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Published in:
International Journal of Older People Nursing

Publication date:
2009

Document Version
Pre-print: The original manuscript sent to the publisher. The article has not yet been reviewed or amended.

Citation for published version (APA):
Differences in health status of older people aged 65 and above after total hip replacement compared with the normal population: a cross-sectional study

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Aim. The aim of the study was to describe the health status of older patients with osteoarthritis following total hip replacement and to compare their health status with population norms in order to analyse the need for a rehabilitation programme after total hip replacement.

Background. Total hip replacement is a very efficient operation in terms of pain relief and improvement of walking ability. However, after the operation some patients still report low health status.

Method. A cross-sectional study including 287 older patients aged 65–74 and 75+ years who had had total hip replacement within the previous 12 months was performed. Patients from five Danish counties received a mailed questionnaire requesting information about their health status and demographic data. The Short-Form 36 measures eight domains of importance of health. The scores related to each dimension are transformed to an interval scale ranging from 0 (worst score) to 100 (best score). Danish population norm data were used as reference point.

Results. In total, 287 (91.4%) patients responded. The patients completed the questionnaire 207 (114) days after surgery within a range of 10–360 days. In all eight health domains patients reported significantly lower scores than the age specific norm population.

Conclusion. Our results indicate that health status is scored lower for patients after total hip replacement. This implies that there might be a need for further postoperative rehabilitation based on the identification of problems experienced by patients in the postoperative period.

Relevance to clinical practice. Patients health status is a predictor for well-being, quality of life and survival. Older people need rehabilitation after surgery to reduce dysfunction and improve perception of health. Our results demonstrate a need for further studies examining problems experienced by patients in the postoperative
period. Intervention research is needed before such a programme can be implemented.

**Key words:** health status, older people, rehabilitation, SF-36, total hip replacement

### Introduction

Osteoarthrosis (OA) is the most frequent disease among people aged 65 years and above (Croft et al., 2002; http://www.dhr.dk 2005). Men and women with OA have a life-expectancy similar to that of the rest of the population, but their quality of life seems to be compromised compared with others in the same age group due to pain, reduced joint movement and reduced walking ability (Croft et al., 2002). Total hip replacement (THR) is a very effective and one of the most common treatments. The surgical procedure has proven effective in relieving patients’ pain and improving their walking ability (Croft et al., 2002). In Denmark with a population of five million people, approximately 15% of the population are older, the annual incidence of THR among patients aged 65 years and above is about 4500 (http://www.dhr.dk 2005). As OA affects middle-aged and older people, the need of THR is predicted to increase during the next decades due to the higher percentage of older people in the society (http://www.dhr.dk 2005).

For some older persons, this type of surgery may not benefit their overall quality of life, as their health status does not improve accordingly. Patients do expect an overall improvement in all functions of their daily life after surgery and not only pain relief and improved walking ability (Hirvonen, 2006; Jacobsson et al., 1991; Ragab, 2003; Rissangan et al., 1996; Södermann et al., 2000; Wiklund & Romanus, 1991), but a number of studies have claimed that patients more or less live the life they did before surgery and that they do not adapt to the new possibilities of living offered by the surgery (Kjoller et al., 1995; Brodie & Sloman, 1998; Ostendorf & Malchau, 2000; Mahomed et al., 2002; Mancuso et al., 2003). These studies also indicate that married couples seem to have a better health status compared to both men and women living alone or patients dependent on the help of others (Brodie & Sloman, 1998; Mancuso et al., 2003).

Studies have reported that to regain previous health status, postoperative training for patients during the first 6 months may be of decisive importance in obtaining for the long-term benefits (Jacobsson et al., 1991; Rissangan et al., 1996; Södermann et al., 2000), but these studies do not indicate whether all patients need training or whether training should only be offered to specific groups (Holmberg 1992; Lieberman et al., 1997). However health status is a predictor of future events such as death, morbidity or the use of health services and it is a cheap and easy way of identifying high risk groups and risk factors (Bjorner et al., 1996, 1997, 1998).

No previous Danish studies have identified health status among older patients after THR or identified whether specific groups of patients are at risk of having a low health status after THR. Thus, before recommending a permanent rehabilitation and intervention programme we carried out a cross-sectional study estimating the general health status (Bjorner et al., 1996, 1997, 1998). The aim of the study was to describe the health status of patients with OA aged above 65 years following THR and to compare their health status with a normal population in order to analyse the need for a rehabilitation programme after THR.

### Patients and methods

Older patients aged 65 years and above from five different counties in Denmark, who had had a THR within the previous 12 months were invited to participate in the study. Hospitals that admitted patients from five out of the 16 counties in Denmark in various parts of the county from both urban and rural areas. The hospitals were chosen by convenient sampling. All of the hospitals invited to participate accepted. In total 314 patients from the hospitals catchment areas who underwent THR from January 2001 to January 2002 enrolled and 287 patients (91.4%) participated in the study. Of the responders, 104 (38%) were men and 179 (62%) women with a mean age of 73.1 (8.3) years. A total of 27 people were non-responders and they were similar to the responders in terms of age and gender. The data were collected in February 2002 at a mean time of 207 (114) days after surgery within a range of 10–360 days.

### Design

A cross-sectional study design was used. From the hospitals records all patients who had been admitted for THR in the previous year were identified. All patients were given an identification number. The hospital mailed an introduction letter together with a questionnaire containing the patient’s identification number and a prepaid return envelop. The questionnaire was returned to the local hospital. The
researcher collected the returned questionnaires and posted reminders if the questionnaire was not returned within 2 weeks. The patients received only one reminder. In the questionnaire they were asked to give demographic data and assess their health status. The questionnaires were returned to the hospitals where the patients had their surgery.

Health status

Health status was assessed by Short-Form 36 (SF-36). The SF-36 is a self-administered generic questionnaire that is reliable and valid for measuring functioning, well-being and general health status (Bjorner et al., 1996). The SF-36 is a much used questionnaire in western countries for evaluating patients’ self-rated health. Furthermore, it is available in a Danish language version and was previously validated in a sample of the general population (Bjorner et al., 1997) and therefore Danish norm data were available. The instrument measures eight health dimensions reflecting the impact of both dysfunctions and general health perception. The questionnaire measures physical function (PF), role physical (RF), bodily pain (BP), social function (SF), role emotional (RE), general health (GH), vitality (VT) and mental health (MH) (Bjorner et al., 1996). The questions related to each dimension are scored on nominal or ordinal scales and later transformed to an interval scale ranging from 0 (worst score) to 100 (best score). In the present study the scoring of data was done according to the latest Danish SF-36 manual (Bjorner et al., 1996).

Ethics

The study was approved by The Local Research Ethics Committee and reported to The Data Protection Authorities. Written information was given to all participants and it was made clear that participation was voluntary. When patients completed and returned the questionnaires, they agreed to participate in the study. The patients were asked to simply return a blank questionnaire if they did not want to participate.

Data analysis

Data were processed by means of the statistics programme, Statistical Package for Social Sciences (SPSS) version 10.0. The results using continuous data are given as mean (± 1 SD). Parametric data were tested for distribution by the F-test. If data were normally distributed, Student’s unpaired two-tailed t-test was used. To test for significance between nominal or ordinal-level data, the chi-square test was used. Correlation analyses were performed by Pearson’s correlation coefficient. Scores from the Danish normal population was obtained from the SPSS manual and compared with the patients’ scores using a confidence interval at 95%. P-values below 0.05 were considered significant.

Results

In this cross-sectional study older patients of the age of 65–95 years were enrolled from hospitals in five different counties in Denmark. More than 60% of the women were living alone but only 25% of the men were living alone. To establish whether time for surgery to the time patients responded on the questionnaire a correlations analysis was performed. No correlations were found between the scores of each of the eight health dimensions and the time that had passed since surgery.

Health status of patients with osteoarthrosis

Table 1 shows the scores from men and women aged 65–74 years after THR compared with the scores from a Danish

<table>
<thead>
<tr>
<th>Dysfunction</th>
<th>Mean (n = 153)</th>
<th>SD</th>
<th>95% CI</th>
<th>Norm population (n = 427)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical function (PF)</td>
<td>53.2</td>
<td>26.1</td>
<td>49.0–57.4</td>
<td>73.7</td>
</tr>
<tr>
<td>Role physical (RP)</td>
<td>33.6</td>
<td>41.6</td>
<td>26.8–40.5</td>
<td>63.1</td>
</tr>
<tr>
<td>Bodily pain (BP)</td>
<td>60.8</td>
<td>28.2</td>
<td>56.3–65.4</td>
<td>78.0</td>
</tr>
<tr>
<td>Social functioning (SF)</td>
<td>79.1</td>
<td>27.0</td>
<td>74.7–83.4</td>
<td>89.6</td>
</tr>
<tr>
<td>Role emotional (RE)</td>
<td>52.8</td>
<td>42.2</td>
<td>45.7–59.9</td>
<td>78.23</td>
</tr>
<tr>
<td>General Health</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General health (GH)</td>
<td>61.6</td>
<td>22.7</td>
<td>57.9–65.4</td>
<td>65.8</td>
</tr>
<tr>
<td>Vitality (VT)</td>
<td>59.4</td>
<td>27.4</td>
<td>55.0–63.9</td>
<td>68.9</td>
</tr>
<tr>
<td>Mental health (ME)</td>
<td>76.3</td>
<td>22.2</td>
<td>72.7–80.0</td>
<td>82.2</td>
</tr>
</tbody>
</table>

SD = 1 standard deviation; CI = confidence limit.

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normal population at the same age. In all dimensions of dysfunction and general health perception, the THR patients as a whole had significantly lower scores than the normal population. Female patients aged 65–74 years scored at the same level as women in the normal population within the three dimensions of general health perception. The mean scores within dysfunction and general health perception of patients aged 75 years and above were significantly lower than the scores from the age-matched normal population, both for men and women (Table 2).

**Discussion**

The present study showed that patients’ health status after THR was reported significantly lower than an age-matched norm population in all dimensions of health measured in this study. Younger women (65–74 years) reported their health perception on the same level as the women in the norm population.

In Denmark, males account for about 40% of THR patients. In this study they accounted for 38% (95% CI: 32–44), which makes the study population gender representative. Hip replacement surgery was performed in 52 hospitals in Denmark during the study period. In a Danish nationwide study, regional differences in health status were described (Kjoller et al., 1995). The present study enjoys good external validity even if the hospitals were not randomly chosen because they represented both urban and rural areas of the country and differences in treatment due to local culture, habits and rehabilitation services offered. Hence five (9.6%) of the 52 Danish hospitals performing hip-replacement surgery participated in the study, covering 6.3% of all hip-replacement surgery performed within the study period (http://www.dhr.dk 2005). In the Danish norm population 45% were men in both age group compared with this study. The patients in our study are similar in gender to the patients in the Danish norm populations as 38% (95% CI: 28.4–48.2) were men.

It is interesting that no correlations were found between scores of the eight health dimensions and the time elapsed from surgery even though the patients reported on their health status over a time period ranging from 10–360 days after their surgery. One might have expected a difference in these scores (Shi et al. 2008). As the study design is cross-sectional the changes over time and within the individual patients are not revealed. The findings therefore, underline the need for further research into the recovery pattern of these patients.

A validity study has confirmed the internal consistency and homogeneity of the Danish version of the SF-36 (Bjorner et al., 1996). A Danish study of data quality (Bjorner et al., 1998) of the SF-36 was able to discriminate between levels of health in all subgroups but there were skewness, kurtosis and ceiling effects in many subgroups except for older people and people suffering from chronic diseases. Although the SF-36 includes eight distinct health status concepts and one item measuring self-reported health transition, important health concepts are not represented. Among those omitted are: health distress, family functioning, sexual functioning, cognitive functioning and sleep disorders (Ware & Sherbourne, 1992). Adding these concepts would multiply the response burden roughly four-fold (Ware & Sherbourne, 1992) and measuring a comprehensive set of health concepts and the full range of levels for each concept does not necessarily produce greater detail.

Because OA is the most frequent disease in people aged 65 years and above, the number of patients needing THR will increase in parallel with the number of older people in society. The condition and the co-morbidity are equally common in men and women both in the normal population

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**Table 2 Health status of patients aged 75 years and above after total hip replacement compared with the health status of an age-matched normal population**

<table>
<thead>
<tr>
<th></th>
<th>Mean (n = 126)</th>
<th>SD</th>
<th>95% CI</th>
<th>Norm population (n = 229)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dysfunction</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical functioning (PF)</td>
<td>44.4</td>
<td>25.4</td>
<td>40.0–48.9</td>
<td>61.6</td>
<td>P &lt; 0.05</td>
</tr>
<tr>
<td>Role physical (RP)</td>
<td>22.5</td>
<td>36.3</td>
<td>15.7–29.4</td>
<td>52.2</td>
<td>P &lt; 0.05</td>
</tr>
<tr>
<td>Bodily pain (BP)</td>
<td>54.9</td>
<td>28.1</td>
<td>49.9–59.9</td>
<td>71.0</td>
<td>P &lt; 0.05</td>
</tr>
<tr>
<td>Social functioning (SF)</td>
<td>76.6</td>
<td>27.6</td>
<td>71.8–81.5</td>
<td>81.6</td>
<td>P &lt; 0.05</td>
</tr>
<tr>
<td>Role emotional (RE)</td>
<td>38.0</td>
<td>42.1</td>
<td>30.0–46.1</td>
<td>64.8</td>
<td>P &lt; 0.05</td>
</tr>
<tr>
<td><strong>General Health</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General health (GH)</td>
<td>59.4</td>
<td>26.4</td>
<td>55.8–63.1</td>
<td>62.5</td>
<td>NS</td>
</tr>
<tr>
<td>Vitality (VT)</td>
<td>54.1</td>
<td>26.4</td>
<td>49.4–58.9</td>
<td>60.4</td>
<td>P &lt; 0.05</td>
</tr>
<tr>
<td>Mental health (ME)</td>
<td>71.7</td>
<td>22.9</td>
<td>67.6–75.8</td>
<td>79.0</td>
<td>P &lt; 0.05</td>
</tr>
</tbody>
</table>

SD, 1 standard deviation; CI, confidence limit; NS, not significant.

In general women report a higher degree of dysfunction than men (Sjoland et al., 1999; Barnason et al., 2000; Vaccarino et al., 2003; Hirvonen, 2006). However, in these studies women were older and more likely to have concomitant diseases (Czajkowski et al., 1997; Westin et al., 1999). In one study, the patients were reported to score lower at 1 month after discharge compared with those in a similar population. Female patients in particular, reported dysfunction within the dimensions of general health, anxiety, depression, self-esteem and experience of sex life compared with men (Sjoland et al., 1999; Barnason et al., 2000; Vaccarino et al., 2003). In another study, the women were less likely than the men to be married, able to perform basic self-care activities and more demanding activities required for independent living, recreation and maintaining a household. Women were also more anxious and reported more symptoms of depression than men (Czajkowski et al., 1997; Hirvonen, 2006).

Limitation in daily living is one of the reasons for THR. However, most studies only measure the effect of THR in the reduction of pain, joint stiffness and functional capacity (Brodie & Sloman, 1998; Ostendorf & Malchau, 2000; Mahomad et al., 2002; Mancuso et al., 2003; Ozawa & Shimizu, 2007; Bachrach-Lindström et al., 2008; George et al., 2008). Latest studies demonstrate that the patients can achieve improvements in body function of 80% (167) after THR, but the same patients only reported an improvement in actual daily activities of 0.7% (de Groot et al., 2008) and furthermore that the degree of role accomplishment at home was one important factor affecting quality of life (Ozawa & Shimizu, 2007). It seems as if patients still have problems transforming the benefit of their surgery into activities of daily living and this is why rehabilitation programmes are needed.

Even though THR is widely performed and many studies have reported changes within the group of patients receiving THR, only a few population-based studies have focused on overall health status and THR. In a French study, subjects with THR reported more difficulty in bending, climbing stairs, walking > 300 m, dressing, and getting in and out of a chair than the general population. However, the evolution in disability was similar to that of the general population (Boutron et al., 2007). Compared with subjects within older hip replacements, those with recent hip replacement reported more difficulty (Boutron et al., 2007). A study including 5300 people (65+) reported that older people with a past THR had significantly greater health and social care needs than other people at the same age – especially needs related to pain and mobility (Linsell et al., 2006). The study included 301 patients who have had a THR, of whom 66 were within the last 12 months.

To our knowledge the present study is still the largest study evaluating health status of THR patients and health status in an age match to the normal population within the first year of THR. In the present study we found that both men and women reported significantly lower dysfunction in all health dimensions and in both the 65–74 and 75 years age groups, the female patients aged 65–74 years reported the same general health perceptions as the women in the same age group in the normal population. No data are available in this study to explain this difference.

Limitations

Cross-sectional design is especially appropriate for describing the status of phenomena or relationships among data phenomena at a fixed point. In this study we examined health status within the first year after surgery. Hence, it only shows the characteristics of health status in the chosen population and not the changes in health status within the first year after surgery. The data of the norm population was published in 1997 (Björner et al., 1997), three years before this study. It is not likely that the health status in Danish older people has changed significantly within this time span; therefore, we consider the comparison valid between our study population and the norm population.

Conclusion

Patients health status was measured within 12 months after THR using the SF-36 and the findings show, that the patients’ health status was compromised and that a rehabilitation programme aimed at improving these dimensions might be needed. However, intervention research is needed before such a programme can be developed and implemented. It is necessary to identify health problems in the postoperative period and to perform further research into specific recommendations for older men and women aged over 65 years after THR, considering the individual patients health status.

Older patients health status after THR could be used as a means of identifying dysfunction and as an outcome measure. These efforts may improve patients health status and benefit the total outcome of THR surgery. In conclusion the present results demonstrate a need for further studies examining problems experienced by patients in the postoperative period and to identify whether specific subgroups of patients are at risk of not improving their health status after THR. When
these results are available a specific rehabilitation programme can be developed.

Acknowledgements

This study has been financially supported by the Health Insurance Foundation in Denmark.

References


