>13</td>
<td>0.623</td>
</tr>
<tr>
<td>Health literacy</td>
<td>30</td>
<td>0.863</td>
</tr>
<tr>
<td>Print-prose</td>
<td>5</td>
<td>0.568</td>
</tr>
<tr>
<td>Print-document</td>
<td>8</td>
<td>0.664</td>
</tr>
<tr>
<td>Print-quantitative</td>
<td>6</td>
<td>0.531</td>
</tr>
<tr>
<td>Oral</td>
<td>6</td>
<td>0.624</td>
</tr>
<tr>
<td>Internet</td>
<td>5</td>
<td>0.964</td>
</tr>
</tbody>
</table>

Construct Validity of Health literacy Measurement

Sun et al. PLOS ONE, 2013, 8(5): e64153
Original results of latent variable model

RMSEA = 0.076  GFI = 0.918
Health literacy model

- Age
- Education
- Knowledge
- Health literacy
- Health Behavior
- Health status

Correlation coefficients:
- Age and Education: 0.337
- Education and Knowledge: 0.306
- Knowledge and Health literacy: 0.356
- Health literacy and Health behavior: 0.201
- Health behavior and Health status: 0.209
- Age and Health status: 0.041
- Education and Health status: 0.246

5th Annual Health Literacy Research Conference
Conclusion

- This model explains the determinants of health literacy and the associations between health literacy and health behaviors well.
  - **Education** and **prior knowledge** has positive, strong and direct effect on health literacy.
  - **Age** has **negative**, strong and direct effect on health literacy.
  - Health behavior is influenced by age and prior knowledge positively but weakly by health literacy.
  - Health behavior is an important factor to health status.
Implication and limitation

- This model is at the individual level.
  - To extend the scope of health literacy beyond the individual.

- Limited by the project background (infectious respiratory diseases)
  - To test the feasibility of the model in regards to other diseases and aspects of health.
Acknowledgement

- China-US Collaborative Program on Emerging and Re-emerging Infectious Diseases (5U2GGHH000018-02).
- CDC China Office and RTI International for their support and valuable comments.
- Health care workers in Beijing, Shenzhen, and Datong for their help in data collection.
- Thank you for your attention.