Costs and Cost-Effectiveness of the Meeting Centres Support Programme for People Living with Dementia and Carers in Italy, Poland and the UK: The MEETINGDEM Study

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Conflict of Interest

The authors declare that they have no conflict of interest.

Ethical approvals

UK-Health Research Authority (REC reference: 15/WA/0232), Poland- Bioethical Committee of Wroclaw Medical University (acceptance number: KB-219/2015), Italy- Ethical committee of the IRCCS Don Gnocchi Foundation Lombardy Region (acceptance number 6/18022015) and VU University medical centre ethics committee confirmation of ‘non-medical research’ (decision number: 2013/370).

Data Availability Statement/ Data Accessibility Statement

Author elects to not share data due to privacy/ethical restrictions.

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Abstract

We examined the costs and cost-effectiveness of the Meeting Centre Support Programme (MCSP) implemented and piloted in the UK, Poland and Italy, replicating the Dutch Meeting Centre model. Dutch Meeting Centres combine day services for people with dementia with carer support. Data were collected over 2015-2016 from MCSP and usual care (UC) participants (people with dementia-carer dyads) at baseline and 6 months. We examined participants' health and social care (HSC), and societal costs, including Meeting Centre (MC) attendances. Costs and outcomes in MCSP and UC groups were compared. Primary outcomes: Persons with dementia: quality-adjusted life years (EQ-5D-5L-derived); QOL-AD. DQoL was examined as a secondary outcome. Carers: Short Sense of Competence Questionnaire (SSCQ). Incremental cost-effectiveness ratios (ICER) and cost-effectiveness acceptability curves were obtained by bootstrapping outcome and cost regression estimates. Eighty-three MCSP and 69 UC dyads were analysed. The 6-month cost of providing MCSP was €4,703; participants with dementia attended MC a mean of 45 times and carers 15 times. Including intervention costs, adjusted 6-month HSC costs were €5,941higher in MCSP than in UC. From the HSC perspective: in terms of QALY, the probability of cost-effectiveness was zero over willingness-to-pay (WTP) ranging from €0 to €350,000. On QOL-AD, the probability of cost-effectiveness of MCSP was 50% at WTP of €5,000 for a one-point increase. A one-point gain in the DQoL positive affect subscale had a probability of cost-effectiveness of 99% at WTP over €8,000. On SSCQ, no significant difference was found between MCSP and UC. Evidence for cost-effectiveness of MCSP was mixed but suggests that it may be cost-effective in relation to gains in dementia-specific quality of life measures. MCs offer effective tailored post-diagnostic support services to both people with dementia and carers in a context where few evidence-based alternatives to formal home-based social services may be available.

Keywords: cost-effectiveness; dementia and cognitive disorders; post-diagnostic support; psychosocial interventions

What is known about this topic and what this paper adds

What is known about this topic:

- Day care for people with dementia may improve wellbeing and provide respite for carers; little evidence exists on cost-effectiveness of day care
- Replicating day care models may be difficult due to heterogeneity in service objectives and delivery
- Dutch Meeting Centres Support Programme (MCSP) reduces behavioural problems in people with dementia and increases feelings of carer competence.

What this paper adds:

- Most people with dementia attended MC in England, Italy and Poland at least weekly.
- The hourly cost of MC attendance was twenty percent higher than generic UK day care.
- MCSP may be cost-effective when considering dementia-specific quality of life but not health-related quality of life or feelings of carer competence.

Introduction

An estimated 7.3 million people in Europe are living with dementia (Galeotti et al., 2013). The condition imposes high costs on the funders of health and care services, people living with dementia and their families. For instance, in England the total cost of dementia is estimated at £24.2 billion (2015 prices), with unpaid care costs accounting for 42% of the total (Wittenberg et al., 2019). Family carers provide an enormous amount of care and support to people with dementia, yet support services for carers of people with dementia across Europe leave much to be desired. Over half of carers surveyed by Alzheimer Europe were unable to access services such as home or day care; a third dedicated 10 or more hours daily to providing care for someone with moderate dementia; and the majority paid for home and residential care (Alzheimer Europe, 2006, 2014). Better post-diagnostic support is therefore arguably needed for people with dementia in the early stages of the condition (Alzheimer Europe, 2014).

Day care services have traditionally contributed to the mix of publicly funded support services to people with dementia. International evidence suggests that day services may bring benefits to carers in the form of respite and to people with dementia in terms of greater wellbeing; however, such services are highly heterogeneous and have many service objectives, posing challenges for replication and generalisability (Fields, Anderson, & Dabelko-Schoeny, 2014; Manthorpe & Moriarty, 2014; Tretteteig, Vatne, & Rokstad, 2016). Evidence is lacking on cost-effectiveness of day services (Fields et al., 2014; Knapp, Iemmi, & Romeo, 2013).

The Dutch Meeting Centre Support Programme (MCSP) model features day services combined with carer support. Dutch Meeting Centres (MC) are based in community facilities promoting an informal, non-medicalised, friendly environment. This person-centred psychosocial approach, grounded in the adaptation-coping model (Dröes, 1991; Dröes, van der Roest, van Mierlo, & Meiland, 2011), features a range of creative activities, emotion-oriented care and psychomotor therapy designed by and for MC members with mild-to-moderate dementia and their close carers. Studies documenting outcomes of MCSP have found positive effects on overall measures of behaviour, inactivity, non-social behaviour, depression and self-esteem, as well as delays to institutionalisation for people with dementia, and reduced carer burden and increased feelings of carer competence (Dröes, Breebaart, Meiland, Van Tilburg, & Mellenbergh, 2004; Dröes, Meiland, Schmitz, & van Tilburg, 2004; Dröes, Meiland, Schmitz, & Van Tilburg, 2006; Dröes, Meiland, Schmitz, & Van Tilburg, 2011). The MCSP model was recently adaptively implemented in Italy, Poland and the United Kingdom in the JPND-MEETINGDEM project. We conducted an economic analysis as part of an evaluation of MCSP for people with dementia and carers in these countries (Brooker et al., 2018; Evans et al., 2020). This paper reports the costs and cost-effectiveness of MCSP for people living with dementia and their carers across Italy, Poland and England.

Methods

Design, sample and setting

A controlled pre-test – post-test study was conducted. The study set a target sample size of 150 dyads of people with dementia and their carers (75 per arm), assuming 15% attrition, giving 80% power to detect a mean difference in study outcomes between groups at the 5% significance level, equating to a moderate effect size (Cohen's d=0.5) (Brooker et al., 2018). Research teams recruited dyads from communities in Italy, Poland and England. The intervention group (MCSP) comprised people with dementia and carers attending one of nine MCs established within the MEETINGDEM project in 2015-2016 (Dröes et al., 2017). The control group comprised people on a comparable part of the dementia pathway receiving usual care (UC) in the same region as those receiving MCSP, but outside the MCSP catchment area. Both groups had access to the same range of health and social care services, which could include day care without carer support or only medical support (as in Poland and Italy).

Evaluation data were collected between May 2015 and December 2016. All participants received assessments via face-to-face interview at baseline and 6-month follow-up. Baseline assessments of MCSP participants were conducted within a month of the person with dementia joining the MC; follow-up assessments took place 6 months after the first assessment. The main target group was people with mild-to-moderate dementia, scoring 4-5 on the Global Deterioration Scale (GDS), but those with milder severity (e.g. mild cognitive impairment) and those with more severe dementia were also included within the analyses as some Meeting Centres allowed these people to participate. People with dementia (of any type) and of any age could be included in the study if they had a close carer (e.g. spouse, other relative or friend) who also agreed to participate.

All necessary ethical approvals were secured by research teams. These were: UK-Health Research Authority (REC reference: 15/WA/0232), Poland- Bioethical Committee of Wroclaw Medical University (acceptance number: KB-219/2015), Italy- Ethical committee of the IRCCS Don Gnocchi Foundation Lombardy Region (acceptance number 6/18022015) and VU University medical centre ethics committee confirmation of ‘non-medical research’ (decision number: 2013/370).

Economic evaluation

The objective of the economic evaluation was to compare outcomes and costs of MCSP and usual care dyads at 6-month follow-up in order to examine the cost-effectiveness of MCSP. The evaluation took, first, a health and social care perspective considering all costs to health and social care service providers and, second, a broader ‘societal’ perspective also including costs incurred by carers (time spent providing care, lost employment and out-of-pocket payments related to providing care).

Costs

We included costs of care and support for people with dementia and carers in MCSP and UC groups. Using the Client Service Receipt Inventory (CSRI) (Beecham &

Knapp, 2001), we collected data on (i) health and social care services used by the person with dementia; and (ii) carer time spent (on care and support activities, lost employment) and out-of-pocket expenditure on taking the person with dementia to condition-related treatment appointments. These data were used, respectively, to calculate (i) health and social care costs of the person with dementia and (ii) societal costs of the dyad. The CSRI covered service use and costs of participants with dementia, as reported by carers, in the 3 months prior to interview. We also collected data from MC managers on participants with dementia's MC attendances and mode of travel to the MC; and carer attendances and time spent attending MCSPs. These data were used to calculate intervention costs. Data on carers' own health and social care use were not collected.

All service use items, apart from intervention-specific items such as MCSP attendances, were valued by applying relevant, nationally generalisable English unit costs (principally National Health Service (NHS) reference costs (Department of Health, 2013), PSSRU Unit Costs (Curtis, 2015) and Prescription Cost Analyses (Health and Social Care Information Centre, 2015)). Applying English unit costs provided consistency in comparing costs across countries. Corresponding Italian and Polish unit costs from published sources were not available for every service use item. Instead UK costs were adjusted by purchasing power parities (PPP) (cf. Jowett et al., 2009; Patel et al., 2013). Unit costs in GBP and PPP-adjusted Euros are given in online supplementary file 1, Table S1.1. Carers' time was valued based on opportunity costs (national minimum wage for each country, in domestic currencies) (L.. Curtis, 2012; Koopmanschap, van Exel, van den Berg, & Brouwer, 2008). We used unit costs at 2015 prices where available; costs from publications in earlier years were uplifted using the Hospital & Community Health Services Index (Curtis, 2015). Country-specific costs

(UK-based unit costs, intervention costs, out-of-pocket travel and unpaid care) were adjusted using PPP weights (OECD, 2017). This enabled aggregation of comparable costs across countries. We used the following conversion rates: 1.09 for GBP, 0.426 for Polish zloty (PLN) and 1.031 for Italian Euro. All costs presented are expressed in PPP-adjusted Euro, unless otherwise stated.

To establish unit costs of MCSP attendances, we collected centres' costs over the initial six months of operation (except for the final centre opening in July 2016, where the initial 4 months of operation costs were adjusted to approximate 6-month costs). Costs were calculated to approximate long-run marginal opportunity costs (Allen & Beecham, 1993), hence start-up elements such as initial training for staff were excluded. Centre managers provided information on MC costs (in domestic currencies) of: regular staffing (employment on-costs, administration time), volunteer inputs (valued adopting opportunity costs), building and utilities, fixtures, day-to-day running costs, and ongoing staff training (excluding training prior to opening). Costs of fixtures and fittings were estimated at half the annuitised value at a discount rate of 3.5% (HM Treasury, 2003). Building costs could not be provided by centre managers, as most centres did not pay market rent on buildings (most paying peppercorn rent, if any, to municipalities). To estimate MC building costs in Poland and Italy, the UK cost of purchasing a square metre of land was adjusted for differences in plot sizes and converted to PPP-adjusted Euros. Rebuild costs were discounted over the lifetime of an average building of 60 years (L. Curtis & Burns, 2015).

MCs collected aggregate activity data on attendances by people with dementia and carers (monthly attendance figures; operating hours; typical duration of groups for carers). Cost per attendance for individuals with dementia and carers was calculated by pro-rating total costs (estimated from aggregate attendance and duration data) according to total hours of attendance for each group. Total intervention costs for people with dementia and for carers were divided by the respective number of attendances to estimate per-attendance cost for each group. We estimated dyadic costs of attending MCSP over 6 months from baseline interview by attaching per-attendance (unit) costs of persons with dementia and carers to participants' attendance data.

Category-level costs were added to give total cost per case. Cases were included where cost data were available for both dyad members.

Outcome measures

We considered two main outcomes for participants with dementia: dementia-related quality of life as measured by the QOL-AD (Logsdon, Gibbons, McCurry, & Teri, 2002) and quality-adjusted life years (QALY). We mapped responses to EQ-5D-5L (Brooks, 1996; Herdman et al., 2011; Janssen et al., 2013) to EQ-5D-3L index scores (using the UK value set), as currently recommended by NICE (National Institute for Health and Care Excellence, 2018; van Hout et al., 2012); and then calculated QALY from EQ-5D-3L scores using the area-under-the-curve method, with linear interpolation between assessments. As a secondary outcome, we also examined dementia-related quality of life as measured by the DQoL subscales (Brod, Stewart, Sands, & Walton, 1999). The QOL-AD and DQoL measures were designed to capture quality of life in dementia in different ways. We used the Short Sense of Competence Questionnaire (SSCQ) (Vernooij-Dassen et al., 1999) as a carer outcome.

Analysis

Incremental costs and outcomes were estimated by jointly bootstrapping coefficients on the group allocation variable from separate costs and outcomes regressions (regression equations are given in the Appendix). Twelve thousand bootstrap replications were produced to estimate bias-corrected confidence intervals of the estimates. Regression covariates were allocation, country and dementia severity (re-categorised into three levels, following Aries et al. (2010): no-to-mild (GDS<=3), moderate (GDS 4-5) and severe (GDS 6-7)). Regressions of outcome measures were adjusted for baseline outcome measure (utilities in the QALY regression); cost regressions were adjusted for baseline costs. Regression estimates were used to calculate incremental cost-effectiveness ratios (ICER), the difference in adjusted mean costs between intervention and control groups over the follow-up period, divided by difference in adjusted mean effects. The ICER represents the additional cost of MCSP over usual care of achieving the additional benefit of MCSP. MCSP can be considered cost-effective compared to usual care if it is more effective and less costly than usual care. MCSP also can be considered cost-effective compared to usual care if it is both more effective and more costly *and* the societal payer (e.g. public sector purchaser) is willing to pay the additional cost in order to achieve the gain in outcome produced by MCSP. In other words, the ICER must be below the societal payer's 'willingness-to-pay' (WTP) threshold.

We calculated net monetary benefit (the societal WTP for a gain in outcome, minus the cost of achieving it (Drummond, Sculpher, Claxton, Stoddart, & Torrance, 2015) from regression estimates. For a given WTP, net monetary benefit must be greater than zero so that the costs of achieving the benefit do not outweigh the monetary benefit. The probability that the ICER was less than the given WTP (so that net monetary benefit exceeded zero) was plotted against a range of WTP values to produce cost-effectiveness acceptability curves (CEAC) (Glick, 2007). CEACs illustrate the impact of sampling uncertainty around the point estimate of the ICER and demonstrate the degree of decision uncertainty associated with the analysis (Drummond et al., 2015).

We use a 5% significance level throughout. If either dyad member withdrew from the study, the case was excluded from analysis. All analyses were carried out using complete cases.

Sensitivity analysis

We examined three scenarios to test the impact of our unit cost assumptions: a ‘maximum-capacity’ scenario (exploring the unit costs of MCSP if as many people with dementia and carers as possible attended each centre/group session offered), an across-the-board 10% reduction in centre costs (if centres could find modest savings in labour and premises expenditure) and a 75% reduction in Polish health and social care unit costs (exploring our assumption that valuing Polish health and care services in UK unit costs converted to PPP-adjusted Euro accurately reflected those service costs in the Polish economy). We also examined the impact of valuing unpaid care at replacement cost (using hourly cost of a homecare worker) (Faria, Weatherly, & van den Berg, 2012). Methods and results of these analyses are detailed in online supplementary file S2; these (see results section) were in line with the main analyses results.

Missing data

In calculating per-participant costs, if the service costs contributing to a cost category were missing, the category total was calculated as missing; if only some costs were missing from the category, these were treated as zeros and the case assigned the sum of available costs within that category (numbers of cases contributing resource use and costs data are given within the results). Pro-rating of missing items within each outcome measure was carried out according to the missing data rules for that instrument.

Results

A total of 229 dyads were approached to join the study (Brooker et al., 2018). Overall, 87 MCSP and 71 UC dyads provided sufficient CSRI data to allow costs to be calculated at baseline; and at 6-month follow-up, 83 MCSP dyads and 69 UC dyads. Data on outcome measures were available at both assessment points for 83 MCSP and 71 UC dyads. Costs and outcomes data from 83 MCSP dyads (Italy N=37; Poland N=19; UK N=27) and 69 UC dyads (Italy N=20; Poland N=18; UK N=31) that completed the study were available for cost-effectiveness analyses. Participants in each dyad did not necessarily complete every measure. The number of participants completing any one measure ranged from 77 to 82 in the MCSP group and 62 to 69 in the UC group.

Baseline characteristics

Groups were comparable in terms of age, sex, educational qualifications and marital status of people with dementia and carers, whether either of the dyad lived alone, and dementia severity (mild, moderate, severe) (Table 1). One case was missing GDS data. We compared the demographic characteristics of dyads that completed the study and those that did not within their allocation group. In the UC group, one statistically significant difference in baseline characteristics was found: people with dementia in completing dyads were almost 4 years younger than those in non-completing dyads (81.9 (SE 1.8) years in 17 non-completers vs. 78.1 (SE 0.6) years in 66 completers; a difference of -3.8 (95% CI -7.6, -0.1), p=0.045).

Intervention-related attendances and costs

Meeting Centres: total attendances, total costs and unit costs of attendance

Most people with dementia in the intervention group used Meeting Centres at least once a week over the 6 months following baseline interview; 42% visited the centres twice a week. Polish centres averaged 40% more attendances by people with dementia than UK and 30% more than Italian centres, but also had the lowest number of carer attendances (supplementary file 3, Table S3.1). UK centres reported more carer attendances than centres in Poland or Italy. Attendances by individuals with dementia lasted approximately 7 hours per day, and carer sessions (see below) lasted 1-to-2 hours.

Total MC costs were highest in the UK and lowest in Poland (supplementary file 3, Table S3.1). Much of this difference is attributable to higher English staff costs (valued at minimum wage). Total costs were split according to distributions of hours spent by centres providing the intervention to carers and people with dementia. Carers' time included time spent at any organised carer event: discussion groups and informative sessions, sessions where carers were active participants in the day club alongside people with dementia and monthly centre meetings. Costs per session for people with dementia and carers were considerably lower in Poland than in the UK or Italy, given that centres in Poland incurred the lowest total costs and the highest number of attendances by people with dementia. The cost per session for a person with dementia across Polish centres (€57.78) was 60% of the cost in the other two countries (€101.70 in England; €94.59 in Italy). Session costs in the UK and Italy were more comparable: for people with dementia and carers, sessions cost €7.1 and €8.7 more in UK than in Italian MCs respectively.

Meeting Centre Support Programme attendances by research participants

On average, over the first 6 months from baseline interview, people with dementia attended MCSP 45 times (median 44.7; inter-quartile range 27) and carers attended groups 15 times (median 7; inter-quartile range 14) (Table 2). The average per-dyad cost (online supplementary file 3, table S3.2) of providing MCSP across three countries over 6 months was €4,703 (95% CI € 4,113 to €5,294). Including out-of-pocket costs of travel (fares and mileage) to centres, the cost was €4,794 (95% CI €4,198 to €5,391).

Health, social care and broader societal costs

Across MCSP and UC groups, numbers of people with dementia using health services were low (online supplementary file 3, Table S3.3) apart from outpatient and GP appointments. Most participants reported taking mental health medication for dementia, antipsychotics, antidepressants or anxiolytics (79% of MCSP and 82% of UC at baseline; 77% of MCSP and 78% of UC at 6-months). While people with dementia had relatively few contacts with most services over the 3 months prior to each assessment, they received an average of 19 home care visits in the MCSP and 8 home care visits in the UC group at baseline; and they received 22 visits in the MCSP and 7 visits in the UC group at follow-up. Almost all received assistance from close carers and other relatives and friends, amounting to hundreds of hours of unpaid care. Unadjusted health and social care costs of people with dementia (online supplementary file 3, Table S3.2) likewise show that community-based social care (e.g. social worker and home care visits) constituted the largest category of health and social care expenditure in both groups at both assessment points. In the UC group, societal costs at both assessment points were more than twice health and social care costs. Regression estimates of follow-up period costs (Table 3) suggest that total health and social care costs did not differ between groups. From a societal perspective, the MCSP group had higher 6-month costs (difference of €3,810, 95% CI €381 to €7,128). Taking MCSP attendance costs into account, the MCSP group's health and social care costs were €5,941 (95% CI €3,753 to €8,264) higher than for the UC group; from a societal perspective costs were €8,514 (95% CI €5,078 to €11,842) greater in the MCSP than the UC group.

Missingness was concentrated in what are generally rarely used items with small contributions to total costs (respite care, GP home visits) (Tables S3.2 and S3.3).

Outcomes

Unadjusted mean EQ-5D, QOL-AD and SSCQ scores did not differ between groups at either baseline or follow-up (supplementary file 3 Table S3.4). At follow-up, MCSP mean scores were higher (i.e. quality of life was better) relative to UC on three DQoL subscales (self-esteem, positive affect, feelings of belonging). Results of outcomes regressions are given in Table 4. Adjusted between-group difference in QALY gain was small and not significant (0.01, 95% CI -0.01 to 0.02). Mean QOL-AD scores were 1.38 points higher in the MCSP than the UC group (95% CI -0.02 to 2.71). Carers' sense of competence scores did not differ between groups. On the DQoL, there were between-group differences in self-esteem, positive affect, and feelings of belonging, favouring MCSP.

Cost-effectiveness analyses

People with dementia

Very small differences in QALY and large differences in costs meant that the cost per QALY, whether confined to health and social care or including societal costs, was extremely high (Table 5). Probability of cost-effectiveness was zero at the equivalent of the lower NICE threshold for adoption into the NHS (£20,000 or €21,800 per QALY) (National Institute for Health and Care Excellence, 2013) and at willingness-to-pay values of up to €350,000 (CEAC figure excluded for this reason). The cost of achieving a one-point difference in QOL-AD completed by people with dementia was €4,600; probability of cost-effectiveness (Figure 1) exceeded 50% at WTP of €5,000 from a health and social care perspective and 95% at WTP of €26,000. Considering societal costs, probability of cost-effectiveness was 50% at WTP of €7,000 per six months and 95% at €35,000. For the DQoL positive affect subscale (supplementary file 4 Table S4.1), ICERs were €2,800 (health and social care perspective) and €4,100 (societal perspective). A one-point gain in this subscale had a probability of cost-effectiveness (from health and social care perspective) of 99% at WTP over €8,000 (online supplementary file 4 Figure S4.3). Results using feelings of belonging and self-esteem subscale measures featured slightly higher ICERs, of €5,500 each.

Carers

The SSCQ ICER was negative (because UC had a non-significantly higher mean score than MCSP). From either the health and social care or societal perspectives, probability of cost-effectiveness was low (not exceeding 10%) over a range of WTP up to €50,000 (Figure 2).

Sensitivity analyses

Results of sensitivity analyses are given in online supplementary file 2. Cost estimates in most scenarios were similar to those in the main analyses. Results of the maximum-capacity scenario demonstrated that unit cost estimates of MCSP had a substantial impact on overall costs of the intervention: mean per-participant cost of the six-month intervention was less than half the estimate used in the main analysis (€2,094 vs

€4,703). However, in all scenarios, the cost-effectiveness analysis results were reasonably consistent with those of the main analyses.

Discussion

Most people with dementia using Meeting Centres attended at least weekly. Quality of life outcomes were better in the MCSP than in the UC group on QOL-AD and three DQoL subscales (positive affect, self-esteem, feelings of belonging). Carers' sense of competence did not differ between groups.

Total mean costs from the health and social care perspective did not differ between groups if intervention costs were excluded but were higher in the MCSP group once included. Not all centres reached maximum capacity in this first implementation period, so MCSP costs per dyad might fall once the programme was fully implemented. A relatively small percentage of UC participants used conventional day care (21% at baseline; 16% at follow-up), and a lower percentage of MCSP participants did the same (14% at baseline; 11% at follow-up) (in some cases MCSP participants were already using day care and combined this with the new MCSP service, which also offered support to the carer; for ethical and pragmatic reasons they were not excluded from the intervention group). The limited use of day care in the UC group in this study is in contrast with the original Dutch studies, where all UC participants attended day care.

While cost-utility analyses demonstrated low probability of cost-effectiveness over a range of WTP values up to €350,000, there was some evidence of cost-effectiveness of MCSP compared to UC in terms of dementia-specific quality of life for people with dementia (QOL-AD exceeds 95% probability of cost-effectiveness at a WTP of €26,000, DQoL positive affect achieves 99% probability of cost-effectiveness at a WTP of €8,000). The inclusion of QOL-AD and DQoL provides a measure of the impact of MCSP on quality of life for people with dementia. These metrics cover some dimensions of health-related quality of life in dementia not covered by EQ-5D (e.g. loss of appetite, restlessness), as well as dimensions of the broader concept of quality of life such as self-esteem and family support (Hounsome, Orrell, & Edwards, 2011).

Carers' sense of competence did not significantly differ between MCSP and UC groups, while costs were higher. Perhaps the SSCQ was not sufficiently sensitive to the benefits produced by the intervention; carer satisfaction was high (Szcześniak et al., 2019). It may be that only certain aspects of carers' sense of competence improved in response to the practical, emotional and social support (or respite time for the carer) provided by MCs.

The UK had the lowest number of MCSP attendances by people with dementia but the highest number of carer attendances. Such variations in attendance patterns warrant further investigation to understand how local practices influence carer involvement in MCs and carer burden and to tailor the intervention accordingly. One explanation could be cultural and social differences between countries: for instance, in Poland, many carers were working during the day and also some preferred not to engage in the centre activities. There was also between-country variation in total costs. Costs from a societal perspective in the Polish MCSP group were not significantly higher than in the UC group, in contrast with the other two countries. This reflects differences between countries in minimum wage rates used to value unpaid carer inputs.

Strengths and limitations

The MEETINGDEM project successfully implemented Meeting Centres for people with dementia in the space of a year or less. The project team evaluated the impact of MCSP from multiple perspectives (implementation, user satisfaction, effectiveness and cost-effectiveness (Brooker et al., 2018; Evans et al., 2020; Mangiaracina et al., 2017; Szcześniak et al., 2019; Van Mierlo et al., 2018). The cost-effectiveness evaluation produced a set of unit costs for MCSP in Italy, Poland and England, and collected detailed information on MCSP attendance by participants with dementia and carers. There were some limitations in data availability collected by the CSRI, particularly in terms of respite care and care from relatives other than the dyadic carer. Data were not available for all cases on some resource use and cost measures. On the other hand, missing data were generally concentrated in relatively seldom-used items such as respite care.

Study design had limitations common to all non-randomised designs: we cannot assume that MCSP and UC groups were comparable on *unobserved* characteristics (e.g. income levels, activities of daily living, or cognition, although the latter two are arguably captured in the GDS). The two groups appeared similar in terms of observed demographic characteristics and comparable in terms of dementia severity distributions. Analyses controlled for baseline differences in outcomes and costs.

The 6-month follow-up period, while allowing comparisons to the original Dutch study (Dröes, Meiland, et al., 2004), proved relatively short in terms of detecting change in utilisation of high-cost services by people with dementia: e.g. there were relatively few hospital admissions. There were also few nursing home admissions: 10 dyads did not complete the study because the person with dementia had permanently moved to a nursing home. We can only speculate on the possible longer-term costs and outcomes. Over a longer-period, MCs could further embed into communities, and perhaps engage people with mild dementia as early as possible (rather than also accepting people with a more advanced dementia from the start as seen in this study (Brooker et al., 2018)). Combined targeting and access to formal and informal community support networks could in turn reduce centre costs and improve outcomes (e.g. carer stress).

A minimum clinically important difference has not been established for QOL-AD (Holden, Jones, Baker, Boersma, & Kluger, 2016) and decision-makers may need to consult clinicians to consider whether a one-point difference is sufficiently large to be worth €5,000 for a 6-month combined support intervention. A similar question will arise in relation to the DQoL subscales.

Implications for policy and practice

The unit cost of an hour of MCSP attendance was reasonably similar to published estimates of English local authority day care: at approximately €16 per hour, the cost of the *combined* MCSP was approximately 20% higher than that of generic UK day care (€13 per hour (L. Curtis & Burns, 2015)). While MCs in their first year of operation (and potentially not yet achieving their full capacity) might not appear to be lower-cost alternatives to local government-provided day care, we must remember that the combined MCSP offers tailored post-diagnostic support services for both people with dementia *and* their carers, while standard day care only offers activities to the former.

Already stretched by demographic and budgetary pressures, long-term care systems in some countries have been further challenged by public expenditure cuts since the 2008 financial crisis. In England, the number of people receiving publicly funded community-based social care support dropped by 30% between 2005 and 2014 (Humphries, Thorlby, Holder, Hall, & Charles, 2016). While no official figures are collected on the number of day care centres in England, there is anecdotal evidence of a sharp decline in recent years, despite rapid growth in the number of people with dementia; budgetary pressures have resulted in centres merging and introducing user charges (Needham, 2012). Local and national voluntary organisations may want to consider how to replicate the MCSP approach while maintaining a sustainable funding base. In most countries, mixed funding will be needed to support MCs. In the

Netherlands, funding is received from local government, long-term care insurance on an individual basis, and sometimes from 'friends of Meeting Centres foundations.' Most MCs participating in this study received funding from local authorities but some were part- or wholly-funded by non-governmental organisations. In some centres, a small proportion of centre income was derived from user charges.

Planners and commissioners should consider all the evidence from the MEETINGDEM study, including effects on other outcomes for people with dementia and carers, user satisfaction and other qualitative and quantitative outcomes not considered in this paper (Brooker et al., 2018; Evans et al., 2020; Szcześniak et al., 2019). The context in which MCs operate is important. Decision-makers should consider that for many people with dementia in Europe there is currently little alternative to home-based social services; indeed, often no formal care services are available.

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Tables

Table 1. Baseline characteristics of person with dementia and carer dyads in MCSP and UC for individuals with economic and outcomes data available at baseline and 6-month follow-up.

	MCSP (N=83)		**UC (N=69)**	
	N	**Mean (SD) or %**	**N**	**Mean (SD) or %**
Person with dementia				
Age	81	78.2 (7.8)	64	78.1 (7.2)
Lives alone	22	27	11	16
Female	48	58	39	57
Marital status				
Married/cohabiting/civil partners	47	57	42	64
Widowed	32	39	18	27
Separated/divorced	1	1	3	5
Single/never married	3	4	3	4
Level of education				
Level 1/no qualifications	23	28	22	33
GCSE A-level/equivalent	36	44	35	53
Graduate education	23	28	9	14
Severity of dementia				
No-to-mild (<=3 GDS)	27	33	23	34
Moderate-moderately severe (4-5 GDS)	51	61	42	62
Severe-very severe (6-7 GDS)	5	6	3	4
Carer				
Age	82	63.5 (13.3)	66	63.0 (14.1)
Lives alone	4	6	5	8
Female	62	75	47	68
Marital status				
Married/cohabiting/civil partners	69	84	52	76
Widowed	0	0	2	3
Separated/divorced	5	6	2	3
Single/never married	8	10	12	18
Level of education				
Level 1/no qualifications	9	11	13	19
GCSE A-level/equivalent	43	52	30	45
Graduate education	30	37	25	37
Relationship to person with dementia				
Spouse or Partner	43	52	38	55
Siblings, child, other relations inc.in-laws	40	48	31	45

Note: GDS=Global Deterioration Scale

Table 2. MCSP attendance data in the 6 months after baseline interview, complete dyads of research participants with economic data available at baseline and follow-up

Italy, Poland and UK	Mean	SE	Min	Max	IQR	N
Person with dementia - days attended MC	44.71	1.91	5	71	27	83
Carer - Informative meeting attendances	2.47	0.6	0	31	2	83
Carer - All other carer meeting attendances	4.57	0.82	0	31	5	83
Carer - active participation at MC attendances	2.81	0.8	0	36	0	83
Carer - Discussion group attendances	5.59	0.85	0	38	8	83
Carer attendances, all groups	15.43	2.59	0	132	14	83

Note: IQR=interquartile range

Table 3. Adjusted health and social care and unpaid carer costs with bootstrapped confidence intervals (PPP-adjusted €) over 6-month follow-up, in the sample with economic data available at baseline and 6 month follow-up in dyads completing the study (N=152)

Cost category[a]	**N**	**MCSP Mean(€)[b]**	**95% CI[b]**	**N**	**Usual Care Mean(€)[b]**	**95% CI[b]**	**Mean difference (€): MCSP-UC[b]**	**95% CI[b]**	**p-value**
Hospital	83	1,120	491 to 1,994	67	980	465 to 1,740	141	-863 to 1,239	0.79
Primary and community health	83	249	189 to 318	68	370	293 to 471	-120	-239 to -20	**0.03**
Respite in care home[c]	59	0	0	38	0	0	0	0	-
Community-based social care	83	4,119	2 611 to 6,508	68	2 397	1,155 to 4,142	1,722	-75 to 4,133	0.10
Community mental health	83	156	70 to 311	68	76	23 to 171	80	-41 to 259	0.29
Day care services	83	253	54 to 630	68	847	415 to 1,566	-594	-1,323 to -160	**0.03**
Equipment and adaptations	73	0	0	59	0	0	0	0	-
Community-based supports	83	223	115 to 357	68	269	153 to 433	-46	-218 to 97	0.56
Medications	83	158	108 to 227	68	152	102 to 219	6	-35 to 46	0.65
Health & social care	83	6,015	4,243 to 8,284	68	4,626	3,223 to 6,348	1,389	-745 to 3,694	0.22
Health & social care inc. MCSP	83	10,650	8,758 to 12,943	68	4,709	3,285 to 6,454	5,941	3,753 to 8,264	**0.00**
Unpaid care and support[d]	83	13,546	11,351 to 15,765	68	12,327	10,133 to 14,714	1,220	-1,326 to 3,712	0.34
Societal[e]	83	20,102	17,244 to 23,068	68	16,292	13,581 to 19,144	3,810	381 to 7,128	**0.03**
Societal inc. MCSP[f]	83	24,856	21,998 to 27,806	68	16,342	13,654 to 19,195	8,514	5,078 to 11,842	**0.00**

a Cost of resources over prior 3 months as reported in the CSRI multiplied by 2 to estimate 6-month costs

b Estimates of costs models adjusted for allocation group, country, baseline severity of dementia and baseline cost; bias-corrected confidence intervals from 12,000 bootstrap replications with replacement. Group means are estimated marginal means. 1 case had no data on baseline GDS (dementia severity)

c Adjusted for allocation group, country, baseline severity of dementia only as there was no use of care homes in the UC group at baseline

d Unpaid carer time, lost production, travel expenditure, privately purchased equipment; time valued at minimum wage

e Sum of health and social care costs, unpaid care and support (includes unpaid carer time, lost production, travel expenditure, privately purchased equipment; time valued at minimum wage)

f Sum of health and social care costs, unpaid care and support (includes unpaid carer time, lost production, travel expenditure, privately purchased equipment; time valued at minimum wage) and MC cost including travel expenditure

Table 4. Adjusted means for outcome measures at 6-month follow-up with bootstrapped standard errors

Outcome measure	**N**	**MCSP Mean**[a]	**95% CI**[a]	**N**	**Usual Care Mean**[a]	**95% CI**[a]	**Mean difference: MC-UC**[a]	**95% CI**[a]	**p-value**
Person with dementia									
QALY	82	0.40	0.35 to 0.39	65	0.40	0.34 to 0.38	0.01	-0.01 to 0.02	0.36
QOL-AD	80	35.58	34.48 to 36.58	66	34.20	33.05 to 35.37	1.38	-0.02 to 2.71	**0.05**
DQoL: Sense of Aesthetics	81	19.29	18.24 to 20.41	68	18.69	17.44 to 19.60	0.60	-0.88to 2.0	0.34
DQoL: Self-esteem	77	14.08	13.39 to 14.70	64	13.02	12.22 to 13.81	1.06	0.09 to 2.0	**0.03**
DQoL: Positive affect	79	22.09	21.22 to 22.90	66	19.96	19.12 to 20.81	2.13	1.04 to 3.19	**0.00**
DQoL: Negative affect	78	26.61	25.25 to 27.96	66	25.52	23.80 to 26.16	1.08	-0.48 to 2.74	0.19
DQoL: Feelings of belonging	78	11.44	10.91 to 11.93	62	10.37	9.66 to 11.07	1.07	0.24 to 1.86	**0.01**
Carer									
SSCQ	79	3.96	3.37 to 4.32	66	4.23	3.89 to 4.70	-0.27	-0.97 to 0.14	0.31

a Estimates of outcomes models adjusted for allocation group, country, and allocation-country interaction term, baseline severity of dementia and baseline outcome; bias-corrected standard errors from 12,000 bootstrap replications with replacement. Group means are estimated marginal means. One case had no data on baseline GDS (dementia severity)

Table 5. Costs and ICER (PPP-adjusted €) for MCSP over UC, from health and social care and societal perspectives using complete dyads with main outcome (QALY, QOL-AD, SSCQ) and economic data available at baseline and 6 month follow-up

Difference/ICER	QALY[a] (95% CI) N=147	QOL-AD[b] (95% CI) N=146	SSCQ[bc] (95% CI) N=145
Person with dementia			
Health and social care incl. MCSP			
Cost difference	6,094 (3,805 to 8,383)	6,479 (4,342 to 8,980)	-
ICER[d]	832,636	4,600 (2,000 to 147,600)	-
Societal[e]			
Cost difference	8,817 (5,440 to 12,194)	9,070 (5,697 to 12,614)	-
ICER[d]	1,204,751	6,500 (2,800 to 204,100)	-
Carer			
Health and social care incl. MCSP			
Cost difference	-	-	6,294 (3,894 to 88,834)
ICER[d]	-	-	-22,900 (-7,100 to 24,600)
Societal[e]			
Cost difference	-	-	8,888 (5,226 to 12,418)
ICER[d]	-	-	-32,600 (36,100 to -9,800)

a. ICER: the cost of achieving a QALY gain

b. ICER: cost of achieving a 1-point difference between groups at follow-up on the measure

c. ICERs are negative as MC had lower mean score on this outcome than UC

d. Results rounded to nearest PPP-adjusted €100

e. sum of health and social care costs, unpaid care and support (includes unpaid carer time, lost production, travel expenditure, privately purchased equipment; time valued at minimum wage) and MC cost including travel expenditure

Figures

Figure 1. Probability of cost-effectiveness: QOL-AD

Figure 2. Probability of cost-effectiveness: SSCQ