The Royal College of Surgeons of England

*Ann R Coll Surg Engl* 2001; **83**: 128–133

Original article

# Disability and mental health of patients waiting for total hip replacement

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**We performed a cross sectional study to examine the relationship between physical function and mental health of patients waiting for total hip replacement surgery, and the relationship between physical and social function and mental health to time spent waiting for surgery. We found that, in addition to the expected poor hip function, limited mobility and pain, one-quarter of the patients had clinically significant mood disorders and another quarter were in the borderline range. No association was found between severity of mental disorder and assessment of hip function. The patients had been waiting for 1–26 months (median 6 months) for surgery: yet those waiting longest were no worse on any of the outcome measures and their mental health was better. We conclude that mental disorders are common in patients waiting for hip replacements, are not directly related to hip function and their origins are unknown, but they require clinical assessment and treatment. There is no evidence that physical or social function or mental health are worse in those waiting longer for hip replacement surgery. Even so, these patients are severely disabled and some have to wait too long.**

*Key words*: Hip replacement arthroplasty – Physical health – Mental health – Waiting lists

The *Patient's Charter*[1] specifies that no-one should have to wait for more than 18 months for an operation and the aim is to reduce this. The implication is that prolonged delay is detrimental to a patient's well-being. It seems likely that a long wait for any operation may allow further progress of the underlying pathology, cause disappointment due to delay in the expected improvement, and permit more time to dwell on the possible risks of the pathology and impending treatment. All these may contribute to deteriorating physical and mental health and social function, as shown in patients waiting for coronary artery bypass surgery.[2]

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*Table 1A Method of grading functional value of hip (d'Aubigne and Postel)*

| | Pain | Ability to walk |
|---|---|---|
| 0 | Intense and permanent | None |
| 1 | Severe even at night | Only with crutches |
| 2 | Severe when walking: prevents any activity | Only with sticks |
| 3 | Tolerable with limited activity | With one stick, less than 1 h: very difficult without stick |
| 4 | Mild when walking; disappears with rest | Prolonged with stick; short time without stick and with limp |
| 5 | Mild and inconstant; normal activity | Without stick but with slight limp |
| 6 | No pain | 'Normal' |

Total score = pain + ability to walk

*Table 1B d'Aubigne and Postel total hip scores* (n = 92)

| Grade | Very good | Good | Medium | Fair | Poor |
|---|---|---|---|---|---|
| Score | 11/12 | 10 | 9 | 8 | 7 or less |
| *n* | 0 | 3 | 1 | 10 | 78 |

However, there have been no studies reported of the mental health of patients waiting for total hip replacement, one of the most commonest elective operations performed in the UK, or of the relationship of their health to time spent on the waiting list.

Approximately 40,000 hip replacements are performed in England each year,[3] and the number is anticipated to rise. Although this operation is highly successful, many patients are expected to have to wait for many months. We wished, therefore, to assess aspects of the physical and social function and mental well-being of patients waiting for this operation, and to determine whether these factors were related to the length of time spent on the waiting list. Our first hypothesis was that mental disorders are not related to severity of hip pathology. The second hypothesis was that there is no relationship between the length of time spent on a waiting list for hip replacement surgery and the amount of pain, disability and mental ill health experienced by patients.

## Patients and Methods

The investigation was cross-sectional in design.

### *Patients*

Consecutive patients attending pre-operative assessment clinics, held 6 weeks or less prior to hip replacement were invited to join the study. For inclusion they had to be English speaking and willing to give informed consent.

### *Measures*

**Demography**

Demographic data were collected by the doctor running the clinic. The time on the waiting list was defined as the interval in months between the date that the patient had been listed for the operation and the pre-operative assessment clinic.

**Pain and walking ability**

Pain and walking ability were measured on 6-point scales which were previously used and validated in the Postel hip scoring system (Table 1).[4] In addition, the range of movements of each affected hip was assessed and the combined range (excluding extension), in degrees, was noted as the cumulative range of movement. The normal expected value is in excess of 200 degrees.

**SF-36**

The SF-36[5] is a self-administered questionnaire consisting of 36 items measuring eight health concepts (see Table 4). For each concept, scores are coded, summed and transformed on a scale from 0 (worst health) to 100 (best health). It is easy to use and the reliability and validity have been studied.[6] For the purpose of the present investigation, the SF-36 pain scale was validated as a measure of pain severity by comparison with results from a visual analogue pain scale (VAPS) in the whole sample. Spearman correlation between the SF-36 pain scale and the VAPS was 0.173 ($P < 0.001$) and, in the interests of brevity, only the results of the SF-36 pain scale are presented.

**Mental health status**

The 28-item General Health Questionnaire (GHQ)[7,8] is a well validated questionnaire aimed at detecting those with an increased risk of suffering a diagnosable psychiatric disorder. Scores from each of four scales (depression, anxiety, somatic symptoms and social dysfunction) are combined to give a total score – higher scores indicating increased risk of a mental disorder.

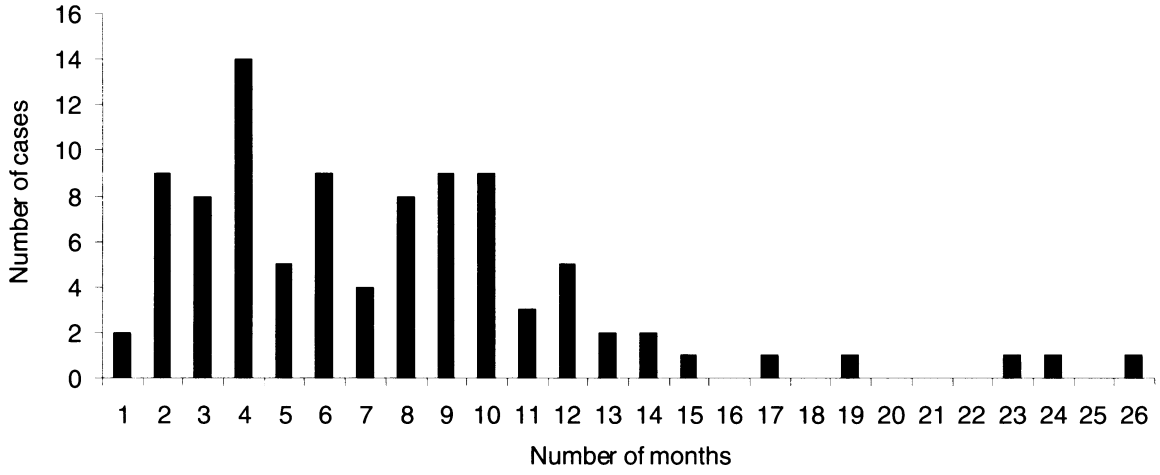


**Figure 1** Distribution of waiting list times.

The Hospital Anxiety and Depression Scale (HADS)[9] is a questionnaire particularly designed for use in the general hospital setting. There are seven items each for the assessment of anxiety and depression. Physical symptoms are not included and, therefore, have no direct effect on the scores. Threshold scores for borderline and clinically significant disorders are shown in Table 2.

*Table 2 Hospital anxiety and depression scale* (n = 93)

| Clinical range | 'Normal' | Borderline | Clinically significant |
|---|---|---|---|
| Score | 0–7 | 8–10 | 11–21 |
| Anxiety (*n*) | 55 | 21 | 17 |
| Depression (*n*) | 64 | 15 | 14 |

### *Analysis of results*

The relationship of duration on the waiting list to the other measures was examined first using Spearman's correlation coefficients for non-parametric data, in view of the skewed distribution of waiting list times (Fig. 1). Second, we compared the top and bottom quintiles on the waiting list, for each of the other measures, using Mann-Whitney U tests. We used two tailed tests. Patients were included in data analyses wherever data were available: missing data are indicated in Table 4 by the reduced number of subjects included in some analyses.

## Results

A total of 111 consecutive patients were invited to enter the study, after the exclusion of one patient who did not speak adequate English and one whose surgery was deferred. Nine patients declined, four failed to complete the questionnaires sufficiently, and three questionnaires were lost. Thus 95 patients (86% of those eligible) were included, with between 85 (76%) and 94 (85%) completing individual assessments. Of these, 55 were female and the median age was 66 years (range 33–83 years). Of the patients, 80 were undergoing primary unilateral hip replacement, 3 were having bilateral arthroplasties, and 12 were undergoing revision procedures. Of the patients having primary hip surgery, 81 (85%) suffered from primary osteoarthritis, 12 (13%) had secondary osteoarthritis and 2 (2%) had rheumatoid arthritis.

The median time on the waiting list was 6.0 months (range 1–26 months; Fig. 1). There were 19 subjects in the shortest waiting list quintile (1–3 months) and 18 in the longest waiting list quintile (11–26 months). Ten patients (10%) waited in excess of 12 months.

As expected, the d'Aubigne and Postel hip scores were rated in the 'poor' category for most patients (Table 1B). The distribution of the cumulative range of movement (mean = 138, standard deviation = 44) is shown in Figure 2, and indicates the expected limitation in mobility in most patients.

The median total score on the GHQ was 5 (range 0–27); 49 (56%) patients had scores of five or above, indicating increased probability of suffering a psychiatric disorder. On the HADS (Table 2), 21 patients (24%) scored within the clinically significant range for anxiety and/or depression, including 10 (10.5%) for both. (Details of the SF-36 results are available on request from the authors.)

The GHQ total score and the HADS anxiety and depression scores were not significantly correlated with the d'Aubigne walking or range of movements scores (Table 3).

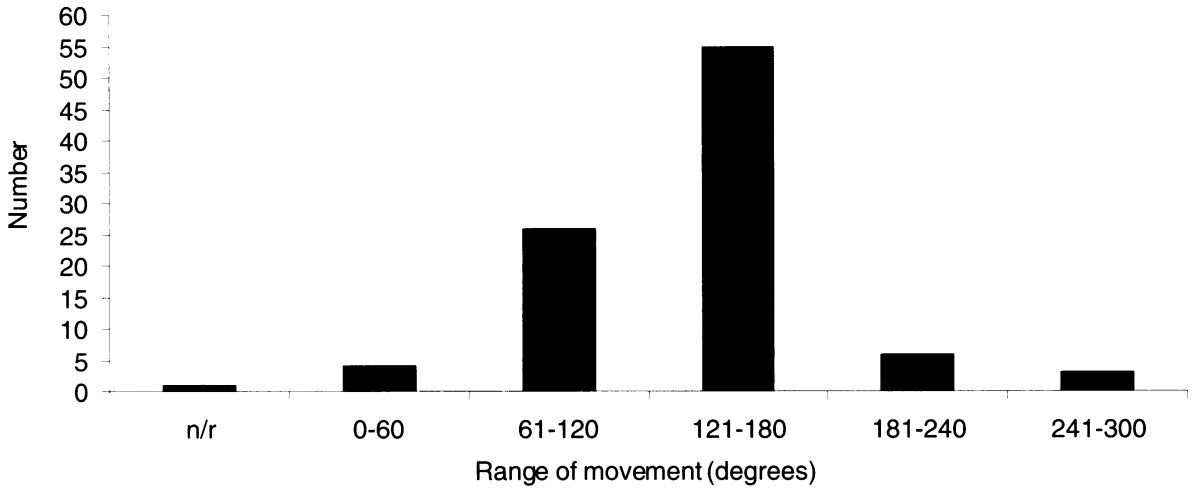


**Figure 2** Cumulative range of movement.

*Table 3 Correlations between assessments of mental health and hip function*

| | d'Aubigne walking | | Range of movements | |
|---|---|---|---|---|
| | *r* | *P* | *r* | *P* |
| GHQ total | –0.11 | 0.32 | 0.07 | 0.51 |
| HADS anxiety | –0.14 | 0.19 | –0.06 | 0.56 |
| HADS depression | –0.13 | 0.29 | –0.04 | 0.73 |

The relationship of each of these measures to time on the waiting list is shown in Table 4. There is a statistically significant negative correlation with the GHQ total score, suggesting that those who waited longest had the least risk of a mental disorder. This appears to be determined only by the inverse relationship of waiting time with the GHQ anxiety subscale ($r = -0.20$, $P = 0.06$). This finding is confirmed by the lower GHQ total scores for the longest waiting list quintile compared with the shortest quintile, and by the weak negative correlation between the HADS anxiety score and waiting time. The positive correlation between the vitality dimension of the SF-36 and waiting time reflects its strong correlation with the GHQ ($r = 0.54$, $P < 0.001$). None of the other measures is significantly related to waiting list time.

## Discussion

The main findings of our study are: (i) most patients suffer serious pain and immobility; (ii) half the patients show evidence of anxiety and/or depression, which is either clinically significant or in the borderline range; (iii) the presence and severity of mental disorders are not

*Table 4 Relationship between time on waiting list and other measures*

| | | *n* | Correlation* | | Shortest versus longest quintile** |
|---|---|---|---|---|---|
| | | | *r* | *P* | *P* |
| d'Aubigne hip score | | 92 | –0.01 | 0.92 | 0.82 |
| Range of movement | | 94 | –0.04 | 0.67 | 0.29 |
| GHQ | Total | 87 | –0.22 | 0.04 | 0.03 |
| HADS | Anxiety | 93 | –0.18 | 0.08 | 0.16 |
| | Depression | 93 | –0.02 | 0.87 | 0.80 |
| SF-36 | Pain | 90 | 0.13 | 0.23 | 0.50 |
| | Physical function | 87 | 0.12 | 0.27 | 0.49 |
| | Social function | 85 | 0.17 | 0.12 | 0.37 |
| | Role limitation – physical | 87 | 0.19 | 0.08 | 0.32 |
| | Role limitation – emotional | 87 | 0.03 | 0.78 | 0.91 |
| | Mental health | 87 | 0.17 | 0.11 | 0.22 |
| | Vitality | 87 | 0.21 | 0.05 | 0.12 |
| | Health perception | 85 | 0.02 | 0.87 | 0.78 |

*Spearman correlations; **Mann-Whitney *U* tests

associated with severity of hip dysfunction; and (iv) those waiting longest for total hip replacement are no worse on any of our assessments than those waiting for shorter periods. These findings are based on multiple measures of physical and social function and mental health, using both patient-rated and medical assessments.

It is not surprising that as many as 85% of our patients had d'Aubigne and Postel hip scores which suggest poor function, but the fact that the remaining 15% had better scores requires comment. It is recognised that no hip scoring system is entirely satisfactory[10] and, therefore, the relationship between any hip score and the clinician's decision to operate will never match exactly. Our pre-operative assessment clinics use a multidisciplinary approach, combining the individual assessments of staff, patients and their families.

There is no evidence from any of our measures that mental health or social function were worst in patients who waited longest. Indeed, the GHQ displayed a significant negative correlation with waiting time, determined particularly by the negative relationship with anxiety. Since it seems unlikely that mental disorders generally improve whilst waiting for an operation, this finding might arise if mental illnesses were treated effectively (we did not assess this), or if those who left the waiting list soonest were more vulnerable to mental disorders. The factors discussed below which may have prevented the most physically disabled from remaining on the waiting list longest may also apply to mental disorders. Further research is needed to confirm whether similar findings occur in other waiting list samples, and a longitudinal study would help to reveal the mechanisms involved.

Other studies have also indicated high levels of undetected and untreated psychiatric morbidity in samples of physically ill and disabled patients, for example in elderly in-patients with fractured hips,[11] and in patients waiting for coronary artery bypass grafting.[2] In our samples, the assessments of mental disorder, and also the patients' own assessments of physical, emotional and social well-being, were not directly related to the severity of arthropathy, as indicated by functional assessment with the d'Aubigne and Postel score and the range of movement. It is important to recognise and treat mental illness pre-operatively, particularly because patients with lower levels of pre-operative anxiety seem to suffer less pain and discomfort postoperatively.[12] Psychiatric assessment of patients with fractured hips can result in reduced psychiatric symptoms, reduced length of hospital admission, and can be cost-effective.[11] The present study demonstrates how a simple screening test can be easily administered prior to elective surgery. Those patients who score highly should undergo more stringent assessment for mental illness and should then receive appropriate treatment.

It may seem surprising that we did not find a positive association between time spent on the waiting list and measures of physical disability. There are several possible reasons for this. First, most patients may only be placed on the waiting list when hip symptoms are severe and the measures used may be relatively insensitive to further deterioration. Second, these patients have chronic, slowly progressive disorders, so further deterioration whilst on the waiting list may be relatively limited. Third, there is anecdotal evidence that patients who ask repeatedly to have their operations brought forward are operated upon sooner. Such patients may be relatively intolerant of pain. There is well-documented evidence for a positive association between ratings of pain, anxiety and depression,[13] so earlier treatment of those with lowest pain tolerance may have also resulted in the negative relationship between GHQ ratings and waiting list time. Fourth, it is possible that patients waiting longest have better pain management strategies (whether physiotherapy, pharmacological or psychological) than those who leave the waiting list early. Whatever the explanation, by the time patients reach pre-operative assessment, as a group they are suffering from substantial physical, social and mental disability and some have waited for over 2 years.

In most respects our sample is likely to be representative of the wider population of patients waiting for hip replacements as it was drawn from two large general hospitals, the sex and age structure is characteristic and the response rate was high. We do not know, however, whether the waiting list time is typical of other units at present. Our waiting time compares quite favourably with the Government's *Patient's Charter*,[1] with only four patients waiting more than 18 months, but is less good than was the national median in 1989/90 which was 127 days.[14] Only 10% of patients waited for more than one year, and it is possible that longer waiting periods, or different management of the waiting list, may have a more detrimental effect.

## Conclusions

Waiting list time has been used as a political issue in the context of National Health Service reforms and the use of league tables. Waiting list time for total hip replacement is especially poignant as this is one of the most successful operations performed in England, for patients with high levels of physical and mental morbidity and disability. The physical and psychological state of those waiting for this operation has been assessed in the US and Finland

and shows a significant and sustained improvement after operation.[15–17] However, the impact of a long wait for operation has not been previously assessed. We have not been able to find evidence that physical or mental health is worse in those who remain longest on the waiting list, but clearly a minority of patients has to wait too long. The high prevalence of mental disorders experienced by patients on the waiting list requires further investigation and appropriate clinical management.

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