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Quality of life related to fear of falling and hip fracture in older women: a time trade off study

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Publication Details  
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Abstract

OBJECTIVE:
To estimate the utility (preference for health) associated with hip fracture and fear of falling among older women.

DESIGN:
Quality of life survey with the time trade off technique. The technique derives an estimate of preference for health states by finding the point at which respondents show no preference between a longer but lower quality of life and a shorter time in full health.

SETTING:
A randomised trial of external hip protectors for older women at risk of hip fracture.

PARTICIPANTS:
194 women aged ≥ 75 years enrolled in the randomised controlled trial or who were eligible for the trial but refused completed a quality of life interview face to face.

OUTCOME MEASURES:
Respondents were asked to rate their own health by using the Euroqol instrument and then rate three health states (fear of falling, a "good" hip fracture, and a "bad" hip fracture) by using time trade off technique.

RESULTS:
On an interval scale between 0 (death) and 1 (full health), a "bad" hip fracture (which results in admission to a nursing home) was valued at 0.05; a "good" hip fracture (maintaining independent living in the community) 0.31, and fear of falling 0.67. Of women surveyed, 80% would rather be dead (utility=0) than experience the loss of independence and quality of life that results from a bad hip fracture and subsequent admission to a nursing home. The differences in mean utility weights between the trial groups and the refusers were not significant. A test-retest study on 36 women found that the results were reliable with correlation coefficients within classes ranging from 0.61 to 0.88.

CONCLUSIONS:
Among older women who have exceeded average life expectancy, quality of life is profoundly threatened by falls and hip fractures. Older women place a very high marginal value on their health. Any loss of ability to live independently in the community has a considerable detrimental effect on their quality of life.

Keywords
hip, related, fracture, fear, falling, time, women; trade, older, off, study, quality, life

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Conclusions Among older women who have experienced a fall the quality of life is profoundly threatened by falls and hip fractures. Older women place a very high marginal value on their health. Any loss of ability to live independently in the community has a considerable detrimental effect on their quality of life.
Introduction

Hipp fractures are a major cause of morbidity and mortality, and almost all occur after a fall. In the next 50 years the number of hip fractures will probably increase greatly. About 20% of people who fracture their hips are dead within a year, and many of those who recover from hip fracture require additional assistance in daily living. Population data tend to obscure the personal impact of falls and hip fracture. Objective measures of function, such as activities of daily living and subjective utility based measures of health related quality of life, can express the personal dimension. Hip fracture adversely affects health related quality of life, with greater physical recovery reflected in better quality of life. Thus, health related quality of life is an important outcome for studies attempting to reduce the number of falls or their consequences. As part of an ongoing randomised trial (the community hip protector trial) that is examining the effectiveness of hip protectors in older women living in the community we sought to estimate the utility (preference for hip protectors if randomised to the intervention group) and control group), and women who had refused to participate in the trial because they would not wear the hip protectors (the intervention group), women who did not have experience in wearing the hip protectors (the intervention group), and women who had refused to participate in the trial because they would not wear the hip protectors if randomised to the intervention group (refusers). The study was approved by the ethics committees of participating hospitals. The quality of life interview schedule was administered to the women six months after they were recruited into the trial (or after refusal to enter).

Health states—To develop descriptions of health states we reviewed the literature and interviewed older women. Sixteen open ended quality of life interviews were conducted with women who had had no contact at all with trial and who had experienced a hip fracture. The interviews helped to define the dimensions of quality of life most affected by a hip fracture and the language used by women to describe their experiences.

Data from the qualitative research and clinical opinion were used to generate four “name labelled” health states. The health states were full health (Anne), fear of falling (Mary), a good hip fracture (Jean—where the respondent returns from hospital to independent living in the community), and a bad hip fracture (Elizabeth—where the respondent moves to a nursing home). (See the appendix for descriptions of the health states.)
Test-retest reliability study—We readministered the interview schedule to 36 respondents three weeks after their initial interview to assess the reliability of using time trade off in an older population group. The reliability of the utility weights was assessed with the intraclass correlation coefficient.

Distribution of the time trade off scores—The mean utility weights for both hip fracture states were highly skewed towards zero. Therefore the Mann-Whitney test for comparing two independent samples has been used when appropriate.

Results

From 1 September 1997 to 31 December 1998 we completed 203 quality of life interviews. There were 84 respondents in the intervention group, 76 in the control group, and 43 in the refusers group. The response rate by group (the number of interviews divided by the number of people asked for an interview) was 86%, 88%, and 31%, respectively. Each interview took, on average, 63 minutes to complete. Table 1 presents a summary of respondent characteristics and health status. There were no significant differences between the groups in self rated health, in the short form-12, activities of daily living, or EQ-5D (t test and χ² test statistic, respectively). For all three groups about half the participants reported that their health was worse when compared with their health 12 months previously.

Consistency of ranked health states with the time trade off weight

We checked the consistency of the utility weights by comparing the ranking for each of the four primary health states with the value elicited by the time trade off technique. Nine respondents (four control, four intervention, and one refuser) whose utilities were not ranked in the expected order were excluded from further analysis of the data.

Descriptive analysis—time trade off utility weights

Health states—Table 2 shows the mean, median, and interquartile range of time trade off scores for 194 subjects by state and age group. Respondents in all groups placed a high marginal value on health. The low mean (and median) utility weight for a “bad” hip fracture (0.05 and 0.0, respectively) indicates that most women were prepared to trade off considerable length of life to avoid the reduction in quality of life that happens after a hip fracture. There was greater variability in the utility weights for a “good” hip fracture, with an interquartile range of scores from 0.0-0.65. The distinguishing feature between a good and a bad hip fracture was that the mean (and median) utility weight for a “good” hip fracture was higher than the corresponding utility weight for a “bad” hip fracture.

Table 1  Characteristics and health status of respondents (at interview) by group. Figures are numbers (percentage) of women unless stated otherwise

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Control (n=76)</th>
<th>Intervention (n=84)</th>
<th>Refusers (n=43)</th>
<th>Total (n=203)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean (range) age (years)</td>
<td>83 (75-97)</td>
<td>83 (75-98)</td>
<td>83 (75-92)</td>
<td>83 (75-98)</td>
</tr>
<tr>
<td>Age 75-84 years</td>
<td>44 (58)</td>
<td>54 (64)</td>
<td>28 (65)</td>
<td>126 (62)</td>
</tr>
<tr>
<td>Aged &gt;85 years</td>
<td>32 (42)</td>
<td>30 (36)</td>
<td>15 (35)</td>
<td>77 (38)</td>
</tr>
<tr>
<td>Mean No of falls in past 12 months</td>
<td>2.5</td>
<td>3.0</td>
<td>NA</td>
<td>2.6</td>
</tr>
<tr>
<td>Previous hip fracture</td>
<td>18 (24)</td>
<td>22 (26)</td>
<td>NA</td>
<td>40 (20)</td>
</tr>
<tr>
<td>Mean (median) No of days in hospital in past 12 months</td>
<td>17 (13)</td>
<td>14 (8.5)</td>
<td>NA</td>
<td>15 (10)</td>
</tr>
<tr>
<td>General health (compared with 12 months ago):</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Better (%)</td>
<td>16</td>
<td>10</td>
<td>5</td>
<td>11</td>
</tr>
<tr>
<td>Same (%)</td>
<td>32</td>
<td>41</td>
<td>44</td>
<td>38</td>
</tr>
<tr>
<td>Worse (%)</td>
<td>52</td>
<td>50</td>
<td>51</td>
<td>51</td>
</tr>
<tr>
<td>EQ-5D</td>
<td>0.78</td>
<td>0.77</td>
<td>0.77</td>
<td>0.77</td>
</tr>
<tr>
<td>Mean (SD) SF-12 physical score</td>
<td>36.3 (10.7)</td>
<td>39.3 (10.2)</td>
<td>NA</td>
<td>37.8 (10.5)</td>
</tr>
<tr>
<td>Mean (SD) SF-12 mental score</td>
<td>52.7 (7.4)</td>
<td>52.7 (8.3)</td>
<td>NA</td>
<td>52.7 (6.0)</td>
</tr>
<tr>
<td>Mean score for activities of daily living:</td>
<td>97.3</td>
<td>97.5</td>
<td>NA</td>
<td>97.4</td>
</tr>
<tr>
<td>Median (25th, 75th centile)</td>
<td>100 (95, 100)</td>
<td>100 (100, 100)</td>
<td>100 (95, 100)</td>
<td></td>
</tr>
<tr>
<td>Country of birth:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Australia</td>
<td>55 (72)</td>
<td>72 (86)</td>
<td>NA</td>
<td>127 (79)</td>
</tr>
<tr>
<td>Overseas</td>
<td>21 (28)</td>
<td>12 (14)</td>
<td>NA</td>
<td>33 (21)</td>
</tr>
<tr>
<td>Income:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pension (welfare)</td>
<td>53 (70)</td>
<td>61 (73)</td>
<td>NA</td>
<td>114 (71)</td>
</tr>
<tr>
<td>Superannuation or private means</td>
<td>23 (30)</td>
<td>23 (27)</td>
<td>NA</td>
<td>46 (29)</td>
</tr>
<tr>
<td>Education:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary school</td>
<td>4 (5)</td>
<td>5 (6)</td>
<td>NA</td>
<td>9 (5)</td>
</tr>
<tr>
<td>Some secondary school</td>
<td>17 (22)</td>
<td>16 (19)</td>
<td>30 (21)</td>
<td></td>
</tr>
<tr>
<td>Completed secondary school</td>
<td>32 (25)</td>
<td>24 (29)</td>
<td>NA</td>
<td>46 (29)</td>
</tr>
<tr>
<td>Trade apprenticeship</td>
<td>15 (20)</td>
<td>20 (24)</td>
<td>NA</td>
<td>35 (22)</td>
</tr>
<tr>
<td>Certificate/diploma</td>
<td>12 (16)</td>
<td>13 (16)</td>
<td>25 (16)</td>
<td></td>
</tr>
<tr>
<td>University degree</td>
<td>6 (8)</td>
<td>6 (7)</td>
<td>NA</td>
<td>12 (7)</td>
</tr>
</tbody>
</table>
| NA=not applicable.

Table 2  Mean (median) time trade off utility weights for health states by age group

<table>
<thead>
<tr>
<th>Group</th>
<th>Fear of falling (Mary)</th>
<th>Good hip fracture (Jean)</th>
<th>Bad hip fracture (Elizabeth)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age 75-84 years (n=126)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>0.70</td>
<td>0.54</td>
<td>0.06</td>
</tr>
<tr>
<td>Median (25th, 75th centile)</td>
<td>0.85 (0.65, 0.99)</td>
<td>0.15 (0.0, 0.75)</td>
<td>0</td>
</tr>
<tr>
<td>Age &gt;85 years (n=74)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>0.62</td>
<td>0.26</td>
<td>0.05</td>
</tr>
<tr>
<td>Median (25th, 75th centile)</td>
<td>0.75 (0.15, 0.99)</td>
<td>0.05 (0.0, 0.55)</td>
<td>0</td>
</tr>
<tr>
<td>Total (n=194)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>0.67</td>
<td>0.31</td>
<td>0.05</td>
</tr>
<tr>
<td>Median (25th, 75th centile)</td>
<td>0.85 (0.35, 0.99)</td>
<td>0.13 (0.0, 0.65)</td>
<td>0</td>
</tr>
</tbody>
</table>
admission to a nursing home. Nearly all women would trade off almost their entire life expectancy to avoid the state of being admitted to a nursing home. Eighty per cent of respondents said that they would rather be dead. The results were also analysed by respondent group. Participants in the refuser group, who had refused to take part in the hip protector trial, provided lower mean utility weights for each health state compared with participants in either the control or intervention group. There were, however, no significant differences in utility weights between the respondent groups. We compared the valuations of those women in our study who had previously fractured a hip (25% of the total sample) with women who had not fractured a hip and there was no difference in values between these two groups.

Reliability—The intraclass correlation coefficient (and 95% confidence intervals) for each health state were 0.88 (0.84 to 0.92) for fear of falling (Mary), 0.61 (0.48 to 0.75) for good hip fracture (Jean), and 0.73 (0.69 to 0.76) for bad hip fracture (Elizabeth). Other time trade off studies have reported test-retest reliability coefficients ranging from 0.63 (at six weeks) to 0.87 at one week or less.\(^2\)\(^3\)\(^5\)\(^6\) The values derived in this study can be considered reliable.

Discussion
The results of this study are very clear: older women place a very high marginal value on their health. The low mean utility weights for “Jean” and “Elizabeth” show that a hip fracture represents a profound threat to their health related quality of life. The single most important factor (threat) seems to be the loss of independence, dignity, and possessions that accompanies the move from living in their own homes to living in a nursing home. It is difficult to estimate accurately the proportion of women experiencing the “bad” hip fracture health state. Data from the Northern Sydney hip fracture audit, however, show that of women living at home before their hip fracture, 22% moved to nursing home care in the 12 months after fracture and only 24% were walking as well as before the fracture.\(^2\)

The utility weights for hip fracture provide interesting contrasts with other health states. A casual observation would suggest that a hip fracture is worse than breast cancer (time trade off utility weight 0.75);\(^1\) myocardial infarction (0.90);\(^1\) or mild osteoarthritis (0.69).\(^1\)

Direct comparisons are difficult because utility weights vary across age groups and application of the time trade off technique varies between studies, but our findings emphasise the gravity of hip fractures in the minds of older women who are at risk of sustaining this injury.

It is interesting to consider why women rate the utility of falls and especially hip fractures so low. These views have presumably been influenced by the experience of their parents, friends, and siblings. The views are largely congruent with the poor objective outcomes of hip fracture, although rather more dramatic in our view.\(^2\)

The results also highlight a valuation effect related to age. Respondents often commented that they were living on borrowed time (all had lived beyond a “normal” span of “three score years and ten”) and that they had lived a good or fair life (a “fair innings”).\(^5\)

What this paper adds

Hip fractures among older women can have a profound effect on quality of life

Eighty per cent of women surveyed would rather be dead than experience the loss of independence and quality of life that results from a bad hip fracture and subsequent admission to a nursing home.

Any loss to living independently in the community has a significant detrimental effect on their quality of life, and it follows that a reduction in the incidence of hip fractures will not only save lives but will prevent a considerable reduction in their quality of life.

Although the quality of life interview did not specifically ask respondents about equity issues (such as who gets health care and how much), their verbal comments during the exercise revealed that they believed in the “fair innings” argument. Respondents did reflect on their health throughout their lifetime. They did not want to live on borrowed time at the expense of younger people. At their age, death was expected and preferable to a state of health that meant losing their home, their independence, and their normal quality of life.

We had some concern about applying utility measurement techniques in a population aged in their 80s and 90s. There was almost no evidence on the acceptability, usefulness, and reliability of the time trade off technique as a method for assessing health values of older people living independently in the community.

The health values of hospitalised patients aged 80 years or older has been assessed with the time trade off technique (the HELP project) but until now evidence on quality of life fear of falling and hip fracture has been lacking.
place a very high marginal value on their health. Any loss to living independently in the community has a significant detrimental effect on their quality of life. It follows that a reduction in the incidence of hip fractures will not only save lives but will prevent a significant reduction in their quality of life.

Contributors: GS was responsible for the original idea (quality of life study), study design, data analysis, and writing the paper; IDC participated in the original idea (randomised trial), study design, recruitment of subjects, and writing the paper; RGC participated in the study design, data analysis, and generation of health state descriptions; SE participated in data collection, qualitative research methods, and writing the paper; JS participated in the study design and data analysis; SEK participated in qualitative research methods and generation of health state descriptions GS is the guarantor.

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Competing interests: None declared.

Appendix

Full health—Anne
Anne is a similar age to you. She lives in her own home and cares for herself. Anne is active in her local community and is out and about with friends quite a bit. She swims regularly and enjoys visiting her children each weekend. Anne walks without any aids and can manage her 12 steps at home without any problems. She enjoys shopping and cooking for herself. Anne does not need any help with the housework and derives pleasure and relaxation from gardening.

Fear of falling—Mary
Mary is a similar age to you. She lives alone in her own home and cares for herself. Mary is involved in community fundraising and enjoys playing bridge. Mary recently had a fall. She did not break any bones but was badly cut and bruised. She is scared of falling. Mary continues to walk without aids. She still looks after herself and does her own housework. Mary has been a bit depressed since her fall. She has returned to her bridge group but is anxious when she is outside the house. She is unable to pursue her gardening or community work. Her leg aches sometimes at night. She has become anxious and is easily upset.

Good hip fracture—Jean
Jean is a similar age to you. She lives in her own home and cares for herself. Before her fall Jean was out and about quite a bit with her church group. She swam on a regular basis and occasionally looked after her grandchildren. Jean broke her hip when she fell. She is finding it difficult to do everything at home now that she walks with a stick. She needs help in shopping as she no longer drives or feels confident to shop alone. Jean can prepare only simple meals and is missing being able to bake for her friends. Jean can no longer manage the housework by herself. She misses her church activities but finds it too painful and tiring to be out for long periods. Jean experiences feelings of frustration and anger. Jean gets tearful thinking about all the things she can’t do.

Bad hip fracture—Elizabeth
Elizabeth is a similar age to you. Until her recent fall, she lived in her own home and managed to care for herself. She was active in her local community.

Elizabeth broke her hip when she fell. She is now unable to live alone as she requires a great deal of help to do most things. Elizabeth now lives in a nursing home near to her family but away from her friends. She is limited in where she can walk because of the frame and is unable to walk for long distances. She is unable to shower or dress without help from the nurse. She is unable to pursue her gardening or community work. Her leg aches sometimes at night. She has become anxious and is easily upset.

Competing interests: None declared.