

## ORIGINAL ARTICLE

# Is it possible to influence ability, willingness and understanding among nursing home care staff to implement nutritional guidelines? A comparison of a facilitated and an educational strategy

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## Abstract

**Background:** Translating nutrition knowledge into care practice is challenging since multiple factors can affect the implementation process. This study examined the impact of two implementation strategies, that is external facilitation (EF) and educational outreach visits (EOVs), on the organisational context and individual factors when implementing nutritional guidelines in a nursing home (NH) setting.

**Methods:** The EF strategy was a one-year, multifaceted (including support, guidance, a practice audit and feedback) intervention given to four NH units. The EOv strategy was a three-hour lecture about the nutritional guidelines given to four other NH units. Both strategies were directed at selected NH teams, consisting of a unit manager, a nurse and 5–10 care staff. A questionnaire was distributed, before and after the interventions, to evaluate the prerequisites for the staff to use the guidelines. Three conditions were used to examine the organisational context and the individual factors: the staff's *ability* and *willingness* to implement the nutritional guidelines and their *understanding* of them. Confirmatory factor analysis and structural equation models were used for the data analysis.

**Results:** The results indicated that on average, there was a significant increase in the staff's ability to implement the nutritional guidelines in the EF group. The staff exposed to the EF strategy experienced better resources to implement the guidelines in terms of time, tools and support from leadership and a clearer assignment of responsibility regarding nutrition procedures. There was no change in staff's willingness and understanding of the guidelines in the EF group. On average, no significant changes were observed for the staff's ability, willingness or understanding in the EOv group.

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**Conclusions:** A long-term, active and flexible implementation strategy (i.e. EF) affected the care staff's ability to implement the nutritional guidelines in an NH setting. No such impact was observed for the more passive, educational approach (i.e. EOV).

**KEYWORDS**

guidelines, implementation, intervention, nursing homes, nutrition

## 1 | BACKGROUND

A high prevalence of malnutrition among old adults, particularly among institutionalised old adults, is well documented. A review (Bell et al., 2013) of 24 studies of malnutrition among nursing home (NH) residents reported that approximately one third of residents are malnourished, and two-thirds are at risk of malnutrition. We have reported corresponding numbers from a Swedish NH setting (Törmä et al., 2013). The causes and negative consequences of malnutrition have also been well established. The multifactorial background comprises medical, social and environmental factors with consequences of increased mortality and morbidity and reduced well-being (Arvanitakis et al., 2008; Volkert, 2013). Actions that are recommended to address malnutrition include malnutrition screening, nutritional guidelines, expertise, education of staff and management and proper legislative frameworks (Arvanitakis et al., 2009; Volkert, 2013). A global initiative to promote better nutritional care is the ESPEN-promoted Nutrition Day (nutritionDay, 2016), which includes nursing homes and aims at improving knowledge and awareness of malnutrition in different health care settings (Valentini et al., 2009). Moreover, experts on NHs have established prioritised NH research areas, of which improving nutritional care is one (Morley et al., 2014). Malnutrition has been recognised as a problem not only in the scientific community but also in the political world. The Council of Europe published a report in 2009 on malnutrition in care homes and home care to improve awareness and management of malnutrition (Arvanitakis et al., 2009).

In Sweden, the nutritional situation of older adults has been acknowledged both nationally and locally. National incentive grants (altogether >530 million EURO) were provided to county councils and municipalities between 2007 and 2012 to enhance the quality of care of older people, including nutritional care. Additionally, a national quality register (Senior Alert), introduced in 2008, records risks and measures taken to prevent, for instance, malnutrition among caretakers over 65 years. At the local level, the Municipality of Uppsala in Sweden adopted nutritional guidelines for older adults in 2009 with the ambition to improve the nutritional care in nursing homes and home care. Thus, in the past decade, nutritional issues in the NH setting have been raised at macro, meso- and microlevels, but we have little knowledge of how these initiatives have been implemented and whether they have actually resulted in better nutritional care. For example, a questionnaire survey conducted prior to this study revealed poor knowledge of and low adherence to the above-mentioned nutritional guidelines (Törmä et al., 2009).

### What does this research add to existing knowledge in gerontology?

- Implementation research in nursing home settings is scarce and this study adds knowledge in that field.
- The impact of two implementation strategies directed at nursing home staff on the organisational context and individual factors.

### What are the implications of this new knowledge for nursing care with older people?

- A long-term, active and flexible implementation strategy affected the care staff's ability to implement the nutritional guidelines in a nursing home setting.
- The more traditional, educational strategy did not provide better preconditions for change among the nursing home staff.

### How could the findings be used to influence policy or practice or research or education?

- Guidelines need to be actively implemented to change practice.
- Targeted tailored implementation strategies with a clearly defined assignment of responsibility should be evaluated in future studies on nutritional care implementation.

However, the process of translating knowledge into practice and changing practice is complex and challenging. Research has not yet been able to identify which implementation approach is the most efficient in different situations and settings (Grimshaw et al., 2004; Low et al., 2015; Spoon et al., 2020) and implementation research in the NH setting is scarce (Diehl et al., 2016). Multifaceted interventions are, however, usually warranted to improve the quality of care (Husebo et al., 2015) and nutritional care of NH residents (Keller et al., 2015). Furthermore, multiple factors can inhibit the implementation process, such as the individual factors of the care staff (e.g. their attitudes, values and beliefs) and the organisational context surrounding the implementation process (e.g. staffing, support and time) (Damschroder et al., 2009; Ersek et al., 2012; Francke et al., 2008; Greenhalgh et al., 2004; Grol et al.,

2005; Peters et al., 2014). As shown above, several factors such as context and individual factors affect the implementation output. For that reason, we set out to evaluate the organisational context and individual factors of the NH staff for the implementation of local nutritional guidelines in Uppsala Municipality (described below) in a nursing home (NH) setting. The aim was to compare two implementation strategies directed at the NH staff, that is external facilitation (EF) and educational outreach visits (EOV) and their impact on the conditions for implementation. The hypothesis was that the EF strategy would improve the organisational factors and individual factors, whereas no such impact would be observed for the EOV strategy.

## 2 | METHODS

### 2.1 | The study design and setting

The study design was a non-randomised cluster-controlled study with baseline and follow-up measurements in eight NHs divided equally into two intervention groups: external facilitation (EF) and educational outreach visits (EOVs). The four EF units were included in the study based on recommendations from the managers of the care provider. The managers were asked to suggest NH units that were interested and motivated to participate in the project. The entire implementation project started as a quality improvement project. Thus, the EF units became a convenience sample. Matching between the EF and EOV units was performed for type of care provider (public or private), focus of care (nursing care or dementia care) and number of residents. Table 1 displays the number of beds and wards and the focus of care at each NH.

TABLE 1 Number of beds and wards and focus of care at each nursing home involved in the study.

NH unit (EF/EOV)	Number of beds	Number of wards	Focus of care
EF 1	51	3	Nursing and dementia care
EF 2	47	3	Nursing and dementia care
EF 3	25	3	Nursing and dementia care
EF 4	50	3	Nursing and dementia care
EOV 1	50	3	Nursing and dementia care
EOV 2	40	2	Nursing care
EOV 3	27	3	Nursing and dementia care
EOV 4	24	2	Nursing care

EF, external facilitation; EOV, educational outreach visit.

### 2.2 | The nutritional guidelines

Back in 2000 Uppsala Municipality (a medium-sized town in mid-eastern Sweden) adopted nutritional guidelines for care of older people, that is the object of implementation in the current study. In 2006 The Senior Citizens Board decided to actively implement the guidelines in collaboration with Uppsala University. Prior to the implementation process, the guidelines were operationalised into three prioritised focus areas: (1) nutrition (nutritional screening, interventions, assessment/follow-up), (2) food (mealtime patterns, snacks, overnight fasting) and (3) mealtime ambience. Operationalisation of the guidelines was performed by two of the research study team members (JT, AS) and a local stakeholder group comprising general managers of care providers, municipal officials from the Health and Social Welfare office and NH staff.

### 2.3 | The implementation strategies

Since evidence is lacking regarding the most effective implementation strategy, a traditional educational strategy (the EOV strategy) was compared with a long-term, more active and flexible strategy (the EF strategy). The EOV strategy aimed to resemble 'conventional practice', since educational strategies are the most common implementation strategy (Forsetlund et al., 2009). Four NHs received the EOV strategy, and the other four received the EF strategy. Both strategies were directed to selected teams at each NH. Each team consisted of a unit manager, a nurse and five-ten nurses' aides/assistant nurses. Thus, only a small portion of all staff members in each NH was exposed to the interventions. One of the research study team member (AS), a researcher (PhD) and registered dietitian (RD) with solid experience in the management of nutrition projects in the nursing home setting, facilitated both interventions. The EOV strategy comprised of one three-hour lecture about the operationalised guidelines and an opportunity for the teams to design an implementation plan.

The EF was a long-term, multifaceted strategy. EF meetings between the facilitator and the NH teams were about one hour and held every three-four weeks over the course of one year. The meetings were based on the principles of action research: (1) plan, (2) act, (3) observe and (4) reflect (Patton, 2004). To engage and involve all of the NH staff, two-three workplace meetings were held during the implementation year. Different activities were performed by the facilitator within the EF strategy, such as 1–2 practice audit and feedback on, for example, mealtime observations and dietary assessments, critical evaluation of current nutritional practices, education in nutritional knowledge and guidance and support in developing structures and goals to overcome obstacles. The development of EF strategy was to create a flexible and adaptable strategy that actively involved the staff by being responsive to their motivations and opinions. No regular control group was included in this study, since the purpose was to study these two implementation strategies.

## 2.4 | Team member questionnaire

A questionnaire was developed for this study (see Appendix 1) and distributed to all managers, nurses, care staff (nurses' aides and assistant nurses) and administrators in the eight NH units. The questionnaire was distributed both before and after the implementation and evaluated the usage and prerequisites for the staff to use the nutritional guidelines. Three conditions that may support successful implementation were used to examine individual factors of the staff and the organisational context, namely staff's *ability* and *willingness* to implement the nutritional guidelines and their *understanding* of them (Lundquist, 1987; Winblad, 2003, 2008). Theories and concepts to substantiate the conditions are outlined below.

A pilot test at an NH unit not involved in the current study was performed to test the feasibility of the questions and the time required to complete the survey (data not shown).

## 2.5 | Structure of the questionnaire

The original questionnaire contained 48 questions, of which 10 questions were related to the ability concept, 14 questions to willingness and 15 to understanding. The answers to the questions regarding ability and willingness were based on five-point Likert scale items. Questions that measured the degree of negative response were recoded prior to the analyses. There were three response options to the questions related to understanding, that is 'yes', 'no' and 'do not know'. The responses were dichotomised as either a correct answer (1) or an incorrect answer (0).

## 2.6 | The care staff's ability to implement the guidelines

The 'ability' condition refers to the organisational context and whether it creates sufficient incentives for care staff to implement the guidelines. The organisational context is the features of the setting or environment in which the implementation is to take place (Kent & McCormack, 2010). Greenhalgh et al. (2004) divide organisational features into structural and non-structural determinants. Structural determinants (i.e. the formal structures of an organisation) that increase the likelihood of a successful implementation are, for example size, functional differentiation (informal division of labour), slack resources, specialisation (expertise and specialist resources) and decentralised decision-making structures. Non-structural determinants are the 'softer' aspects, such as the prevailing culture and climate in relation to leadership style, clear visions and goals, attitudes towards risk taking and social relations (internal and external networks). Thus, context is a multifaceted concept where structural, physical, environmental, economic, cultural and social factors interact in a complex way. Leadership, culture and resources are usually

included in the concept of context (Damschroder et al., 2009; Estabrooks et al., 2009; Harvey & Kitson, 2016).

The organisational context, in this study, is characterised as having a clear assignment of responsibility regarding nutrition and resources to implement the guidelines, such as tools, time and support from leadership. Thus, for the staff to be *able* to implement the guidelines, the organisational context needs to be supportive.

## 2.7 | The care staff's willingness to implement the guidelines

The second condition, that is 'willingness', investigates the respondents' attitudes towards and approval of the nutritional guidelines and changing practice. This condition is based on professional theory (Abbott, 1988; Freidson, 2001). Professionals are in an exceptional position due to their monopoly of knowledge in their field of work, which is achieved through extensive education, training and examination. This body of knowledge is not available to others, that is non-professionals, which gives professionals a high degree of clinical autonomy in their decisions. The common knowledge base is achieved through education, which establishes practice, but also shared values, identity and language within the profession – in other words, strong internal loyalty (Brante, 1987). Innovations consistent with professional standards are often easier to implement.

Both nurses' aides and assistant nurses, the target groups of the questionnaire in this study, have low professional status; according to the classic definition; this is particularly true for, nurses' aides, who lack a knowledge monopoly (Fahlström, 1999). However, studies among NH care staff show that autonomy (Tyler et al., 2006), involvement in decision-making (Head et al., 2013; Lapane & Hughes, 2007; Parsons et al., 2003) and being valued as a team member (Bishop et al., 2009; Head et al., 2013; Törnqvist, 2004) are associated with job satisfaction. Thus, nurses' aides and assistant nurses also have a strong desire for autonomy at work, authority and a sense of community, which is in line with theories of more traditional professions. Implementation of guidelines can conceivably be perceived as an increased workload, which takes time from other work tasks and standardisation of work, which may interfere with the staff's desire for autonomy and authority.

The 'willingness' condition relates to external autonomy, that is how guidelines affect the working situation and internal autonomy, that is threats against the staff's inner professional role. External autonomy was investigated with the following statements: 'Implementation of guidelines is laborious' and 'I want to work in accordance with the guidelines, but I face resistance from my work colleagues'. Statements representing internal autonomy were 'Working in accordance with the guidelines means that my own knowledge and experience are not being valued' and 'Guidelines work only in theory, not in practice'. Thus, for the staff to be *willing* to implement the guidelines, the guidelines need to align with working practice and professional autonomy.

## 2.8 | The care staff's understanding of the guidelines

The third condition 'understanding' refers to the respondents' interpretation of the guidelines, that is their understanding of the content and intentions of the nutritional guidelines. The theory of 'street-level bureaucrats' by Michael Lipsky has been used to explain this condition (Lipsky, 1980). With his bottom-up approach, Lipsky emphasises the role and power that 'street-level bureaucrats' (those who in reality implement the political decisions) have in policy implementation. According to Lipsky, 'street-level bureaucrats' possess all the power in the success of the implementation of policies mandated from above because of their discretion in implementing or ignoring policy goals (Roh, 2012). Superiors' difficulty controlling and monitoring these 'street-level bureaucrats' give them this great amount of discretion (Winblad, 2008). Since the 'street-level bureaucrats' are responsible for implementation, it seems reasonable to think that their understanding of the policy content and its intentions may increase the likelihood that the policy will be recognised and applied. Translated to the current study, the NH staff must understand the content and intentions of the nutritional guidelines to be able to implement them.

It was investigated whether the staff understood the intentions of the guidelines and the importance of nutrition for older adults. The following statements and questions represented this condition in the questionnaire: 'Guidelines aim to guide and train staff', 'Food- and nutrition-related problems are common among older adults due to illness', 'Energy and protein deficits are common causes of malnutrition among older adults' and 'Who should have energy and protein-enriched food?' Thus, NH staff must *understand* the content and intentions of the nutritional guidelines to be able to implement them.

## 2.9 | Data collection

All staff in both intervention groups was asked to answer the questionnaire at regular workplace meetings at the NH units, both at baseline and follow-up. The duration of follow-up was approximately 18 months. Follow-up data at the EF units were collected directly after the 1-year intervention ended, whereas at the EOJ units collection of follow-up data was performed one year after the intervention. The intention was to give both intervention groups the same timeframe to implement the nutritional guidelines. The data collection was performed through personal visits (by JT) at the NH units to achieve a response rate as high as possible. Staff who was not present at these meetings received the survey from the administrator. Reminders were sent one-four times by e-mail to the managers and administrators. The study was conducted from March 2009 to June 2011.

## 2.10 | Statistical analysis

Descriptive characteristics are presented as proportions, means or medians, depending on the variable type, and differences between

the intervention groups were evaluated using either *t* tests or the Mann-Whitney *U* test (see Table 3).

The statistical analysis consisted of two parts: (1) the establishment of a measurement model using confirmatory factor analysis (CFA) and (2) the estimation of a structural equation model (SEM) studying the development of the latent construct over time in each intervention group.

The original questionnaire consisted of 48 questions. When conducting a CFA, three to five questions per latent construct are recommended to confirm unidimensional latent constructs and provide a model that is identified (Kline, 2015). Five questions per latent construct remained after a screening based on face validity.

To establish construct validity, the questions were related to the proposed latent constructs: ability, willingness and understanding. CFA was performed on all individuals measured at baseline ( $n = 217$ ). Some practical considerations had to be made regarding the CFA. The amount of missing data on each question was not high, and the median proportion of missingness among the 48 questions was 5%. The highest amount of missingness was 17%. However, the amount of missingness differed between the questions; thus, only 96 individuals would be retained if a complete case analysis were conducted. Therefore, multivariate imputation by chained equations was carried out to handle missing data under the assumption of missing at random (MAR; Buuren & Groothuis-Oudshoorn, 2011; Little & Rubin, 2014). All questions and demographics in the questionnaire were linearly included in the imputation models with logistic regression for questions with binary outcome and proportional odds models for questions with ordinal outcomes. In total, 20 imputed data sets were generated. The estimates from each imputed data set were combined using Rubin's rule (Buuren & Groothuis-Oudshoorn, 2011; Little & Rubin, 2014) for the parameters or the method suggested by (Asparouhov & Muthen, 2010) the goodness of fit tests.

Because Likert items are ordinal, polychoric correlations were used in the CFA. Due to problems with convergence, the two lowest categories of the questions related to Can and Will were collapsed into one category before the polychoric correlations were calculated. The confirmatory factor model was estimated using diagonally weighted least squares (DWLS) with robust standard errors (Muthén, 1984). The model fit was assessed using a chi-squared test, the comparative fit index (CFI) and the root-mean-square error of approximation (RMSEA). Moreover, the significance level of the factor loadings was set to 5%. The final selection of questions was based on differences in chi-square values and an overall examination of goodness of fit statistics. Models that did not converge or yielded Heywood cases were not further considered.

A SEM was conducted to examine the development of the latent constructs (ability, willingness, understanding) over time in each intervention group. To estimate these models, only individuals studied at baseline and follow-up were included in the analysis ( $n = 118$ ). Additionally, an important difference from the measurement model is that we studied one latent construct at a time. Because the aim was to compare the latent means over time, an assumption of strong measurement invariance, that is equal factor loading and equal

thresholds, was required at both time points for a latent construct of interest (Millsap & Yun-Tein, 2004). Moreover, to ensure identification, the first factor loading was set to 1. Due to the repeated measurements, we allowed for the residual variances of questions to be correlated across time. Finally, we fixed the mean of the latent construct at the first time point to zero. Thus, the estimation of the latent mean at follow-up became the SEM equivalent of a paired *t* test. See Appendix 2 for a display of the structural model. The procedure regarding the handling of missing data, ordinal data and estimation was the same as that for the CFA in the measurement model. We were for the latent construct understanding not able to take clustering into account due to non-convergence. However, this does not change the conclusions based on statistical inference.

All statistical analyses were conducted using Mplus version 8, R version 3.2.3 and the R packages lavaan 0.5–22 and Mice 2.25 (Buuren & Groothuis-Oudshoorn, 2011; RCoreTeam, 2015; Rosseel, 2012).

### 2.11 | Ethics approval and consent to participate

The study was approved by the Regional Ethical Review Board at Uppsala University (ref no: 2009/053). A unit manager at each NH served as a guardian and consented to study enrolment and intervention. The questionnaire was accompanied by participant information. Completing the survey implied consent to participate.

## 3 | RESULTS

### 3.1 | Response rate

Altogether, the questionnaire was distributed to 275 persons at baseline and 279 persons at follow-up. Only responses from staff participating in measurements at both baseline and follow-up

(*n* = 118) were included in the analyses. Sixty-seven (*n* = 67, 57%) persons belonged to the EF strategy group and 51 (43%) to the EOVS strategy group (Figure 1).

### 3.2 | Staff characteristics

No differences in staff characteristics between the intervention groups (EF and EOVS) at baseline were observed (Table 2).

Tables 3–5 display the mean values and medians of each question within each latent construct (ability, willingness, understanding). The baseline values of each question based on all individuals (*n* = 217) are displayed, that is the individuals on whom the confirmatory factor analysis (CFA) was conducted. Additionally, the descriptive data of each question based on the individuals studied at both time points are shown. The baseline measurement on which the CFA is based does not differ statistically from the baseline values that are later studied in the two intervention groups (Tables 3–5). Without a formal hypothesis test, we observe that all responses appear to have improved over time in the EF group. A similar pattern is observed for the EOVS group, but on average, the improvement seems to be less than that in the EF group.

### 3.3 | Measurement model

A confirmatory factor analysis (CFA) was conducted to test the construct validity of the questionnaire, and a model with three latent constructs represented by four questions per construct seemed to be consistent with the data. In the final model, all standardised factor loadings were statistically significant and ranged from 0.51 to 0.86 (Table 6). The proposed ability–willingness–understanding model showed an acceptable albeit not ideal fit ( $\chi^2 = 69.2$ ; *df* = 51; *p* = 0.048, CFI = 0.96, RMSEA = 0.04).

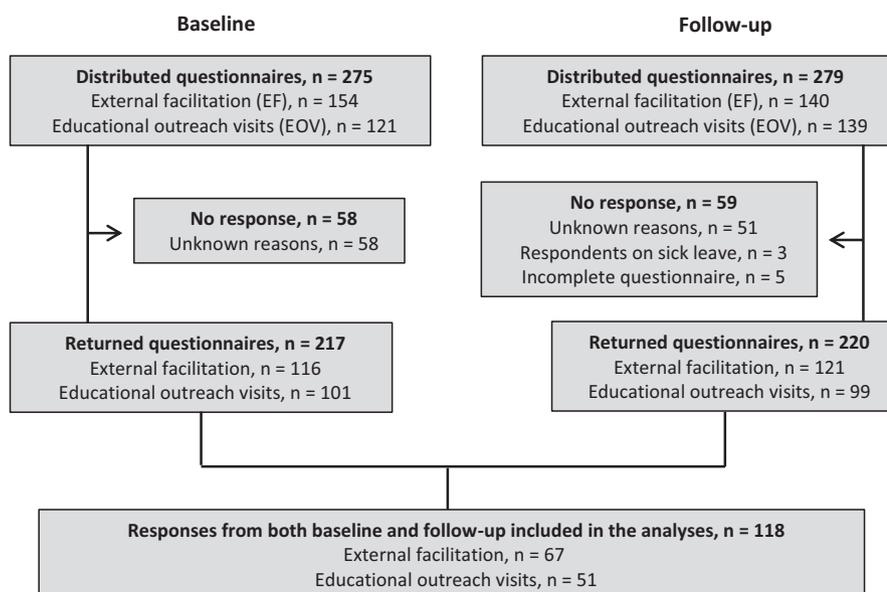


FIGURE 1 Flow chart of the response rate.

**TABLE 2** Staff characteristics (incl. managers, administrators, nurses, assistant nurses, nurses' aides) in each intervention group (EF and EO) at baseline.

Variable	EF	n	EOV	n	p <sup>†</sup>
Age, mean±SD	45.0 ± 10.3	65	44.8 ± 13.3	48	0.94
Employment at current workplace in years, median (IQR)	5.3 (6.5)	64	8.3 (7.5)	48	0.09
Working day and evening shifts, % (n) ‡	91 (61)	67	84 (43)	51	0.26
<b>Profession</b>					
Care staff (nurses' aides/assistant nurses), %	85	56	92	47	0.53
Nurses, %	6	4	4	2	
Administrators, %	3	2	0	0	
Managers, %	6	4	4	2	

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

†Between-group differences: chi-squared test for nominal variables, t test for independent samples or Mann-Whitney U test, according to data distribution, ‡ Not including those working night shifts.

**TABLE 3** Descriptive statistics for questions related to latent construct ability.

Ability		Baseline		Follow-up	
		Mean ± SD (MD)	n	Mean ± SD (MD)	n
ALL INDIVIDUALS AT BASELINE (n = 217)	Q1. To what extent do you feel that there are <b>tools</b> (e.g. utensils, assessment tools, scales, aids) to work in accordance with the nutritional guidelines?	3.06 ± 1.00 (3.0)	193		
	Q2. To what extent do you feel that you have <b>time</b> to work in accordance with the nutritional guidelines?	2.90 ± 0.89 (3.0)	198		
	Q3. To what extent do you feel that you have <b>support from your leadership</b> to work in accordance with the nutritional guidelines?	3.19 ± 0.92 (3.0)	185		
	Q4. To what extent do you feel that there is a <b>clear assignment of responsibility</b> between professionals regarding nutrition, food and mealtimes?	2.97 ± 0.94 (3.0)	191		
EF GROUP (Individuals at both time points, n = 67)	Q1.	2.75 ± 1.04 (3.0)	61	3.53 ± 0.87 (4.0)	60
	Q2.	2.98 ± 0.88 (3.0)	62	3.59 ± 0.74 (4.0)	61
	Q3.	3.20 ± 0.89 (3.0)	59	3.79 ± 0.75 (4.0)	62
	Q4.	2.92 ± 0.95 (3.0)	62	3.55 ± 0.77 (4.0)	60
EOV GROUP (Individuals at both time points, n = 51)	Q1.	3.24 ± 0.99 (3.0)	46	3.53 ± 1.08 (3.0)	45
	Q2.	3.00 ± 0.92 (3.0)	46	3.21 ± 0.86 (3.0)	47
	Q3.	3.30 ± 0.88 (3.0)	44	3.46 ± 0.97 (3.5)	48
	Q4.	3.00 ± 0.90 (3.0)	43	3.15 ± 0.87 (3.0)	46

MD, median; SD, standard deviation.

All questions are five-point Likert items.

### 3.4 | Structural model of latent constructs over time

The latent constructs from the CFA were used to separately examine how the two implementation strategies (EF and EO) were

associated with the development of the care staff's ability, willingness and understanding to implement the guidelines. The results in Table 6 show that on average, there was a significant increase over time in the care staff's ability to implement the nutritional guidelines in the EF group. The mean change in the care staff's ability (0.646,

TABLE 4 Descriptive statistics for questions related to latent construct willingness.

Willingness		BASELINE		FOLLOW-UP	
		Mean±SD (MD)	n	Mean±SD (MD)	n
ALL INDIVIDUALS AT BASELINE (n = 217)	Q5. I want to work according to the nutritional guidelines, but I face <b>resistance from my work colleagues</b> .	4.18 ± 1.03 (5.0)	185		
	Q6. Working in accordance with guidelines means that <b>my own knowledge and experience are not being valued</b> .	4.15 ± 0.99 (4.0)	180		
	Q7. <b>Guidelines work only in theory</b> , not in practice.	3.85 ± 1.06 (4.0)	183		
	Q8. <b>Implementation of guidelines is laborious</b> .	3.84 ± 1.14 (4.0)	198		
EF GROUP (Individuals at both time points, n = 67)	Q5.	4.16 ± 1.11 (5.0)	58	4.31 ± 1.05 (5.0)	64
	Q6.	4.26 ± 0.93 (4.5)	58	4.35 ± 0.96 (4.5)	65
	Q7.	3.83 ± 1.17 (4.0)	58	4.25 ± 0.93 (4.0)	64
	Q8.	3.83 ± 1.15 (4.0)	64	4.05 ± 1.02 (4.0)	65
EOV GROUP (Individuals at both time points, n = 51)	Q5.	4.17 ± 1.01 (4.5)	42	4.20 ± 0.96 (4.0)	49
	Q6.	4.20 ± 1.02 (4.5)	40	4.10 ± 1.08 (4.0)	49
	Q7.	3.70 ± 1.10 (4.0)	43	4.16 ± 0.90 (4.0)	49
	Q8.	3.98 ± 1.06 (4.0)	46	4.04 ± 0.92(4.0)	48

SD, standard deviation; MD, median.

All questions are 5-point Likert items.

TABLE 5 Per cent correct answers for questions related to latent construct understanding.

Understanding		Baseline		Follow-up	
		%	n	%	n
ALL INDIVIDUALS AT BASELINE (n = 217)	Q9. Guidelines aim to guide and train staff.	94	214		
	Q10. Food- and nutrition-related problems are common among older adults due to illness.	91	206		
	Q11. Energy and protein deficits are common causes of malnutrition among older adults.	77	209		
	Q12. Who should have energy- and protein-enriched food?	56	203		
EF GROUP (Individuals at both time points, n = 67)	Q9.	94	66	97	65
	Q10.	91	65	94	65
	Q11.	81	64	84	64
	Q12.	52	65	63	60
EOV GROUP (Individuals at both time points, n = 51)	Q9.	92	51	90	50
	Q10.	89	47	94	49
	Q11.	78	49	78	49
	Q12.	46	50	60	48

All questions are dichotomous.

$p < 0.001$ ) was moderate. There was a small and not statistically significant increase in the care staff's willingness (0.329, ns). Also, no such change was found in the EOV group. As for the change in the

mean level of the staff's understanding of the guidelines, no change was found in either group. Most structural models had an acceptable model fit ( $\chi^2$  test with  $p > 0.05$ , CFI,  $\geq 0.90$ , RMSEA  $\leq 0.08$ ), with the

**TABLE 6** The measurement model from the confirmatory factor analysis (CFA) and the structural models for the latent constructs (ability, willingness, understanding).

	Measurement model from CFA	Structural models for Ability		Structural models for Willingness		Structural models for Understanding	
		EF	EOV	EF	EOV	EF	EOV
X <sup>2</sup> , df, p-value	69.2, 51, 0.048	15.2, 14, 0.36	16.9, 14, 0.26	24.1, 14, 0.045	19.9, 14, 0.13	22.5, 23, 0.49	27.2, 23, 0.25
CFI	0.96	0.99	0.99	0.98	0.97	0.99	0.66
RMSEA	0.04	0.03	0.06	0.10	0.08	0.01	0.10
Loading for Q1	0.62	1	1				
Loading for Q2	0.71	1.03	0.82				
Loading for Q3	0.86	1.26	0.90				
Loading for Q4	0.56	1.17	0.95				
Loading for Q5	0.55			1	1		
Loading for Q6	0.61			0.97	0.99		
Loading for Q7	0.73			0.99	1.12		
Loading for Q8	0.69			0.98	0.90		
Loading for Q9	0.80					1	1
Loading for Q10	0.58					0.79	0.55
Loading for Q11	0.51					0.55	0.64
Loading for Q12	0.60					0.58	0.38
Variance at baseline		0.421	0.618	0.522	0.503	1	1
Variance a follow-up		0.185	0.837	0.815	0.304	1	1
Mean of latent construct at follow-up (SE)		0.646 (0.144)***	0.368 (0.253)	0.329 (0.214)	0.202 (0.140)	0.272 (0.193)	0.138 (0.203)

CFI, comparative fit index; df, degrees of freedom; EF, external facilitation; EOV, educational outreach visits; RMSEA, root-mean-square error of approximation; SE, standard error; X<sup>2</sup>, chi-squared test.

\*\*\* $p < 0.001$ ,

\* $p < 0.05$ .

exception being the structural model for understanding, which had a poor CFI and RMSEA. Overall, the estimation of the structural models for understanding was complicated by the issue that some of the questions related to this latent construct had low variability, indicating an already good understanding at baseline, which left little room for improvement over time.

The results indicate that the organisational context improved moderately in the EF group, that is the staff experienced a clearer

assignment of responsibility regarding nutritional procedures and had more time, tools and support from their leadership over time.

## 4 | DISCUSSION

The aim of this study was to investigate whether two implementation strategies, external facilitation (EF) and education outreach

visits (EOVs), targeted at selected nursing home (NH) teams influenced the care staff's ability to implement the guidelines and their understanding of them. We hypothesised that the EF strategy would improve the care staff's ability, willingness and their understanding, whereas the shorter intervention, the EOV strategy, would not. The results demonstrated that on average, there was a significant increase in the staff's ability to implement the guidelines, but there was no change in staff's willingness and understanding of the guidelines in the EF group. Thus, the care staff experienced that they had more time, support from their leadership and tools to implement the guidelines. No significant changes in the staff's ability, willingness or understanding were observed for staff in the EOV group.

The impact of EF on the staff's ability to implement the guidelines seems valid. The EF strategy included the unit manager (leadership) and set time aside for the implementation process. Furthermore, the EF strategy provided the NH staff with appropriate tools through the practice audit and feedback on the mealtime ambience and dietary assessments. Moreover, discussions at the EF meetings may have defined responsibility roles more clearly. The relation between the care staff's willingness to implement the guidelines and the impact of the EF strategy is intriguing. Although willingness was a non-significant result, we believe that attitudes cannot be changed with a written or passive strategy but rather require social interactions and discussions. Therefore, the more holistic approach of the EF strategy might be an appropriate strategy. The EF meetings between the facilitator and NH teams included reflections and critical evaluations of current nutritional practices, which might contribute to changing the staff's attitudes for the better. Workplace meetings involving all of the staff in addition to the selected team might be important so that everyone feels involved.

The long-term, active strategy (EF) did not have an impact on the staff's understanding of the content or intentions of the guidelines, although this finding must be interpreted with caution due to the poor model fit and low variability. A need for nutritional knowledge and training among NH staff has been identified by others (Bauer et al., 2015; Merrell et al., 2012; Persenius et al., 2008). Since nutritional deficiencies are identified as barriers to optimal nutritional care, practical training and education are important activities in nutritional care implementation.

We observed effects on the organisational context among all staff members (or at least among those who answered the questionnaire), although the intervention (the EF strategy) was targeted only at selected teams at the NHs (involving 10–15 individuals). The goal of exposing only a selected team to the EF intervention was that this team would indirectly disseminate the knowledge obtained from the EF meetings to the entirety of the staff. However, specific dissemination techniques were never discussed at the EF meetings. Future studies should also evaluate dissemination strategies.

Evidence is lacking on which implementation approach to use in different circumstances and settings, but an often recommended strategy is to base the implementation strategy on analysis of barriers (Low et al., 2015). The approach motivates a combination of implementation strategies, that is different strategies at different stages

of the implementation process depending on whether awareness, knowledge, interest or attitude is to be changed. The current study also supports this approach, since it was the multifaceted strategy (EF) including different activities that had an impact on the organisational context and the individual factors. Frequently reported barriers to better nutritional care in hospitals and nursing home settings are a poorly defined responsibility in nutritional procedures (Bauer et al., 2015; Lindorff-Larsen et al., 2007; Ross et al., 2011), a lack of knowledge and skills and adverse attitudes towards nutrition and ageing (Bauer et al., 2015; Bachrach-Lindström et al., 2007; Merrell et al., 2012). Targeted tailored implementation strategies with a clearly defined assignment of responsibility should therefore be evaluated in future studies on nutritional care implementation.

In addition, we have also reported on clinical outcomes of NH residents and guidelines adherence by measuring staff performance after the two implementation efforts (Törmä et al., 2015, 2018). The more active and flexible strategy, that is the EF strategy, appeared to improve mealtime ambience in several mealtime activities and was also associated with delayed cognitive deterioration in sub-sample of communicative NH residents. This further supports the use of multifaceted strategies to improve nutritional care in the nursing home setting (Husebo et al., 2015).

#### 4.1 | Methodological limitations

Confirmatory factor analysis (CFA) was performed to establish construct validity of the proposed ability–willingness–understanding model. All estimated coefficients were statistically significant, but one question in the understanding construct loaded  $<0.50$ . A general rule of thumb is that loadings should be  $>0.50$  to demonstrate that the question strongly relates to the construct (Hair et al., 2014). However, it is sometimes necessary to retain low loadings to meet the requirements of statistical identification (Hair et al., 2014). The chi-squared test is sensitive to sample size; therefore, one should also include other measures of goodness of fit (GOF), for example the comparative fit index (CFI) and the root-mean-square error of approximation (RMSEA). The poor model fit of the understanding construct needs to be taken into account when interpreting the results, since the measured items in the understanding construct might not represent the latent construct as they were designed to do. It is likely that this model is not very reliable, which could be due to the combination of small sample and dichotomous questions.

A limitation of the study design is that allocation to any of the two implementation strategies was not randomised, which allows for a discussion only about association. However, since the NH units were selected by the managers they might represent the best cases suggesting that if implementation will not succeed where conditions are optimal, for instance by motivated staff, then it will probably not succeed in any other case either. Furthermore, generalisations beyond the studied municipality should be made with caution because of the specific prevailing context in the current municipality. Another potential limitation of the study design is the lack of a regular control

group. Nonetheless, the EOV strategy represents a standard implementation model and could in this sense be called a control strategy. Moreover, the lack of short-term follow-up measurements, in addition to the one-year follow-ups, is a possible shortcoming that may have influenced the results.

In addition, a cluster randomised controlled trial (CRT) would have been a more appropriate design in the current study evaluating the effectiveness of implementation strategies. However, CRTs face logistical and resource challenges since the unit of randomisation is the nursing homes and not the individuals. Thus, CRTs require in most cases more participants to reach statistical power. Hence, the small participant number in both administrations of the questionnaire is another limitation of the study.

## 5 | CONCLUSIONS

This study demonstrated that on average, there was a significant modest increase in the staff's ability to implement the nutritional guidelines in the external facilitation (EF) group, even when the intervention was targeting only a small group of the staff. Thus, the staff exposed to the EF strategy experienced a clearer assignment of nutritional responsibility and felt they had resources in terms of time, tools and support from leadership. No significant changes, on average, were observed for the staff's ability, willingness or understanding in the educational outreach visit (EOV) group.

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## CONFLICT OF INTERESTS

No conflict of interests to declare.

## AUTHORS' CONTRIBUTIONS

JT, TC, AS and UW conceived and designed the study. AS carried out the implementation. JT collected the data. RP performed the statistical analyses, and all authors interpreted the results. JT and RP drafted the manuscript, and all authors commented and contributed to the revision of the paper. The final version of the manuscript was read and approved by all authors.

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## APPENDIX 1

### The questionnaire.

#### DEMOGRAPHIC QUESTIONS

- Profession (nurses' aide/assistant nurse, nurse, team manager, unit manager, other)
- Working day/evening/day and evening/night shifts
- Year of birth
- Employment at current workplace in years

#### QUESTIONS ABOUT THE USAGE OF THE NUTRITIONAL GUIDELINES

Q1: How often are the NH residents screened for nutritional problems?

Q2: How many (%) of the NH residents at your unit do you estimate have been screened for nutritional problems?

Q3: Are individual measures of nutritional problems documented?

Q4: Who document the measures?

Q5: How often are the NH residents' individual overnight fast measured?

Q6: How often are the NH residents offered dessert at the lunch meal?

Q7: How many meals (breakfast, lunch, dinner and snacks) are the NH residents offered daily?

Q8: What of the following is usually done during mealtimes?

- Describing the main dish and dessert for each NH resident
- Laying the table with full cutlery, drinking glasses and napkins before the meal is served
- Offering all NH residents more food
- Offering all NH residents a choice of beverages
- Having condiments (salt and spices) available on the tables
- Interacting with the NH residents and encouraging good conversations
- Turning off TV and radio
- Cleaning the tables before/after the mealtime

- Encouraging the NH residents to take time during the meals
- Highlight weekends, holidays and festivities through menu selection
- Highlight weekends, holidays and festivities through table setting

#### QUESTIONS ABOUT YOUR PREREQUISITES TO WORK IN ACCORDANCE WITH THE NUTRITIONAL GUIDELINES

Q9: To what extent have you received information about the nutritional guidelines?

Q10: Who has mainly informed you about the nutritional guidelines?

Q11: To what extent do you feel that you have enough knowledge to work in accordance with the guidelines?

Q12: To what extent have you received training/education in how the nutritional guidelines are to be used?

Q13a): To what extent do you feel that there are tools (e.g., utensils, assessment tools, scales, aids) to work in accordance with the nutritional guidelines?

Q13b): To what extent do you feel that you have time to work in accordance with the nutritional guidelines?

Q13c): To what extent do you feel that there is enough staff to work in accordance with the nutritional guidelines?

Q13d): To what extent do you feel that you have support from your leadership to work in accordance with the nutritional guidelines?

Q13e): To what extent do you feel that there is a clear assignment of responsibility between professionals regarding nutrition, food and mealtimes?

Q13f): To what extent do you enjoy your work?

Questions about your attitudes towards nutrition, food and mealtimes

Q14a): To what extent do you feel that nutrition, food and mealtimes are included in your duties?

Q14b): To what extent do you feel that nutrition, food and mealtimes are interesting?

Q14c): To what extent do you feel that nutrition, food and mealtimes are of significance for the health of the elderly?

Q14d): To what extent do you feel there is a need to change the current way of working with food, nutrition and mealtimes?

Statements about your attitudes towards nutritional guidelines

Q15a): Working in accordance with nutritional guidelines mean more work than before.

Q15b): Working in accordance with the guidelines is hindered since the elderly do not value it.

Q15c): I want to work according to the nutritional guidelines, but I face resistance from my work colleagues.

Q15d): Nutritional guidelines are useful in my work.

Q15e): The language in nutritional guidelines is understandable.

Statements about your attitudes towards guidelines in general

Q16a): Working in accordance with guidelines means that my own knowledge and experience are not being valued.

Q16b): Guidelines work only in theory, not in practice.

Q16c): Working in accordance with guidelines is a good way to develop practice.

Q16d): Working in accordance with guidelines is not possible since teamwork within the staff is not working.

Q16e): Implementation of guidelines is laborious.

Q16f): Working in accordance with the guidelines means that someone else decides over my way of working.

Question about the intentions of guidelines

Q17: What do you consider is the overall aim with guidelines generally?

Q18: What do you consider is the overall aim of nutritional guidelines?

Q19: Evaluate the following statements

- Food- and nutrition-related problems are common among older adults due to illness.
- Nutrients are important to maintain bodily functions, such as mobility, cognition, wound healing, immune system etc.
- It is more difficult for older adults to absorb nutrients than for younger persons.
- Older adults need in general less energy/calories than younger persons.
- Older adults need in general less vitamins and minerals than younger persons.
- Older adults digest nutrients slower because of a delayed digestion.
- Energy and protein deficits are common causes of malnutrition among older adults.

Q20: What is A-diet? (standard-diet)

Q21: Who should have A-diet?

Q22: What is E-diet? (energy- and protein-enriched diet)

Q23: Who should have E-diet?

Q24: What is the aim with an overnight fast of maximum 11 hours?

APPENDIX 2.

A structural model.

