OBJECTIVES:  
Scarcity of public resources in middle-income countries, especially in challenging economic times, draws attention to potential reduction of pharmaceutical expenditure. Per capita pharmaceutical spending proportion of pharmaceutical spending compared to GDP and total health care spending are frequently used indicators to justify potential savings. Our objective was to explore the influencing factors of pharmaceutical spending in the middle-income OECD countries with special attention to the generalizability of conclusions based on international comparisons.

METHODS:  
We scrutified the potential limitation of the OECD methodology for the presentation of international comparison of pharmaceutical expenditure. We conducted a literature review to set up hypotheses for differences in pharmaceutical spending between middle-income (below 30,000 USD GDP/capita) and high income countries (above 30,000 USD GDP/capita). Cross sectional survey based on OECD Health Data 2010 and cluster analysis was conducted to test those hypotheses by applying Mann-Whitney-Wilcoxon test.

RESULTS:  
Some general methodological problems limit the generalizability of international comparison of pharmaceutical expenditure.  
- Countries have significant differences in which technologies are reported in the category of pharmaceuticals: prescribed medicines, OTC medicines, medical non-durables and medical goods (see Figure 1).  
- Confidential pricing agreements influence the published price of pharmaceuticals. The impact of price reductions on pharmaceutical expenditure is taken into account in some countries (mainly in those with ex-ante pricing agreements), and not taken into account in other countries (especially in those with ex-post pricing agreements, such as price volume risk-sharing agreements). In Hungary the pharmaceutical industry paid back 16% of the total public outpatient pharmaceutical expenditure in 2011, and this factor was not corrected in the reporting of total/publish pharmaceutical expenditure.
- The pharmaceutic expenditure in OECD databases includes mainly outpatient drug expenditure, as prospective financing of hospitals (e.g. DRG) prevents countries from capturing real hospital drug expenditure. Therefore in those countries with high proportion of drug utilization in hospitals (e.g. if special expensive drugs are available in special hospital centers) the outpatient drug expenditure is relatively lower.

CONCLUSIONS:  
In order to improve the generalizability of international comparison of pharmaceutical expenditure, several methodological problems has to be addressed:  
- The definition of pharmaceuticals has to be standardized.  
- Pharmaceutical expenditures have to be corrected for the impact of confidential pricing agreements, especially payback by the pharmaceutical industry.  
- The magnitude of hospital drug expenditure has to be taken into account when benchmarking the outpatient pharmaceutical spending.  
- Instead of PPP exchange rate the official currency exchange rate should be used for the presentation of per capita pharmaceutical spending.  
- It can be misleading to compare the pharmaceutical expenditure of middle-income countries to the average of OECD countries. Cluster analyses of countries with similar economic status and comparison of absolute spending based on currency exchange rate provide appropriate benchmarks to substantiate policy initiatives.

Table 1. Comparison pharmaceutical expenditure in high and middle income countries in 2009
(Source: OECD Health Data, 2011)

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Average of middle income countries (&gt;30'000 USD/GDP/capita)</th>
<th>Average of high income countries (&gt;50'000 USD/GDP/capita)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total health care exp. per capita (USD, 2009)</td>
<td>1659</td>
<td>5181</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>pharm &amp; med device exp. per capita (USD, 2009)</td>
<td>23.59</td>
<td>13.38</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Health expenditure</td>
<td>8.52</td>
<td>16.64</td>
<td>0.003</td>
</tr>
<tr>
<td>% of GDP</td>
<td>1.99</td>
<td>1.42</td>
<td>0.004</td>
</tr>
<tr>
<td>Total pharm &amp; med device exp.</td>
<td>23.59</td>
<td>13.38</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>