Adjusted Clinical Groups (ACG) and co-morbidity

Economic steering owing to the burden of sickness in the population – recent experiences from Sweden

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Background

PHC plays an important role in the health care system by delivering more efficient, equitable and effective care(1). The two major challenges to PHC are managing co-morbidity and improving equity in health care services. Thus patients with co-morbidity often need complex treatment and account for a high proportion of resource use in health care.

An ageing population and co-morbidity

The demographic curve has changed markedly during the last century in Sweden and the number of elderly individuals has increased. One of the emerging problems in an ageing population is co-morbidity. With increasing life expectancy in society, the number of patients with multiple chronic diseases occurring simultaneously increases. Patients with co-morbidity are the norm rather than the exception in PHC practices(2,3). Their health needs should be recognized. This is important for those who organize PHC and for planning and deciding about reimbursement in PHC. Due to the increasing number of patients with multiple chronic diseases in PHC(4), the problem of assessing co-morbidity seems to be very important. Co-morbidity increases the risk of mortality (5), leads to longer stays in hospital (6), increases health care utilization (3) and deteriorates physical functioning (7). Although co-morbidity is a common condition among PHC patients, it is not so often the subject of studies as single diseases, such as for example asthma or hypertension (8).

Measuring co-morbidity

Patients with co-morbidity require a comprehensive health assessment and treatment taking into account all of the diseases. Co-morbidity and multimorbidity are the concepts which are often used to describe individuals with more than one chronic condition.

The studies with indices of co-morbidity are based on different sources such as self reports (Seattle Index of Comorbidity), medical records (Kaplan-Feinstein Index, Charlson Index) or administrative data (Chronic Diseases Score). It is important to have complete data. Data collected with use of interviews or questionnaires depend on the patients’ ability to give an adequate answer, which is a weakness of such studies. The risk of using self-reported diagnoses is that patients can forget to inform about some of diagnoses or confuse symptoms.
ACG- Case-Mix System

Another way to measure co-morbidity in PHC is the Adjusted Clinical Groups Case-Mix System (ACG Case-Mix System) (9). The ACG Case-Mix System not only describes the presence of disease but also gives a measure of co-morbidity on an ordinal scale. The ACG Case-Mix System takes into account all possible diagnoses and calculates groups of individuals with the same level of morbidity. This method makes it possible for us to compare patients with different diagnoses. The Adjusted Clinical Groups Case-Mix System (ACG Case-Mix System) was designed to measure co-morbidity level. It was developed in the 1980s at Johns Hopkins University. Primarily the system was created to analyse the relationship between morbidity and the use of health care by children over a time. Diagnoses were grouped in categories dependent on the diagnoses’ self-limitation, likelihood to recur over time or chronic character and need of specialist’s consultation. It was then modified for use in adults.

The first step in building an ACG group is gathering all the diagnoses in one of 32 ADGs. Each ADG includes a diagnosis with similar severity and likelihood of the health condition’s persistence over time. There are five criteria of ADG which are based on the opinions of expert physicians concerning:
- the duration of the condition (acute, recurrent, chronic)
- the severity of the condition (e.g. minor and stable versus major and unstable)
- diagnostic certainty (symptom versus disease)
- aetiology of the condition (infectious, injury or other)
- specialty care involvement (e.g. medical, surgical, obstetric.)

One patient can have more than one ADG as he or she can have more than one disease. The next step is to group each individual in one specific ACG by a branching algorithm. ACG categories are based on empirical analysis and clinical judgement and are calculated by combining ADGs, gender and age but not the number of visits or episodes. Individuals who are grouped in the same ACG have a similar pattern of morbidity and resource consumption during a given period.

PHC in Sweden today

According to the Swedish Health and Medical Services Act from 1982, PHC should ensure basic medical treatment, care, prevention and rehabilitation which do not require specialist or hospital resources.

Family medicine has been a separate specialty in Sweden since 1982. PHC is organized in small health care centres with physicians, mostly specialists in family medicine, nurses, physiotherapists and midwives with responsibility for patients within geographically limited areas. This system has changed in recent years with a tendency towards smaller PHC practices consisting of physicians and nurses only.

In Sweden health care can be provided by both public and private care givers. Both public and private driven health care are publicly financed by county councils. Most PHC is public, but the privatization of PHC under contract from county councils is increasing. This means a higher level of competition between PHC centres/practices but at the same time should ensure better access to PHC. Expansion of the private sector in PHC caused by reforms in Swedish health care resulted in more private PHC practices being established, mostly in major cities.
Costs in primary health care and how they relate to co-morbidity

Health care costs depend on the development of technology. The use of new high-tech medical devices or drugs increases the costs of health care. SHC doctors are used to meeting selected patients who need advanced diagnosis and treatment. This means that the specialists more readily use more expensive methods in order to diagnose and begin treatment after a short time of observation. Most PHC patients’ health condition is not so severe and GPs can assess their health care needs and treat them with easier and cheaper methods. It saves costs and protects patients from unnecessary and sometimes potentially harmful diagnostics. In one study in the USA the costs of health care were lower and the quality of care higher in states with a higher supply of general practitioners in comparison to states with a higher supply of specialists (10). Whittle et al. found that among patients who were treated for pneumonia and did not die, those whose attending doctor was a family physician had the lowest costs of treatment (11). Patients with co-morbidity are common PHC patients, and many studies show that co-morbidity is associated with higher health care costs (3,12).

Rational use of resources can ensure health service for all who need it, and conversely if we use resources irrationally or inadequately there is a risk that there will not be enough for everyone in need. In Sweden the capitation was based mainly on the age of the inhabitants, but only about 11% of the variation in PHC costs could be explained by age and gender (12). People of the same age can have different needs of health care, and relying only on age or gender when allocating resources or deciding about reimbursement is not enough.

Socioeconomic factors and equity in health care

Social stratification in society partly explains the unequal distribution of wealth. This can be significant for differences in health between different groups. Some diseases are equally distributed regardless of socioeconomic status (SES) whereas others more often exist in affluent groups or poor groups. Worse socioeconomic circumstances often lead to worse health status (13) with higher morbidity and mortality both in Sweden and in other countries (14, 15, 16). Unequal distribution of resources in society results in different exposures, and this can result in unequal distribution of diseases. Therefore the confounding effect of socioeconomic conditions is so important to take into consideration when analysing other factors. Even though Sweden is known as an egalitarian society, socioeconomic differences in mortality are found here (14). Although some studies have found that socioeconomic differences were not as large as in other countries (17, 18), other research suggests that they were higher (16).

A number of indicators are used to measure SES, but all the different indicators are correlated with each other and they describe particular aspects of social stratification.

One of these indexes is CNI – Care Need Index, using seven factors, developed by Swedish researchers (19).
1. Degree of unemployment
2. Proportion of children below 5 years
3. Proportion of population born outside EU
4. Single parents with children below 17 years
5. Single people over 65 years
6. Moved last year
7. Low educational level
The Skåne model for Reimbursement of PHC

In Skåne region in Southern Sweden, with a population of 1,25 million, a combination of ACG-weights and CNI was introduced in 2010 as a model for reimbursement for needs.

Primary care allowance moves as patient chooses health centre

Primary care allowance (more than 90% of the reimbursement).
Target-related reimbursement (linked to degree of coverage and quality criteria).
Special reimbursement for interpreter and socioeconomic factors.
Reimbursement for special assignments

Reimbursement for needs, also including pharmaceuticals. PHC has the cost responsibility for common essential drugs, which means 75% of the total budget.

If you attract sick individuals you need more resources, because of that;
- 80 % of the amount is determined by age, gender and ACG care weighting

If you attract groups at risk for sickness you need more resources for preventive care, therefor;
- 20 % of the amount is determined by socioeconomic determinants, Care Need Index, based on unemployment, income, education level etc.
Figure 1. Combined weights for four PHC centres with different sickness and socioeconomic burdens.

<table>
<thead>
<tr>
<th>PHCC</th>
<th>Needs Description</th>
<th>ACG Weight</th>
<th>CNI Weight</th>
<th>Combined Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Low needs – urban population, low sickness good socioeconomy</td>
<td>0.72</td>
<td>0.86</td>
<td>0.75</td>
</tr>
<tr>
<td>B</td>
<td>Rather low needs – student families, low sickness but worse socioeconomic situation</td>
<td>0.69</td>
<td>1.23</td>
<td>0.80</td>
</tr>
<tr>
<td>C</td>
<td>High needs: low sickness, most worse socioeconomic situation</td>
<td>0.85</td>
<td>2.21</td>
<td>1.12</td>
</tr>
<tr>
<td>D</td>
<td>Highest needs: Highest individual sickness, old rural population, not so good socioeconomic situation</td>
<td>1.30</td>
<td>1.09</td>
<td>1.26</td>
</tr>
</tbody>
</table>

**Combination of ACG- and CNI-weights for some PHC centres in Skåne region, Sweden 2010**
Figure 2: Degree of explanation of costs in PHC, up to gender, gender and age, PHC district and gender, age, PHC district and ACG-weights.

<table>
<thead>
<tr>
<th>Degree of explanation of costs in PHC</th>
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<tbody>
<tr>
<td>1. gender</td>
</tr>
<tr>
<td>1+age</td>
</tr>
<tr>
<td>2+PHC district</td>
</tr>
<tr>
<td>3+ACG-weights</td>
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Comments: In figure 2 can be seen that age explains much more than gender up to costs. However, when adding the burden of sickness in a population you will explain almost 2/3 of the total costs. It may be expected that if pharmaceutical costs and costs for sick-leave are added the degree of explanation will be still higher.

Discussion and conclusions

Although co-morbidity is a very common condition, not much is known about how to organize PHC in order to ensure the best health care for this patient group. The importance of co-morbidity should be made more visible for health care managers. Their decisions about reimbursement or organization changes of health care system can be more appropriate for improving the care of older patients with co-morbidity.

Co-morbidity level measured as ACG or RUB explains patients’ costs to a high degree and much higher than demographic data such as age and gender. The usefulness of measuring co-morbidity lies in the possibility of creating a model for more adequate resource allocation in Swedish PHC. This could ensure more equitable PHC where patients with multiple chronic diseases would have good access to PHC resources. The ACG Case-Mix System has shown to be an important tool to help to allocate resources according to need (21).

In Sweden in 2012 an increasing proportion of county councils are implementing this tool for reimbursement of PHC.
References


