Differences in Medical Care Utilization Rates of the Disabled and the Non-disabled with Ambulatory Care Sensitive Conditions

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Facts about South Korea (2005)

- Population: 4.7 million
  - Disability rate: 4.59%
- Area: 99,646 km²
- GDP per capita: $16,306
- Life expectancy: 77.46 yr
- Health expenditure: 5.6% of GDP (2004)
The disabled population in South Korea

<table>
<thead>
<tr>
<th>Disability</th>
<th>Type</th>
<th>Subtype</th>
<th>The registered disabled persons</th>
<th>The estimated disabled persons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical disability</td>
<td>External impairment</td>
<td>Limb impairment</td>
<td>923,183</td>
<td>1,005,618</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Stroke and brain injury</td>
<td>154,614</td>
<td>270,853</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Visual impairment</td>
<td>180,526</td>
<td>221,166</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Auditory impairment</td>
<td>151,184</td>
<td>229,159</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lingual impairment</td>
<td>13,874</td>
<td>20,947</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Facial deformity</td>
<td>1,311</td>
<td>4,394</td>
</tr>
<tr>
<td></td>
<td>Internal impairment</td>
<td>Renal impairment</td>
<td>40,288</td>
<td>40,355</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cardiac impairment</td>
<td>12,226</td>
<td>42,007</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Respiratory impairment</td>
<td>10,815</td>
<td>30,186</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hepatic impairment</td>
<td>4,583</td>
<td>13,443</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Intestine and bladder impairment</td>
<td>8,848</td>
<td>15,508</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Epilepsy</td>
<td>6,032</td>
<td>14,756</td>
</tr>
<tr>
<td>Mental disability</td>
<td>Mental retardation</td>
<td></td>
<td>123,868</td>
<td>125,563</td>
</tr>
<tr>
<td></td>
<td>Developmental disability</td>
<td></td>
<td>8,754</td>
<td>23,478</td>
</tr>
<tr>
<td></td>
<td>Mental diseases</td>
<td></td>
<td>59,223</td>
<td>91,253</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td></td>
<td>1,669,329</td>
<td>2,148,686</td>
</tr>
</tbody>
</table>

Greater barrier to access to health care for people with disabilities

- People with disabilities confront several barriers not experienced by people without disabilities (Sutton & Dejong, 1998; Lawthers et al., 2003)
  - Physical and transportation barriers
  - Limited access to assistive technology and equipment
  - Limited access to medications, specialists
  - Limitations in access to personal care attendants
- Lack of timely access to health care services can be problematic for people with disabilities (Beatty et al., 2003)
  - Who are often at risk of deteriorating health, secondary conditions, and secondary functional loss
Background (2)

- Under-use of appropriate health services for people with disabilities (Lawthers et al., 2003)
  - Less likely to receive indicated preventive care such as Pap smears, mammograms, or preventive dental care
  - Under-treatment of co-morbid conditions that are unrelated to the primary disability

- Importance of access to timely and appropriate primary health services
  - Many of the secondary health conditions acquired by people with disabilities are entirely preventable before new health conditions become emergent or even life-threatening (Dejong, 1997)
Hospitalization for ambulatory care sensitive conditions

- Outcome indicator used to evaluate access to primary care (Billings et al, 1993; Laditka et al, 2003)
- Ambulatory care sensitive conditions (ACSCs): conditions for which good outpatient care can potentially prevent the need for hospitalization, or for which early intervention can prevent complications or more severe disease (AHRQ, 2004)
  - Asthma, angina, gastroenteritis, congestive heart failure, etc.
Objectives

❖ To evaluate whether the disabled have worse access to primary care than the non-disabled

❖ To determine the differences of in medical care utilization rates of the disabled and the non-disabled with ACSCs

❖ To determine the effect of disability on medical care utilization rates
Methods (1)

AHRQ’s prevention quality indicators: 16 ACSCs

National Disability Registry

Eligibility data of Health Insurance & Medical Aid (2003)

Health Care Utilization data of Health Insurance & Medical Aid (2003)

Selection of indicator diseases for assessing accessibility to the primary care

The disabled registered by Dec. 2003 and a double number of the non-disabled matched to them

[The disabled : The non-disabled = 1 : 2]
- Age
- Gender
- Area of residence
- Average insurance premium per month

The disabled
807,380

The non-disabled
1,614,760

- excluded miscoded or missing data
- excluded the internal impairment

Primary Diagnosis Code

9 ACSCs included
- Pediatric gastroenteritis
- Hypertension
- Congestive heart failure
- Angina
- Diabetes short-term complications
- Diabetes long-term complications
- Chronic obstructive pulmonary disease
- Bacterial pneumonia
- Urinary tract infection

• Analysis of differences in physician visits & hospitalizations rates of the disabled and the non-disabled with ACSCs
• Analysis of the effect of disability on physician visits & hospitalizations rates
• Analysis of the effect of physician visits rates on hospitalizations
## Inclusion criteria of selected ACSCs

<table>
<thead>
<tr>
<th>ACSCs</th>
<th>Age (years)</th>
<th>ICD-10 codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pediatric gastroenteritis</td>
<td>&lt;18</td>
<td>A08, A09, K52.8, K52.9</td>
</tr>
<tr>
<td>Hypertension</td>
<td>≥18</td>
<td>I10, I11.9, I12.9, I13.9</td>
</tr>
<tr>
<td>Congestive heart failure</td>
<td>≥18</td>
<td>I09.9, I11.0, I13.0, I13.2, I50</td>
</tr>
<tr>
<td>Angina</td>
<td>≥18</td>
<td>I20, I24.0, I24.8</td>
</tr>
<tr>
<td>Chronic obstructive pulmonary disease</td>
<td>≥18</td>
<td>J 20.9, J 40, J 41, J 42, J 43.8, J 43.9, J 44.8, J 44.9, J 47</td>
</tr>
<tr>
<td>Bacterial pneumonia</td>
<td>all</td>
<td>J 13, J 14, J 15.3, J 15.4, J 15.7, J 15.9, J 16, J 18.0, J 18.8</td>
</tr>
<tr>
<td>Urinary tract infection</td>
<td>all</td>
<td>N10, N11.8, N11.9, N12, N15.1, N30.0, N39.0</td>
</tr>
</tbody>
</table>

Methods (3)

Descriptive analysis
- *t*-test for evaluation of the differences in medical care utilization rates
- Medical care utilization rates
  - Physician visits rate: the numbers of physician visits per 100 patients
  - Hospitalizations rate: the numbers of hospitalizations per 100 patients

Multivariate analysis
- Multiple logistic regression analysis for evaluation of
  - the effect of disability on medical care utilization rates
    - Dependent variable: physician visits (yes / no) or hospitalizations (yes / no)
    - Explanatory variables: presence of disability (disabled / non-disabled), severity of disability (mild / severe)
  - the effect of physician visits rates on hospitalizations
    - Dependent variable: hospitalizations (yes / no)
    - Explanatory variable: physician visits per patient (<1 / ≥ 2)
    - Control variables: presence of disability (disabled / non-disabled), severity of disability (mild / severe)
  - Control variables: gender, age, area of residence, average insurance premium per month
Results
## Medical care utilization rates of the disabled and the non-disabled with ACSCs

<table>
<thead>
<tr>
<th>ACSCs</th>
<th>Number of physician visits per 100 patients</th>
<th>Number of hospitalizations per 100 patients</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Disabled persons (A)</td>
<td>Non-disabled persons (B)</td>
<td>Physician visit ratio (A/B)</td>
</tr>
<tr>
<td>Pediatric gastroenteritis</td>
<td>199.93</td>
<td>199.84</td>
<td>1.00</td>
</tr>
<tr>
<td>Hypertension</td>
<td>861.45</td>
<td>884.81</td>
<td>0.97</td>
</tr>
<tr>
<td>Congestive heart failure</td>
<td>417.14</td>
<td>462.62</td>
<td>0.90</td>
</tr>
<tr>
<td>Angina</td>
<td>360.51</td>
<td>388.49</td>
<td>0.93</td>
</tr>
<tr>
<td>Diabetes short-term complications</td>
<td>203.52</td>
<td>260.72</td>
<td>0.78</td>
</tr>
<tr>
<td>Diabetes long-term complications</td>
<td>724.87</td>
<td>764.12</td>
<td>0.95</td>
</tr>
<tr>
<td>Chronic obstructive pulmonary disease</td>
<td>309.66</td>
<td>308.98</td>
<td>1.00</td>
</tr>
<tr>
<td>Bacterial pneumonia</td>
<td>275.91</td>
<td>286.31</td>
<td>0.96</td>
</tr>
<tr>
<td>Urinary tract infection</td>
<td>279.63</td>
<td>280.64</td>
<td>1.00</td>
</tr>
</tbody>
</table>
### The effect of disability and severity of disability on medical care utilizations among persons with ACSCs

<table>
<thead>
<tr>
<th></th>
<th>Pediatric gastro-enteritis</th>
<th>Hypertension</th>
<th>Congestive heart failure</th>
<th>Angina</th>
<th>Diabetes short-term complications</th>
<th>Diabetes long-term complications</th>
<th>Chronic obstructive pulmonary disease</th>
<th>Bacterial pneumonia</th>
<th>Urinary tract infection</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Model I</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disabled persons</td>
<td>0.44 (0.34-0.55)</td>
<td>0.61 (0.56-0.67)</td>
<td>0.52 (0.46-0.58)</td>
<td>0.67</td>
<td>0.70 (0.56-0.88)</td>
<td>0.58 (0.53-0.63)</td>
<td>0.63 (0.57-0.70)</td>
<td>0.65 (0.59-0.72)</td>
<td>0.55 (0.51-0.61)‡</td>
</tr>
<tr>
<td>Severely disabled</td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Model II†</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mildly disabled</td>
<td>0.40 (0.31-0.51)</td>
<td>0.40 (0.35-0.44)</td>
<td>0.34 (0.29-0.40)‡</td>
<td>0.39</td>
<td>0.53 (0.38-0.72)</td>
<td>0.32 (0.29-0.36)‡</td>
<td>0.36 (0.32-0.42)</td>
<td>0.48 (0.42-0.55)</td>
<td>0.36 (0.32-0.41)‡</td>
</tr>
<tr>
<td>Disabled persons</td>
<td>1.89 (1.58-2.26)</td>
<td>1.45 (1.36-1.53)‡</td>
<td>1.55 (1.42-1.70)‡</td>
<td>1.16</td>
<td>1.37 (1.09-1.72)</td>
<td>1.50 (1.42-1.58)</td>
<td>1.40 (1.31-1.50)</td>
<td>1.52 (1.39-1.65)</td>
<td>1.73 (1.60-1.86)</td>
</tr>
<tr>
<td>Severely disabled</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model II†</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mildly disabled</td>
<td>2.01 (1.66-2.42)‡</td>
<td>1.85 (1.70-2.01)‡</td>
<td>2.23 (1.96-2.55)‡</td>
<td>1.38</td>
<td>1.97 (1.45-2.69)</td>
<td>2.08 (1.93-2.24)‡</td>
<td>1.95 (1.75-2.18)</td>
<td>1.99 (1.76-2.24)</td>
<td>2.80 (2.54-3.09)‡</td>
</tr>
</tbody>
</table>

* Adjusted for gender, age, area of residence, average insurance premium per month; reference=non-disabled persons (explanatory variable: presence of disability)
† Adjusted for gender, age, area of residence, average insurance premium per month; reference=non-disabled persons (explanatory variable: severity of disability)
‡ p<0.05 by Hosmer-Lemeshow goodness-of-fit test
### The effect of physician visits per patient on hospitalizations among persons with ACSCs

<table>
<thead>
<tr>
<th>Model I*</th>
<th>Disabled persons (≤1 physician visit)</th>
<th>Model II†</th>
<th>Severely disabled persons (≤1 physician visit)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pediatrics gastro-enteritis</td>
<td>1.93 (1.61-2.30)*</td>
<td>2.04 (1.68-2.46)*</td>
<td>2.35 (1.95-2.83)*</td>
</tr>
<tr>
<td>Hyper-tension</td>
<td>1.42 (1.34-1.51)*</td>
<td>1.75 (1.61-1.90)*</td>
<td>6.15 (5.81-6.51)*</td>
</tr>
<tr>
<td>Congestive heart failure</td>
<td>1.49 (1.35-1.64)*</td>
<td>2.10 (1.83-2.42)*</td>
<td>4.82 (4.37-5.32)*</td>
</tr>
<tr>
<td>Angina</td>
<td>1.14 (1.11-1.21)*</td>
<td>1.33 (1.21-1.47)*</td>
<td>1.68 (1.59-1.78)*</td>
</tr>
<tr>
<td>Diabetes short-term complications</td>
<td>1.39 (1.08-1.80)*</td>
<td>1.87 (1.32-2.64)*</td>
<td>19.56 (12.92-29.62)*</td>
</tr>
<tr>
<td>Diabetes long-term complications</td>
<td>1.47 (1.40-1.55)*</td>
<td>2.01 (1.86-2.17)*</td>
<td>2.81 (2.65-2.97)*</td>
</tr>
<tr>
<td>Chronic obstructive pulmonary disease</td>
<td>1.40 (1.31-1.50)*</td>
<td>1.93 (1.73-2.15)*</td>
<td>2.25 (2.11-2.41)*</td>
</tr>
<tr>
<td>Bacterial pneumonia</td>
<td>1.48 (1.35-1.63)†</td>
<td>1.95 (1.70-2.22)†</td>
<td>8.82 (7.91-9.84)†</td>
</tr>
<tr>
<td>Urinary tract infection</td>
<td>1.70 (1.55-1.83)†</td>
<td>2.77 (2.51-3.07)†</td>
<td>4.84 (4.45-5.26)†</td>
</tr>
</tbody>
</table>

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* Adjusted for gender, age, area of residence, average insurance premium per month; reference=non-disabled persons (control variable: presence of disability), ≥ 2 physician visits per patient

† Adjusted for gender, age, area of residence, average insurance premium per month; reference=non-disabled persons (control variable: severity of disability), ≥ 2 physician visits per patient

‡ p<0.05 by Hosmer-Lemeshow goodness-of-fit test
Less physician visits & more hospitalizations in the disabled than in the non-disabled with ACSCs

- The odds for physician visits: 0.44~0.70 times lower in the disabled
- The odds for hospitalizations: 1.16~1.89 times higher in the disabled
- Higher odds for hospitalizations in the disabled may be due to thinner margin of health or lower accessibility to primary care

Larger effect of the physician visit rate than the effect of disability on hospitalization

- The effect of lower physician visits on hospitalization: aOR 1.69~19.77
- The effect of disability on hospitalization: aOR 1.14~1.93
- Suggest that poor access to primary care of the disabled leads to more preventable hospitalizations of the disabled than the non-disabled
Limitation

- Excluding the effect of disability on the medical care utilization rates,
  - People with internal impairment were not included → 2.6%
  - People with disabilities registered for less than one year were not included → because the disabled use health services for the disability itself during the period of about 6~12 months after acquiring the disability (Kim, 2005)
- Accuracy of primary diagnosis codes was low (20~80%)
  - Exclude the pediatric and adult asthma, dehydration
  - Assume that both the disabled and the non-disabled have limitation of data
- The effects of the severity of ACSCs and mobility impairment were not adjusted
  - The severity of ACSCs ↑ → preventable hospitalizations ↑
  - Use the severity of disability as a proxy of the mobility impairment
  - Severe : mobility impairment (+); mild : mobility impairment (-)
Conclusion

- The findings in this study suggest that people with disabilities may have more preventable hospitalizations than people without disabilities due to the lower access to primary care.
  - Severely disabled persons might have greater barrier to access to primary care
- Policies for improving the accessibility to primary care of people with disabilities should be established in South Korea
Thank you very much

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