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The Enriched Opportunities Programme for people with dementia: a cluster-randomised controlled trial in 10 extra care housing schemes

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Objectives: The Enriched Opportunities Programme (EOP) is a multi-level intervention focussing on improved quality of life for people with dementia. This study compared the experience of people living with dementia and other mental health problems in extra care housing schemes that utilised EOP with schemes that employed an active control intervention.

Method: Ten extra care housing schemes were cluster randomised to receive either the EOP intervention or an active control intervention for an 18-month period. Residents with dementia or other significant mental health problems (20–30 per scheme) were assessed on a number of outcome measures at baseline, six months, one year and 18 months. The primary outcome measure was quality of life. Self-reported depression was an important secondary outcome.

Results: The EOP-participating residents rated their quality of life more positively over time (4.0 (SE 0.6) units; 14% p < 0.001) than the active control (1.3 (SE 0.6) units; 4% p = 0.003). There was also a significant group–time interaction for depressive symptoms (p = 0.003). The EOP-participating residents reported a reduction of 25% at both six and 12 months and a 37% reduction at 18 months (all p’s < 0.001). EOP residents were less likely than residents in the active control sites to move to a care home or to be admitted to a hospital inpatient bed. They were more likely to be seen by a range of community health professionals.

Conclusion: The EOP had a positive impact on the quality of life of people with dementia in well-staffed extra care housing schemes.

Keywords: non-pharmacological intervention; Locksmiths; assisted living; staff training; quality of life

Introduction

The provision of extra care housing has been put forward as a means of improving the quality of life for older people living with long-term conditions, such as dementias, whilst maintaining their choice and control such as rights of tenancy or home ownership (Department of Health, 2005, 2009). However, whilst promising ‘a home for life’, the reality is that many have to move on to more dependent care facilities if they experience significant problems. The only UK longitudinal study looking at how people with dementia fared in extra care housing over a three-year period showed that residents with dementia and their relatives were very positive about extra care as an experience (Vallelly, Evans, Fear, & Means, 2006). Despite this, over half were admitted to other care settings during the first two years. Reasons for moving on were given as challenging behaviour, conflicts with staff and other residents, and increased distress. One of the issues for research and practice in this area is that this model of long-term support is relatively new and many different terms are used to describe extra care housing. In the UK it was traditionally known as sheltered housing or very sheltered housing and is now also referred to as housing with care. In the United States the term assisted living settings is used. In a review of research on assisted living (Hyde, Perez, & Forrester, 2007) highlighted that networks of researchers in this area are relatively new when compared to care home research and that there are significant methodological and practical issues to overcome. They concluded that much of what we know from research into care practices for people with dementia in community and nursing home settings needs to be replicated and new types of research undertaken in assisted living settings.

People who live with dementia are a particularly vulnerable group who face enormous challenges if they are to optimise their potential for good mental health and well-being (Brooker, Argyle, & Clancy, 2009). Although randomised controlled trials (RCTs) of person-centred care interventions are starting to appear with respect to care homes (Chenoweth et al., 2009), there is a lack of evidence-based practice in extra care housing that actually demonstrates improvements in well-being for people with dementia. Likewise, those who experience other common mental health problems in later life such as depression or anxiety generally have poor outcomes. Rates of depression of up to 24% have been reported in housing scheme populations (Field, Walker, & Orrell, 2002). However, as with care home populations (Purandare, Burns, Challis, & Morris, 2004), little contact with mental health professionals

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is reported. In a study of assisted living in Maryland (Rosenblatt et al., 2004) two-thirds of residents reviewed had dementia with lower numbers being reported as adequately evaluated or treated.

The Enriched Opportunities Programme (EOP) for extra care housing was developed from earlier work utilising a review of the published literature, expert opinion from practice, service user perspectives and an action research programme in four practice development sites (Brooker & Woolley, 2007; Brooker, Woolley, & Lee, 2007) including three specialist nursing homes and one extra care housing scheme.

In line with the Medical Research Council (MRC) sequential framework for Complex Interventions (MRC, 2000), these exploratory studies helped us to further develop the intervention and plan this definitive evaluative study. On the basis of this, we are able to define the key components of a replicable intervention and a feasible protocol for comparing the intervention to an appropriate alternative. This study represents a Phase 3 definitive RCT of the EOP as described in the ‘Methods’ section.

It is hypothesised that the different elements of EOP work together as a group of interventions to provide a psycho-social intervention to support people long term to live where they have chosen to live and to help them enjoy a good quality of life. Because the EOP intervention involves whole team training and the provision of a specialist worker for a whole housing scheme, randomisation at the individual level was not plausible. The unit of randomisation was therefore the housing scheme. The RCT presented here attempted to evaluate the effectiveness of the EOP intervention on improving the quality of life for people with dementia and related mental health problems living in five extra care housing schemes, in comparison to five active control sites.

Methods

Participants

As this was a whole facility intervention, a cluster-randomised design was used. The study comprised 10 extra care housing schemes belonging to a medium-sized charitable trust specialising in extra care housing provision in England. Inclusion criteria were schemes that had been operational for at least two years, had a relatively stable staff and management team, and had the capability to engage with the research process.

Originally, it had been intended that dementia diagnosis was used as the main inclusion criteria. However, previous experience suggested that rates of formal diagnosis would be low although staff in the schemes could reliably identify those residents with significant problems. In order to identify the most vulnerable residents in the schemes, all residents were reviewed by staff who knew them well using the Enriched Opportunities Housing Inclusion Criteria (EOHIC) schedule (Brooker & Woolley, 2007). Staff rated all residents on severity of problems in five problem areas: confused behaviour, communication difficulties, social isolation, challenging behaviour and low mood.

30 residents per scheme who scored in the most vulnerable range were approached to see if they would take part. Exclusion criteria were people without significant problems detailed above and those who declined to participate.

The EOP intervention

The EOP intervention was developed during the previous research stage (Brooker & Woolley, 2007; Brooker et al., 2007). It encompasses a whole scheme approach including specialist staff role (EOP Locksmith), leadership, staff training, individualised care-work, community liaison and the provision of activities.

A full-time senior staff member, the ‘EOP Locksmith’, was appointed to each scheme in the month before baseline measures and was employed for 18 months. This was a new additional staff role. The aim of the post was to focus on unlocking the potential and to enable individual residents to enjoy an enriched lifestyle. No specific qualifications were required but a clear person specification and job description had been identified in previous research. These staff led the EOP in-house intervention.

The change management leadership function was fulfilled by the allocation of one EOP Locksmith per scheme, the existing site manager for each scheme and one senior leadership role (the EOP Coach) who worked across all EOP sites. The EOP Locksmith worked with the site manager to implement the programme, working both with individual residents and with direct support staff to ensure that the programme was implemented. All EOP Locksmiths also received supervision from the EOP Coach to ensure their work remained focussed. The EOP Coach had substantial dementia care experience and was employed by the Trust to provide leadership to the programme overall. The coach was employed specifically to fulfil this role and to liaise with the research team.

The EOP Locksmith worked with around 20–30 residents on scheme to identify types of occupation and activity that were the most likely keys to unlock the potential for well-being and to help them achieve their goals. They utilised an enriched care planning approach (May, Edwards, & Brooker, 2009) to achieve this. Individualised casework also ensured that any potential problems were dealt with quickly. This involved active liaison with primary and secondary health and care teams when appropriate. The EOP Locksmith worked closely with all the direct staff-team in order to identify problems and solutions, to offer guidance and model positive ways of assisting residents with dementia.
The EOP Locksmith took the lead on ensuring that a programme of activity was available and accessible for their client group. The programme was designed to be stimulating, tailored to the capabilities of the individual residents and encouraged integration with the local community.

During the first month of the intervention, all staff within the EOP housing schemes received a one-day course in person-centred dementia care. Senior staff received a further three-day course focussing on the enriched care planning model (May et al., 2009).

The control intervention

From staff interviews in our previous research (Brooker & Woolley, 2007), lack of time to provide individualised care was seen as the major barrier in helping people with dementia achieve an optimal lifestyle. Having an extra member of staff to provide a focus on activity appeared a reasonable active control intervention.

In the control intervention schemes, a full-time senior staff member, a Project Support Worker Coach (PSWC), was employed for a period of 18 months, commencing a month prior to baseline measures. The PSWC was a new staff role whose remit was to try to increase the activities generally within the scheme. Their job description was that of a regular support worker with an additional responsibility around improving activities. Unlike the EOP intervention, there was no emphasis on individualised case work, change management leadership or specific training in person-centred care. They were, however, free to undertake whatever training and development opportunities became available to them as part of their role.

Given that we already had evidence of the beneficial effects of the EOP intervention, it was decided that the control intervention schemes would change over to the EOP intervention after 12 months. Thus, during the final six months of the study reported here, the control intervention sites received the additional staff training and the PSWC received supervision of the EOP coach and began functioning as a Locksmith. Ensuring that diffusion was limited between EOP and PSWC schemes was primarily managed through them having very limited contact with each other or with the EOP coach.

Objectives

The specific objectives pertained to the individual resident level. The main objective was to evaluate whether the EOP enabled individuals with dementia to remain in extra care housing scheme over time and whether they were able to enjoy a better quality of life, than they would do in a similar scheme that had employed a PSWC. It was hypothesised that the EOP intervention would have the following impact on residents included in the programme:

1. improve reported quality of life;
2. for those reporting symptoms of depression, these should lessen;
3. improve perceived levels of social integration and social support;
4. reduce admissions to higher dependency care, e.g. care homes;
5. reduce hospital admissions;
6. improve observed well-being in social situations; and
7. improve the engagement of residents in activities.

Outcome measures

The intervention was delivered at the housing scheme level but the primary outcome measures pertained to the individual resident level. These were a dementia-specific quality of life measure – the QOLAD (Logsdon, Gibbons, McCurry, & Teri, 2000) and the Geriatric Depression Scale (GDS; Sheikh & Yesavage, 1986). Secondary standardised outcome measures included: perceived levels of social support and quality of relationships assessed by self-report from the Duke Social Support Index; (DSSI) (Koenig et al., 1993); impact on diversity of occupation and observed well-being in public areas using Dementia Care Mapping; DCM (Bradford Dementia Group, 2005).

In addition, the following data were collected at each stage in each facility. Level and enjoyment of activity: number of activities that the participant has taken part in the past four weeks both within the scheme and outside of it. These figures were obtained both from participants themselves and from members of staff. Participants were also asked to rate their enjoyment of the various activities on a five point scale ranging from ‘enjoyed very much’ to ‘did not enjoy at all’. In order to determine some economic data about the impact, the following were also collected: Number and type of relocation to alternative care environment (e.g., care home); mortality rate; number of hospital in-patient days; and use of community health resources.

A repeated measures design was used with the 20–30 most vulnerable residents in each facility having measures taken at four points in time: baseline, six months, 12 months, and 18 months.

Sample size

The sample size was initially estimated using DCM as the primary outcome measure. A review of the research literature on DCM (Brooker, 2005) reviewed 29 studies on DCM including 10 intervention research studies where DCM had been used as a main outcome measure. Observed well-being is measured on a −5 to +5 scale which is used to calculate a WIB score. The standard deviation for DCM WIB scores for day-care
and assisted living populations was 0.40. Intervention studies showed that a significant difference, measured by DCM, ranged from changes of 0.4 to 1.1. For the purposes of the sample size estimation, the difference was estimated as 0.8. For a two-group comparison at the 12-month time point, using a two-sided alpha of 0.05 and assuming an intra-cluster correlation coefficient of 0.1; for 80% power, a sample size of 114 was required for each group (Donner & Klar, 2000). The target for recruitment was approximately 130 in each group to account for potential drop out.

DCM had been chosen because it is an observational tool. It was thought that this would provide a good indicator of quality of life for a larger number of participants than the QOLAD that relied on interview data. As the study progressed, however, it became apparent that DCM scores would not be available on a large number of participants because of the lack of time spent in public areas. DCM observations were only undertaken in public areas of the housing scheme. On the other hand, as the study progressed, it became apparent that the vast majority of participants were able to complete the self-rated QOLAD as part of a structured interview with research staff. Due to the focus of the analysis being on quality of life, the QOLAD scores became the primary endpoint for the study.

Randomisation
Out of a total of 17 possible study sites, 10 extra care housing schemes were identified by the provider organisation as being eligible to take part in the research. The eligible schemes varied in size. It was anticipated that size of scheme could have an effect on the intervention. For this reason, the schemes were randomised but stratified in terms of size of scheme. Large schemes are defined as having greater than 250 residents, medium schemes as having between 60 and 249 and small schemes as having less than 60.

Schemes were allocated a number between 1 and 10 and a letter to indicate size indicator, e.g. ‘A’ large ($n = 2$), ‘B’ medium ($n = 4$) and ‘C’ small ($n = 4$). Ten numbered pieces of paper with the relevant letter indicating size were given to the allocator. Random allocation to the intervention or control condition was undertaken by a member of university staff who had no knowledge of the identity of the housing schemes. They were picked out of a bag and the first out was allocated the number 1 and the next number 2, alternating until each pile had five schemes (1 large, 2 medium and 2 small). Prior to the randomisation, it was decided that those allocated as 2 would be the control intervention and those allocated as 1 would be the intervention schemes.

Thus, five housing schemes were randomly assigned to receive the EOP intervention with a further five schemes randomly assigned to receive the active control intervention.

Recruitment
Potential participants were identified by staff in the month prior to them being approached for consent. All residents living in the selected sites who were assessed as having dementia or another significant problem as outlined in the inclusion criteria were invited to take part.

Given the nature of residents’ problems, consent was undertaken bearing in mind that we expected a number of participants would not be able to provide informed consent. The consent procedure was carried out in each scheme during one week prior to baseline measures commencing. The consent procedure was a process rather than a one-off event, with individuals being given information about the study on a repeated basis, and a sequence of opportunities being provided to withdraw if this was their wish.

The week following baseline measures the EOP or the active control commenced in each scheme. All participating residents were interviewed on a further three occasions at six-month intervals and other recordings were taken at this time. Each data collection took approximately two weeks per scheme. Verbal assent from residents was sought on each occasion.

External Steering Group
In accordance with Medical Research Council guidelines (Medical Research Council, 1998), an external Steering Group was established to provide overall supervision for the evaluation. The group composed of an independent chair and four independent experts in the field of evaluative research/practice development in mental health of older people and health economics for older people in extra care housing. Residents’ representatives from two of the housing schemes and one lay representative were also included. These group members were not directly involved with the research. Interim reports were produced at baseline, six months, and 12 months which were scrutinised by the external Steering Group to look for any adverse effects which would suggest halting the programme.

Blinding
Given the nature of this complex psychosocial intervention, it was not possible from a practical point of view for the researchers collecting the outcome measures to be blind to the type of intervention. We seriously considered how to do this but concluded that as soon as the researcher entered a scheme and began talking to residents and staff, it would be obvious to them whether it was an intervention or a control scheme. The use of the term Locksmith made this
particularly obvious because most of the data were collected through interviewing residents.

The participants themselves knew that they were taking part in a research programme to improve the quality of life in their housing scheme. They would have been largely unaware as to whether they were part of the intervention or the attention control condition. By comparing the intervention with an active control intervention, we hoped to control for the impact of taking part in a research study. The way in which measures were collected in the intervention and the control schemes were identical.

**Statistical methods**

All outcome measures were analysed using a linear mixed model in Stata Release 9.2. This type of model takes appropriate account of the two levels of clustering of the data: outcome measures on the same individuals on repeated occasions, and clustering of individuals within the housing schemes. The main effects of group and time were incorporated as factors in the models and a group–time interaction was also included. Time was, on occasion, incorporated as a covariate rather than a factor when there appeared to be a linear trend with time. The group–time interaction terms identify any differential effect, over time, on the outcome measures between control and intervention groups. An identity covariance structure was used for each model. For all compound scales, where responses for individual elements were missing, the mean score over the completed elements was imputed.

**Results**

**Participant flow**

All 10 schemes that were eligible for inclusion completed the intervention at each stage and contributed towards the final analysis. Senior staff members in each study site assessed the whole resident group on a number of dimensions identified by the EOHIC. A total of 1101 residents were reviewed over the 10 schemes. The average EOHIC score was similar between schemes and across conditions.

Table 1 shows the cluster and participant flow, the numbers of potential participants approached and the numbers giving consent, the numbers participating in the EOP and the active control and who completed research data-sets at each stage.

**Baseline characteristics**

Table 2 shows study site and demographic and clinical characteristics of participants at baseline. The participant groups at baseline were broadly similar on gender and age and living situation.

A number of measures were undertaken to assess baseline characteristics. The participating residents were assessed using key worker reports of Bristol Activities of Daily Living (BADLS) (Bucks, Ashworth, Wilcock, & Siegfried, 1996) and their physical functioning (Barthel Index) (Mahoney & Barthel, 1965). These were broadly similar across settings and participants although the whole range of dependency for Activities of Daily Living and physical functioning were recorded. Cognitive functioning was assessed directly using the Mini Mental State Examination (MMSE; M.F. Folstein, S.E. Folstein, & McHugh, 1975). Around a quarter of participants declined to complete the MMSE. Of those that did there were around 80% scoring in the impaired range in both EOP and control schemes. There were slightly more in the EOP schemes who scored in the severe impairment range (14%) compared to the same range in the control schemes (10%).

**Numbers analysed**

The numbers analysed at each time point and in each group are given in Table 1.

**Primary outcome measures**

The primary outcome measures of self-rated and staff-rated quality of life and self-reported depression are presented in Table 3.

There was a significant group–time interaction for participants’ self-perceived quality of life ($p < 0.001$). The baseline mean score for the control group (29.0)
did not differ significantly from the baseline mean score of the intervention group (27.6, \( p = 0.41 \) for the difference). For the control group, the mean score was slightly higher at all three subsequent time points, but only the 18-month mean score was significantly higher than baseline (1.3 units (4%), \( p = 0.033 \)). In the intervention group, there was a step increase in the baseline score at six months that was maintained fairly consistently at 12 and 18 months. Over the three periods, the increase averaged 4.0 units (14%, \( p < 0.001 \)).

For the QOLAD staff-rated which was performed alongside the self-rated QOLAD, there was again a significant group-time interaction (\( p = 0.004 \)). The mean score at baseline was 29.3 in the control group with a slightly, but significantly (\( p = 0.014 \)), lower value of 21.5 in the intervention group. In the control group, from an initial, non-significant (\( p = 0.28 \)), slight increase of 0.5 units at six months from the baseline score, there was subsequently a small but statistically significant (\( p = 0.01 \)) downward trend. At 18 months, the mean score was 1.0 unit (3%) lower in the control group than at baseline. This was not significant (\( p = 0.067 \)). In the intervention group, the mean staff-rated QOLAD had increased by 2.5 units (9%, \( p = 0.001 \)) at six months, fell back slightly to 4% above...

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### Table 2. Baseline information for housing schemes and individuals.

<table>
<thead>
<tr>
<th>Housing scheme characteristics</th>
<th>EOP</th>
<th>Active control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large schemes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>● 270 residents</td>
<td></td>
<td>● 320 residents</td>
</tr>
<tr>
<td>● Opened 2002</td>
<td></td>
<td>● Opened 2002</td>
</tr>
<tr>
<td>Medium schemes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>● 175 residents</td>
<td></td>
<td>● 60 residents</td>
</tr>
<tr>
<td>● Opened 2005</td>
<td></td>
<td>● Opened 1995</td>
</tr>
<tr>
<td>● 65 residents</td>
<td></td>
<td>● 65 residents</td>
</tr>
<tr>
<td>● Opened 1998</td>
<td></td>
<td>● Opened 1997</td>
</tr>
<tr>
<td>Small schemes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>● 50 residents</td>
<td></td>
<td>● 50 residents</td>
</tr>
<tr>
<td>● Opened 1991</td>
<td></td>
<td>● Opened 1995</td>
</tr>
<tr>
<td>● 45 residents</td>
<td></td>
<td>● 40 residents</td>
</tr>
<tr>
<td>● Opened 2000</td>
<td></td>
<td>● Opened 1999</td>
</tr>
</tbody>
</table>

### Participant characteristics

- **Number of participants**: 144 (EOP) vs. 149 (Active control)
- **Age in years (mean (SD))**: 81 (8.2) vs. 82 (7.9)
- **Women (N (%))**: 111 (77%) vs. 110 (74%)
- **Time in months since moving in (mean (SD))**: 36 (7.4) vs. 43 (9.1)
- **Sharing flat with family member (N (%))**: 21 (15%) vs. 16 (11%)
- **Cognitive impairment (scoring < 24) on MMSE (N (%))**: 80 (80%) vs. 84 (81%)
- **MMSE mean score (SD)**: 18.8 (7.2) vs. 19.5 (8.2)
- **BADLS mean score (SD)**: 6.9 (3.1) vs. 6.7 (3.0)
- **Barthel mean score (SD)**: 69 (31) vs. 72 (31)
- **EOHIC mean score (SD)**: 6.9 (3.1) vs. 6.7 (3.0)

### Notes

- MMSE data for 100 in EOP and 104 in control (70% did not want to complete): BADLS higher score indicates low ADL independence; Barthel higher score less dependent; and EOHIC higher score equals greater number of vulnerability factors.

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### Table 3. Quality of life self-rated, quality of life staff-rated and depression; baseline scores and changes from baseline at 6, 12 and 18 months.

<table>
<thead>
<tr>
<th></th>
<th>Baseline</th>
<th>6 months</th>
<th>12 months</th>
<th>18 months</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>QOLAD self-rated</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EOP mean (SE)</td>
<td>27.6 (1.7)</td>
<td>+3.7 (0.5)</td>
<td>+3.8 (0.6)</td>
<td>+4.4 (0.6)</td>
</tr>
<tr>
<td>(% change)</td>
<td>(+13%)</td>
<td>(+14%)</td>
<td>(+16%)</td>
<td></td>
</tr>
<tr>
<td>Control mean (SE)</td>
<td>29.0 (1.2)</td>
<td>+1.0 (0.5)</td>
<td>+0.3 (0.6)</td>
<td>+1.3 (0.6)</td>
</tr>
<tr>
<td>(% change)</td>
<td>(+3%)</td>
<td>(+1%)</td>
<td>(+4%)</td>
<td></td>
</tr>
<tr>
<td><strong>QOLAD staff-rated</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EOP mean (SE)</td>
<td>29.3 (0.8)</td>
<td>+2.5 (0.5)</td>
<td>+1.2 (0.5)</td>
<td>+1.4 (0.5)</td>
</tr>
<tr>
<td>(% change)</td>
<td>(+9%)</td>
<td>(+4%)</td>
<td>(+5%)</td>
<td></td>
</tr>
<tr>
<td>Control mean (SE)</td>
<td>31.3 (0.6)</td>
<td>+0.5 (0.5)</td>
<td>+0.3 (0.5)</td>
<td>-1.0 (0.5)</td>
</tr>
<tr>
<td>(% change)</td>
<td>(+2%)</td>
<td>(+1%)</td>
<td>(-3%)</td>
<td></td>
</tr>
<tr>
<td><strong>Depression GDS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EOP mean (SE)</td>
<td>6.3 (0.5)</td>
<td>-1.6 (0.3)</td>
<td>-1.6 (0.3)</td>
<td>-2.3 (0.4)</td>
</tr>
<tr>
<td>(% change)</td>
<td>(-25%)</td>
<td>(-25%)</td>
<td>(-37%)</td>
<td></td>
</tr>
<tr>
<td>Control mean (SE)</td>
<td>5.3 (0.4)</td>
<td>-0.3 (0.3)</td>
<td>-0.8 (0.4)</td>
<td>-0.5 (0.4)</td>
</tr>
<tr>
<td>(% change)</td>
<td>(-6%)</td>
<td>(-15%)</td>
<td>(-9%)</td>
<td></td>
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</table>
baseline (p = 0.02 for the difference from baseline) at 12 months and remained fairly constant at 5% (p = 0.007) above baseline at 18 months.

Self-rating of depressive symptoms using the GDS also showed a significant group–time interaction (p = 0.003). The model estimate for the mean GDS score at baseline was 5.3 for the control group and 6.3 for the intervention group; this difference was borderline significant (p = 0.06). For the control group, the GDS score at subsequent time points was consistently lower, though the only statistically significant change was a fall of 15% at 12 months (p = 0.024). The reductions from baseline of 6% (p = 0.35) and 9% (p = 0.19) at six and 18 months, respectively, were not statistically significant. For the intervention group, there was a reduction in GDS score from baseline of 25% at both six and 12 months and a 37% reduction at 18 months (all p’s < 0.001).

### Secondary outcome measures

Secondary outcome measures are summarised in Table 4.

Perceived levels of social support were measured by the first part of the Duke Social Support Inventor (DSSI). By and large participants in both the EOP group and the control group were happy with the level of social support they received and this did not change much over time. Perceptions about the quality of relationships were measured by the second part of the DSSI. At baseline the mean score in the control group was 18.6, compared to 17.0 in the intervention group. This difference, though small, was statistically significant (p = 0.002). In the control group, there was a significant linear trend for the DSSI part 2 score to fall by 0.4 units (2%) per 6-month period (p = 0.002). In the intervention group, the DSSI part 2 score was fairly stable, with a very slight, and non-significant (p = 0.33) fall of 2% at 12 months, the score being maintained close to the baseline value (+0.6%, p = 0.8) at 6 and 18 months. The group–time interaction was not significant (p = 0.11).

As an indicator of general activity, records were looked at to discover the number of activities that people took part in over the past four weeks. The number of activities that were available to participants increased significantly both at the EOP and the control intervention schemes, although the rate of increase was higher at the EOP schemes. This was particularly the case for activities that were participated in-house rather than outside the schemes.

The enjoyment of activities undertaken in the past 4 weeks was rated on a 1–5 scale. Average scores showed a general enjoyment of activities and gradual increases in this enjoyment in both EOP and control sites. For the enjoyment of activities score, the group–time interaction was not significant (p = 0.66); therefore the change over time was very similar for each group. At baseline, the mean enjoyment of activities score was very similar for the two groups (3.8 for the control group and 3.6 for the intervention group; p = 0.61). At six months, this increased by 10% above baseline (p < 0.001) and was maintained at 12.4% and 11.6% above baseline at 12 months and 18 months, respectively (p = 0.65 for differences post-baseline).

In-depth, DCM observations were undertaken by the researchers at each stage in the communal areas of the schemes. Because the observations took place in communal areas, usable DCM data were only available for a smaller subset of participants. In the EOP intervention schemes, data were available for 30 participants at baseline and 35 at the 18-month point. In the control schemes, DCM data were available for 25 and 42 participants at the respective data points. In the intervention group, DCM occupational diversity improved by 39% (p < 0.001) at six months and was maintained at 25% (p = 0.02) above

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### Table 4. Perception of social support, activities and DCM diversity of occupation observed in public areas: baseline scores and changes from baseline at 6, 12 and 18 months.

<table>
<thead>
<tr>
<th></th>
<th>Baseline</th>
<th>6 months</th>
<th>12 months</th>
<th>18 months</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Perception of social support</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DSSI; time × intervention interaction p = 0.04</td>
<td></td>
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</tr>
<tr>
<td>EOP mean (SE)</td>
<td>17.0 (0.5)</td>
<td>+0.1 (0.4)</td>
<td>–0.4 (0.4)</td>
<td>+0.1 (0.4)</td>
</tr>
<tr>
<td>(% change)</td>
<td>(+0.6%)</td>
<td>(–2%)</td>
<td>(–4%)</td>
<td>(+0.6%)</td>
</tr>
<tr>
<td>Control mean (SE)</td>
<td>18.6 (0.4)</td>
<td>–0.6 (0.4)</td>
<td>–0.7 (0.4)</td>
<td>–1.2 (0.4)</td>
</tr>
<tr>
<td>(% change)</td>
<td>(–3%)</td>
<td>(–4%)</td>
<td>(–6%)</td>
<td>(–6%)</td>
</tr>
<tr>
<td><strong>Total number of activities</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(within and outside scheme)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EOP mean (SE)</td>
<td>16.9 (4.5)</td>
<td>+14.6 (4.2)</td>
<td>+12.4 (4.6)</td>
<td>+23.7 (4.6)</td>
</tr>
<tr>
<td>(% change)</td>
<td>(+86%)</td>
<td>(+73%)</td>
<td>(+98%)</td>
<td>(+98%)</td>
</tr>
<tr>
<td>Control mean (SE)</td>
<td>12.0 (3.3)</td>
<td>+3.2 (2.5)</td>
<td>+8.7 (2.8)</td>
<td>+11.7 (2.8)</td>
</tr>
<tr>
<td>(% change)</td>
<td>(+27%)</td>
<td>(+73%)</td>
<td>(+98%)</td>
<td>(+98%)</td>
</tr>
<tr>
<td><strong>Occupational diversity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(from DCM data)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EOP mean (SE)</td>
<td>2.00 (0.28)</td>
<td>+0.78 (0.20)</td>
<td>+0.50 (0.21)</td>
<td>+0.50 (0.21)</td>
</tr>
<tr>
<td>(% change)</td>
<td>(+39%)</td>
<td>(+25%)</td>
<td>(+25%)</td>
<td>(+25%)</td>
</tr>
<tr>
<td>Control mean (SE)</td>
<td>1.82 (0.20)</td>
<td>+0.70 (0.21)</td>
<td>+0.43 (0.21)</td>
<td>+1.34 (0.23)</td>
</tr>
<tr>
<td>(% change)</td>
<td>(+38%)</td>
<td>(+24%)</td>
<td>(+74%)</td>
<td>(+74%)</td>
</tr>
</tbody>
</table>
In the control group, there was a very similar pattern to the intervention group at six and 12 months, but an increase of 74% above baseline at 18 months. This was significantly higher than in the intervention group ($p = 0.007$).

Levels of improved and observable well-being (WIB score) measured by DCM in communal areas also improved significantly both in the EOP and the control schemes. The group–time interaction was not statistically significant ($p = 0.34$); therefore, the change over time was again very similar for each group. At baseline, the mean WIB score was very similar for the two groups (1.36 for the control group and 1.32 for the intervention group; $p = 0.83$). At six months, this increased by 18% above baseline ($p = 0.012$), was only marginally and not significantly above baseline at 12 months ($<1\%, p = 0.94$), but rose again to 47% above baseline at 18 months ($p < 0.001$).

### Other changes of interest

Overall, there was a 42% decrease in hospital in-patient days in the EOP sites over the 18-month period. There was a 52% increase in hospital in-patient days over the same time period in the control schemes. Generally in the EOP sites that had a relatively high number of in-patient days at baseline, the number of days decreased over time. In contrast, the control sites that had a relatively high number of in-patient days to begin with, the number increased still further over time.

Residents supported by the EOP intervention were half as likely to have to relocate to care homes than those supported in the control schemes. Twenty-two participating residents moved out of the control schemes to nursing and care homes during the 18-month period, whereas only 11 relocated to these type of establishment in the EOP schemes. A couple of residents in each condition either moved to another housing scheme or in with family members. Those who relocated from the control sites were more likely to relocate to nursing home care.

The number of general practitioner (GP) visits to people at home increased in the EOP group and decreased in the control group residents overall. The number of visits that residents made to GPs at their surgery remained similar at baseline and 18 months. The number of physiotherapy, chiropody and local authority and NHS occupational therapy (OT) contacts all increased for the EOP sites. These contacts either stayed the same or decreased at the control sites. The contacts with community physiotherapists doubled in EOP sites and remained stable in control schemes. Contact with OTs increased fourfold in EOP but decreased by half in control schemes. Contact with chiropodists increased by 25% in EOP schemes and remained the same in control schemes.

The percentage of residents with a formal dementia diagnosis varied greatly between the schemes at baseline with 65% in one scheme to no-one diagnosed in another. The incidence of recorded diagnosis of dementia increased in all except one site in the EOP sites. The only EOP site where it did not increase was the one that had the highest formal diagnosis levels at baseline. In contrast to the control sites, the incidence of dementia diagnosis increased at three out of the five sites.

### Discussion

Taken as a whole, the EOP intervention was associated with better outcomes than an active control. The ratings of quality of life made by the participants themselves and ratings made by staff, in the EOP schemes rose significantly over the course of the intervention.

Those in the EOP schemes had a significant and sustained reduction in their self-rating of symptoms and feelings of depression over the period of the intervention. Although there was a downward trend in symptoms in the control schemes, this was not sustained to a significant level.

Participants in the EOP and the control sites rated the level of support they received as very good right from the start of the programme. This did not change much over the 18 months. Positive perceptions about supportive relationships declined slightly over time for those residing in control sites but remained stable in EOP sites.

Over time there was an increase in enjoyment of activities at both the EOP sites and the control sites. The diversity of activities observed in communal areas within the schemes increased significantly in both the EOP and control schemes and was actually at its highest in the control schemes six months after they had converted to the EOP intervention.

There were a number of advantages enjoyed by participants in both interventions. Taken together, it would appear that employing an extra member of senior staff increases activity and enjoyment. However, in order to have the added impact on quality of life, levels of depression and feelings of belonging, the extra factors involved in the EOP intervention are necessary.

Taken together, it looks as if EOP residents utilised community health resources more as a result of the programme than control residents. This could be because EOP Locksmiths had a specific role in liaising with local health care teams and were either more vigilant in referring people or the residents themselves were more empowered to make appointments. This in turn could have led to less hospital in-patient days. If this was the case, this may also have a bearing on the higher relocation rate to nursing homes in the control group. Deteriorating physical health problems such as infections or medication problems can lead to a hospital admission if they are not treated early. Admission to hospital can lead to loss of confidence and self-care skills. This in turn may then result in...
residents not being in a fit state to return to the housing schemes.

The National Audit Office (2010) carried out a secondary analysis on the EOP data. They concluded that if EOPs were rolled out to all extra-care housing schemes in England over a two-year period, the net savings to the public through reduced hospital stays and reduced use of nursing homes could be £21 million, shared between Local Authorities and the National Health Service (NHS; or a net present value of £89 million over 10 years).

One of the limitations of this research was that all the study sites belonged to one extra care housing provider. It is unclear whether the EOP intervention would have the same impact in housing schemes provided by other providers. The housing support provided by the ExtraCare Charitable Trust has a strong resident focus which champions the rights of residents. The EOP intervention was designed for schemes where people with dementia were integrated within the housing community. By and large residents with dementia had developed dementia following moving into the scheme rather than having significant problems before moving in. None of the schemes in this study catered specifically for ‘vulnerable’ groups, although selected participants in this research did show relatively high levels of mental health problems (Brooker et al., 2009). A number of extra care housing providers have designed schemes – or parts of schemes – specifically for residents with dementia. The evidence here is insufficient to say whether the EOP approach would be beneficial in specialist dementia schemes.

The EOP was designed as a complex multi-level intervention (Brooker & Woolley, 2007). Evaluating it within an RCT design was not without problems. In many respects, it would have been neater to have evaluated each element of the EOP separately to ascertain their respective contributions to the outcomes. We cannot say whether training alone for example would have led to a beneficial outcome. However, the previous development (Brooker & Woolley, 2007; Brooker et al., 2007) underlined that in real service setting providers did not see it as desirable or possible to split off the different elements.

Research with people with dementia in extra care housing is a relatively new field of endeavour (Hyde et al., 2007). Outcome measures in this context are in development. Our original choice of primary outcome was DCM but through the course of the evaluation it became apparent that the QOL-AD was more useful. This was because it allowed us to directly collect meaningful data from a greater number of residents.

Methodological as well as operational issues may have also impacted on the evaluation process. Given the ‘real-life’ nature of the issues under scrutiny, it was impossible to blind the researchers to the intervention type. However, the use of methodological triangulation aimed to minimise any researcher bias and the incidence of reactivity in participants’ responses.

In addition to the positive impacts experienced as a result of the EOP intervention, there were positive changes seen for both types of intervention. For example, the number and diversity of activities participated in and the level of enjoyment of these activities increased in both EOP and the active control sites throughout the intervention.

However, we cannot rule out that bias may have crept into some of the data collection, particularly those collected by interview or by observation. The researchers did form relationships with all the residents and staff in the study sites over time. The experience of the researchers was that staff at all schemes, regardless of which intervention (EOP or active control), had a huge desire to do well. The fact that there were significant differences in the economic outcome data, such as moves and hospitalisations, for the EOP intervention validates to a certain extent the other changes seen. These data, coming as they did from written records of events, would not have been influenced by researcher–staff bias.

Given these caveats and limitations, this study demonstrates that it is possible to provide a cost-effective intervention that promotes well-being and quality of life for people living with dementia. The EOP intervention elements should be generalisable to similar service settings where people with dementia are integrated into housing schemes that are well resourced and have a relatively stable staff and management team and who are committed to improve the quality of lives for people living with dementia.

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The authors thank all the residents, tenants and staff of the ExtraCare Charitable Trust villages and schemes who took the time to share their experiences with us.

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The ExtraCare Charitable Trust: The Trust had no role in study design, data collection, data analysis or writing of the report.

Conflict of interest statement: None of the authors have a conflict of interest with either the funding source or with reporting the results of this research. Professor Brooker had full access to the data and the final decision to submit for publication lay with her.

Ethical approval

The research project was submitted to COREC at the West Midlands Research Ethics Committee in October 2006 (Reference REC: 06/MRE07/76). At the formal meeting of the committee attended by Professor Brooker and Dr Argyle, we were informed that the project did not come under the jurisdiction of the NHS REC as participants were not NHS patients. They advised us that as the participants were taking part in the research by virtue of living in housing schemes provided by a charitable trust, that University Ethics
Committee approval would be sufficient for this project. Subsequently, the research was submitted to and approved by the University of Bradford School of Health Ethics Panel in December 2006.

At the first Steering Group meeting, it was raised that we should enquire whether we needed Local Authority Ethics Approval. We subsequently contacted known leads in St Helens, Warrington, Stoke, Wolverhampton, Staffordshire, Coventry and Worcestershire. We had responses and subsequent approval from Warrington, Wolverhampton and Coventry. This covered 6 out of the 10 schemes. Despite follow-up enquiries, we had no responses from St Helens, Staffordshire or Worcestershire.

The external Steering Group oversaw the ethical procedures and research governance of the study over its duration. This included assessing the appropriateness of continuing the trial at key stages dependent on whether any clear and sustainable benefits were indicated for one intervention group compared to the other, or whether no benefits were found for either intervention group. It was the intention that if one intervention was found to be most beneficial by the end of the trial, then this would be offered to all participants and other eligible residents in each scheme as part of their usual care following the evaluation.

References


