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Waiting times for cataract surgery in ten European countries: An analysis using data from the SHARE survey

Stefania M Mojon-Azzi, Daniel S Mojon

Aims: To assess waiting times for cataract surgery and their acceptance in European countries, and to find explanatory, country-specific health indicators.

Methods: Using data from the survey of health, ageing and retirement in Europe (SHARE), waiting times for cataract surgery of 245 respondents in ten countries were analysed with the help of linear regression. The influence of four country specific health indicators on waiting times was studied by multiple linear regression. The influence of waiting time and country on the wish to have surgery performed earlier was determined through logistic regression. Additional information was obtained for each country from opinion leaders in the field of cataract surgery.

Results: Waiting times differed significantly (p<0.001) between the ten analysed European countries. The length of wait was significantly influenced by the total expenditure on health (p<0.01) but not by the other country specific health indicators. The wish to have surgery performed earlier was determined by the length of wait (p<0.001) but not by the country where surgery was performed.

Conclusion: The length of wait is influenced by the total expenditure on health, but not by the rate of public expenditure on health, by the physician density or by the acute bed density. The wish to have surgery performed earlier depends on the length of wait for surgery and is not influenced by the country.

In Western countries the rate of cataract surgery has increased significantly during the past two decades. Cataract surgery now accounts in many areas for over half of all ophthalmic surgery, and has become in some countries the most common elective surgical procedure. Although today, the removal of the opaque lens and its replacement with an artificial one represent a routine operation that involves only minor risks, it consumes a considerable share of the resources for ophthalmic care. Particularly in countries with publicly funded systems, long waiting times for cataract surgery have become an important issue. This delaying of surgery can have an impact on patients satisfaction and on patients quality of life, because of limited functionality, increased social isolation, anxiety, higher risks for development of more complications, a worsening of symptoms or poorer prognosis and outcome following surgery. Particularly for the eldest-old visual impairments can be severe enough to interfere with daily activities and independence. For them, the time waiting for cataract surgery can represent a large part of their remaining life and several persons suffering visual impairment from cataracts would even die without having received surgery. The costs of imposed delays in surgery are usually not included in the health care costs of cataract surgery and in their comparison between countries. They can be very high and have been the subject of some health care and economical studies. Based on the patients’ stated willingness to pay for a one month reduction of waiting time for cataract surgery, the lost consumer surplus due to the cataract surgery queue (in terms of 1992 US $) was estimated at $128 in Manitoba (Canada), $160 in Denmark, and $243 in Barcelona (Spain) resulting in estimated annual net losses of consumer welfare worth $15 million in Spain, $1.4 million in Denmark and $4.9 million in Canada. This hidden costs of imposed delays in surgery represent between 10% and 25% of cataract surgery costs.

Another study performed in the same countries showed that despite their dissatisfaction, only 12.3% of respondents from Barcelona, 23.9% from Denmark, and 14.9% from Manitoba were willing to pay higher taxes to eliminate waiting times, and that 28.6% of Spanish, 16.9% of Dutch and 38.2% of Canadian cataract patients were willing to pay $500 to have cataract extraction performed within one month. As the out-of-pocket price increased, the percentage of respondents willing to pay declined. These results show that despite the negative impact of waiting times, a majority of patients prefer longer waiting times to higher costs.

The aim of this study was to analyse if differences in waiting times for cataract surgery (WTCS) and acceptance of this waiting times between ten European countries exist and, if so, to find country-specific health indicators that explain these differences.

METHODS

Study population

This study is based on data from the survey of health, ageing and retirement in Europe (SHARE). Data representing the population aged 50 and older and their spouses was collected in 2004 through computer assisted personal interviews in ten European countries. Probability samples were taken from national, regional or local registers or from telephone directories of households with at least one member speaking the local language and aged 50 or more. The study population consisted of 22,777 persons (10,088 men, 12,685 women, four gender missing) aged between 10 and 104 years (mean: 64.2 ± 10.5). For 251 individuals (93 men and 158 women) aged 51 to 91 years (mean: 73.8 ± 9.1) cataract surgery was the last surgery performed before the SHARE-interview. 245 out of 251 respondents answered the question about the length of waiting time for cataract surgery and were included in this study.

Four country specific health indicators for the year 2003 were taken from the 2005 OECD statistics: (1) the total expenditure on health, (2) the average working year’s productivity loss due to illness, (3) the ratio of skilled to unskilled workers and (4) the variation inflation factors (VIF). Waiting times for cataract surgery were defined as the number of days from the time a person was referred for surgery to the day of surgery.

Abbreviations: GDP, gross domestic product; SHARE, survey of health, ageing and retirement in Europe; VIF, variance inflation factors; WTCS, waiting times for cataract surgery
Waiting times for cataract surgery in ten European countries

RESULTS

68.5% (172 cases) of all analysed cataract operations were performed on an outpatient and 31.5% (79 cases) on an inpatient basis, with considerable differences in the proportion of outpatient cataract surgery between the analysed countries (table 1). The differences between the mean age of day surgery patients (mean 73.2, SD 9.2) and overnight patients (mean 75.2, SD 8.8) and between their gender (men: 67.7% outpatient, women: 69% outpatient) were non-significant.

The average WTCS of all analysed countries amounted to 3.3 months (SD 4.3) and was shorter for inpatients (mean 3.0 months, SD 3.7) than that for outpatients (mean 3.5 months, SD 4.6). WTCS differed consistently among the analysed countries with the shortest WTCS in Switzerland (mean 1.3 months, SD 0.9), and the two longest in Spain (mean 6.2 months, SD 6.4) and Sweden (mean 5.8 months, SD 7.2). For half of the countries inpatient surgery was related to longer and for the other half to shorter waiting times (table 1).

Linear regression results indicated highly significant differences in WTCS among the ten analysed countries (p<0.001). Comparison of outpatient surgery waiting times also yielded highly significant differences between countries (p<0.001), while such an influence was not found for inpatient cataract surgery (table 2). Compared to Switzerland, the reference country with shortest waiting times, only Spain (p<0.001) and Sweden (p<0.01) had significantly longer waiting times. Inpatient WTCS were only significantly longer for Spain (p<0.01). Outpatient WTCS were significantly longer for Spain (p<0.05) and Sweden (p<0.05) (table 2). The health expenditure as % of GDP was the only country specific health indicator with a significant influence (an increase induced a reduction) on WTCS (p<0.01). Health expenditure as % of GDP was also the only explanatory variable having a significant influence (again an increase induced a reduction) on the waiting times for outpatient surgery (p<0.001). None of the health indicators had a significant influence on the waiting times for inpatient surgery.

On average, 43.8% (85) of all cataract patients would have preferred to wait less time for surgery (41.1% of outpatients and 43.1% of inpatients). This proportion varied considerably from country to country. While in some countries only 30% or less (France 21.1%, Germany 22.2%, Denmark 25% and Switzerland 30%) of cataract patients wished surgery had been performed earlier, in others more than 60% (Sweden 61.5%, Spain 75%) would have preferred to wait less. 31.6% of patients had waiting times exceeding three months ranging from 0% in Switzerland to 58.6% in Sweden (table 1). Binary logistic regression showed that the wish to have surgery performed earlier significantly depended on the WTCS (p<0.001) but not on the country...

### Table 1

<table>
<thead>
<tr>
<th>Country</th>
<th>Age, yr</th>
<th>Outpatient surgery, %</th>
<th>Months waiting for surgery</th>
<th>Patients wishing surgery earlier, %</th>
<th>Patients waiting longer than 3 months, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>20</td>
<td>74.5 9.8 0.0</td>
<td>2.9 3.1</td>
<td>2.9 3.1</td>
<td>37.5 30.0</td>
</tr>
<tr>
<td>Germany</td>
<td>28</td>
<td>72.6 7.7 64.3</td>
<td>2.3 3.1</td>
<td>3.8 4.5</td>
<td>22.2 17.9</td>
</tr>
<tr>
<td>Sweden</td>
<td>31</td>
<td>75.8 8.9 93.6</td>
<td>5.8 7.2</td>
<td>7.3 4.0</td>
<td>65.1 38.6</td>
</tr>
<tr>
<td>Netherlands</td>
<td>29</td>
<td>75.7 9.8 93.1</td>
<td>2.2 1.8</td>
<td>3.5 2.1</td>
<td>34.8 17.9</td>
</tr>
<tr>
<td>Spain</td>
<td>33</td>
<td>76.0 7.5 81.6</td>
<td>6.2 6.4</td>
<td>7.2 9.5</td>
<td>75.0 56.3</td>
</tr>
<tr>
<td>Italy</td>
<td>29</td>
<td>72.1 7.5 69.0</td>
<td>3.4 3.5</td>
<td>2.1 2.4</td>
<td>52.0 37.9</td>
</tr>
<tr>
<td>France</td>
<td>23</td>
<td>75.1 9.8 52.2</td>
<td>2.2 1.8</td>
<td>2.6 1.7</td>
<td>21.1 14.3</td>
</tr>
<tr>
<td>Denmark</td>
<td>22</td>
<td>70.6 11.6 100.0</td>
<td>2.1 2.2</td>
<td>2.1 2.5</td>
<td>46.1 31.8</td>
</tr>
<tr>
<td>Greece</td>
<td>24</td>
<td>71.5 8.9 41.7</td>
<td>2.3 2.6</td>
<td>2.1 2.5</td>
<td>30.0 0.0</td>
</tr>
<tr>
<td>Switzerland</td>
<td>12</td>
<td>71.4 9.8 38.3</td>
<td>1.3 0.9</td>
<td>1.0 0.7</td>
<td>43.8 31.6</td>
</tr>
<tr>
<td>Total</td>
<td>251</td>
<td>73.8 9.1 68.5</td>
<td>3.3 4.3</td>
<td>3.5 4.6</td>
<td>30.0 0.0</td>
</tr>
</tbody>
</table>

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where surgery was performed. While the mean WTCS of patients who did not wish earlier surgery was 2.8 months (SD 2.7), the mean WTCS of patients wishing an earlier operation was 6.0 months (SD 5.6). The explanations of the country specific opinion leaders are summarised in table 4.

DISCUSSION

Our results show that although there are large differences in WTCS between the ten analysed European countries, only patients in Spain and Sweden had to wait significantly longer than in Switzerland. The only country specific health indicator explaining the differences in WTCS between countries was health expenditure as % of GDP. Higher expenditure significantly reduced waiting times, particularly for outpatient surgery. Often long WTCS are regarded as a characteristic or a failure of countries with dominantly public health care systems, mainly because of the limited public resources.

However, we found no evidence for an influence of the rate of public expenditure on health on WTCS. Neither did we find an impact of the density of practicing physician or of acute care beds on the length of wait. Since we were not able to obtain data on the number of ophthalmologists performing cataract surgery for all the ten countries, we cannot exclude that the density of cataract surgeons might have an influence on waiting times. The answers of the opinion leaders also indicate that an influence of the density of cataract surgeons may exist. In Switzerland and France opinion leaders explain the short WTCS by the high number of cataract surgeons. On the other hand the long average WTCS in Sweden is explained by the lack of trained surgeons in some parts of the country. Not only the number of surgeons but competition in general seems to have a positive influence on waiting times. In The Netherlands waiting times were reduced by private clinics starting cataract surgery and insurance companies suggesting hospitals with a shorter wait to their clients. This could explain the results of regression analysis as a high number of surgeons induces higher health costs. Higher health costs could also be attributed to other factors such as a better education of physicians, higher salaries, better infrastructure or more diagnostic and therapeutic procedures.

The differences in waiting times between inpatients and outpatients are explained by most country specific opinion leaders by the fact that inpatient surgery patients are more complicated cases. In some countries (Sweden, Italy, Switzerland) such cases seem to be more urgent and have therefore separate waiting lists (Italy) or generally shorter waiting times. In other countries (The Netherlands, France, Germany, Spain) this cases have to wait longer for surgery as they need access to beds in (academic) clinics/hospitals. Several countries do not have quota or other limits to the number of cataract extractions that can be performed in a month or year and most opinion leaders do not see particular reasons for a surgeon to schedule less surgery than possible. On the other hand there are countries with limitations; for example, the Italian government limits the number of cataract extractions per year as well as the equipment, disposables and wages and imposes wage reductions if the activity overcomes the assigned.

Differences in waiting times were explained to about 11% by the country. The large standard deviations shows strong differences in WTCS in the countries itself. Several opinion leaders explain them with regional diversities in the health organisations or regional preferences of surgeons for some parts of the countries (particularly for larger cities). This remaining variance in waiting times could also be explained by the cataract surgeon, by social and economical characteristics of the patients (age, employment, gender, urgency rating, relative affluence, psychosocial variables, etc.), by the visual and general health status of the patient (visual handicap, general disabilities, coexisting factors, chronic conditions), by the hospital where surgery was performed, by physician and hospital reimbursement method, by waiting lists, by maximum waiting time guarantees or by other measures taken to reduce waiting times, and finally by the incidence of cataract in a population. Unexpectedly, we did not find evidence for differences between waiting times for inpatient and for outpatient surgery. The slightly shorter average waiting time for overnight compared to day case surgery could be due to the fact that some of the countries with long waiting times (for example, Spain, Sweden) mainly performed outpatient surgery.

As expected, the length of wait for cataract surgery significantly influenced the wish for shorter waiting times. No such influence was found for the country. Several publications show that patients usually accept waiting times of three months or less, and consider waits longer than six months for cataract surgery a failure of the health system.

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Table 2: Linear regression of the effect of the country on waiting times for cataract surgery

<table>
<thead>
<tr>
<th>Waiting time for cataract surgery</th>
<th>p Value</th>
<th>Adjusted R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>All surgeries</td>
<td>&lt;0.001</td>
<td>0.107</td>
</tr>
<tr>
<td>Inpatient surgeries</td>
<td>&gt;0.1</td>
<td>0.028</td>
</tr>
<tr>
<td>Outpatient surgeries</td>
<td>&lt;0.001</td>
<td>0.118</td>
</tr>
</tbody>
</table>

Countries significantly differing from Switzerland (Reference country):
- Japan: p<0.001
- Spain: p<0.001

Table 3: Multiple regression analysis of the influence of country specific health indicators on waiting times for cataract surgery

<table>
<thead>
<tr>
<th>Waiting time for cataract surgery in weeks</th>
<th>Total health expenditure (HE) as % of GDP</th>
<th>Public expenditure on health as % of HE</th>
<th>Density of practicing physicians per 1000 population</th>
<th>Density of acute care beds per 1000 population</th>
<th>Adjusted R-squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>All surgeries</td>
<td>-0.647 ± 0.243</td>
<td>0.063 ± 0.037</td>
<td>0.091 ± 0.014</td>
<td>-0.423 ± 0.231</td>
<td>0.0578</td>
</tr>
<tr>
<td>Inpatient surgeries</td>
<td>-0.341 ± 0.328</td>
<td>0.100 ± 0.083</td>
<td>-3.441 ± 1.868</td>
<td>-0.234 ± 0.377</td>
<td>0.013</td>
</tr>
<tr>
<td>Outpatient surgeries</td>
<td>-1.151 ± 0.319</td>
<td>0.049 ± 0.038</td>
<td>-3.623 ± 0.884</td>
<td>p&gt;0.1</td>
<td>0.074</td>
</tr>
</tbody>
</table>

*Not included because acute beds are not supposed to influence outpatient surgery
Waiting times for cataract surgery in ten European countries

Table 4  Summary of the answers of country specific actual or past board members of the “European Society for Cataract and Refractive Surgery”

<table>
<thead>
<tr>
<th>Country</th>
<th>WTCS</th>
<th>WTI – WTO</th>
<th>Main reason for waiting time</th>
<th>Main reason for difference in waiting time between inpatient and outpatient surgery</th>
<th>Quota/limitations or other reasons to limit the number of cataract extractions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>2.9</td>
<td>NA</td>
<td>Is accepted by patients, currently not a problem.</td>
<td>NA</td>
<td>No quota or limitations. A minor amount of surgery is done privately. In hospitals the number of cataract surgery is determined by department and hospital.</td>
</tr>
<tr>
<td>Germany</td>
<td>2.3</td>
<td>2.3</td>
<td>Regional differences and longer waiting times in regions with quota.</td>
<td>The limited number of beds is often occupied by other patients, e.g. needing retinal detachment surgery or keratoplasty.</td>
<td>Quota in some regions and limitations in the number of surgery reimbursed by insurances.</td>
</tr>
<tr>
<td>Sweden</td>
<td>5.8</td>
<td>–1.8</td>
<td>Lack of trained surgeons in northern parts of Sweden. WTCS is shorter in Stockholm.</td>
<td>Inpatients are often children, more urgent or complicated cases needing general anesthesia.</td>
<td>No quota, tax money pays the surgery that is free for all. On the other hand hospitals are in most part paid for a certain volume done per year.</td>
</tr>
<tr>
<td>The Netherlands</td>
<td>2.2</td>
<td>1.4</td>
<td>Competition through private clinics starting cataract surgery and insurance companies suggesting hospitals with a shorter wait.</td>
<td>Inpatients are often referred to academic hospitals with waiting lists as they often have severe comorbidity and are financially not interesting.</td>
<td>No strict quota, but a fixed number of procedures that has to be operated for a fixed price; on top of this, additional procedures are possible for a different price. Possible limitations concern the total cost of material (mainly IOL’s and viscoelastic) per year in each particular hospital and the fact that in some public hospitals surgeons are still paid per working time and not related to the results (e.g. number of surgeries). Yes, in public hospitals only the amount of surgery of the previous year is reimbursed. Private hospitals have less strict reimbursement limitations. Government requires constant decreases of the volume of activity, limits equipment and disposables (including IOL’s) and imposes wage reductions if the activity overcomes the assigned.</td>
</tr>
<tr>
<td>Spain</td>
<td>6.2</td>
<td>1.2</td>
<td>Relatively old population, many younger cataract candidates because of refractive reasons and relative inefficiency of the health care system.</td>
<td>Difficult access to a bed in a clinic/hospital.</td>
<td>None: there are about 500 000 procedures per year now.</td>
</tr>
<tr>
<td>Italy</td>
<td>3.4</td>
<td>–1.9</td>
<td>Although people are allowed to move at no expense there are regional differences due to diversities in health organisations.</td>
<td>Inpatients are usually more difficult cases needing general anesthesia. They use different lists than outpatients.</td>
<td>None: there are about 500 000 procedures per year now.</td>
</tr>
<tr>
<td>France</td>
<td>2.2</td>
<td>0.8</td>
<td>High number of cataract surgeons (3 500 surgeons out of 3 800 ophthalmologists).</td>
<td>Inpatients need access to a bed in a clinic/hospital.</td>
<td>No: there are about 500 000 procedures per year now.</td>
</tr>
<tr>
<td>Denmark</td>
<td>2.1</td>
<td>NA</td>
<td>If the maximum waiting time guarantee of 2 months is exceeded government pays private surgery. But long waiting time to get an appointment with a practicing ophthalmologist: up to one year.</td>
<td>NA</td>
<td>Private practice: the average ophthalmologist in Switzerland takes a total of 3 months vacation. University and state hospitals: poor organisation and perceived shortage of staff.</td>
</tr>
<tr>
<td>Switzerland</td>
<td>1.3</td>
<td>–0.4</td>
<td>Many (too many?) surgeons in major population centers. Every ophthalmologist is certified for surgery.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

WTCS: mean waiting time for cataract surgery, WTI: mean waiting time for inpatient cataract surgery, WTO: mean waiting time for outpatient cataract surgery, IOL, intraocular lens, NA, Not applicable

months to be excessive.\textsuperscript{2, 19, 20} In our study, approximately one third of patients had to wait longer than 3 months, again with consistent differences between the countries. However, acceptance and satisfaction with waiting time do not only depend on the length of the wait. A Canadian study performed by Conner-Spady et al showed that both the actual waiting time and the maximum acceptable waiting time, had a significant effect on satisfaction with waiting time. Patients for which the actual waiting time was longer than the maximum acceptable waiting time had significantly higher probability of being dissatisfied.\textsuperscript{19} Another study performed by Conner-Spady et al showed that the patient-rated maximum acceptable waiting time of 9.8 weeks was significantly shorter than the physician-rated maximum acceptable waiting time of 15.1 weeks for cataract surgery.\textsuperscript{19} A Dutch study found a relation between patient satisfaction and the patient’s preoperative expectations and explained that if patients are adequately informed about waiting times they are often willing to accept longer time.\textsuperscript{19}

We also should consider that shorter waiting times for surgery are not always imposed by a system, as there are patients who prefer a longer waiting time to a shorter one postponing surgery until a time that is more convenient to them.\textsuperscript{1, 11, 22} This study has some limitations. First, it is based on the waiting times reported by patients which may differ from the actual waiting times.\textsuperscript{5} Second, as OECD health statistics for 2004 were not yet available, we based our study on the most recent health indicators available, from the year 2003. However, based on the development of the health indicators for the past years we did not expect major changes between 2003 and 2004. Third, the Greek density of acute care beds was missing in the OECD statistics. Fourth, our sample included only the waiting times for cataract surgery of 245 respondents. For some of the smaller countries the sample may be too small in order to be representative.

Despite these limitations we can conclude that WTCS differs significantly between European countries and that it is significantly shorter in countries with high health expenditures as % of GDP (probably due to a larger number of ophthalmologists performing cataract surgery and to better and more equipment) but do not depend on the rate of public expenditure on health or on the density of acute care beds or practicing
physicians. The wish for shorter waiting times is influenced only by the length of the wait and not by the country where surgery is performed.

Authors’ affiliations
Stefania M Mojon-Azzi, Research Institute for Labour Economics and Labour Law, University of St. Gallen, Switzerland
Daniel S Mojon, Department of Ophthalmology, Kantonsspital, St. Gallen, Switzerland

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