International Journal of Nursing Studies Advances 2 (2020) 100005

Contents lists available at ScienceDirect

International Journal of Nursing Studies Advances

journal homepage: www.elsevier.com/locate/ijnsa

Impact of plate shape on the conservation of food praxis in institutionalised elderly adults with severe Alzheimer's disease or mixed dementia: Praxalim an observational before-after non-randomized study

Valérie Delaide[a,*], Pascale Beloni[a], Anaïs Labrunie[a], Benoît Marin[b]

[a] University Hospital Limoges, 2 avenue Martin Luther King, 87000 Limoges, France
[b] Centre for Epidemiology, Biostatistics, and Research Methodology (CEBIMER) - University Hospital Limoges, Limoges, France

ARTICLE INFO

Keywords:
Alzheimer's disease
Severe dementia
Apraxia
Nourishing behaviour
Plate

ABSTRACT

Purpose: To investigate whether the shape of the food plate could affect the conservation of praxis in institutionalised elderly adults with severe Alzheimer's disease or mixed dementia.

Patients and methods: We conducted a monocentric, prospective, observational, before-after case-only study in 32 patients with a loss of the ability to self-feed. The primary objective was to assess the change of food praxis using the Blandford scale at 3 weeks after changing the food plate. Secondary variables included the impact of the change of diet on the food praxis at 6 weeks, the patient's autonomy in the food intake evaluated by Tully's Eating Behaviour Scale (EBS), and the enjoyment of eating assessed by Part D of the Alzheimer's Disease-Related Quality of Life (ADRQL) scale at 3 and 6 weeks. Results: At 3 weeks after changing the food plate we observed a significant decrease in the number of aversive feeding behaviours ($\Delta = -0.90 \pm 2.23$; $p = 0.03$) and an improved autonomy in self-feeding ($\Delta = 1.88 \pm 3.36.23$; $p = 0.001$). There was also an increase in the enjoyment of eating at 3 weeks ($\Delta = 4.07 \pm 13.02$), but it was not statistically significant. These results were not consolidated at the 6 week timepoint. Conclusion: A simple change in the organisation of care during meals and the use of a familiar object can positively affect the recovery of the self-feeding autonomy of patients with severe dementia.

1. Introduction

Dementia refers to several neurodegenerative diseases, showing as a progressive decline in cognition of sufficient severity to interfere with activities of daily living (World Health Organisation [WHO], 2016). Age being one of the risk factors, this disease induces a loss of autonomy, a change in social life and the frequent occurrence of behavioural disorders which are often responsible for the elderly entering a geriatric home (HAS, 2011; Thomas, 2005). Alzheimer's disease (AD) is the most common form of dementia and accounts for 60-70% of cases (WHO, 2016). The other forms are vascular dementia, Lewy body disease; however, some mixed forms coexist. In France, 46% of elderly adults who lived in nursing homes in 2015 suffered from dementia including AD (Makdessi and Pradines, 2016). Limousin (west-central France region), is particularly concerned by the ageing-related problems since it has a much higher proportion of senior citizens and elderly people than the rest of the country. The proportion of people aged 60 and over is 29.1%, with an expected increase of over 18% by 2040 (Observatoire Régional de la santé, 2018). The number of dependent elderly adults

* Corresponding author.
E-mail address: valerie.delaide@chu-limoges.fr (V. Delaide).

https://doi.org/10.1016/j.ijnsa.2020.100005
Received 23 September 2019; Received in revised form 21 July 2020; Accepted 27 July 2020
Available online 8 August 2020

is estimated at 23,400 (i.e., >3% of Limousin's population) (Mallemanche and Simonneau, 2014). To reduce the impact of dementia on individuals, families, societies and countries, WHO proposes a global action plan (2017–2025) (WHO, 2016), complemented with a national "neurodegenerative diseases 2014-2019" plan (Ministère des affaires sociales de la santé et des droits des femmes, 2018). In this context, the prevention and management of loss of autonomy is a priority for an ageing society (ORS, 2017).

Older people in institutional care are highly vulnerable nutritionally and at high risk of undernutrition (Starr et al., 2015).The relationship to food is often disrupted in patients with AD, as explained by its five 'A' symptoms (amnesia, agnosia, attention, aphasia, and apraxia) (Chang and Roberts, 2008). Patients can reject and even feel aversion for food, have difficulty with cutlery handling (i.e., early apraxias), and fail to recognise and differentiate food from other non-food substances or things (i.e., agnosia). The feeding behaviour and the way in which the elderly relate to food must be assessed periodically to avoid deviations. The prevalence of undernutrition is high in elderly adults with AD (Benattar and Lemoine, 2009), resulting in increased morbidity and mortality (O'Neill et al., 1990). Weight loss is a significant predictor of rapid cognitive decline (Soto et al., 2012).

Several targeted recommendations on meal environment and quality of life guide professionals and promote environmental interventions (Herke et al., 2018; Murphy et al., 2017; Volkert et al., 2015). Another studies have shown the value of influencing the attractiveness of meals by varying the food on offer: finger food, the appearance of the food on offer, thematic meals to encourage the consumption of food and the enjoyment of eating activity (Pouyet et al., 2014; Dunne et al al., 2004; Malerba et al., 2015). The convivial atmosphere, the content of the plate, the presentation of the meal, must surprise, be cheerful while remaining identifiable to reveal gustatory pleasures which are felt but not always expressed by this population (Murphy et al., 2017). Based on social learning theories, sensory information is the key to perceiving and making sense of the environment around us, and remains a determinant of many memory processes. Together with cognitive functions and affects, they contribute to the establishment and organisation of goal-directed behaviour (Kenigsberg et al., 2015). However there is no definitive evidence on the effectiveness and sustainability of such interventions to improve the nutritional health and wellbeing of this people (Liu et al., 2018). Additionally, Liu et al. (2015) highlight concerns that many training programmes and mealtime assistance interventions in original studies are implemented by trained research assistants or researchers instead of front-line nursing care staff.

The food plate typically used in some institutions (compartmented, rectangular plate) can be destabilising for mentally ill individuals since they do not recognise the shape of the food plate and, may not even relate it to food. During outings, caregivers have observed that some residents requiring total feeding assistance in institutional settings could perform some independent tasks when eating at restaurants (e.g., grab and use a glass and/or cutlery and bring food to their mouths).

We thus hypothesised that the use of a smooth round plate (to avoid hallucinations created by decals or asperities), white with a dark blue border (to delimit the food and make it stand out visually) (Dunne et al., 2004), favours the maintenance of praxis in the diet, and the ability to self-feed, in subjects with severe dementia of the Alzheimer or mixed type, through a better recognition of the food container.

2. Methodology

2.1. Study design

We conducted a prospective, observational, case-only, before-and-after study (Praxalim), to determine whether the shape of the food plate could affect praxis retention in institutionalized older adults with severe AD or mixed dementia who had lost the ability to eat on their own. We analysed the feeding behaviours of elderly adults with severe AD or mixed dementia institutionalised in the University Hospital Centre of Limoges (France). Data were collected with paper case-report forms by allocated caregivers over three days (at lunchtime only due to logistic reasons), with a three-week gap between assessments over nine weeks in total (Fig. 1).

During the first three weeks (i.e., the "before" period), at lunchtime and dinner, a cohort of four eligible patients was seated, at a specific table with allocated positions which were preserved over the entire study (Fig. 2). Meals were served in the rectangular institutional plate. It was considered that three weeks were necessary to stabilise any possible behavioural disorders induced by the change of seat at the table due to the enrolment in the study (Lyketsos et al., 2000). At lunchtime of days 19, 20, and 21, a first round of assessments was conducted. From day 22 onwards (start of the "after" period, six weeks in total), the food plate was changed from rectangular to round, both at lunchtime and dinner. We chose to use smooth plain round plates to avoid hallucinations created by decals or asperities, with a dark border (navy blue) to allow patients to spot a contrast between the plate and the table. At days 40, 41, and 42 (3 weeks after the change of plate) and 61, 62, 63 (6 weeks after), new assessments were conducted. At day 64, the four patients left the study but could continue to use round-shaped plates if their self-feeding autonomy was better.

To assure that the observations were related to the change of plate and not to the food itself, one identical sequence of three different meals over the three evaluation days, respecting each patient's preferences and diet, was proposed on each assessment.

2.2. Participants and recruitment

The sample size was based on an α risk of 5%, a β risk of 20%, an average number of Blandford's aversive feeding behaviours of 16, a minimal clinically important difference (MCID) of 2, and a standard deviation (SD) of the difference of 3.33. Thus, the number of patients required for this study was calculated to be 24. Due to a proportion of non-evaluable subjects estimated at 25%, it was decided to include 32 patients in total (calculated using Nquery Advisor® V7.0) (O'Brien and Muller, 1993). These hypotheses were based on a pilot study conducted in our department (13 patients, average of negative responses to aversive behaviours of 15.8 ± 3.33).

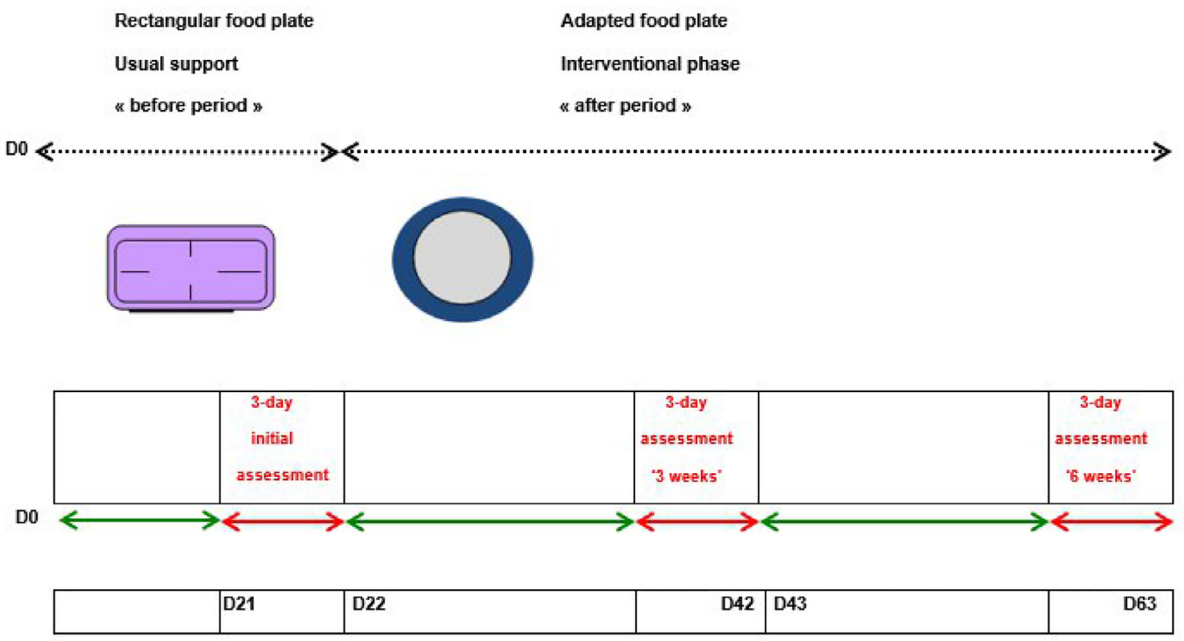

Fig. 1. Praxalim study design.

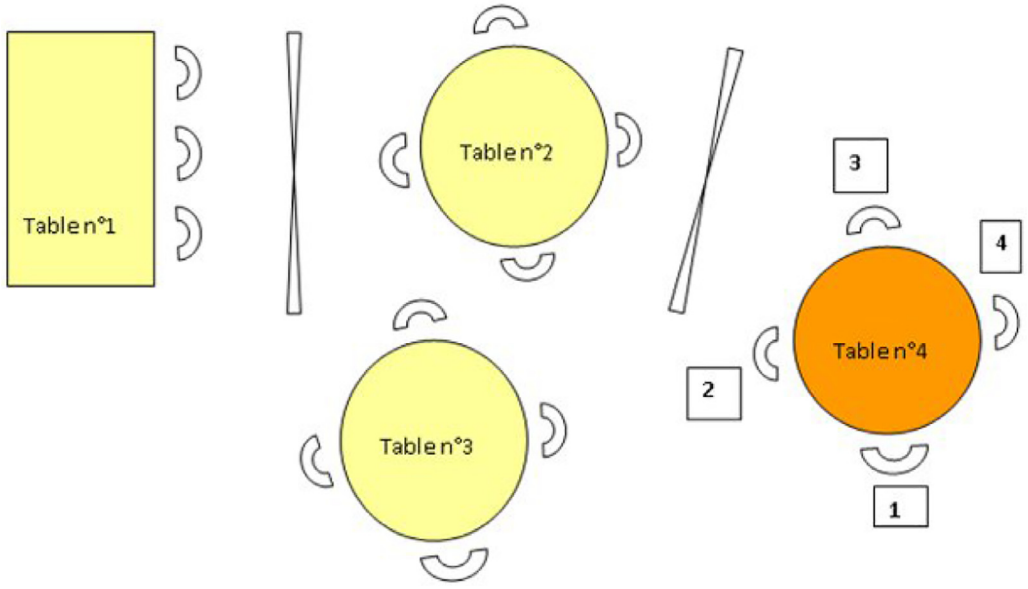

Fig. 2. Table setting during Praxalim study.

Patients aged >75 years, with confirmed AD or mixed dementia (most common), a mini-mental state examination (MMSE) score of <9 (Folstein et al., 1975), and a loss of self-feeding autonomy (averaged by a mean score of <16 using Tully's Eating Behaviour Scale [EBS], over 3 days) were eligible. Additionally, they had to have been residents for at least 30 days to eliminate any confusional state related to changes in their living environment (Cohen-Mansfield, 1996). Patients with a diagnosis of frontotemporal orLewy body disease were excluded because they have a marked impairment of alertness and attention (Taylor et al., 2019; Von Gunten et al., 2019). Patients with blindness, Parkinson's disease, malnutrition, or stroke sequelae were not eligible because they often require assistance during meals.

Patients' legal representatives provided written informed consent prior to study participation. The study was approved by the relevant institutional review boards and complied with the Good Clinical Practice guidelines and the Declaration of Helsinki.

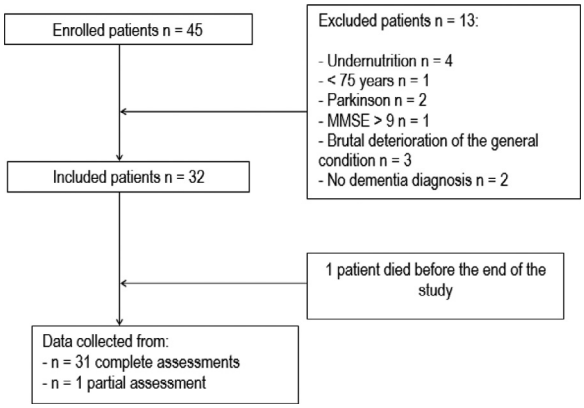

Fig. 3. Praxalim's patient recruitment plan.
Abbreviations: MMSE, mini-mental state examination.

2.3. Endpoints and assessments

Observation is an appropriate method for the assessment of older adults with dementia and eating disorders (Aselage, 2010; Waltz et al., 2010). The primary objective was to assess the change in food praxis using the Blandford scale at 3 weeks after changing the food plate (Blandford et al., 1998). Although it lacks a rating, this scale makes it possible to identify 25 different aversive behaviours and four developmental stages: aversion to self-feeding, buccal dysphagia, selective behaviour, and oropharyngeal dysphagia.

Secondary variables included the impact of the change of plate on the feeding behaviours at 6 weeks, the patient's autonomy in taking in food evaluated by Tully's EBS at 3 and 6 weeks (Tully et al., 1997). The EBS score ranges from 0, complete dependence, to 18, complete independence. The pleasure of eating is assessed by Part D of the Alzheimer's Disease-Related Quality of Life (ADRQL) scale at 3 and 6 weeks (González-Salvador et al., 2000). The caregiver, using a dichotomous "agree/disagree" response choice, describes the person with dementia after observation, and notes reactions to the environment (Aselage, 2010).

The three scales chosen have proven their validity in elderly adults with AD or mixed dementia, regardless of stage (Blandford et al., 1998; González-Salvador et al., 2000; Tully et al., 1997), based on direct observation methods useful in an institutional setting. We conducted a feasibility study to verify their consistency prior to the start of the study. This unpublished pilot study selected two simple scales (Blandford, BSE), focused on the study of eating behaviours (physical and social) typically used by caregivers and with psychometric qualities for statistical analysis. Due to fluctuations in the behaviour of dementia patients from one day to the next, we decided to make readings over three consecutive days and to only retain the most favourable value per patient for each assessment.

2.4. Statistical analysis

Statistical analyses were performed by the Centre for Epidemiology, Biostatistics, and Research Methodology (CEBIMER) at University Hospital Limoges using SAS® V9.2 (SAS Institute Cary, NC). A p value of 0.05 was considered statistically significant.

Quantitative variables were described using mean, SD, and range values, and qualitative ones using population and percentages. The main analysis consisted in a paired comparison of the average number of Blandford's aversive feeding behaviours between days 21 (initial state) and 42 (at 3 weeks). The comparison was made by Wilcoxon's matched series test. For secondary endpoints, comparison of quantitative variables between baseline and 3 or 6 weeks were performed by Wilcoxon's matched series tests. Covariance analyses allowed the comparison of the potential evolution of the MMSE scores between the compared timepoints.

3. Results

From July 2011 to January 2015, 32 patients (23 women and 9 men) with a mean age of 87 ± 6.2 years (range: 75-101) were included in the study in subsequent cohorts of four (Fig. 3). At day 0, patients presented severe dementia (MMSE = 3.50 ± 3.49; range: 0.00-9.00), which was stable throughout the study (Fig. 4). Hence, adjustment for changes in MMSE scores did not modify any of the endpoints. The results are summarised in Table 1 and the evolution of the scores in Table 2. Of note, one patient did not complete the study and therefore was not included in the 6-week evaluation.

3.1. Aversive feeding behaviours

Blandford's scale mean scores were 3.22 ± 2.90 (range: 0.00–11.00) at baseline, 2.31 ± 2.36 (range: 0.00–10.00) at 3 weeks, and 2.65 ± 2.64 (range: 0.00–10.00) at 6 weeks after changing the food plate (Fig. 5). Although a decrease in the number of aversive

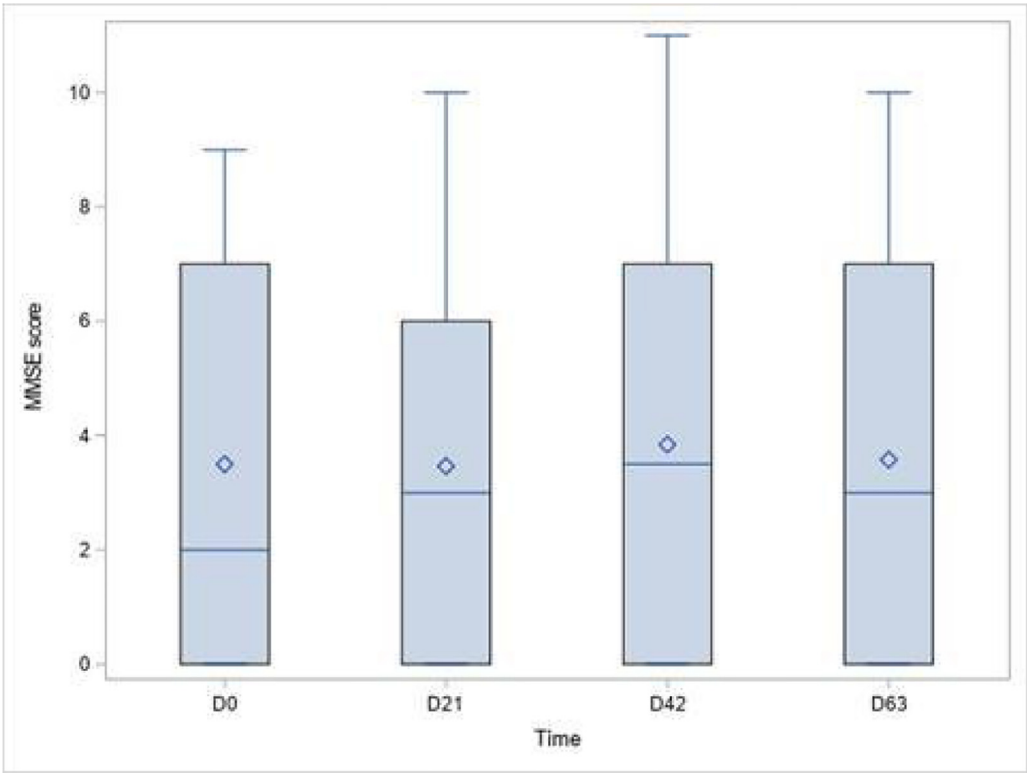

Fig. 4. Evolution of MMSE scores.

Table 1
Praxalim results.

Assessment	Timepoint	*N*	Mean	STD	min	max
MMSE	day 0	32	3.50	3.49	0.00	9.00
	Baseline[a]	30	3.47	3.40	0.00	10.00
	3 weeks[b]	32	3.84	3.77	0.00	11.00
	6 weeks[c]	31	3.58	3.65	0.00	10.00
EBS	day 0	32	12.16	3.94	3.00	18.00
	baseline	32	12.13	3.83	3.00	18.00
	3weeks	32	14.00	4.24	3.00	18.00
	6 weeks	31	12.29	4.81	3.00	18.00
Blandford	baseline	32	3.22	2.90	0.00	11.00
	3weeks	32	2.31	2.36	0.00	10.00
	6 weeks	31	2.65	2.64	0.00	10.00
ADRQL[d]	baseline	32	37.16	14.87	0.00	56.61
	3weeks	32	41.22	13.75	12.43	56.61
	6 weeks	31	39.22	17.43	0.00	56.61

N = 31 as one patient did not complete the study and therefore it was not considered for the 6-week assessment.

Abbreviations: ADRQL, Alzheimer's disease Related Quality of Life scale; EBS, Eating Behaviour Scale; MMSE, mini-mental state examination; *N*, no. patients; STD, standard deviation.

NOTE:

*[a] baseline, days 19-21;
†[b] days 40-42;
‡[c] days 61-63;
§[d] Only part D considered.

Table 2
Score evolution for the different scales.

Score evolution	Improved	Same	Worse	Missing†
Assessment	***N* (%) @ 3 weeks after the change of plate**			
Blandford	15 (47)	7 (22)	10 (31)	0 (0)
EBS	20 (64)	6 (18)	6 (18)	0 (0)
ADRQL*	18 (56)	8 (25)	6 (19)	0 (0)
	***N* (%) @ 6 weeks after the change of plate**			
Blandford	16 (50)	3 (9)	12 (38)	1 (3)
EBS	12 (38)	6 (18)	13 (41)	1 (3)
ADRQL	16 (50)	4 (12)	11 (35)	1 (3)

NOTE: *Only part D considered; † one patient did not complete the study.
Abbreviations: ADRQL, Alzheimer's disease Related Quality of Life scale; EBS, Eating Behaviour Scale; N, no. patients.

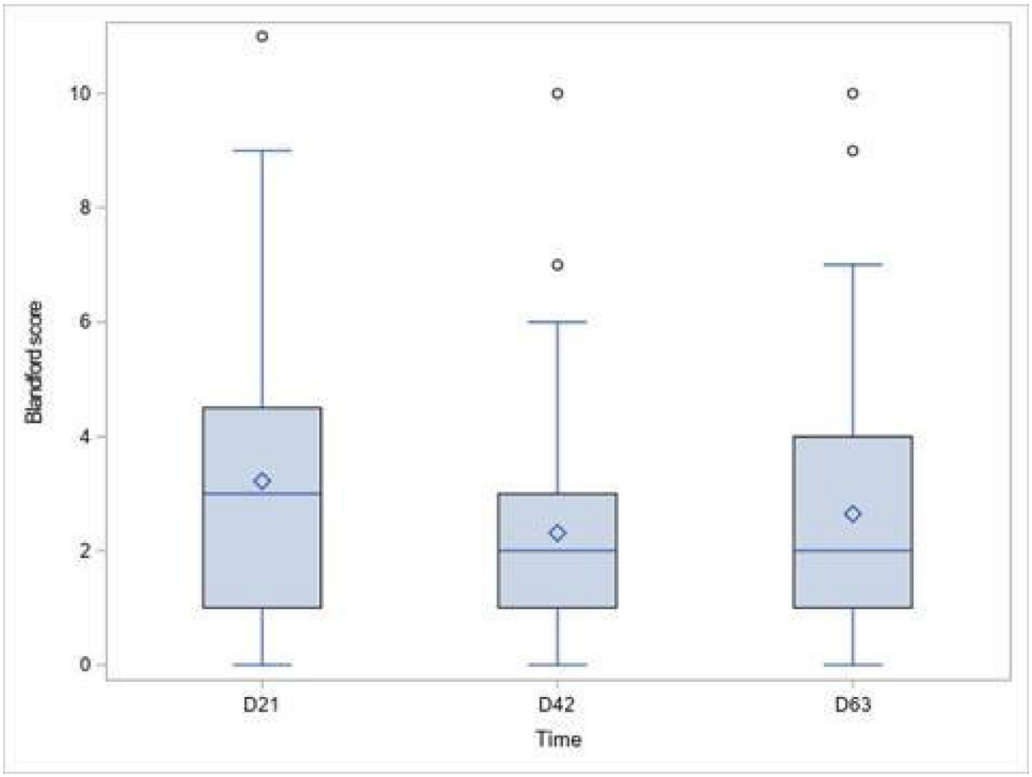

Fig. 5. Evolution of Blandford's scores

feeding behaviours was observed at both timepoints, the difference was only significant at 3 weeks ($\Delta = -0.90 \pm 2.23$; $p = 0.03$ *vs* $\Delta = -0.65 \pm 3.57$, $p = 0.15$ at 6 weeks).

3.2. Ability to eat alone

At baseline, patients could not eat alone (EBS = 12.13 ± 3.83; range: 3.00–18.00). Patient's autonomy in self-feeding improved at both 3 (EBS = 14.00 ± 4.24; range: 3.00–18.00) and 6 weeks (EBS = 12.29 ± 4.81; range: 3.00–18.00) after changing the food plate. However, the difference was only significant at 3 weeks ($\Delta = 1.88 \pm 3.36$; $p = 0.001$ *vs* $\Delta = 0.26 \pm 3.16$, $p = 0.65$ at 6 weeks).

3.3. Enjoyment of eating activity

Regarding the initial state, there was an increase in eating activity enjoyment at both 3 ($\Delta = 4.07 \pm 13.02$) and 6 weeks ($\Delta = 2.32 \pm 13.56$).However the difference was not statistically significant ($p = 0.09$ and 0.47, respectively).

4. Discussion

People with dementia often have problems eating and feeding, which puts them at risk of undernutrition. The way in which food is delivered at institutionalised mealtimes may affect the amount of food eaten by residents with dementia. Indeed, changing the style of delivery to a more 'family-style' service, where residents are presented with empty plates and serving bowls from which to take the food, may improve both resident participation in mealtimes and communication among residents and carers, thereby increasing nutritional intake at mealtimes (Altus et al., 2002; Desai et al., 2007). Furthermore, by improving the attractiveness of meals (e.g. eating with the hands) and the variation of the menus (themed meals, unusual menus), the consumption, the motivation to eat, and the pleasure from food may increase (Fauré and Camallières, 2012; Hanson et al., 2011; Malerba et al., 2015; Pouyet et al., 2014).

In our experience, residents who required total assistance to eat recovered some autonomy during outings at restaurants. Cassolato emphasizes the social, user-friendly aspect of these activities for people with dementia, which contributes to the feeling of social integration (Cassolato et al., 2010). We thus hypothesised that the compartmented, rectangular, institutionalised food plate used in some French geriatric homes does not allow residents to associate it with food, since they do not recognise the shape, and may contribute to an earlier loss in the ability to self-feed. We studied the effect of substituting the institutionalised food plate with round-shaped plates, like those used in most homes, since the use of an object is correlated with its knowledge and familiarity (Bozeat et al., 2002). In everyday life, the use of objects is related to their knowledge stored in the semantic memory. The view of the plate stimulates the visual and motor sensory channels, reactivates the traces memorised during the person's previous experiences, and promotes the evocation of the object's meaning. Indeed, we find some motor theories on cognition, where perception and action are coupled to give meaning to objects as well as to the world interacting with the individual (Kenigsberg et al., 2015). Several studies demonstrate that the nutritional intake of people with dementia improves when high-contrast red or blue coloured tableware is used instead of low-contrast white tableware (Dunne et al., 2004); or when contrasting the colour of the place setting with the colour of the table, e.g. using a blue table cloth or dark table with white plates (Brush and député de Calkins, 2002). Hence, we chose to use smooth plain round-shaped plates with a dark border.

Apraxias represent a key symptom of AD or mixed dementia but have been little studied because they are very complex to understand (Lesourd et al., 2013). Despite their impact on daily activities, misuse of objects or idiopathic apraxia remains underdiagnosed and constitutes a vast subject for investigation among the elderly population suffering from neurodegenerative disorders. Few studies exploring praxis are performed with the object in its actual condition of use. The patient is often invited to use a utensil in the context of a consultation or as a mime exercise (pantomime production). Our study was conducted in the context of the institutionalised settings found in most French geriatric homes, which limits the stress for patients who are already very sensitive to changes. The choice of our study design (i.e., before and after changing the food plate) allows to collect baseline data from the same patient and limit certain biases related to the very heterogeneous progression of dementia.

Our results show that the number of aversive feeding behaviours measured by Blandford's scale significantly decreased 3 weeks after changing the food plate ($\Delta = -0.90 \pm 2.23$; $p = 0.03$), although the difference is not considered clinically relevant (1 point). Since the study population had a mean age of 87 years and presented severe dementia (MMSE = 3.50 ± 3.49), a decrease of two aversive gestures (i.e., MICD) seems very ambitious. Indeed, several studies show that in less advanced stages of AD or mixed dementia and in younger patients (<70 years), the loss of motor skills already induces many errors in the complex manipulation of objects (Benke, 1993). Furthermore, disease progression likely alters the knowledge about the use of objects, and familiarity seems to be preserved only in the early stages of AD or mixed dementia (Kenigsberg et al., 2015). Some studies have attempted to demonstrate that it is personal familiarity with the object, rather than the context, that enables the individual to use it properly. It is possible that its repeated use would trigger automatic and stereotypical responses (Bozeat et al., 2002). In our study, we considered the round-shaped plate as the only familiar object, but one with which some patients had not had contact for several weeks or months (residents had been institutionalised for >30 days). The advanced stage of the disease and the type of object (a plate with indirect use, since it serves only as a support for food) had probably reduced the patients' ability to remember what a plate is. Intrinsic factors related to residents, such as cognitive impairment, change in taste and appetite, comorbidities, physical abilities, drug use, motivation, and mood may have also contributed to feeding difficulties (Liu et al., 2017; Slaughter and Hayduk, 2012; Zimmerman et al., 2014).

EBS scores significantly improved at 3 weeks ($\Delta = 1.88 \pm 3.36$, $p = 0.001$), which reflects that patients regained, to some extent, the ability to eat alone. The change of food plate had induced a reaction in the patient, allowing their active participation in taking meals. These results correlate with the decrease in the number of aversive feeding behaviours, as shown previously, and translates into lesser healthcare interventions.

We also observed a decrease in the number of aversive behaviours and an improvement of the EBS scores at 6 weeks, but the differences were not statistically significant ($p = 0.15$ and 0.65, respectively). This is not surprising as other groups have shown that the fluctuations observed in severe AD may explain the lack of consolidation of the beneficial effects in the long term. Indeed, several studies that investigated the impact of environmental interventions (e.g., music, aromatherapy, and luminosity) on the behaviour of elderly people with AD, show a moderate effect, or none, in the long term (Opie et al., 1999). Our results suggest that familiarity with the object is not the only explanation for the decline of Blandford's scores, since there was no consolidation of the results in the long term. It seems that the change of plate played the role of a stimulus, shown by a decrease in the assistance to eat (i.e., improved EBS scores). As shown by Dunne et al. (2004) and Sulmont-Rosse et al. (2018), the effect of novelty as a stimulus for the individual can increase food consumption in patients with dementia. It is likely that the change of plate represented a simple visual attraction, enabling to "wake up" the patient and stimulate the desire to eat. The effects observed in our study are in line with Cassolato's study on the impact of outings at restaurants, which act as a stimulant, a "spice of life", for these people. "The novelty of the environment would have favoured a mental break, by appealing to their senses to help them get out of their role as dementia

patients" (Cassolato et al., 2010). However, most care homes not only impose constraints but also aim to "routineise" everyday life and make certain tasks automatic to help residents maintain their remaining mental capacity. It has been recommended to develop a secure atmosphere around the resident with AD, thereby helping this person keep their bearings and reducing anxieties. According to the study by Mamhidir et al., patients with dementia have difficulty interpreting new situations and, for meals, a rather stable environment is recommended for fear of aggravating behavioural disorders (Mamhidir et al., 2007). The resident does not know how to do things or how to perform well, but the routine maintains the remaining activity (Manoukian, 2007). We wonder today if the repetition of gestures, in which we enclose residents involuntarily, is ultimately detrimental to them.

As a secondary objective, we studied the effect of the change of the plate on the enjoyment of eating by using part D of the ADRQL scale. According to O'Rourke et al, the experience of independence in daily life for people with dementia has improved their quality of life (O'Rourke et al., 2015). Assessing QOL in persons with dementia is important given the need to evaluate emerging treatment modalities from drugs to environmental design (Rabins and Black, 2007). We observed an increase in the enjoyment of eating at both 3 and 6 weeks; however, the difference was not statistically significant ($p = 0.09$ and 0.47, respectively). The scientific literature shows the existence of a link between QOL and cognitive impairment, but also between the level of dependence and the alteration of the patient's judgment and QOL perception (González-Salvador et al., 2000; Missotten et al., 2010; O'Rourke et al., 2015). Food performance, or even the ability to self-feed, does not only promote social engagement and enjoyment of meals, but it can also improve functional autonomy (Liu et al., 2017). However, in our study where MMSE scores were relatively stable, we do not find any correlation. These results should be taken with caution because our study sample is small, the ADRQL scale is used partially, and we focused only on the activity of eating.

Finally, this study, carried out in the Limousin region of France, complements numerous studies and research carried out by teams caring for the elderly.

5. Limitations

Our study has other limitations that should be mentioned. It is a single-center study and thus generalisation of the results must be taken with care. Residents with severe dementia have very heterogeneous clinical histories, with profound cognitive impairments, highly disturbed social interactions, and likely significant apathy, making some assessments difficult. We restricted ourselves to mixed dementias or AD, the population studied thus corresponding to that of most French retirement homes. Further studies should be carried out on the other dementia profiles excluded from the study. In this context the interventional study could not be carried out blindly or with a control group. Material environmental factors such as the behaviour of caregivers or the sensitivity of patients to their presence could not be analysed (Waltz et al., 2010). The investigation of apraxias through nursing does not refine the neuropsychological data of patients and does not provide accurate elements of understanding, but the results offer a real breakthrough in the nutritional approach of institutionalised elderly adults with AD. It would now be interesting to examine whether the positive effects of the interventions in this study are replicable in different contexts and whether the effects extend beyond mealtimes. To consolidate our findings, a randomized confirmatory trial would be recommended for future studies.

6. Conclusions

The results of this study are encouraging as they suggest that a simple change in the organisation of care during meals and the use of a familiar object can positively affect the preservation and/or recovery of the feeding autonomy of residents with AD or mixed dementia. Faced with the lack of therapeutic solutions, Praxalim offers a simple and non-pharmacological intervention to stimulate these patients on a daily basis by partially modifying their environment to keep them curious and awake, encourages health care teams to help these patients cope with their illness, focusing on an escape from the daily routine.

Effective interventions should (i) take into consideration the importance of the preservation of the residents' feeding autonomy, (ii) encourage the use of familiar and personal objects, and (iii) prioritise individual and personalised care.

7. Contribution

Alzheimer's disease is a progressive age-related neurodegenerative disease whose cognitive decline gradually leads to a loss of autonomy in the activities of daily living. The prevalence of undernutrition is high in the elderly subject suffering from this disease, and increases morbidity and mortality. It is in this context that the Praxalim study was conducted, based on the observation of frequent apraxia in the diet. Our questioning focused on an apractognosia related to the compartmentalized and rectangular institutional plates proposed by the institution during meals. It has been argued that the use of an object is correlated with knowledge about it, and familiarity with it is a predictor of performance in its use.

The change in plate, introduced in our study, elicited a reaction from the person, including more active participation in eating meals. But the lack of consolidation of our results at 6 weeks suggests that the change of plates would represent a simple visual attraction, having the power to "wake up" the patient, to stimulate his desire and desire to eat. It would confirm that a simple change in the organisation of care during meals and the use of a familiar object can positively affect the patient's recovery of autonomy. If by inducing small changes, the team contributes to stimulating the patient, it offers easy care perspectives, and deserves further research to flesh out this observation and validate its beneficial effects.

Declaration of Competing Interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Acknowledgements

The authors would like to thank all the participants and their families for their contributions to this study. We wish to thank the committee for Nursing and Paramedical Research Promotion at University Hospital Limoges, Seck Oumar (clinical research associate) for his support at all stages of this project, Irene Farré (IF Medical Writing) for providing medical writing support, and Haviland for its porcelain supply. Furthermore, we are grateful for the support of the nursing teams at EHPAD Chastaingt (University Hospital Limoges).

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.ijnsa.2020.100005.

References

Altus, D.E., Engelman, K.K., Mathews, R.M., 2002. Utiliser des repas de type familial pour accroître la participation et la communication des personnes atteintes de démence. J. Gerontol. Nurs. 28 (9), 47–53.

Aselage, M.B., 2010. Measuring mealtime difficulties: eating, feeding and meal behaviours in older adults with dementia. J. Clin. Nurs. 19 (5-6), 621–631. doi:10.1111/j.1365-2702.2009.03129.x.

Benattar, L., Lemoine, P., 2009. La vie Alzheimer. Armand Colin.

Benke, T., 1993. Deux formes d'apraxie dans la maladie d'Alzheimer. Cortex 29 (4), 715–725.

Blandford, G., Watkins, L.B., Mulvihil, M.N., 1998. Assessing abnormal feeding behavior in dementia: a taxonomy and initial findings. Research and practice in Alzheimer's disease 49–66.

Bozeat, S., Ralph, M.A., Patterson, K., Hodges, J.R., 2002. L'influence de la familiarité personnelle et du contexte sur l'utilisation des objets dans la démence sémantique. Neurocase 8 (1-2), 127–134. doi:10.1093/neucas/8.1.127.

Brush, JA, député de Calkins, M.R., 2002. Utiliser l'environnement pour améliorer l'accueil des personnes atteintes de démence. Alzheimer's Care Q. 3 (4), 330–338.

Cassolato, C.A., Keller, H.H., Dupuis, S.L., Schindel Martin, L., Edward, H.G., Genoe, M.R., 2010. Meaning and experience of "eating out" for families living with dementia. Leisure/Loisir 34 (2), 107–125.

Chang, C.C., Roberts, B.L., 2008. Feeding difficulty in older adults with dementia. J. Clin. Nurs. 17 (17), 2266–2274. doi:10.1111/j.1365-2702.2007.02275.x.

Cohen-Mansfield, J., 1996. Conceptualization of agitation: results based on the Cohen-Mansfield agitation inventory and the agitation behavior mapping instrument. Int. Psychogeriatr. 8 (Suppl 3), 309–315 discussion 351-304.

Desai, J., Winter, A., Young, K.W., Greenwood, C.E., 2007. Les changements dans le type de service alimentaire et d'environnement de la salle à manger profitent de préférence aux personnes âgées institutionnalisées ayant un faible indice de masse corporelle. J. Am. Diet Assoc. 107 (5), 808–814. doi:10.1016/j.jada.2007.02.018.

Dunne, T.E., Neargarder, S.A., Cipolloni, P.B., Cronin-Golomb, A., 2004. Visual contrast enhances food and liquid intake in advanced Alzheimer's disease. Clin. Nutr. 23 (4), 533–538. doi:10.1016/j.clnu.2003.09.015.

Fauré, M., Camallières, M., 2012. A propos du manger-mains dans une unité de soins de longue durée: point de vue de l'équipe soignante. Lett. Psychogériatr. 1–5.

Folstein, M.F., Folstein, S.E., McHugh, P.R., 1975. "Mini-mental state". A practical method for grading the cognitive state of patients for the clinician. J. Psychiatr. Res. 12 (3), 189–198.

González-Salvador, T., Lyketsos, C.G., Baker, A., Hovanec, L., Roques, C., Brandt, J., Steele, C., 2000. Qualité de vie des patients atteints de démence en soins de longue durée. J. Geriatr. Psychiatry 15 (2), 181–189. doi:10.1002/(SICI)1099-1166, (200002)15:2≤181::AID-GPS96>3.0.CO;2-I .

Hanson, L.C., Ersek, M., Gilliam, R., Carey, T.S., 2011. Options d'alimentation par voie orale pour les personnes atteintes de démence: une étude systématique. J. Am. Geriatr. Soc. 59 (3), 463–472. doi:10.1111/j.1532-5415.2011.03320.x.

HAS. (2011). Maladie d'Alzheimer et Maladies Apparentées: Diagnostic et Prise en Charge Retrieved from https://www.has-sante.fr/

Herke, M., Fink, A., Langer, G., Wustmann, T., Watzke, S., Hanff, A.M., Burckhardt, M., 2018. Environmental and behavioural modifications for improving food and fluid intake in people with dementia. Cochrane Database Syst. Rev. 7, CD011542. doi:10.1002/14651858.CD011542.pub2.

Kenigsberg, P.A., Aquino, J.P., Berard, A., Boucart, M., Bouccara, D., Brand, G., . . ., Robert, P., 2015. Fonctions sensorielles et maladie d'Alzheimer: une approche pluridisciplinaire. Gériatr. Psychol. Neuropsychiatr. Vieil 13 (3), 243–258. doi:10.1684/pnv.2015.0553.

Lesourd, M., Le Gall, D., Baumard, J., Croisile, B., Jarry, C., Osiurak, F., 2013. Apraxie et maladie d'Alzheimer. [Apraxia and Alzheimer's disease]. Rev. Neuropsychol. 5 (3), 213–222. doi:10.3917/rne.053.0213.

Liu, W., Shaw, C., Tripp-Reimer, T., Williams, K.N., 2018. Optimizing eating performance among cognitively impaired older adults: facilitators and barriers from nursing assistants'perspective. Alzheimer's Dementia: J. Alzheimer's Assoc. 14 (7), P1490.

Liu, W., Galik, E., Resnick, B., 2015. The self-efficacy for functional abilities scale for older adults in long-term care: two-level exploratory and confirmatory factor analysis. J. Nurs. Meas. 23 (1), 112–126. doi:10.1891/1061-3749.23.1.112.

Liu, W., Jao, Y.L., Williams, K., 2017. L'association de la performance alimentaire et de la stimulation environnementale chez les personnes âgées atteintes de démence dans les maisons de retraite: Une analyse secondaire. Int. J. Nurs. Stud. 71, 70–79. doi:10.1016/j.ijnurstu.2017.03.004.

Lyketsos, C.G., Steinberg, M., Tschanz, J.T., Norton, M.C., Steffens, D.C., Breitner, J.C., 2000. Mental and behavioral disturbances in dementia: findings from the cache county study on memory in aging. Am. J. Psychiatry 157 (5), 708–714. doi:10.1176/appi.ajp.157.5.708.

Makdessi, Y., & Pradines, N. (2016). En EHPAD, Les Résidents les Plus Dépendants Souffrent Davantage de Pathologies Aiguës.

Malerba, G.P., Alina, Jonveaux, Therese, Mouchotte, Stéphanie, Fabbro, Julien, N'Guyen, Alexandra, Schmitt, Anne, Quilliot, Didier, 2015. Nourrir un patient atteint de troubles neurocognitifs à l'hôpital et à domicile ? Le manger-mains: aspects pratiques. Nutr. Clin. Métab. 29. doi:10.1016/j.nupar.2015.06.001.

Mallemanche, C.P.P., Simonneau, G. (2014). *Personnes âgées dépendantes: plus de 2 000 emplois à créer en Limousin d'ici 2020*. Retrieved from https://www.prisme-limousin.fr/sites/default/files/focal-98.pdf.

Mamhidir, A.G., Karlsson, I., Norberg, A., Mona, K., 2007. Augmentation du poids des patients atteints de démence, et modification des habitudes et de l'environnement des repas après la promotion de l'intégrité des soins. J. Clin. Nurs. 16 (5), 987–996. doi:10.1111/j.1365-2702.2006.01780.x.

Manoukian, A., 2007. Les Soignants et les Personnes Âgées. Editions Lamarre, coll. Pratiquer, Paris.

Ministère des affaires sociales de la santé et des droits des femmes (2018). Plan Maladies Neuro Degeneratives 2014-2019. Retrieved from https://solidarites-sante.gouv.fr/IMG/pdf/Plan_maladies_neuro_degeneratives_def.pdf.

Missotten, P., Squelard, G., Ylieff, M., 2010. Évaluation de la qualité de vie dans la maladie d'Alzheimer et les troubles apparentés. Gérontol. Soc. 33/133 (2), 115–131. doi:10.3917/gs.133.0115.

Murphy, J.L., Holmes, J., Brooks, C., 2017. Nutrition and dementia care: developing an evidence-based model for nutritional care in nursing homes. BMC Geriatr. 17 (1), 55. doi:10.1186/s12877-017-0443-2.

Observatoire Régional de la santé (ORS). (2018). Nouvelle Aquitaine: État des lieux 2017 des Dispositifs. Retrieved from www.fondation-mederic-alzheimer.org/la-lettre-de-lobservatoire.
O'Brien, R.G, Muller, K.E., 1993. In: Edwards, L.K. (Ed.). M. Dekker, New York.
O'Neill, D, McKeirnan, M., Gibney, M., 1990. Dietary and anthropometric measures in mild to moderate senile dementia of the Alzheimer type (SDAT). J. Hum. Nutr. Dietetics 3, 177–181.
Opie, J., Rosewarne, R., O'Connor, D.W., 1999. L'efficacité des approches psychosociales des troubles du comportement dans la démence: une revue systématique de la littérature. Aust. N. Z. J. Psychiatr. 33 (6), 789–799. doi:10.1046/j.1440-1614.1999.00652.x.
O'Rourke, H.M., Duggleby, W., Fraser, K.D., Jerke, L., 2015. Factors that affect quality of life from the perspective of people with dementia: a metasynthesis. J. Am. Geriatr. Soc. 63 (1), 24–38.
Pouyet, V, G., A., Benattar, L, Cuvelier, G., 2014. Attractivité et consommation de finger foods chez les personnes âgées atteintes de la maladie d'Alzheimer. Qual. Préf. Aliment. 34, 62–69.
Rabins, P.V., Black, B.S., 2007. Mesurer la qualité de vie dans la démence: buts, objectifs, défis et progrès. Int. Psychogeriatr. 19 (3), 401–407. doi:10.1017/s1041610207004863.
Slaughter, S.E., Hayduk, L.A., 2012. Contributions de l'environnement, de la comorbidité et du stade de la démence à l'apparition des troubles de la marche et de l'alimentation chez les résidents des établissements de soins de longue durée. J. Am. Geriatr. Soc. 60 (9), 1624–1631. doi:10.1111/j.1532-5415.2012.04116.x.
Soto, M.E., Secher, M., Gillette-Guyonnet, S., Abellan van Kan, G., Andrieu, S., Nourhashemi, F., . . ., Vellas, B., 2012. Weight loss and rapid cognitive decline in community-dwelling patients with Alzheimer's disease. J. Alzheimers Dis. 28 (3), 647–654. doi:10.3233/jad-2011-110713.
Starr, K.N.P., McDonald, S.R., Bales, C.W., 2015. Nutritional vulnerability in older adults: a continuum of concerns. Curr. Nutr. Rep. 4 (2), 176–184. doi:10.1007/s13668-015-0118-6.
Sulmont-Rosse, C., Gaillet, M., Raclot, C., Duclos, M., Servelle, M., Chambaron, S., 2018. Impact de l'amorçage olfactif sur l'ingestion de nourriture dans une unité de la maladie d'Alzheimer. J. Alzheimers Dis. 66 (4), 1497–1506. doi:10.3233/jad-180465.
Taylor, J.-P., McKeith, I.G., Burn, D.J., Boeve, B.F., Weintraub, D., Bamford, C., O'Brien, T., J., 2019. New evidence on the management of Lewy body dementia. Lancet Neurol. 1–13.
Thomas, P., 2005. Entrée en institution des déments l'étude pixel. Gérontol. Soc. 28/112 (1), 141–156. doi:10.3917/gs.112.0141.
Tully, M.W., Matrakas, K.L., Muir, J., Musallam, K., 1997. L'échelle de comportement alimentaire. Une méthode simple d'évaluation des capacités fonctionnelles chez les patients atteints de la maladie d'Alzheimer. J. Gerontol. Nurs. 23 (7), 9–15 quiz 54-15.
Volkert, D., Chourdakis, M., Faxen-Irving, G., Fruhwald, T., Landi, F., Suominen, M.H., . . ., Schneider, S., M., 2015. ESPEN guidelines on nutrition in dementia. Clin. Nutr. 34 (6), 1052–1073. doi:10.1016/j.clnu.2015.09.004.
Von Gunten, A., Nogueira, E., Parmentier, H., & Gomes, I. (2019). Neurocognitive Disorders in Old Age: Alzheimer's Disease, Frontotemporal Dementia. Primary Care Mental Health in Older People: A Global Perspective, 251.
Waltz, C.F., Strickland, O.L., Lenz, E.R., 2010. Measurement in Nursing and Health Research. Springer Publishing Company.
WHO. (2016). Draft WHO Global Action Plan on the Public Health Response to Dementia.
Zimmerman, S., Sloane, P.D., Reed, D., 2014. Prévalence de la démence et soins dans le cadre de l'aide à la vie autonome. Santé Aff. 33 (4), 658–666. doi:10.1377/hlthaff.2013.1255.

Valérie Delaide is a health nurse and works on the Limoges hospital. She has worked for 12 years with elderly people with dementia and their families on a geriatric home. She participates in the implementation of research in care services and teaches the methodology of research in initial training. She leads professional training courses on care for the elderly with dementia, in order to improve care practices and support respectful care.

Pascale Beloni is a nurse, senior health executive, coordinator of paramedical research at the University Hospital Centre of Limoges. Holder of a PhD in health biology, her research theme focuses on the study of ageing in retirement homes. At the Limoges Faculty of Medicine, she is responsible for the research pathway for health professionals and for the activity within the Master in Public Health and co-responsible for the nursing diploma in advanced practice.

Anaïs Labrunie is a biostatician in the Centre d'Epidémiologie, de Biostatistique et de Méthodologie de la Recherche (CEBIMER) from the University Hospital Centre of Limoges since 2010. She is working on the statistical analysis for which the University Hospital Centre of Limoges is a promotor. She also accompanies authors in the redaction of their scientific article for which she has made the statistical analysis.

Benoît Marin is PU-PH in Public Health "Epidemiology, Health Economics and Prevention", habilitation to direct research and is currently assistant to the deputy director - Health Products Policy Quality Practices and Care General Direction of the Health in Paris. He previously was a methodologist for the projects of clinical and epidemiological research, (UMR Inserm 1094 Tropical Neurépidémiologie of the Faculty of Medicine of Limoges University and Center of Epidemiology of Biostatistics and Methodology. He also holds an Inter-University Diploma in Medical Pedagogy and a Ph.D. thesis in public health, environment and society.