


Self-reported quality of life in people with dementia attending a day-care programme in Norway: A 24-month quasi-experimental study

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Abstract

The objectives of the study were (a) to compare self-reported Quality of Life (QoL) in a 24-month follow-up of people with dementia attending day care designed for people with dementia (day-care group, DC) with people with dementia who did not attend day care (control group, CG) and (b) to explore factors associated with QoL. A quasi-experimental design with a 24-month follow-up period was used. The DC group included 181 participants recruited from 53 day-care services. The CG included 76 participants recruited from 19 municipalities with no available day care designed for people with dementia. The sample covered the four health regions of Norway and inclusion period lasted from December 2013 to July 2015. The Quality of Life in Alzheimer's Disease (QoL-AD) scale was used as the outcome measure. The differences in QoL between groups and the associations between participant characteristics and QoL, such as depressive symptoms and functional dependency, were examined using a linear mixed model. In the multiple model, the overall trend in QoL did not differ significantly between the DC and CG. However, the DC group exhibited significantly higher self-reported QoL than the CG at all time points ($p < 0.001$ at T0, $p = 0.018$ at T12, and $p = 0.006$ at T24). Participants with shallow or no awareness who attended day care had significantly higher scores on QoL-AD than persons with full awareness ($p = 0.017$). More depressive symptoms ($p < 0.001$) and higher functional dependency ($p < 0.001$) were associated with lower self-reported QoL. The study revealed higher scores of self-reported QoL among people attending day care compared with those who did not attend, showing that day care might have positive impact on the lives of people with dementia.

KEYWORDS

day care, dementia, meaningful activities, quality of life

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1 | INTRODUCTION

People living with dementia often experience a decline in their quality of life (QoL) (Ettema et al., 2005; Logsdon et al., 1999). Programmes that are designed to enhance dementia care to improve well-being and QoL for those living with dementia and their family carers are highly recommended (World Health Organization & Alzheimer's Disease International, 2012). Day care designed for people with dementia (hereafter, day care) is presented as a suitable programme for enhancing QoL (Du Preez et al., 2018; Gustafsdottir, 2011; Rokstad et al., 2017, 2019).

The World Health Organization (WHO) defines QoL as 'an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns' (World Health Organization, 1995). QoL is often described as a multidimensional concept that includes the person's individual perception of his or her own state of the physical, mental, emotional, spiritual and social components of well-being (Ettema et al., 2005; Motley & Buch, 2016; Wilcock & Hocking, 2015). Lawton (1997) described four main factors that influence QoL for people in general and for those with dementia: (a) psychological well-being as positive or negative affect; (b) behavioural competence, such as social behaviour, physical health and cognitive and functional abilities; (c) the objective environment, such as the structure of life and routine events; and (d) QoL as perceived by the patients themselves (Lawton, 1997).

From an occupational science perspective, meaningful activities and QoL are closely related. Humans are understood as occupational beings through doing meaningful activities that influence health and well-being (Christiansen & Townsend, 2011; Wilcock & Hocking, 2015). Thus, occupational participation provides opportunities for involvement with others through activities that have meaning and significance both personally and socially (Du Preez et al., 2018). Day care can provide opportunities for occupational participation by offering people with dementia an opportunity to continue to engage in meaningful activities and, thereby, to maintain or improve their health, QoL and well-being (Han et al., 2016; Wilcock & Hocking, 2015).

Day care has been established in many countries, but research in the field is mainly made in industrial countries like Germany, Norway, Netherlands, UK and USA. Based on national initiatives that reflect the different histories, societal structures and cultures of the countries, it is easy to understand why different day-care models have evolved. The organisation, content and aim of the service vary and, thus, make it challenging to compare research in the field (Manthorpe & Moriarty, 2014). In Norway, the aim of day care for people with dementia is to offer meaningful activities and a safe environment to improve attendees' QoL (Norwegian Directorate of Health, 2017; Taranrød & Strandli, 2012). Additionally, it should be a respite service for family carers. In Norway, day care is managed and funded primarily by public authorities, and the service is offered to home-dwelling people with dementia in about 90% of the municipalities (Norwegian Directorate of Health, 2019).

What is known about this topic?

- Day care for older adults has been established in many countries. However, the organisation, content and aim of the service vary.
- At present, evidence about the effect of day care for people with dementia is sparse.
- Meaningful activities and quality of life (QoL) is closely related. In general, little attention has been given to the impact of day care on the QoL of the attendees.

What does this paper add?

- Participants attending day care report higher scores of QoL compared with participants from municipalities with no available day-care service for people with dementia.
- More depressive symptoms and higher functional dependency were associated with lower self-reported QoL.
- Among the day-care attendees, participants with limited awareness of their memory loss reported higher scores of QoL compared with those with full awareness.

The provision of day care has been one of the main priorities in both Norwegian National Dementia Plans (Ministry of Health & Care Services, 2011, 2015). By January 2020, all Norwegian municipalities will be obliged by law to offer day care to people with dementia. Day care is offered mainly during the daytime hours on weekdays. Additionally, some services are open for attendees in the evening and in weekends (Gjøra et al., 2015; Taranrød & Strandli, 2012). The content of day-care programmes is generally linked to everyday activities and to addressing safe surroundings, social interaction and physical and cognitive stimulation. Attending day care two days a week is considered a minimum and it is recommended to have small groups (6–8) with a minimum of two staff present. Day-care staff have highlighted challenges with a group-based service for people with dementia because of the variety of personalities, stages of dementia and level of functioning. Consequently, some day care alternate attendees of different ages and functional levels to different activities or days for more homogenous groups. When there is a progression in dementia or behavioural problems occur, day care is often no longer considered a suitable service (Strandenaes et al., 2019). Day care is traditionally and most commonly established in an institution like a nursing home or in centres offering services for older adults (Gjøra et al., 2015; Taranrød & Strandli, 2012). The group of day-care staff typically include healthcare professionals with training and experience in dementia care (Gjøra et al., 2015; Norwegian Directorate of Health, 2017).

At present, evidence about the effects of day care is sparse. In a review published in 2011, the Norwegian Knowledge Centre

for the Health Service concluded that day care might reduce the incidence of behaviour problems and the use of psychotropic drugs for people with dementia. However, no effect on level of functioning was revealed (Reinar et al., 2011). An updated review made in 2014 (Dahm et al., 2014) did not identify any new studies exploring the effects of day care. Both reviews concluded that few high-quality studies have been conducted. A study evaluating geriatric day-care units found that day care improved or stabilised subjective well-being and dementia symptoms compared with a control group receiving no day-care services (Zank & Schacke, 2002).

A review of qualitative studies based on the perspective of people with dementia identified four factors that affect QoL: relationships, agency in life today, a wellness perspective and a sense of place. A feeling of connectedness positively influenced QoL within each factor (O'Rourke et al., 2015). Another study revealed that people with dementia characterised QoL as a sense of freedom and independence, having their basic needs met, physical health, engagement in meaningful activities and tranquillity. Self-determination was important in all domains (Stewart-Archer et al., 2016). The study of Dröes et al. (2006) further revealed that general well-being, the ability to take part in activities, having friendships and experiencing feelings of belonging or attachment are important aspects of QoL (Dröes et al., 2006). A review by Banerjee et al. (2009) found no consistent associations between demographic variables and QoL among people with dementia, and there was no convincing evidence that poorer cognition or greater activity limitations were associated with lower QoL, based on self-report assessments. However, an association between depression and reduced QoL was described (Banerjee et al., 2009).

In general, little attention has been given to the impact of day care on the QoL of attendees (Du Preez et al., 2018; Fields et al., 2014). Qualitative studies conducted with people with dementia have reported that day care improves well-being (Rokstad et al., 2019; Strandenaes et al., 2018). Day-care staff and family caregivers have reported improved mood and well-being/QoL in attendees (Du Preez et al., 2018; Tretteteig et al., 2017); Solum Myren et al., 2013). The baseline findings in the present project, 'Effects and costs of day-care centre programmes designed for people with dementia: A 24-month controlled study (ECOD)', reveal higher self-reported QoL among day-care attendees compared with the group of participants not attending day care (Rokstad et al., 2017). To our knowledge, no study has been conducted to explore the longitudinal influence of day care on QoL. Extended knowledge about how day care influences QoL is important not only on an individual level but also for the evaluation and further development of the quality of day care for people with dementia (Bowling et al., 2015). The present study is based on analyses of the longitudinal data from the ECOD project (Rokstad et al., 2017).

To explore the influence of day care designed for people with dementia in a longitudinal perspective, the aims of the present study were (a) to compare self-reported Quality of Life (QoL) at a 24-month

follow-up of the group of participants attending day care designed for people with dementia (day-care group, DC) with participants not attending day care (comparison group, CG) and (b) to explore factors associated with QoL.

2 | Method

2.1 | Design

This is an explorative study with a quasi-experimental design comparing one group of participants attending day care designed for people with dementia (DC) and one group of participants with no access to day care, as this service was not available in their municipality (CG). Both groups were followed up 12 and 24 months after baseline assessments were made.

2.2 | Participants

The participants were included based on the following criteria: 65 years old or older with a dementia diagnosis according to the ICD-10 criteria, a Mini-Mental State Examination (MMSE) score of ≥ 15 and the capacity to give informed consent as evaluated by healthcare staff. Additionally, a family carer having face-to-face contact with the person at least once a week should be willing to participate. Both the person with dementia and the family caregiver had to give informed consent. Participants in the DC group should have attended day care for at least four weeks and for no longer than 12 months at baseline to be included. Additionally, they had to attend day care at least twice a week. These criteria were chosen to ensure a potential impact of day care on the attendees.

Participants who had applied for permanent nursing-home placement or were suffering from a serious comorbid physical disorder, with a life expectancy of less than six months, were excluded.

The content of the day-care service designed for people with dementia is not fully standardised, but the national recommendations are to offer activities stimulating the social, cognitive, and physical function of the attendees. At least one meal should be included during the stay and the staff should be trained in dementia care.

2.3 | Recruitment

Participants in the DC were recruited from 53 day-care services designed for people with dementia. The participants in the CG were recruited by local dementia teams and home-based community service in 19 municipalities without available day care designed for people with dementia as illustrated in Figure 1. The sample was recruited from all four health regions of Norway. The participants were included from December 2013 to July 2015.

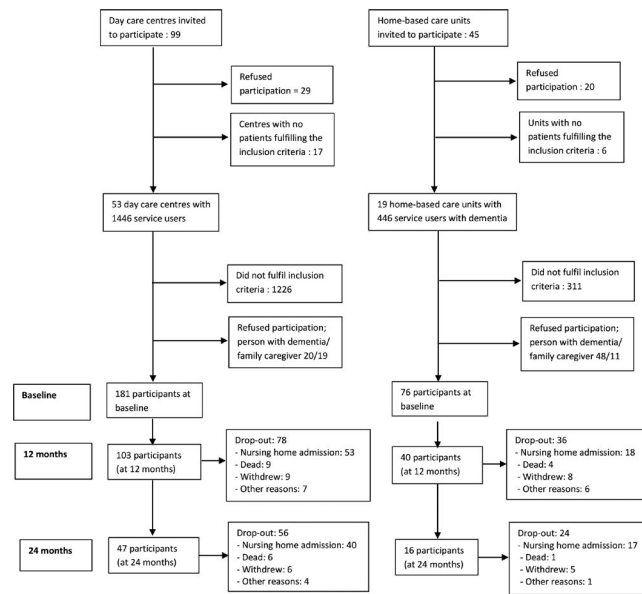


FIGURE 1 Recruitment of participants and numbers of completed follow-ups and dropouts

2.4 | Data collection

Data were collected at baseline and after 12 and 24 months. A group of 13 assessors including registered nurses, occupational therapists and a psychologist collected the data. The assessors underwent an information and training on the use of the tests and scales. Data were collected at day care and in the participants' own homes.

Demographic data including age, gender, years of education and whether the person with dementia lived alone were collected in an interview with the participant and/or caregiver.

The Quality of Life in Alzheimer's Disease (QoL-AD) scale was used to assess QoL (Logsdon et al., 1999). The QoL-AD measures the domains of physical condition, mood, memory, functional abilities, interpersonal relationships, ability to participate in meaningful activities, financial situation, self-assessment about the situation and overall QoL. The scale consists of 13 items with a sum score ranging from 13 to 52, with a higher score indicating better QoL. The QoL-AD was used as a self-reporting assessment in interviews with the participants with dementia. The scale has been evaluated and found to have good reliability and validity (Logsdon et al., 1999).

The Anosognosia Rating Scale was used to assess each participant's degree of awareness of memory loss. The scale is a four-point categorical measurement (full awareness – 1, shallow awareness – 2, no awareness – 3 and denies impairment – 4). Scoring relies on information from an interview, often combined with cognitive testing of the participant. The inter-rater reliability is reported to be high (Reed et al., 1993).

The Mini-Mental State Examination (MMSE) was used to assess global cognitive function. The scale has 20 items with a sum score ranging from 0 to 30, with lower scores indicating poorer cognitive function (Folstein et al., 1975). The MMSE is considered an

appropriate tool for assessing cognitive status in older Norwegian patients (Engedal et al., 1988).

The Physical Self-Maintenance Scale (PSMS) and the Instrumental ADL Scale (IADL) were used to assess functioning with regard to activities of daily living (Lawton & Brody, 1969). The PSMS measures basic personal activities like toileting, eating, dressing, grooming, self-transportation and bathing with a score ranging from 6 to 30. The IADL assesses instrumental activities of daily living like telephone use, shopping, food preparation, housekeeping, laundry, transportation, medication management and financial management; its score ranges from 6 to 31, with higher scores indicating reduced functioning and a greater need for assistance with activities of daily living. Both scales are considered appropriate for use in diverse settings and with a range of population groups (Lawton & Brody, 1969) and have been used in previous Norwegian studies of home-dwelling people with dementia (Bruvik et al., 2013; Wergeland et al., 2015).

The Neuropsychiatric Inventory Questionnaire (NPI-Q) was used to evaluate neuropsychiatric symptoms (Cummings et al., 1994). The questionnaire evaluates the following symptoms: delusion, hallucination, agitation/aggression, depression/dysphoria, anxiety, euphoria, apathy, disinhibition, irritability/lability, aberrant motor behaviour, sleep and appetite. The NPI-Q was used in an interview with the family carer to assess presence (yes/no) and severity (mild, moderate, severe) of neuropsychiatric symptoms. The score ranges from 0 to 36, with a higher score indicating the presence of more-severe neuropsychiatric symptoms. The NPI-Q has been found to be valid and reliable (Kaufer et al., 2000). Based on previous principal component analysis, three sub-scores of the NPI have been identified: NPI-hyperactivity including the variables agitation/aggression, irritability, euphoria, disinhibition and aberrant motor behaviour; NPI-psychosis including the variables delusions and hallucinations; and NPI-affective including the variables depression, anxiety and apathy (Aalten et al., 2007; Wergeland et al., 2015).

The Montgomery-Asberg Depression Rating Scale (MADRS) was used to assess depressive symptoms (Montgomery & Asberg, 1979). The scale comprises 10 items, and each item can be evaluated using a score from 0 to 6. The total MADRS score ranges from 0 to 60. The MADRS has been validated and found appropriate for use with people with mild and moderate degrees of dementia (Engedal et al., 2012). In the present study, it was used in interviews with the participants.

2.5 | Statistical analysis

Patient characteristics were presented as means and standard deviations (SD). The characteristics at baseline were compared for the DC and CG by linear mixed model for continuous variables and generalised linear mixed model for dichotomous variables. The models included fixed effects for groups (DC or CG) and random effects for centres.

Between-group differences in changes in QoL were assessed by linear mixed model with fixed effects for time, group and the

TABLE 1 Characteristics of participants at baseline, 12- and 24-month follow-up in day-care group (DC) and control group (CG)

	Baseline		12-month follow-up		24-month follow-up	
	DC (n = 181)	CG (n = 76)	DC (n = 103)	CG (n = 40)	DC (n = 47)	CG (n = 16)
Age, mean (SD)	81.1 (6.5)	82.4(6.0)				
Female, n (%)	110 (60.8)	58 (76.3)				
Living alone, n (%)	92 (50.8)	43 (56.6)				
Education after primary school, n (%)	87 (48.1)	25 (32.9)				
The Anosognosia Rating Scale:						
Full awareness, n (%)	62 (34.3)	22 (28.9)	32 (31.1)	10 (25)	11 (23.4)	5 (31.3)
Shallow awareness, n (%)	115 (63.5)	53 (69.7)	66 (64.1)	30 (75)	36 (76.6)	11 (68.7)
QoL-AD rated by patient, mean (SD)	38.9 (4.9)	36.2 (5.0)	38.8 (5.2)	36.7 (5.0)	39.0 (6.2)	36.3 (5.5)
MMSE score, mean (SD)	20.5 (3.5)	20.3 (3.6)	19.1 (4.7)	19.2 (3.9)	19.09(5.3)	17 (4.9)
MADRS, score, mean (SD)	4.7 (4.8)	5.9 (5.4)	4.4 (5.9)	6.7 (6.0)	4.5 (6.4)	7.8 (8.5)
PSMS score, mean (SD)	9.5 (3.2)	9.3 (5.4)	10.7 (3.7)	10.4 (4.0)	11.0 (3.3)	10.1 (3.4)
IADL score, mean (SD)	22.6 (5.1)	20.4 (5.6)	23.6 (5.6)	21.9 (4.8)	24.3 (5.8)	22.3 (5.2)
NPI-psychosis sub score, mean (SD)	0.9 (1.4)	0.6 (1.2)	0.7 (1.1)	0.6 (1.1)	0.6 (1.0)	0.9 (1.2)
NPI-affective sub score, mean (SD)	2.3 (2.1)	2.0 (1.9)	2.1 (1.8)	2.3 (2.0)	2.1 (1.7)	2.6 (2.5)
NPI-hyperactivity sub score, mean (SD)	2.0 (2.2)	1.4 (2.1)	1.9 (2.5)	2.1 (2.6)	1.8 (2.3)	1.3 (1.7)

Note: DC day-care group, CG control group, QoL-AD Quality of Life Alzheimer Disease, MMSE Mini Mental State Examination, MADRS Montgomery-Asberg Depression Rating Scale, PSMS Physical Self-Maintenance Scale, IADL Instrumental Activities of Daily Living, NPI Neuropsychiatric Inventory Questionnaire.

interaction between these two and random effects for patients. Centre-cluster level was zero and, hence, no adjustment was included in the model. Predetermined participant characteristics (age, gender, years of education and whether the person with dementia lived alone and results of the MMSE, MADRS, NPI, IADL, PSMS and Anosognosia Rating Scale) were further included in the model as fixed effects together with the interaction between each characteristic and group. Bivariate and multiple models were estimated. Akaike's Information Criterion (AIC), where the smaller value indicates a better model, was applied to reduce the multiple model for excessive interactions and covariates. Age and gender were kept in the model despite the AIC value. Only $N = 239$ cases with no missing

values on covariates were included in the regression models. No covariates had more than 2% missing values. The results with p-values below 0.05 were considered statistically significant. The analyses were performed in IBM SPSS v25.0.

2.6 | Ethical considerations

The study was approved by the Regional Committee for Ethics in Medical Research in South-East Norway (2013/1020). The participants were asked to give written consent after receiving written and oral information. Only patients with the capacity to give

TABLE 2 Results of linear mixed model for self-reported QoL-AD

	Self-reported QoL-AD, <i>n</i> = 239			
	Bivariate models		Multiple AIC-reduced model	
	Regr.coeff. (SE)	<i>p</i> -value	Regr.coeff. (SE)	<i>p</i> -value
Time trend stratified by group				
Baseline	0		0	
One year	0.69 (0.78)	0.375	1.54 (0.75)	0.041
Two years	-1.00 (1.16)	0.393	0.51 (1.12)	0.652
DC	2.79 (0.71)	<0.001	3.25 (0.66)	<0.001
T0 x DC	0		0	
T12 x DC	-0.71 (0.92)	0.439	-1.15 (0.88)	0.195
T24 x DC	1.47 (1.36)	0.281	0.20 (1.31)	0.876
Baseline characteristics				
Age	-0.03 (0.05)	0.536	-0.02 (0.04)	0.750
Gender, male	-0.64 (0.65)	0.322	-0.85 (0.50)	0.088
Education after primary school	1.32 (0.61)	0.033	0.86 (0.47)	0.070
Living alone	0.40 (0.62)	0.521		
Longitudinal characteristics				
MMSE sum	0.10 (0.07)	0.159		
MADRS sum	-0.46 (0.04)	<0.001	-0.41 (0.04)	<0.001
NPI-psychosis	-0.49 (0.20)	0.016		
NPI-affective	-0.62 (0.13)	<0.001		
NPI-agitation	-0.13 (0.12)	0.250		
IADL sum	-0.09 (0.05)	0.087		
PSMS sum	-0.43 (0.08)	<0.001	-0.35 (0.07)	<0.001
Anosognosia Rating Scale (full awareness)	0.10 (0.53)	0.845	-1.61 (0.87)	0.067
Interaction				
DC Awareness (The Anosognosia Rating Scale)			2.90 (1.01)	0.005

Note: DC day-care group, CG control group, QoL-AD Quality of Life Alzheimer Disease, MMSE Mini Mental State Examination, MADRS Montgomery-Asberg Depression Rating Scale, PSMS Physical Self-Maintenance Scale, IADL Instrumental Activities of Daily Living, NPI Neuropsychiatric Inventory Questionnaire.

informed consent, as judged by healthcare staff with competence in dementia care and a close clinical relation to the potential participant, were included. The study is registered in Clinical Trials (NCT01943071).

3 | RESULTS

At baseline, we included 181 participants from 53 day-care services in the DC and 76 participants from 19 municipalities in the CG as illustrated in Figure 1.

At 12 months, a total of 143 participants (57%) completed the follow-up assessment, 103 (57%) in the DC group and 40 (53%) in the CG. A total of 114 (44%) had dropped out, 78 in the DC and 36 in

the CG, either for reasons of NH admission (*n* = 71), death (*n* = 13), withdrawal (*n* = 17) or for other reasons (*n* = 13).

At 24 months, a total of 63 participants (25%) completed the follow-up assessment, 47 (26%) in the DC and 16 (21%) in the CG. A total of 80 (60%) had dropped out, 56 in the DC and 24 in the CG, because of NH admission (*n* = 57), death (*n* = 7), withdrawal (*n* = 11) or other reasons (*n* = 5).

The descriptive data for the 257 participants are presented in Table 1. There were significantly more women (*p* = 0.019) and participants with education after primary school (*p* = 0.046) in DC compared with CG. Participants in DC had a significantly higher mean score for NPI-psychosis (*p* = 0.013), QoL (*p* < 0.001) and IADL (*p* = 0.003) compared with participants in CG. No further significant differences between groups were found at baseline.

According to the bivariate linear mixed model, there were no overall differences in time trends between the groups in self-reported QoL-AD (non-significant interactions between group and time) as illustrated in Table 2.

However, scores on self-reported QoL-AD were significantly higher in the DC than in the CG at all three time points as illustrated in Figure 2a ($p < 0.001$ at T0, $p = 0.029$ at T12, and $p = 0.002$ at T24). Furthermore, in the bivariate models, higher functional dependency (PSMS), more-severe NPI-psychosis and NPI-affective and more-severe depressive symptoms (MADRS) assessed longitudinally, in addition to lower education at baseline, were significantly associated with lower self-reported QoL.

In the multiple model, the overall trend in QoL did not differ significantly between DC and CG (non-significant interactions between group and time), but the DC group still exhibited significantly higher self-reported QoL than the CG at all time points ($p < 0.001$ at T0, $p = 0.018$ at T12, and $p = 0.006$ at T24). More depressive symptoms (MADRS) and higher functional dependency (PADL) were associated with lower self-reported QoL. There was also a significant interaction between group and awareness (Anosognosia Rating Scale). Among persons in the DC group, those with shallow or no awareness had significantly higher self-reported QoL than persons with full awareness at all time points ($p = 0.017$), while no differences were found among people in the CG ($p = 0.067$) as illustrated in Figure 2b. The differences between those with shallow or no awareness and those with full awareness were different in the DC and the CG ($p = 0.005$ for interaction).

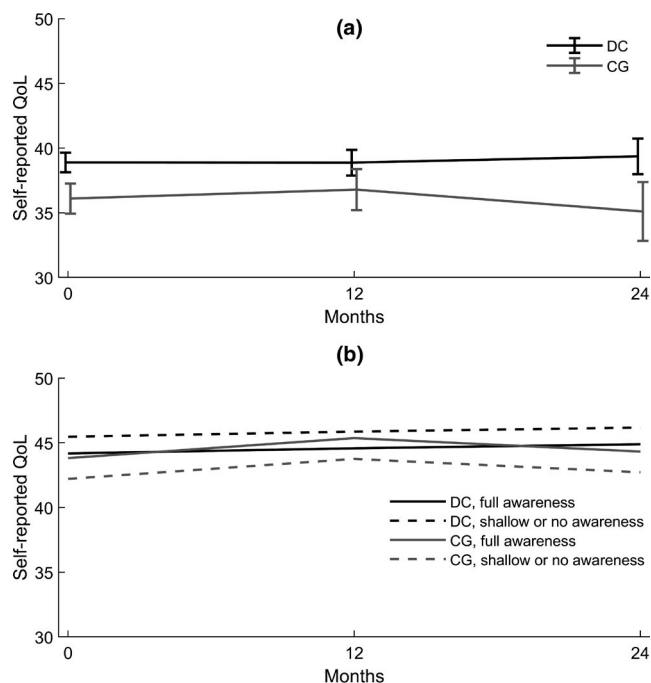


Figure 2A Unadjusted self-reported QoL in DC and CG

Figure 2B Interpreting the interaction between group and awareness in multiple models for self-reported QoL

FIGURE 2 (a) Unadjusted self-reported QoL in DC and CG. (b) Interpreting the interaction between group and awareness in multiple models for self-reported QoL

4 | DISCUSSION

The results showed that participants attending day care reported significantly higher scores for QoL than the participants in the comparison group at baseline and at 12-month and 24-month follow-ups. We assume that this difference might be related to attending day care. However, these findings should be interpreted carefully, as we are not able to determine that day care is the main or only explanation of this finding. There might be other factors contributing to the results. To our knowledge, this is the first longitudinal study comparing QoL in people with dementia who attended day care with a control group who did not attend day care for more than one year. Hence, it is difficult to compare with other studies. Zank and Schanke reported positive effects of day care on increased or stabilised well-being in a 12-month follow-up study (Zank & Schacke, 2002). In the study of Zank and Schanke, the term well-being was based on items representing life satisfaction, perceived social support, depression and self-esteem. In the present study, the QoL-AD (self-report) was used to evaluate QoL. Thus, the results of the two studies are not directly comparable, but both indicate a possible longitudinal positive effect of day care.

There can be multiple and compound reasons why day care might influence QoL positively. Previous research has often concluded that day care fosters a meaningful day and facilitates structure in the daily lives of the attendees. Attendees can meet other people, enjoy meals in a community and be physically active. Additionally, being met by staff with a person-centred approach is important to enhance the attendees' well-being (Brataas et al., 2010; Rokstad et al., 2019; Strandenaes et al., 2018). Day care provides support and continuity and might enhance the feeling of stability in the attendees' lives (Strandenaes et al., 2018). The research indicates that day care manages to address the four main factors of QoL for people with dementia: psychological well-being, behavioural competence, the structure of life and routine events, and QoL as perceived by the patients themselves (Lawton, 1997). Furthermore, the findings of the present study indicate that day care has the potential to improve QoL for people with dementia based on their possibilities to participate in activities, being with other people and having a sense of belonging (Du Preez et al., 2018; O'Rourke et al., 2015; Stewart-Archer et al., 2016; Dröes et al., 2006). This supports the close relationship between performing meaningful activities and QoL (Whiteford, 2014). People with dementia may benefit more from interventions that include meaningful activities than from interventions that merely stimulate their activity levels in general. Thus, understanding each individual's motivation for participating in a given activity is important (Han et al., 2016; Nyman & Szymczynska, 2016). Opportunities to engage in social and leisure activities provide pleasure in the moment and incite to maintain a good QoL and sense of well-being. As highlighted in the review by Nyman & Szymczynska, activities for people with dementia should be designed to meet fundamental psychological needs described in psychological theories (Nyman & Szymczynska, 2016).

Previously published baseline data from the ECOD study revealed that day-care attendees with shallow or no awareness of their memory loss reported higher scores for QoL than those with full awareness (Rokstad et al., 2017). The present study, analysing longitudinal data, confirms these findings. Day-care attendees with shallow or no awareness reported significantly higher QoL than persons with full awareness. These findings are in line with previous research investigating the association between awareness of memory loss and perceived QoL of people with dementia (Karttunen et al., 2011). Hurt et al. (2010) reported that people with a moderate degree of dementia and impaired insight into their condition displayed a tendency to perceive that their QoL was better than those with full insight (Hurt et al., 2010). In addition, Woods et al. (2014) revealed that those with full awareness of memory loss had lower scores of QoL than those with no awareness (Woods et al., 2014). However, in the CG, no association between awareness and QoL was found; this finding is somewhat difficult to interpret. A possible explanation could be that day care is tailored mostly for those people with shallow awareness of their dementia, and hence, the service contributes positively to their QoL.

Furthermore, the analysis of factors associated with QoL found that higher functional disability and more depressive symptoms were associated with lower scores for QoL. Banerjee et al. (2009) reported no convincing evidence that having a more-limited capacity for activity was associated with lower scores for QoL (Banerjee et al., 2009). However, research findings are not consistent on this topic. The present study coincides with other studies reporting that higher functional disability is associated with lower scores for QoL (Andersen et al., 2004; Bruvik et al., 2012; Martyr et al., 2018). The association between depressive symptoms and lower QoL has been reported in a large body of literature for both home-dwelling people with dementia (Banerjee et al., 2009; Bruvik et al., 2012; Martyr et al., 2018; Woods et al., 2014) and people with late-stage dementia living in nursing homes (Barca et al., 2011). However, this is complex, as depression can promote disability and disability can foster depression. Cognitive impairment may also influence disability and depression and might contribute to reduced participation and engagement in meaningful activities that furthermore influence QoL and well-being (Martyr et al., 2018; Wilkins et al., 2010). According to behavioural models, depressive symptoms may influence the absence of positive feelings gained from participation in enjoyable and meaningful activities (Orgeta et al., 2017). This underlines the importance of detecting depression and offering treatment with antidepressant or non-pharmaceutical approaches.

When facilitating day care for people with dementia, the impact of meaningful activities should be considered. Day care is expected to offer activities linked to everyday activities, to address safe surroundings and to provide social interaction and physical and cognitive stimulation. The Norwegian national guidelines on dementia strongly recommend psychosocial interventions based on the interests, preferences and functional levels of the participants (Norwegian Directorate of Health, 2017). Following these guidelines

can promote functional ability and QoL and prevent depression. Based on these assumptions, day care in Norway has a potential to promote health and QoL by offering meaningful activities that are individually tailored for the attendees (Tretteteig et al., 2017).

4.1 | Strengths and limitations

The study sample included participants from all regions in Norway, which provides good representation. The assessment tools used are found reliable and valid for use in a sample of people with dementia. The findings are based on a 24-month controlled study, making it possible to investigate the longitudinal effect of attending day care.


However, the study has several major limitations mainly arising from challenges in recruiting the targeted sample of 200 participants in each group (DG and CG). Additionally, the dropout rate during the observation period was larger than expected mainly because of nursing home admission and death. This reduces the statistical power and weakens the generalisability of the findings to the general population of people with mild-to-moderate dementia. Additionally, the sample comprises limited ethnic variation, making it inappropriate to compare groups of different ethnic backgrounds in the analyses, a fact also limiting the possibility for generalisation.

When taking the limitations of the study into consideration, we state that the results add extended knowledge to the so-far available evidence that day-care services should be offered for people with dementia to enhance their QoL.

5 | CONCLUSION

Findings from the present study and previous research reveal that day-care service designed for people with dementia has the potential to influence the attendees' QoL positively over time. However, higher functional disability and more depressive symptoms were associated with lower scores for QoL. To optimise day care and meet the needs of people in various stages of cognitive impairment and awareness of memory loss, more innovation, evaluation and research of a variety of day-care programmes are needed.

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