

The effects of nutritional guideline implementation on nursing home staff performance: a controlled trial

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Rationale: Suboptimal nutritional practices in elderly care settings may be resolved by an efficient introduction of nutritional guidelines.

Aims: To compare two different implementation strategies, external facilitation (EF) and educational outreach visits (EOVs), when introducing nutritional guidelines in nursing homes (NHs), and study the impact on staff performance.

Methodological design: A quasi-experimental study with baseline and follow-up measurements.

Outcome measures: The primary outcome was staff performance as a function of mealtime ambience and food service routines.

Interventions/research methods: The EF strategy was a 1-year, multifaceted intervention that included support, guidance, practice audit and feedback in two NH units. The EOV strategy comprised one-three-hour lecture about nutritional guidelines in two other NH units. Both strategies

were targeted to selected NH teams, which consisted of a unit manager, a nurse and 5–10 care staff. Mealtime ambience was evaluated by 47 observations using a structured mealtime instrument. Food service routines were evaluated by 109 food records performed by the staff.

Results: Mealtime ambience was more strongly improved in the EF group than in the EOV group after the implementation. Factors improved were laying a table ($p = 0.03$), offering a choice of beverage ($p = 0.02$), the serving of the meal ($p = 0.02$), interactions between staff and residents ($p = 0.02$) and less noise from the kitchen ($p = 0.01$). Food service routines remained unchanged in both groups.

Conclusions: An EF strategy that included guidance, audit and feedback improved mealtime ambience when nutritional guidelines were introduced in a nursing home setting, whereas food service routines were unchanged by the EF strategy.

Keywords: implementation, nutrition, clinical guidelines, nursing home, mealtime ambience, nursing.

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Introduction

Several initiatives and efforts have been made to improve the nutritional practices in elderly care settings (1–5). Various barriers have been identified, including lack of nutritional knowledge and skills (6–9), adverse attitudes towards nutrition and ageing (10), understaffing and high staff turnover, lack of time and resources (6–8), unsupportive organisation and management (1, 7) and unclear distribution of responsibilities (1, 9).

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A number of local, national and international clinical guidelines have been developed over recent decades to address inappropriate variations in the quality of nutritional practices between care settings. The Institute of Medicine (IOM) defines clinical practice guidelines as 'systematically developed statements to assist practitioner and patient decisions about appropriate healthcare for specific clinical circumstances' (11). The existence of guidelines does not guarantee their usage (6, 8, 9, 12), and it has proven difficult to motivate healthcare staff to follow guidelines. To change staff behaviour, guidelines must be actively disseminated and implemented (13).

The inappropriate introduction of guidelines and the low efficiency in introducing new knowledge is a significant barrier towards improving practices. Traditional methods of introduction, such as educational approaches

aimed at translating knowledge into practice, have not been successful at reducing gaps between evidence and practice. Several other strategies have been proposed to bridge these gaps, including financial strategies (e.g. financial rewards or penalties), organisational strategies (e.g. change in services, ownership, professional roles), regulatory strategies (e.g. changing regulations or laws, such as through accreditation or licensure) and strategies directed at health professionals (e.g. local consensus processes, outreach visits, local opinion leaders, audit and feedback, reminders (14), facilitation (15)).

Facilitation refers to offering support to individuals or teams to change practices, attitudes, skills, habits or working routines. The support can range from being task oriented (technical, practical support) to being enabling (developmental, process-oriented support) (16). Many strategies have the potential to change practice but none have been proven superior to the others. This can partly be explained by the fact that an implementation process is context dependent, which makes it difficult to generalise a finding from one context or setting into another. There exists limited knowledge regarding effective implementation strategies (17), and few implementation studies have been conducted concerning nutritional care in the context of elderly care (18, 19).

Aim

The aim of the study was to evaluate two different implementation strategies for introducing nutritional guidelines in nursing home (NH) settings. The traditional approach of employing an educational outreach visit (EOV) was compared with a more active and flexible strategy, which we termed external facilitation (EF). We have previously reported on the resident outcomes from this method of guideline implementation (20). The primary outcomes in this report were measures of staff performance (process of care) in terms of providing mealtime ambience for the residents and in food service routines (e.g. types and amounts of snacks and beverages that were served). We hypothesised that the staff members that were exposed to the EF strategy would exhibit significantly improved performance (mealtime ambience and food service routines) in relation to the implemented guidelines compared to the staff members exposed to the EOV strategy.

Methods

Design

The study design was a quasi-experimental study that included baseline and follow-up measurements. The duration of follow-up was approximately 18 months. At the EF units, follow-up data were collected directly after

the 1-year intervention ended. At the EOV units, follow-up data were collected 1 year after the 3-hour lecture intervention, to give these units the same opportunity and time frame to implement the nutritional guidelines as the EF units.

Setting and participants

Four NH units were involved in the study, including two EF units and two EOV units. The EF units were selected based on recommendations from senior community care managers; that is, these units became a convenience sample. The two EOV units were selected and matched for type of care provider (public or private), focus of care (nursing care or dementia care) and number of residents. Each of the four NH units served between 40 and 48 residents, who were distributed across 2–3 wards. A total of three out of the 11 included wards cared for residents with dementia disorders (two at EF units and one at an EOV unit). Thus, the majority of the included NHs primarily focused on nursing care due to somatic dysfunctions. The performance of the staff, primarily of the nurses' aides and assistant nurses, who were working at the NH units was observed and analysed (see below).

Nutritional guidelines

Nutritional guidelines for elderly care were adopted by the municipality, a medium-sized town in mid-eastern Sweden, in the year 2000. In 2006, the Senior Citizens Board decided to actively implement the guidelines. Collaboration with the university was initiated to facilitate the implementation. Prior to the start of the implementation process, a questionnaire survey was conducted, and the guidelines were operationalised into more user-friendly recommendations. The survey indicated a poor knowledge of and low adherence to the adopted guidelines (12). The operationalisation of the guidelines clarified the focus of the guidelines. The guidelines concentrated on the following factors: (i) nutrition (nutritional screening, interventions, assessment/follow-up), (ii) food (mealtime patterns, snacks, overnight fasting) and (iii) mealtime ambience (the latter two are described in Table 1).

Development of the mealtime instrument

To evaluate the performance of staff during mealtimes, a structured mealtime instrument was developed. To the best of our knowledge, there is no such comprehensive instrument to assess mealtime ambience, but there are instruments for observing individual eating difficulties (21–23). The mealtime instrument was developed based on the operationalised guidelines and a review of the literature. The structure of the Five Aspects Meal Model (FAMM) was used as the theoretical model. FAMM was

Table 1 Detailed description of the observed mealtime variables according to the operationalised guidelines and outcome measures in the food records

<i>Mealtime variables</i>	<i>Detailed description of the mealtime variables according to the norm</i>
<i>The room</i>	Laying a table was included in the aspect 'the room'
Cleaned tables	Cleaned and wiped tables before the mealtime (before food and beverages are served)
Laying a table	To what extent full cutlery, drinking glasses, napkins, tablecloths, salt, spices, candles, flowers (or other table decoration), bread and butter, and beverages on the tables were provided
<i>The product</i>	'The product' referred to the method by which food and beverages were served and offered
Offering a choice of beverages	The resident is asked about what he/she wants to drink. If not possible, the beverage is described when served
Offering more to drink	The residents are offered more to drink during the meal
Offering more food	The residents are offered more food when finished eating
Serving of the meal	To what extent, the resident is offered more food, drinks and condiments/accompaniments. Simultaneous start of the meal per table. Main course is cleared away before serving of the dessert
<i>The meeting</i>	To what extent there are social interactions (verbal prompting or social conversations) between the staff and the residents
Presentation of main dish and dessert	Each component of the main dish and the dessert should be described. The dishes should not be presented as 'food', 'lunch', 'dessert' etc.
Interaction between staff and resident	To what extent the staff interacts with the residents and encourages good conversations
Interaction between staff and staff	To what extent the staff interacts with each other. No talking between staff about work, diseases/medical conditions or other residents, etc., during the mealtime
<i>The atmosphere</i>	No disturbing activities (cleaning, visitors, handing out medications, etc.) during the mealtime. TV, radio and private mobile phones turned off. If music is played, it should be appropriate background music
Nondisturbing resident movement	No excessive walking around of the residents
Noise from the kitchen	No disturbing noise from the kitchen, for example, washing activities, the water tap standing on, excessive rattling with china and opening/closing of cupboards
Noise from the dishwasher	The dishwasher should not be running during the mealtime
<i>Food records</i>	<i>Detailed descriptions of the food service routines</i>
Number of meals served	Included breakfast, lunch, dinner and snacks between meals
Number of snacks served	A snack could be edible or drinkable, contain calories or no calories and should at least be 1 dl (i.e. not just a tablespoon of something to swallow medicine). A resident declining a snack was defined as an offered snack Snack events were divided into six occasions: before breakfast, a.m. snack (before lunch), p.m. snack (before dinner), evening snack (after dinner), a late snack (22:00–00:00) and a night snack (00:00–06:00)
Overnight fast	The number of hours between the last eating episode in the evening and the first eating episode the next morning
Type of snacks and beverages served	Snacks were categorised according to their content (no calories, calories, nutrients). Examples of no-calorie snacks include water, tea and coffee. Examples of calorie-containing snacks include juice/soda, cookie/pastry and stewed fruit. Examples of nutritious snacks include milk/sour milk, sandwich, fruit and oral nutritional supplements (ONS). The snacks were ranked according to their content, where nutrients were considered better than calories and no calories, and calories was considered better than no calories. For example, if a resident was served a nutrient-containing and a calorie-containing snack (e.g. coffee with cookie and an ONS), it was coded as a nutritious snack. Beverages were categorised according to their content of no calories (e.g. water/tea/coffee), calories (e.g. juice/soda/low-alcohol beer), nutrients (e.g. milk/sour milk) or alcohol (e.g. wine/beer)
Amount of served beverages (mL/kg)	Amount of liquid served per mL/kg/day. Liquid was defined as sour milk, yogurt, oral nutritional supplements (ONS), soda, juice, fruit soup, stewed fruit, gruel, milk, water, coffee, tea, wine, beer. For example, cream, gravy, ice cream or soup as a main course was not considered as liquid

originally designed to provide an optimal dining experience for restaurant guests, and it studies five different aspects of mealtimes: 'the room', 'the meeting', 'the product', 'the management control system' and 'the atmosphere' (24).

The mealtime instrument included assessment of four of the five aspects in FAMM: the atmosphere, the meeting, the room and the product. The various aspects were operationalised into feasible measurable variables that were assessed on 100 mm VAS-scales. For a detailed description of

the variables according to the operationalised guidelines, see Table 1. The VAS-scale ranged from 'not at all' (0) to 'very high degree' (100) and to provide an answer an observer placed a mark on a horizontal VAS line. The operationalised guidelines (See Table 1) exemplified the 'optimal situation'.

Implementation strategies

Two implementation strategies were decided upon, to put the guidelines into practice, that is educational outreach visits (EOV) and external facilitation (EF). Both strategies were targeted to teams at the NHs that consisted of a unit manager, a nurse and 5–10 nurses' aides/assistant nurses and implemented by one research study team member (AS), a researcher (PhD) and a registered dietitian (RD) with approximately 25 years of experience in the management of nutrition projects in the elderly care setting. The EOV consisted of a 3-hour lecture about the operationalised guidelines. The EOV also included limited feedback on baseline data from initial mealtime observations (see below) and clinical outcome measures of the NH residents (25), which provided an opportunity for the team to formulate a plan for introducing the guidelines. The EOV strategy was selected to resemble 'conventional practice'.

The EF provided a long-term multifaceted strategy. The facilitator (AS) met with the team every 3–4 weeks over the course of 1 year. The 1-hour meetings were based on the principles of action research: (i) plan, (ii) act, (iii) observe, (iv) reflect (26). Workplace meetings (2–3 meetings/year) were also held to engage and involve the entirety of the staff (in addition the team). The EF strategy consisted of obtaining feedback on baseline data and of continuous practice audit and feedback on, for example, mealtime observations and dietary assessments. Furthermore, the EF strategy encouraged the staff to critically evaluate current nutritional practices to increase their nutritional knowledge and to develop structures and goals to overcome obstacles. The facilitator had an administrative role in planning the meetings and provided support during the implementation processes. The EF approach was developed to create a flexible strategy for its adaptation to the local setting, and it actively involved the practitioners by being responsive to the staff's motivations and opinions. The aim was to make the change be perceived as coming from the staff itself.

Data collection

The study was conducted from September 2009 to October 2011. Two primary outcomes were defined. One was observed mealtime ambience, and the other was recorded food service routines.

Mealtime ambience by observations. A total of 47 mealtime observations (22 at baseline and 25 at follow-up) were

performed in two of the included NH homes (one EF unit and one EOV unit). Only lunchtime meals, which is the main daily meal served at Swedish NHs, that were served on weekdays were observed. A structured observational mealtime instrument was developed (see below) to assess to what extent staff performance agreed with the guidelines (See Table 1). A single researcher (JT) conducted the mealtime observations. Field notes were taken. Directly after the observations, the field notes were transcribed and then the transcribed field notes were recorded in the mealtime instrument.

Food service routines by food records. Food records were recorded to evaluate the compliance of the staff to the recommendations of the guidelines. Thus, the focus was to assess, for example, how often and what types of snacks were served by the staff rather than to assess the actual food intake of the NH residents. The estimated food records (27) were recorded by the staff (after providing oral and written information) over a course of 3 days (two weekdays and one weekend day) at baseline and again at follow-up 1 year later. The NHs were visited on each day (JT, AS) of data collection to assess the records and to answer questions from the staff. Everything that the residents were served by the staff and everything that they actually consumed (including breakfast, lunch, dinner, snacks between meals and beverages) from 06:00 to 06:00 the next day was registered in the food records according to quantity or common household measuring devices. In total, 109 food records were collected from the four NHs, and they were evenly dispersed ($n = 25$, $n = 28$, $n = 30$, $n = 26$) between the NHs both at baseline and at follow-up. The food service variables that were evaluated included number of snacks and meals served, quantities of beverages served, type of snacks and beverages served and durations of overnight fasting (Table 1).

Ethical considerations

The study was approved by the Regional Ethical Review Board at the university (ref no: 2009/053). The staff was informed about the study and about the different methods of data collection. A unit manager at each NH served as a guardian and consented to study enrolment and intervention (28).

Data analysis

The data are presented either as proportions, as the means \pm standard deviations or as medians (interquartile range), depending on the type of variables. Chi-square tests were used to compare proportions. According to the distribution of the data, between-group differences were evaluated using either a *t*-test for independent samples or

the Mann–Whitney *U*-test. Intragroup analyses were performed using either the Wilcoxon matched pairs test or a *t*-test for dependent samples, in accordance with data distribution. The Mann–Whitney *U*-test was used to compare the measurements of mealtime variables between baseline and follow-up in each group, as the before and after observations could be viewed as independent of each other. Statistica (version 12, 2014, StatSoft, Inc.) was used for all statistical analyses.

Validity and reliability. To test the variables of the mealtime instrument, duplicate observations were performed repeatedly by two of the study members (JT, AS) and by master's degree students in nutrition and dietetics. The face validity (29) of the variables was assessed by the study team, and the variables that were assessed as not measuring what they intended to measure were excluded. The interobserver reliability of the mealtime instrument was assessed with Cronbach's alpha coefficient and was based on 26 duplicate observations. The median Cronbach's alpha coefficient was 0.73 (0.25), and it ranged between 0.52 and 0.89. Mealtime variables with low coefficients (<0.50) were excluded from the analyses.

Results

Characteristics of the participating staff

The characteristics of staff at baseline and follow-up in both the EF and EOV units are shown in Table 2. The mean age of the staff across the units ranged from 41 to 45 years, and the median employment duration ranged from 3 to 7 years. There was a higher staffing density (both scheduled and observed) in the EOV setting at baseline. Otherwise, no further differences in staffing characteristics were noted between the NHs.

Mealtime ambience by observations

There was no difference between the EF and EOV units according to observed mealtime ambience at baseline (Table 3). Staff performance improved in EF units compared to EOV units with respect to the implementation of guidelines for laying a table, offering a choice of beverages, offering more to drink, serving the meal, increasing the interactions between staff and residents, decreasing the interactions between staff and staff, the meeting, and the reduction of noise from the kitchen and dishwasher (Table 3). Thus, improvements were achieved in all observed FAIM aspects (the room, the product, the meeting, the atmosphere). The EF group also exhibited positive trends for the presentation of the main dish and for the atmosphere in the dining room (Table 3). Moreover, improvements between baseline and follow-up were more frequently observed in the EF group than in the EOV group (Table 3).

Food service routines based on food records

No changes in food service routines could be attributed to any of the interventions, but rather to specific nursing home units.

Serving of meals and overnight fasting. The number of served meals was greater in the EOV group at baseline (Table 4). At follow-up, the number of served meals decreased in the EOV group but was unchanged in the EF group (Table 4). As shown in Fig. 1, afternoon and evening snacks were the most frequently served meal item in both of the groups. An average of two snacks were served per day in both of the groups, and this pattern was stable over the observation period.

The duration of overnight fasting, which was defined as the number of hours between the last eating episode

Table 2 Characteristics of the staff (nurses' aides and assistant nurses) and staffing practices at baseline and follow-up

	Baseline/Follow-up	EF	<i>n</i>	EOV	<i>n</i>	<i>p</i> ^a
Age, mean ± SD	Baseline	44.8 ± 12.3	61	41.9 ± 14.1	44	0.28
	Follow-up	45.3 ± 12.6	54	41.0 ± 13.1	50	0.09
Employment at current workplace (years), median (IQR)	Baseline	5.5 (6.5)	60	2.8 (7.5)	44	0.13
	Follow-up	7.0 (8.0)	55	5.5 (6.5)	54	0.57
Scheduled staffing (scheduled staff per number of beds)	Baseline	0.22 (0.04)	4.5:1 ^c	0.25 (0.05)	4:1 ^c	<0.01
	Follow-up	0.22 (0.14)	4.5:1 ^c	0.25 (0.0)	4:1 ^c	0.05
Observed staffing ^b (staff per dining residents)	Baseline	0.24 (0.07)	4.3:1 ^d	0.36 (0.09)	2.8:1 ^d	<0.01
	Follow-up	0.27 (0.11)	3.8:1 ^d	0.30 (0.06)	3.3:1 ^d	0.26

EF, external facilitation; EOV, educational outreach visit; SD, standard deviation; IQR, interquartile range.

^aBetween-group differences, *t*-test for independent samples or Mann–Whitney *U*-test according to data distribution.

^bAt the time for the mealtime observations.

^cRatio between numbers of beds per 1 scheduled staff member (nurses' aides and assistant nurses).

^dRatio between dining residents per staff members (nurses' aides and assistant nurse).

Table 3 Variables reflecting observed mealtime ambience at baseline, follow-up and the before–after changes at the EF units (14–15 observations) and EOV units (8–10 observations)

FAMM aspects	Variable	EF/EOV	VAS baseline median (IQR)	VAS follow-up median (IQR)	VAS change mean \pm SD ^a	p baseline ^b	p change ^c
The room	Cleaned tables	EF	9.8 (0.4)	9.3 (0.4)*	-0.4 ± 0.4	0.57	0.37
		EOV	9.8 (0.5)	9.1 (0.9)*	-1.2 ± 1.6		
	Laying a table	EF	4.1 (2.0)	5.5 (4.0)	1.1 ± 1.9	0.05	0.03
		EOV	3.4 (0.5)	3.2 (1.8)	-0.8 ± 1.2		
The product	Offering a choice of beverages	EF	1.0 (1.1)	4.8 (7.3)*	3.6 ± 3.6	0.17	0.02
		EOV	1.7 (6.3)	0.7 (0.9)	-1.5 ± 4.8		
	Offering more to drink	EF	0.9 (1.4)	5.6 (3.7)*	3.8 ± 3.3	0.87	0.002
		EOV	1.2 (4.7)	0.8 (0.4)	-1.7 ± 3.4		
	Offering more food	EF	1.3 (1.7)	1.4 (2.4)	0.3 ± 2.7	0.40	0.13
		EOV	1.7 (1.5)	0.3 (0.4)*	-1.5 ± 1.9		
Serving of the meal	EF	3.9 (1.8)	6.6 (2.9)*	2.1 ± 2.8	0.66	0.02	
	EOV	5.7 (5.4)	3.3 (4.0)	-1.4 ± 3.5			
The meeting	Presentation of main dish	EF	2.3 (1.6)	8.0 (3.8)*	3.7 ± 3.3	0.71	0.07
		EOV	3.1 (3.9)	2.2 (4.5)	0.8 ± 4.0		
	Presentation of dessert	EF	3.0 (3.1)	6.2 (5.1)	1.8 ± 3.0	0.44	0.66
		EOV	1.9 (3.5)	2.6 (5.8)	0.6 ± 4.9		
	More interaction staff–resident	EF	3.0 (1.6)	4.2 (2.2)*	1.4 ± 1.8	0.11	0.02
		EOV	4.1 (3.3)	3.8 (2.9)	-0.7 ± 2.0		
Less interaction staff–staff	EF	4.7 (1.3)	5.6 (2.1)	1.0 ± 1.0	0.17	0.04	
	EOV	6.4 (2.0)	5.2 (2.0)	-0.03 ± 1.5			
The meeting	EF	5.4 (2.1)	5.8 (2.6)	1.0 ± 2.2	0.40	0.03	
	EOV	6.6 (5.0)	3.9 (5.1)	-1.9 ± 3.3			
The atmosphere	Nondisturbing resident movement	EF	9.7 (2.2)	9.1 (1.9)	0.2 ± 1.3	0.92	0.57
		EOV	9.4 (1.3)	9.4 (1.0)	-0.4 ± 1.2		
	Less noise from the kitchen	EF	3.2 (1.9)	6.8 (5.3)*	2.8 ± 2.2	0.37	0.01
		EOV	8.3 (8.3)	3.8 (5.7)	-0.7 ± 3.6		
	Less noise from the dishwasher	EF	4.9 (3.0)	10.0 (2.2)*	3.4 ± 3.1	0.30	0.005
		EOV	8.3 (6.7)	6.4 (7.2)	-0.9 ± 3.3		
The atmosphere	EF	4.4 (2.2)	6.2 (2.4)*	1.2 ± 1.9	0.54	0.07	
	EOV	6.2 (6.0)	5.0 (2.9)	-1.7 ± 2.2			

EF, external facilitation; EOV, educational outreach visit; SD, standard deviation; IQR, interquartile range.

^aBefore–after differences are displayed as the mean \pm SD to show the magnitude of change.

^bBetween-group differences at baseline by Mann–Whitney *U*-test.

^cBetween-group differences for the changes from baseline to follow-up by Mann–Whitney *U*-test.

*Differences within the group between baseline and follow-up measurements by Wilcoxon matched pairs test ($p > 0.05$).

in the evening and the first eating episode the following morning, was longer in the EF group at baseline. At follow-up, however, this difference disappeared (Table 4).

Serving of beverages. Figure 2 indicates the types of beverages that were served at lunch and dinner at baseline and at follow-up in both settings. Calorie-containing beverage (e.g. lemonade) was the most commonly served beverage at lunch and dinner in both groups at baseline (68 and 56%, respectively) and follow-up (45 and 56%, respectively). The quantities (mL/kg BW) of beverages that were served were also registered (Table 4). These quantities decreased in the EOV group after the implementation, although no pre-/postimplementation differences were observed between the groups (Table 4).

Quality of snacks served. The qualities of the afternoon and evening snacks are displayed in Fig. 3. No changes could be attributed to the interventions, that is, EF or EOV. In addition, the pattern of snack quality was similar in both groups both at baseline and at follow-up; that is, coffee and pastry (i.e. a calorie-containing snack) was the most predominant type of snack that was served in the afternoon, whereas a sandwich (i.e. nutrient-containing snack) was usually served in the evening.

Discussion

This study evaluated two different methods of implementing nutritional guidelines and assessed how they affected NH staff performance. The major finding

was that an external facilitation strategy that included guidance, audit and feedback resulted in improved mealtime ambience with respect to laying a table, offering a choice of beverage, offering more to drink and the quality of serving of the meal. Moreover, improvements were noted in the following areas: interactions between the staff and the residents, interactions among the staff themselves, the meeting, and less noise from the kitchen and the dishwasher. Of the assessed mealtime observation variables, almost all of the changes in the EF group were favourable.

The changes of food service routines were not as consistent. At baseline, the EOVS residences exhibited shorter overnight fasting and were served more meals than the EF residences, although these differences disappeared at follow-up. No improvements in overnight fasting, numbers of served meals or quantities of served beverage were caused by the interventions under any of the conditions.

The favourable results that were produced with respect to mealtime ambience in the EF units could be due to the fact that the facilitator emphasised that the staff should not be engaging in nonmeal activities, such as cleaning, washing up, or having a break, during mealtimes. The dining room staffing ratio (i.e. staff/resident ratio) was at a higher density during lunchtime meals in the EOVS group at baseline, but tended to decrease [less staff per residents ($p = 0.07$)] at follow-up (Table 2). At follow-up, the staffing density was similar between the EOVS and EF units, indicating that staff number was not a major determinant of positive outcome. However, Simons et al. (30) have suggested that a staff ratio of 1 : 5 should be maintained during meals, which is less dense than the ratios that were observed in this study (Table 2).

Surprisingly, the mealtime variable of offering more food exhibited low VAS values in both of the groups at baseline and at follow-up. All of the wards were structured such that food was delivered from a centralised kitchen; therefore, an inability to offer more food could partially explain this finding.

The positive results regarding mealtime ambience at the EF units might also be related to the fact that the staff themselves chose mealtime ambience as a prioritised area for change, and a goal of the EF strategy was to be flexible and amenable to staff motivations. The study team concluded afterwards that there had been considerable focus on mealtime ambience during the implementation process (data not shown). We have not been able to identify any other external factors that influenced the positive developments in mealtime ambience at the EF units beyond the intervention and motivation of the staff to improve the dining experience for the residents.

Recent reviews have concluded that improved NH dining experiences may be beneficial to residents with

respect to weight, energy intake, nutritional status and well-being (31, 32). In a recent study (20), we reported on corresponding resident outcomes in the same NH setting. Interestingly, we found a delayed cognitive deterioration among NH residents in centres where staff had been exposed to the EF strategy, whereas nutrition-related outcomes like Mini Nutritional Assessment-Short Form (MNA-SF), weight and body mass index (BMI) and function (ADL Barthel Index) outcomes remained unchanged. A suggested explanation for this finding was that the EF intervention focused on individual preferences and choices at mealtimes, which may have contributed to social and mental stimulation during the meals. This notion is potentially supported by the current results showing improvements in mealtime ambience (i.e. offering a choice of beverages, offering more to drink, presentation of the main dish, increased interactions between staff and residents). These measures all demonstrate increased levels of interaction, which in turn could contribute to cognitive stimulation. A considerable amount of previous research has indicated that engaging in social activities in later life is protective against cognitive decline and dementia (33, 34).

The shorter durations of overnight fasting and greater quantity of meals that were observed in the EOVS group at baseline might be explained by the higher staff ratio that was present in the EOVS group at baseline compared to the EF group (Table 2). In the current study, we observed overnight fasts that exceeded 11 hours and an average of fewer than four meals being served per day (Table 4). Long overnight fasting (>11 hours) and few offered meals (<4/day) have been associated with an increased risk of malnutrition among hospitalised elderly adults (35). However, the length of overnight fasting that was observed in this study is comparable with what has been observed in other studies conducted in hospital and nursing home settings (35, 36).

The absence of positive findings with respect to food service routines might be due to several causes. One reason may be that the same focus was not put on food service routines as on mealtime ambience in the EF group. A lack of facilitation time may also have influenced these findings, as the 14–15 facilitator–practitioner meetings that were held during the year might not have provided enough time to adequately review all of the recommended guidelines. Another causative factor might be that food service routines are more established and may require a greater degree of hands-on effort to be changed. Moreover, nutritional assessment and tailoring adequate interventions, such as snacks, less overnight fasting and beverage quantity, are the nurses' responsibility. The nurses at the EF units attended less than half of the facilitator–practitioner meetings (data not shown), indicating that nurses' aides and assistant nurses were more strongly exposed to the EF strategy. Adverse attitudes

Table 4 Amount of beverage served, duration of overnight fasting and number of meals according to the food records at baseline, follow-up and the changes from baseline to follow-up at the EF and EOJ units

Variable	Guideline recommendations	EF/EOJ	n	Baseline	Follow-up	Change	p baseline ^a	p change ^a
Amount of beverage served (mL/kgBW/day), median (IQR)	30 mL/kgBW/day	EF	25 ^b	22.0 (6.6)	20.2 (7.8)	-1.8 (6.7)	0.30	0.15
		EOJ	18 ^b	24.1 (6.3)	20.2 (10.4)*	-4.6 (7.7)		
Overnight fast (hours), median (IQR)	<11 hours	EF	61	14.3 (2.0)	14.0 (1.5)	0.1 (1.6)	0.003	0.57
		EOJ	48	13.5 (2.5)	13.6 (2.7)	0.08 (3.5)		
Number of meals, mean ± SD	5–6/day	EF	61	3.8 ± 0.9	3.8 ± 0.8	-0.07 ± 0.8	0.007	0.02
		EOJ	48	4.3 ± 0.6	3.8 ± 0.7*	-0.4 ± 0.8		

EF, external facilitation; EOJ, educational outreach visit; BW, body weight; SD, standard deviation; IQR, interquartile range.

^aBetween-group differences, Mann–Whitney U-test or t-test for independent samples (p > 0.05).

^bIncludes only those assessed as dependent in food intake and mobility according to Mini Nutritional Assessment-Short Form (MNA-SF) and Barthel ADL index, both at baseline and at follow-up (n = 43). MNA-SF and ADL assessments were performed on 93 of the 109 individuals.

*Within-group differences, Wilcoxon matched pairs test or t-test for dependent samples (p > 0.05).

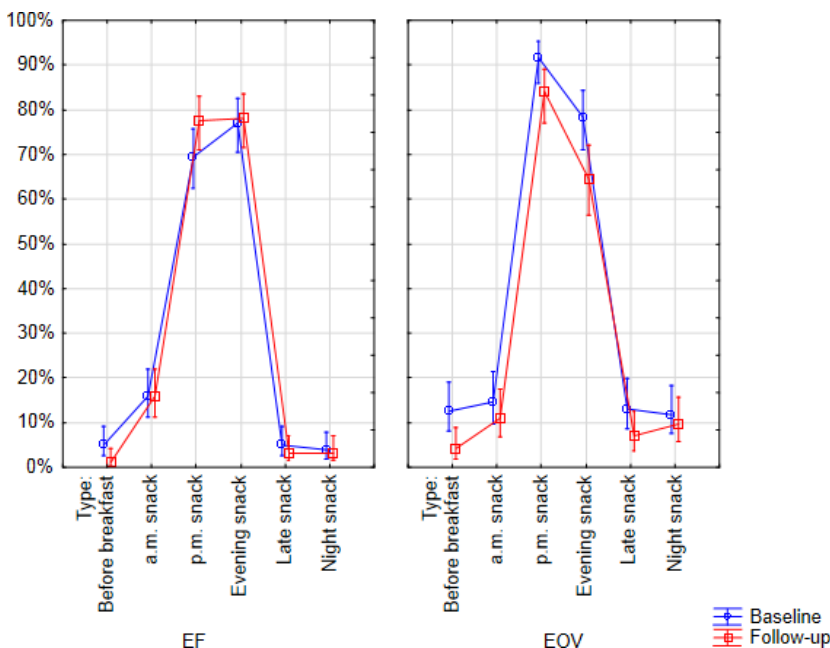


Figure 1 Proportions (%) of residents that were served/offered snacks at various time points over the day EF: External facilitation, EOJ: educational outreach visit.

towards nutrition and ageing might explain the lack of interest among nurses (10, 37). No improvements could be observed in the food service routines. Likewise, no changes were observed in the corresponding nutritional outcomes (body mass index, Mini Nutritional Assessment, weight) of NH residents in a previous study (20).

To achieve practical changes in the nutritional arena is challenging. A Danish study (38) observed very little progress in food service routines in hospitals and nursing homes over the course of an 8-year period, despite several interventions and initiatives from authorities and researchers.

To engage in observations rather than in conducting interviews has both advantages and disadvantages. An advantage is that one can study what people actually do

and not what they claim to do. To increase reliability, the observations should be systematically performed (26). By using a structured observational instrument and operationalised guidelines as a standard, our focus on the sites could be more narrowed and systematic. VAS was used to quantitatively measure the intervention effects. VAS-scales have frequently been used in both research and clinical practice to measure pain, health status, fatigue and quality of life (39). Although VAS can be criticised for translating subjective assessments into objective estimates, it was a strength in the current study because the same observer performed all of the observations, including the VAS evaluation.

A mealtime instrument was developed for the purpose of this study. Several of the included mealtime ambience

variables are consistent with descriptions by NH residents concerning the quality of a dining experience, such as having a variety of choices, the provision of good service from friendly and knowledgeable staff, receiving help/assistance as needed and being served in an attractive environment (40–42). The interobserver reliability of the mealtime variables was acceptable (43), with a median Cronbach’s alpha value of 0.73. However, the instrument that we developed still requires further refinement considering the wide range of Cronbach’s alpha values that were obtained. Other mealtime instruments especially

designed for nursing homes are under development, for example, by Keller et al. based on the M3 model (32, 44–47).

Strengths and limitations

An obvious limitation of the study was that the staff members were aware that they were being observed and therefore might have changed their behaviour accordingly, which would agree with the so-called Hawthorne effect (48). This can certainly not be ruled out with regard to the mealtime observations of the EF group. However, several observational sessions were performed on the same ward to ensure that conditions were being monitored under different staff constellations. Another limitation was that the observer was not blinded. However, the operationalised guidelines directed the observer on what exemplified an ‘optimal’ mealtime ambience and what to focus on during the observations.

Both strategies were targeted to a selected team of the staff, which in turn was responsible for disseminating the guideline implementations to the rest of the staff. An approach was inspired by others (49). The alternative of involving all of the staff directly in the implementation process was not considered to be feasible due to logistics and resource availability.

Food records include limitations such as over- and underreporting due to forgetfulness and incorrect estimations of food and beverage quantities (27). It is possible that over-reporting with the goal of providing desirable answers posed a problem in the current study because the staff recorded the food records (50, 51). One strength of the study was that two of the study team members (JT, AS) visited the NHs every day during the course of data collection to monitor the food records.

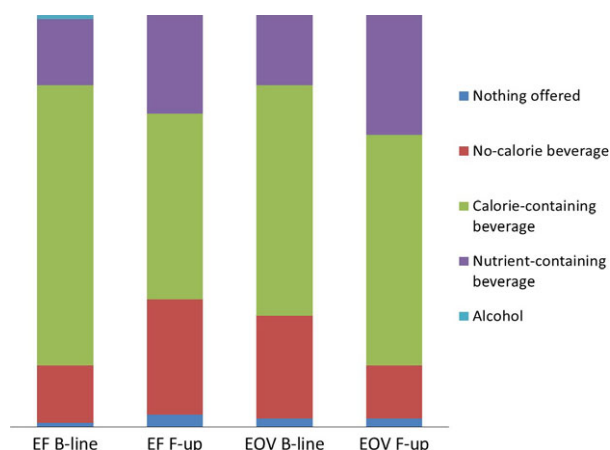


Figure 2 Types of beverages served at lunch and dinner (a). EF, External facilitation; EO, educational outreach visit; B-line, baseline; F-up, follow-up; alcohol, for example wine/beer; nutrient-containing beverage, for example milk/sour milk; calorie-containing beverage, for example juice/soda/low-alcohol beer; no-calorie beverage, for example water/tea/coffee. (a) Percentages of the types of beverage served (183 occasions [61 individuals ×3 days] at the EF units, and there were 144 occasions [48 individuals ×3 days] at the EO units).

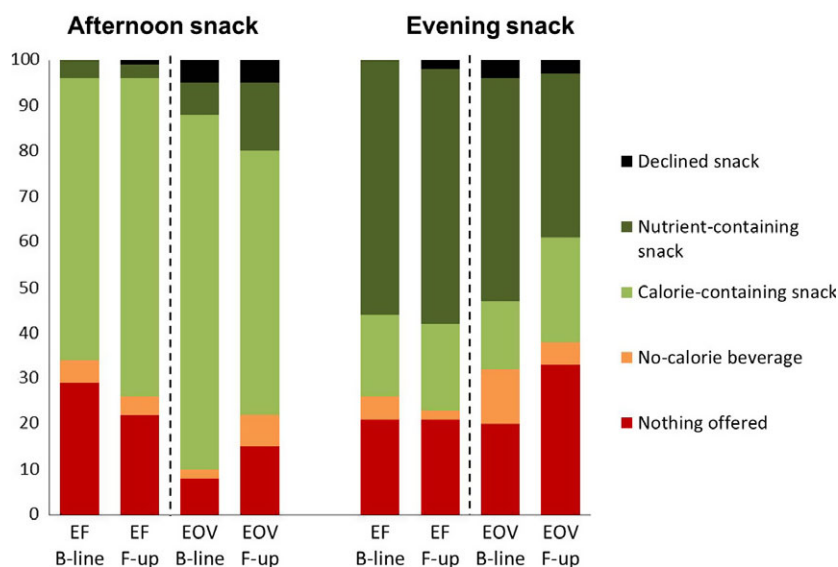


Figure 3 Types of afternoon and evening snacks as percentage of the total number of snacks. EF, external facilitation; EO, educational outreach visit; B-line, baseline; F-up, follow-up; nutrient-containing snack, for example sandwich/oral nutritional supplements/fruit; calorie-containing snack, for example cookies/pastry/stewed fruit; no-calorie beverage, for example water/tea/coffee.

A criticism of convenience sampling is that the ability to generalise the results is limited. However, the EF units were selected by the senior community care managers, possibly representing the most likely case. This proof-of-concept approach means that if the implementation does not work under cases where conditions are optimal, it would most likely not work in any case (52). However, generalisations that are made from any implementation study should be made with caution because they are context dependent. A cluster randomised controlled trial (CRT) would have been a more appropriate design, but CRTs face substantial logistical and resource challenges.

Changing practical behaviours is challenging, as demonstrated by both the current study and other studies that have identified several barriers for the implementation to be successful (1, 6, 10, 53). Therefore, all possible determinants of change should also be taken into account in implementation studies. To improve the quality of care for the elderly, many more future studies should focus on the technique to implement new interventions in practices, and not only to study the intervention itself. Thus, studies are needed on how to translate the knowledge obtained from intervention studies into practice.

Conclusion

In this study, we demonstrated that several improvements in mealtime ambience were observed when using an external facilitation (EF) strategy combining guidance, audit and feedback to introduce nutritional guidelines in a nursing home setting, whereas food service routines were unchanged. It is likely that food service routines are more established and may require additional hands-on efforts to be altered.

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Author contribution

Johanna Törmä and Anja Saletti participated in the conception, design of the study, data collection, analysis and interpretation of data, and drafting the manuscript. Tommy Cederholm and Ulrika Winblad contributed to the conception, design of the study, analysis and interpretation of data, and drafting of the manuscript. The final version was read and approved by all authors.

Ethical approval

The study was approved by the Regional Ethical Review Board at Uppsala University (ref no: 2009/053).

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