The role of staff in food behaviour interventions in out-of-home and health care settings - an overview of existing literature

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Preface

Behaviour change interventions on food in health care settings and in out-of-home settings require the participation of practitioners, volunteers or staff. The effectiveness of these interventions depends on the extent to which they are accepted and implemented by these staff members. Their involvement is key.

Therefore we studied the facilitators and barriers of implementing behavioural interventions. The overview has been helpful for the partners in the PPP 'Implementation of food interventions in health care and out of home' (in Dutch: 'Implementatie van voedingsinterventies in intramurale zorginstellingen en horeca'). In the PPP the next step is to develop and test interventions in real life based on the insights of this report in which former research has been studied.

Furthermore the report can be helpful for other practitioners who want to stimulate healthy and sustainable food choices within closed settings, like caterers, restaurant owners, health care staff, employers or other providers of food. Additionally, this overview can be helpful for researchers who are interested or want to develop an intervention in one of these settings.

The study has been performed within the PPP 'Implementation of food interventions in health care and out of home' (in Dutch: 'Implementatie van voedingsinterventies in intramurale zorginstellingen en horeca'). We thank the Dutch government and the Topsector Tuinbouw & Uitgangsmaterialen (KV-18012) for the financing of the PPP and this study. Furthermore, we thank our colleagues in the PPP for their feed back and contribution: Monique Medema en Elena Cavagnaro (NHL Stenden Hogeschool), Michel Altan (Breda University of Applied Sciences), Lilou van Lieshout and Arzien Wels (Greendish), Marieke Battjes-Fries, Gerda Pot, Olga Patijn en Peter Voshol (Louis Bolk Instituut), Esmée Doets (Wageningen Food & Biobased Research).

Preface

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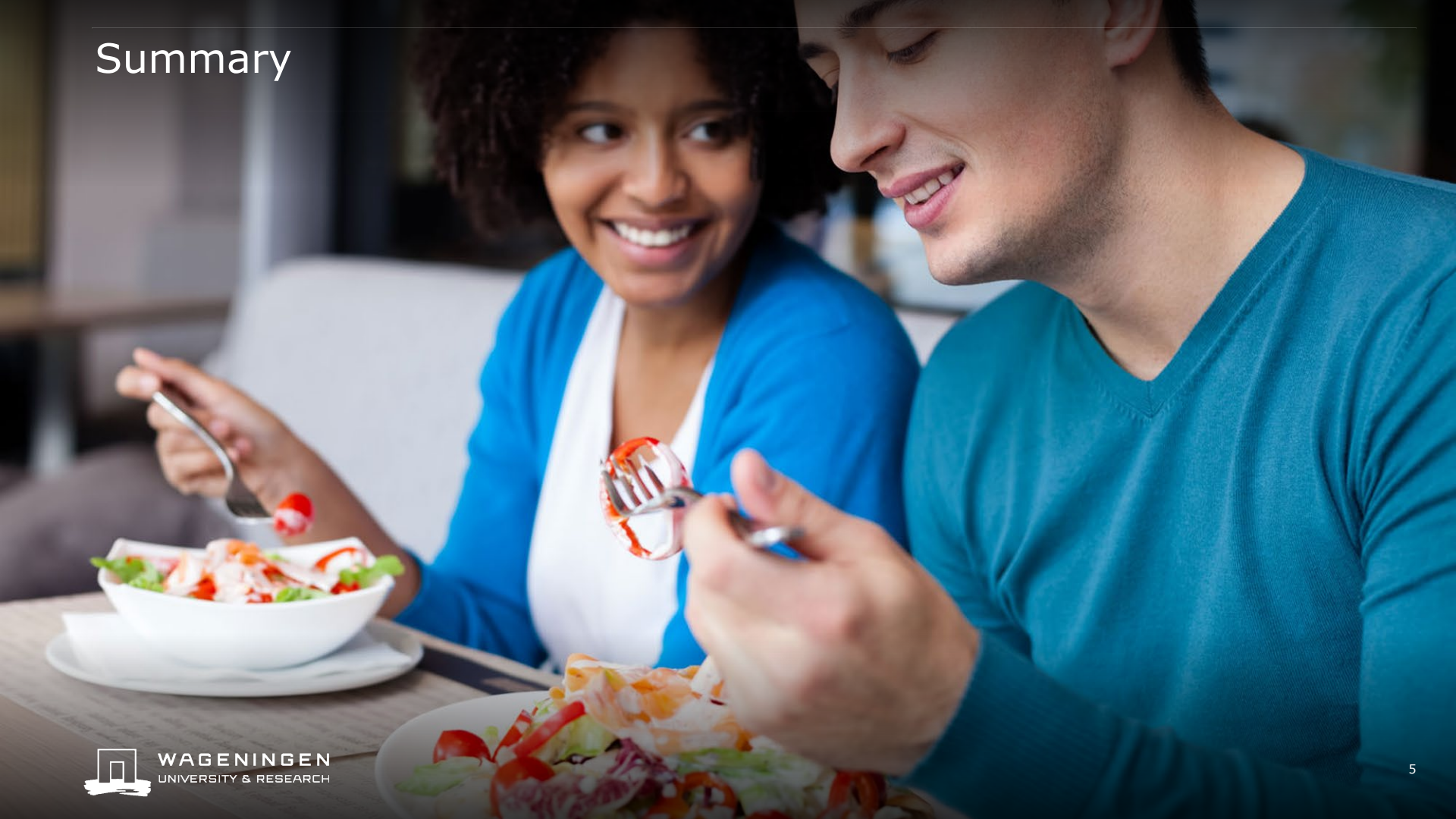

Summary

In this deliverable of the PPP project *Implementatie van voedingsinterventies in intramurale zorginstellingen en horeca* an overview is made of the role of staff in conducting interventions promoting healthy and sustainable food choices in out-of-home and health care settings. This deliverable provides insight into the role of the staff in behavioural interventions and what the barriers and supporting factors are for the staff to implement the intervention in these settings. The overview is based on 17 studies in total, that were found by doing a literature search in the database Web of Science.

Results show that in the **health care setting** most studies are conducted in either a hospital or a nursing home. The role of the staff in the intervention was mainly that they had to undergo training, coaching and/or education. Main barriers of the staff to implement the intervention are a lack of time, a lack of staff capacity and inflexibility of the food service system. Main supporting factors are satisfaction of the staff with the intervention and the involvement with patients as a result of the intervention.

In the **out-of-home setting** most studies are conducted in a school setting. The role of the staff was mainly training in how to promote and prepare healthy food and educating about the consequences of unhealthy cooking. Main barriers for staff to implement the intervention are a lack of time, having to participate in a training, lack of communication from the managers to the staff and amongst staff members about execution of the intervention and negative perceptions of the staff towards the intervention. Supporting factors are positive perceptions towards the intervention and knowledge of the intervention and the benefits for the target group.

Summary

Taken together, some of the types of barriers and facilitators recur in both settings. A main barrier that is mentioned for both settings is lack of time. Other overlapping barriers were lack of staff, other competing priorities, negative perceptions of staff toward the intervention, a lack of support and a lack of communication to and amongst staff about the intervention. Facilitators that were similar across settings were satisfaction of the staff with the training, positive perceptions towards the intervention, knowledge of the intervention and the benefits for the target group, being confident to make changes and, finally, the presence of incentives. The observed similarities in the two different settings, might be an indication that these barriers and facilitators are important aspects to consider in implementing an intervention in other closed settings as well. Stated differently, within this study the settings health care and out of home were the focus, but it could be possible that the found barriers and facilitators also apply in other closed settings.

This overview cannot only be helpful for researchers who are involved in the project *Implementatie van voedingsinterventies in intramurale zorginstellingen en horeca*, but also for those who are interested in developing or implementing real-life food interventions in a health care or out-of-home setting or other settings. Furthermore, this overview might be relevant for the management of these settings, as it provides information on critical success factors of implementing interventions, i.e. barriers amongst staff that need to be overcome as well as supporting factors that can be helpful in successfully implementing the interventions. Note that the studies described in this report depend on the search criteria that were set for the literature search. Therefore it is possible that some relevant studies might be missing. Nevertheless, we believe that this literature review gives an overview of how staff can be motivated to implement an intervention.

Samenvatting

In dit document met betrekking tot het PPS-project *Implementatie van voedingsinterventies in intramurale zorginstellingen en horeca* wordt er een overzicht gemaakt van de rol van het personeel bij het uitvoeren van interventies ter bevordering van gezonde en duurzame voedselkeuzes in omgevingen out-of-home en de gezondheidszorg. Dit document geeft inzicht in de rol van de medewerkers bij gedragsinterventies en wat de barrières en ondersteunende factoren zijn van de medewerkers om de interventie in deze omgevingen te implementeren. Het overzicht is gebaseerd op in totaal 17 studies, die werden gevonden door het uitvoeren van een literatuuronderzoek in de database Web of Science.

De resultaten laten zien dat in de **setting gezondheidszorg** de meeste onderzoeken werden uitgevoerd in een ziekenhuis of verpleeghuis. De rol van de medewerkers in de interventie was vooral het volgen van trainingen, coaching en/of opleidingen. De belangrijkste belemmeringen voor het personeel om de interventie uit te voeren zijn een gebrek aan tijd, een gebrek aan personeelscapaciteit en de inflexibiliteit van het voedselservicesysteem. De belangrijkste ondersteunende factoren zijn de tevredenheid van het personeel over de interventie en de betrokkenheid bij de patiënten als gevolg van de interventie.

In de setting **out of home** werden de meeste studies uitgevoerd in een schoolomgeving. Het personeel had vooral als taak om trainingen te volgen in het bevorderen en bereiden van gezond eten, waarin sommige trainingen voorlichting gaven over de gevolgen van ongezond eten. De belangrijkste belemmeringen voor het personeel om de interventie uit te voeren zijn een gebrek aan tijd, het moeten deelnemen aan een training, een gebrek aan communicatie van de managers naar het personeel en en onder het personeel/de medewerkers over de uitvoering van de interventie en negatieve percepties van het personeel ten aanzien van de interventie. Ondersteunende factoren zijn positieve percepties ten aanzien van de interventie en kennis van de interventie en de voordelen voor de doelgroep.

Samenvatting

Bij elkaar genomen keren sommige typen barrières en facilitatoren in beide settings terug. Een belangrijke barrière die voor beide settings wordt genoemd, is het gebrek aan tijd. Andere overlappende belemmeringen waren gebrek aan personeel, andere prioriteiten, negatieve percepties van het personeel ten aanzien van de interventie, een gebrek aan steun en een gebrek aan communicatie naar en onder het personeel over de interventie. Ondersteunende factoren die hetzelfde waren in beide settings waren de tevredenheid van het personeel over de training, positieve percepties ten aanzien van de interventie, kennis van de interventie en de voordelen voor de doelgroep, het vertrouwen om veranderingen door te voeren en, tot slot, de aanwezigheid van incentives. De waargenomen overeenkomsten in de twee verschillende settings zouden een indicatie kunnen zijn dat deze barrières en ondersteunende factoren belangrijke aspecten zijn om in overweging te nemen bij het uitvoeren van een interventie in andere gesloten settings. Anders gesteld, binnen deze studie stonden de settings gezondheidszorg en out of home centraal, maar het is mogelijk dat de gevonden barrières en ondersteunende factoren ook in andere gesloten settings van toepassing zijn.

Dit overzicht kan niet alleen nuttig zijn voor onderzoekers die betrokken zijn bij het project *Implementatie van voedingsinterventies in intramurale zorginstellingen en horeca*, maar ook voor personen die geïnteresseerd zijn in het ontwikkelen of implementeren van praktijkgerichte voedselinterventies in de settings gezondheidszorg of out of home of andere settings. Bovendien kan dit overzicht relevant zijn voor het management van deze settings, omdat het informatie biedt over kritische succesfactoren voor het implementeren van interventies, dat wil zeggen barrières bij het personeel die overwonnen moeten worden en ondersteunende factoren die nuttig kunnen zijn bij het succesvol implementeren van de interventies. Voor de beschreven literatuur zijn zoekcriteria vastgesteld die gebruikt zijn voor het literatuuronderzoek. Daarom is het mogelijk dat enkele relevante studies ontbreken. Desalniettemin zijn wij ervan overtuigd dat dit literatuuronderzoek een overzicht geeft van de wijze waarop medewerkers gemotiveerd kunnen worden om een interventie te implementeren.

Introduction

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Introduction

Dietary change interventions can have the greatest impact when they are conducted in so-called 'closed settings', i.e., restaurants and canteens, as it is easier in these settings to sway customers towards making healthier choices (Bianchi et al., 2018). Therefore, restaurants, canteens, hospitals and other out-of-home locations can play an important role in improving diet quality by offering healthier and more sustainable food choices (i.e., more vegetables, less meat) on their menus (for an overview see Kraak et al., 2017 and Lorenz & Langen, 2018). Behaviour change interventions in these settings typically involves the participation of practitioners, volunteers or staff. The effectiveness of these interventions is, at least partly, dependent on the extent to which they are accepted and implemented by these staff members (Collins et al., 2017). This is illustrated in a health care setting by Ross et al. (2011), who found that there is no coordinated food service approach and a lack of communication and shared responsibility between different staff members, preventing intervention success. Additionally, in relation to catering (out of home), a series of expert interviews revealed the potential for resistance from catering staff to implement interventions that, in their opinion, work against satisfying the customer, emphasizing the need to motivate catering staff when it comes to implementing the intervention (Velema et al., submitted).

In order to more systematically map the facilitators and barriers of implementing behavioural interventions, a review of the literature has been conducted with a main focus on the role of staff in conducting interventions promoting healthy and sustainable food choices in out-of-home settings and health care settings. The results can be found in this report, which aims to provide an overview of which type of behavioural interventions have been tested, what the role of staff is in these interventions and what facilitators and barriers can be found linked to this role.

This report is part of the PPP project *Implementatie van voedingsinterventies in intramurale zorginstellingen en horeca (Workpackage 1).*

Methodology

Methodology: Search terms

Criteria that were used to initiate the literature review search were: (1) the study should involve some kind of field experiment, (2) the outcome variable of the study should be some kind of behavioural measure, (3) the study should concern the food domain, (4) the study should be applied in an out-of-home or a health care setting and (5) the study should involve staff or employees. Based on these criteria, an initial list of search terms for the literature review for electronic searching of appropriate databases (i.e., 'Web of Science') was developed. The search covered studies in the period from 2000 to 2019. The search terms were included in the topic section of the database, and in the keywords, title, or abstract of the article being searched. For pragmatic reasons only articles published in English were included. The search terms were tested and refined through several rounds of paper identification, running the full search term in 'Web of Science', until the resulting database was manageable, while simultaneously demonstrating face validity (i.e. important key papers in the area of interest were picked up by the search string used). See Appendix 3 for the final search strings that were used to retrieve articles for respectively the out-of-home settings and health care settings.

The search was conducted on 10 October 2019 in Web of Science, which yielded 650 papers related to the out-of-home setting and 380 papers related to the health care setting.

Methodology: Screening process

Round 1

The retrieved papers were screened based on their title. The titles provided a first indication whether a paper is relevant or not.
For example, papers that were clearly outside the behavioural domain (e.g., medical articles, microbiological articles, etcetera) as well as papers targeted at specific eating problems were excluded. Furthermore, interventions for specific patient groups (e.g., cancer, diabetes, etc), but that were not in relation to hospitalization, were excluded. Also studies focusing on home care or community-dwelling groups (i.e., elderly or individuals with developmental disabilities) were excluded. Finally, we excluded non-western studies. Based on this screening 41 papers were selected for the setting 'out of home' and 24 papers were selected for the setting 'health care'. The selected papers were stored in EndNote.

Methodology: Screening process

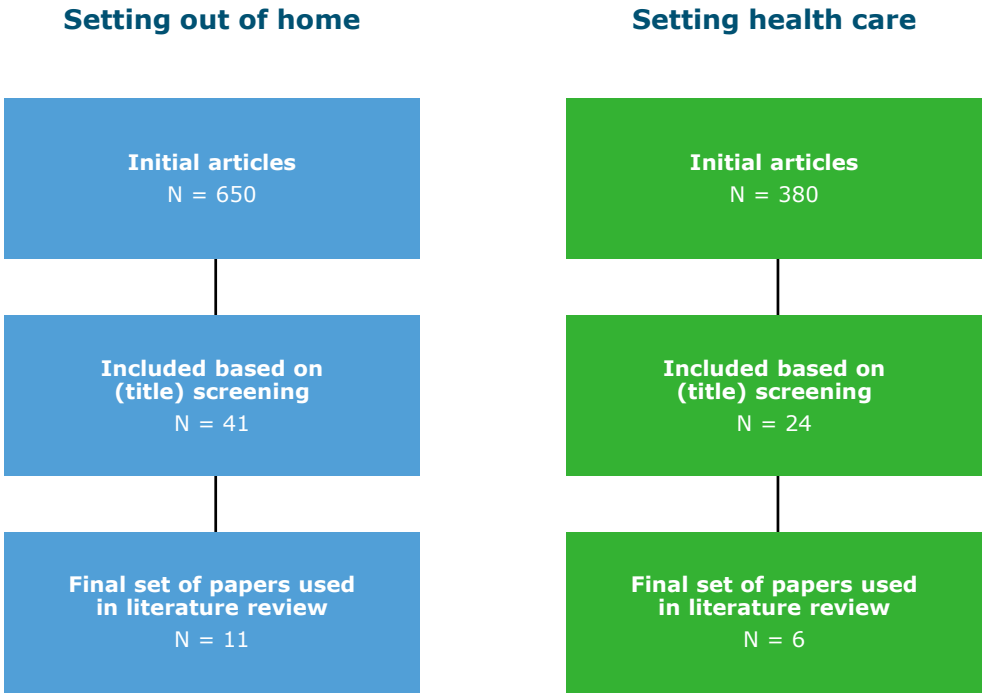
Round 2

The remaining papers were further screened for inclusion/exclusion in the literature review based on the paper abstracts. If doubting whether a paper should be included, the full paper was retrieved to obtain the relevant information. The following *exclusion criteria* were used to identify papers that were relevant to the literature review:

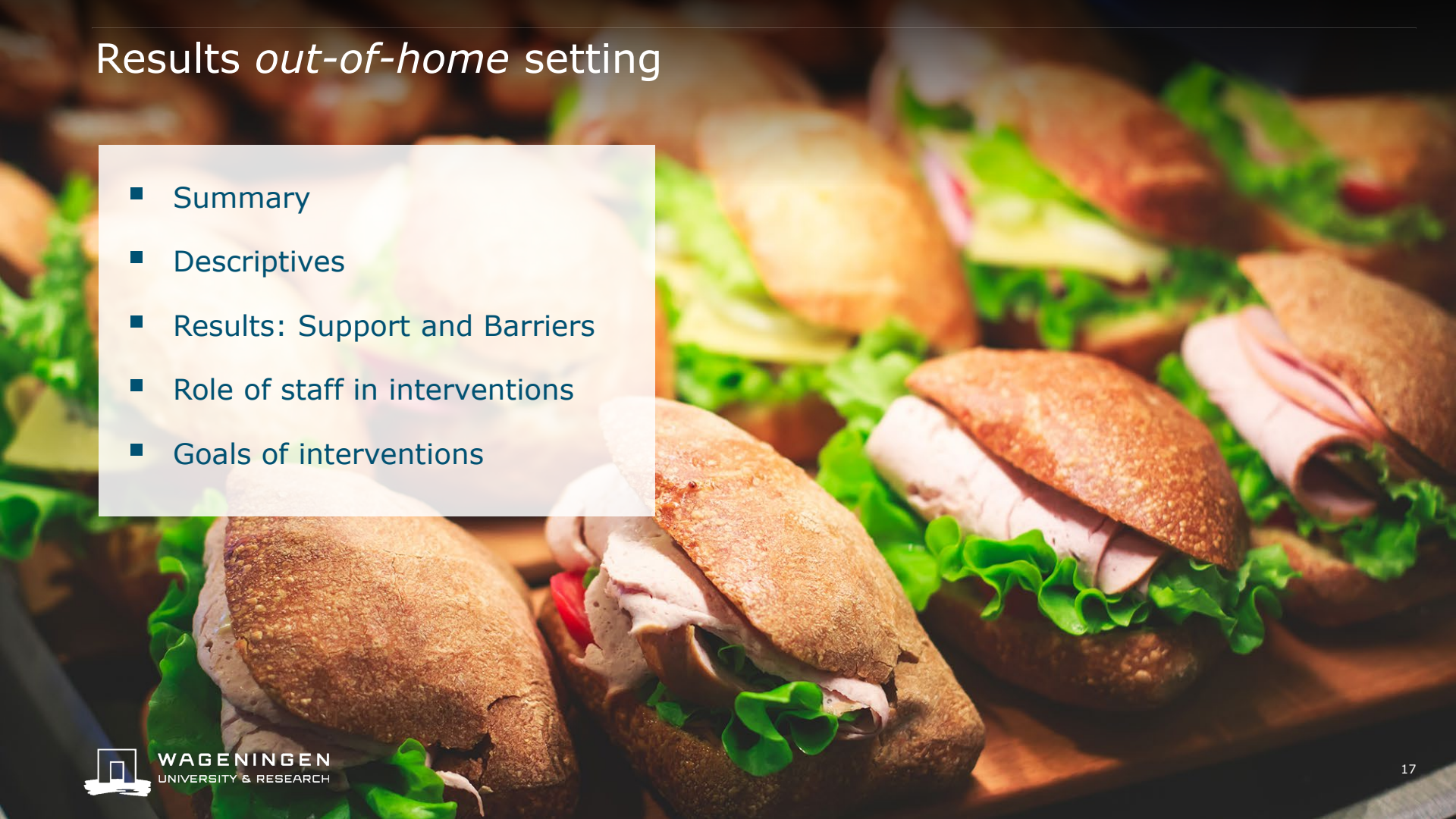
1. **Not English:** Study is not in English
2. **No results:** No empirical results are presented (e.g., only a study protocol is described)
3. **No western study:** Interventions executed in non-western countries, since these countries have their own dynamics that do not allow to 'translate' the results to a western context
4. **Specific target group**: Interventions executed among specific 'niche' target groups (e.g., people with certain diseases or syndromes, specific ethnic minority groups)
5. **Not in relevant settings**: Interventions that were not executed in out-of-home or health care settings
6. **Not focused on staff:** Articles that were not focused on staff (e.g., their role in the intervention, their motivation, opinion, etc.)
7. **No experimental study:** Papers that contain no interventions or experiments (i.e., qualitative studies, correlational studies, cross-sectional studies or trend analyses)
8. **Outside domain**: Interventions that do not focus on food (e.g., focused on alcohol, smoking, physical activity, gardening)
9. **No consumer study**: Interventions that focused on other aspects of food instead of consumption (e.g., food safety, contamination)
10. **No real-life study**: Studies that were not executed in a real-life context are excluded (i.e., lab or online studies).

Paper selection flow chart for inclusion into literature review

See the figures on the right for an overview of the number of articles in each of the rounds of the literature review process. The final number of articles that were incorporated in the literature review was 11 articles for the setting 'out of home' and 6 articles for the setting 'health care'.



Results *out-of-home* setting



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- Descriptives
- Results: Support and Barriers
- Role of staff in interventions
- Goals of interventions

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Summary

Most studies in the out-of-home setting focused on schools settings (6 studies), like school canteens, but also within the school in general. The other studies focused on workplace and restaurant settings. Within these settings students, costumers and employees were the target group.

The goal of the interventions was to increase the overall health of the target group, through offering and promoting healthier foods. Most school studies had a decrease of obesity as a goal. This was mostly done through an increase in fruit, vegetables, non fat and whole grain food.

The profession of the staff was mostly either food service manager or food service staff (6 studies). In total, twelve different professions are mentioned for the staff in the studies, ranging from principal to restaurant owner.

Within 8 studies the staff received training in how to promote healthy food, knowledge about food preparation and consequences of unhealthy cooking. Within the other three studies the staff received guidelines about how they could offer and sell more healthy food.

Most studies mentioned as support and motivation for staff to implement an intervention, that they needed to be knowledgeable of what the intervention entailed and which benefits the outcomes of the intervention had for the target group. Furthermore, a positive perspective of the intervention programme and its outcomes was mentioned as an important supportive factor. Most studies mentioned as a barrier for implementing an intervention a lack of time and communication about the intervention from the management, but also between the staff. Furthermore, a negative perception of the intervention programme and its outcomes functioned as a barrier for implementation.

Descriptives

Appendix 1 presents an overview of the relevant articles found for food interventions in out-of-home settings, in which staff insights with regard to the intervention were also reported. The following paragraphs describe point-by-point the main findings regarding staff insights for interventions in this setting.

Descriptives (number of articles, setting specifications)

- In total 11 articles are incorporated. These 11 articles all reported (qualitative) insights of staff perceptions on interventions to improve dietary behaviours of customers in an out-of-home setting.
- Studies were published between 2003 and 2019; 7 studies were published since 2015.
- Most studies were conducted in school canteens (6 studies). Furthermore, 2 studies took place in a workplace canteen, 1 study in a restaurant, 1 study in a take-out restaurant and 1 study in armed forces camps.
- Studies in school canteens mainly involved the food service managers and staff (6x). Also school administrators/principal (2x), classroom teachers (2x), head maintenance (1x), physical education instructors (1x) and the school nurse (1x) were involved (2 out of 6 studies involved more than 1 type of staff in the intervention). The other settings involved restaurant/canteen owners and managers (4x), canteen staff (1x), military kitchen staff chefs (1x) and a consultant (1x).
- Target groups of the school interventions were school children that went to that school. The target groups of the other settings were the customers of the (take-out) restaurant (2x), clients and employees visiting a canteen (2x) and soldiers (1x).

Results: Supports and Barriers

Supports and Barriers to implement interventions for out-of-home staff

- **Supports** are factors identified by staff which can be either advantages or facilitators for staff and/or target groups of the intervention
- **Barriers** are factors identified by staff which can hinder effective implementation of the intervention by the staff

Supports reported in the studies

- Knowledge of intervention and benefits for target group (8 studies)
- Positive perceptions of staff towards intervention (8 studies)[3]
- Support (from fellow staff or administration, teachers, managers, or positive reactions of customers to the intervention) (5 studies)[3]
- Satisfied with training and enjoyed it (3 studies) [2]
- Easy to implement (minimal extra time and work) (3 studies)
- Communication of intervention among staff (2 studies)[3]
- Confidence to make changes (1 study)
- Publicity for intervention (1 study)
- Incentives for participating staff or companies (1 study)
- Mandatory implementation (1 study)

Barriers reported in the studies

- Lack of time (7 studies)[2]
- Negative perceptions of staff towards intervention (5 studies)[2]
- Lack of communication amongst/to staff about intervention (5 studies)
- Lack of staff (4 studies)
- Other competing priorities (4 studies)[2]
- Practical barriers (preparing smaller portions, waste, expensive vegetables, coolers, electricity, training material) (4 studies) [2]
- Lack of focus on health benefits for target group in intervention (3 studies)
- Lack of support (other stakeholders, teachers, manager or negative reactions of customers on the intervention) (3 studies)
- Losing profit and customers concerns (2 studies)
- Lack of financial resources (2 studies)

[2] Thomas, Hill, Gaines and Dollahite (2016) interviewed the interventionist, who delivered training to the staff.
[3] Thorsen, Lassen, Tetens, Hels, and Mikkelsen (2010) described staff insights based on the interpretation of the researchers. Both these insights did not come directly from staff.

Role of staff in interventions

The exact role of the staff in the interventions depended on the design/content of the intervention.

- In 8 of the 11 studies health care staff received a form of **training**, either about nutrition, how to prepare healthier meals, or making products more attractive with promotion and placement in the canteen.
    - In 3 of these studies *managers and interventionists* were trained and they, in turn, trained the staff.
- In 3 studies, no training was provided. In 2 studies the managers, owners or school staff received implementation guidelines or rules, of what they needed to offer. In 1 study a request was made to chefs, in which three possible alternatives were given to reduce meat consumption.

Goals of interventions

All 11 studies targeted to improve healthier dietary options of students or consumers in out-of-home settings.

All studies aimed to increase healthier food intake of students or consumers; The studies in school settings targeted a decrease of childhood obesity and increase of overall health for children. Most of the studies did this by increasing the availability of fruit and vegetables. Two of these articles also targeted academic outcomes of the students.

Studies done in restaurants or company canteens focused on an increase of overall health.

- One study targeted a decrease of sodium use in meals and reduction of cardiovascular disease,
- One study also targeted reduction of cardiovascular disease through a decrease of meat consumption. Furthermore, this study focused on increase of sustainable eating.

Results *health care* setting

- Summary
- Descriptives
- Results: Support and Barriers
- Role of staff in interventions
- Goals of interventions

Summary

The studies in health care settings either focused on hospitals or nursing homes. In one half of the studies, behavioural interventions targeted patients in general, while in the other half of the studies there was a more specific target group (i.e., patients with dementia or patients aged 70 or older).

The goals of the interventions was to improve the dietary intake of the patients, by for instance increasing the energy intake and/or protein intake of the patients. Often, prevention of malnutrition was specifically mentioned as a goal of the intervention.

Nurses were involved in almost all of the interventions (5 out of 6), while food service staff had a role in half of the interventions.

In most studies (4 out of 6), the role of the staff in the behavioural intervention revolved around a form of training, coaching and/or education that they received. Furthermore, in 2 studies the menu that was offered was changed by foodservice staff (in the form of higher amount of kJ and/or protein).

Barriers with regard to the interventions were mentioned far more often than supporting factors in the included papers. Lack of time to properly execute the intervention was by far the most often mentioned barrier (5 out of 6 studies), while lack of staff and practical barriers such as inflexibility of the food service system and problems in information flow were also regularly mentioned (3 out of 6 studies each). The main supporting factors that were mentioned revolved around satisfaction of the staff with the intervention itself and a greater involvement with patients as a result of the intervention.

Descriptives

Appendix 2 presents an overview of the relevant articles found for food interventions in health care settings, in which staff insights with regard to the intervention were also reported. The following paragraphs describe point-by-point the main findings regarding staff insights for interventions in this setting.[1]

Descriptives (number of articles, setting specifications)

- In total 6 articles are incorporated. These 6 articles all reported (qualitative) insights of staff on interventions to improve dietary behaviours of patients in health care settings.[1]
- Half of the studies were published since 2015 (3 out of 6 articles).
- 3 studies were conducted in hospitals and 3 studies were conducted in nursing homes.
- 5 studies involved nurses in the intervention, 3 studies involved food service staff, and 1 study involved volunteers (3 out of 6 studies involved more than 1 type of staff in the intervention).
- Target groups of the interventions were patients of the health care setting; in 2 studies there was a specific focus on patients with dementia and 1 study there was a specific focus on patients aged >70.

[1] 1 of the 6 studies reported staff insights with regard to the intervention via interpretation of the researchers; these insights did not come directly from the staff that executed the intervention (Simmons & Schnelle, 2004)

Results: Supports and barriers

Supports and Barriers to implement interventions for health care staff

- **Supports** are factors identified by staff which can be either advantages or facilitators for staff and/or target groups of the intervention
- **Barriers** are factors identified by staff which can hinder effective implementation of the intervention by the staff

Supports reported in the studies

- Satisfied with training (2 studies)
- More involvement with patients (2 studies)
- Positive perceptions of staff towards intervention (1 study)
- Knowledge of intervention and benefits for target group (1 study)
- Confidence to make changes (1 study)
- Incentives for participating staff (1 study)

Barriers reported in the studies

- Lack of time (5 studies)[2]
- Lack of staff (3 studies)[2]
- Practical barriers (inflexibility food service system, food waste, problems in flow of information) (3 studies)
- Other competing priorities (2 studies)
- Negative perceptions of staff towards intervention (lack of interest, not open to coaching) (2 studies)
- Lack of incentives (1 study)
- Lack of communication amongst/to staff about intervention (management decision to implement intervention) (1 study)
- Patients' resistance (1 study)
- Lack of support (staff observations not translated into action) (1 study)
- Dilution of responsibility among staff to execute intervention (1 study)
- Fear of situations that are not dealt with in training (1 study)

[2] Simmons and Schnelle (2004) described lack of time & lack of staff in their study based on their own interpretation; these insights did not come directly from staff

Role of staff in interventions

The exact role of the staff in the interventions depended on the design/content of the intervention.

- In 4 of the 6 studies health care staff received a form of **training, education and/or coaching**, either about nutrition in general and/or skills to improve patients' nutrition. Lectures, presentations and (group) discussions were often used forms of training/education/coaching in these studies.
    - In 3 of these studies *feeding assistance* was trained.
    - In 1 of these studies staff were trained to *monitor patients' nutritional status* in food diaries/records.
- In 2 studies, as part of the intervention there was a **change in the menu** available to patients by foodservice staff, for instance by increasing the amount of kJ and/or protein in meals.

Goals of interventions

All 6 studies targeted to improve the dietary intake of patients in health care settings.

All studies aimed to increase the meal/energy intake of patients; one of these studies specifically targeted an increase in protein intake. The underlying reason for increase in meal/energy intake did (slightly) differ between the studies:

- 5 of the 6 studies explicitly mention **prevention of malnutrition** as the reason to increase meal/energy intake of patients.
- One study explicitly mentions **reduction of length of hospital stay** & **reduction in the need for intravenous antibiotics** by increasing meal/energy intake of patients.

Conclusion and discussion

- Conclusions out-of-home
- Conclusions health care
- Recommendations
- Limitations
- Implications and conclusions

Conclusions out-of-home

In **out-of-home settings**, interventions were implemented in schools (canteens), work environment or restaurants with the goal to improve the overall health and weight of students, employees or customers. The staff involved in the interventions were mostly food service managers and staff and a variety of other staff like canteen staff or chefs, principals, teachers, restaurant owners and managers.

Involvement of the staff in the intervention was mostly training in how to promote and prepare healthy food and knowledge about consequences of unhealthy cooking. In some studies the staff received guidelines about how they could offer and sell more healthy food.

Lack of time to implement changes and to participate in training were the most often mentioned barriers by staff. Additionally, a lack of communication from the managers to the staff and amongst staff members about execution and benefits of the intervention and negative perceptions of the staff towards the intervention were also regularly mentioned barriers.

The main supporting factors that were mentioned by involved staff included knowledge on how to implement the intervention and of the benefits for the target group and positive perceptions of staff towards the intervention.

Conclusions health care

In the **setting health care**, interventions were implemented in either a hospital or nursing home, with the goal to improve the dietary intake of the patients residing in these facilities. The staff involved in the interventions were nurses in almost all interventions, while food service staff (e.g. catering) had a role in half of the interventions in these health care settings.

Staff participation in the interventions most often involved a form of training, coaching and/or education. Furthermore, in some interventions the menu that was offered was changed by foodservice staff, to increase energy and/or protein intake of the patients.

A variety of barriers are mentioned in the included studies, which could potentially hinder effective implementation of an intervention by the staff. Lack of time to properly execute the intervention was by far the most often mentioned barrier by staff. Additionally, a lack of staff/ workforce capacity and practical barriers such as inflexibility of the food service system were also regularly mentioned barriers.

The main supporting factors that were mentioned by involved staff included satisfaction of the staff with the intervention itself and a greater involvement with patients as a result of the intervention.

Discussion: link with behavioural framework

Michie, van Stralen and West (2011) created a framework in which three behaviour conditions were identified, together with intervention functions and policy categories. These behaviour conditions are: motivation, opportunity and capability. This framework can be viewed as a wheel in which different behaviour conditions can be combined with (multiple) different interventions. Interventions can be combined with policies, but policies can not directly be combined with the behaviour conditions, and the intervention is first needed. The findings of this review can be linked to the behaviour conditions of the framework, to explore possible recommendations per behaviour condition.

The behaviour conditions (motivation, opportunity and capability) can influence each other. This means that if one barrier is linked to motivation and another to opportunity, that these barriers can also influence each other and that solving one barrier can affect or maybe even create another barrier. Additionally, by ignoring the most important barriers for staff, for example lack of time, solving another small barrier might not change their participation in the intervention.

In Tables 1 and 2 the supports and barriers are placed within one of the three conditions, after which recommendations are formulated.

Figure: The behaviour change wheel from Michie et al. (2011)

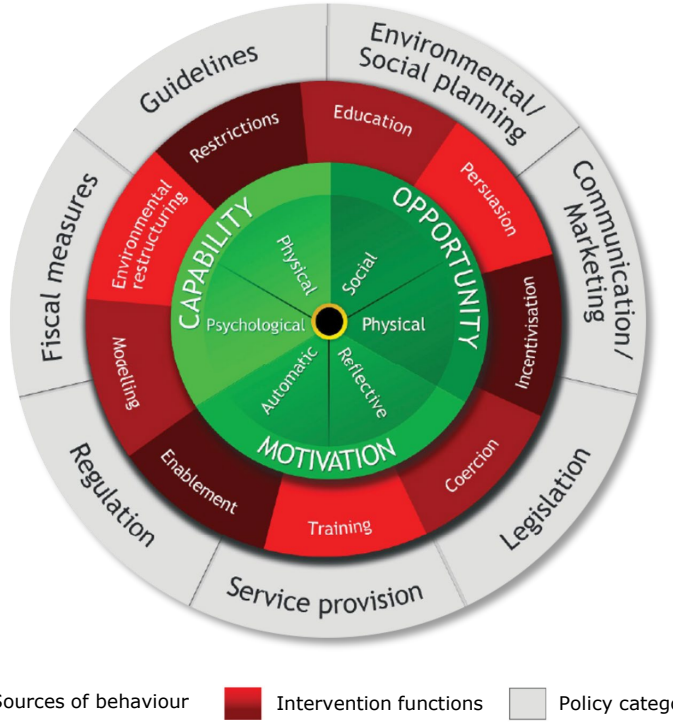

Table 1: Supports linked to behaviour conditions, and their occurrence in the settings out-of-home and health care.

Behaviour condition	Supports	Out-of-home	Health care
Opportunity	Incentives	Yes	Yes
	Easy to implement (minimal extra time and work)	Yes	
Capability	Confident to make changes	Yes	Yes
	Knowledge of the intervention and the benefits for target group	Yes	Yes
Motivation	Positive perceptions towards the intervention	Yes	Yes
	Communication of intervention among staff and towards stakeholders	Yes	
	Mandatory implementation	Yes	
	Support (from fellow staff or administration, teachers, managers, or positive reactions of customers on the intervention)	Yes	
	Greater involvement with patients		Yes
	Staff was satisfied with the training	Yes	Yes

Table 2: Barriers linked to behaviour conditions, and their occurrence in the settings out-of-home and health care.

Behaviour condition	Barriers	Out-of-home	Health care
Opportunity	Lack of time (to implement changes and/or participate in training)	Yes	Yes
	Lack of staff/workforce capacity	Yes	Yes
	Other competing priorities	Yes	Yes
	Practical barriers (preparing smaller portions, waste, expensive vegetables, coolers, electricity, training material) or (inflexibility food service system, food waste, problems in flow of information)	Yes	Yes
	Lack of financial resources	Yes	
	Lack of incentives		Yes
	Patients' resistance		Yes
Motivation	Lack of communication ▪ lack of communication amongst staff members about benefits of the intervention ▪ lack of communication from the managers to the staff about the benefits of the intervention	Yes	Yes
	Lack of focus on health benefits for target group in intervention	Yes	
	Lack of support (from managers or customers)	Yes	Yes
	Concerns about loosing profit and customers	Yes	
	Dilution of responsibility among staff to execute intervention		Yes
	Fear of situations that are not dealt with in training		Yes
	Negative perceptions towards the intervention	Yes	Yes

Recommendations

The barriers were mostly linked to motivation and opportunities of the behavioural framework of Michie et al. (2011). Six barriers were mentioned in both settings, four were only mentioned in the out-of-home setting and four were only mentioned in the health care setting. Supports were linked to motivation, opportunities and capabilities. Five supports were mentioned in both settings, four in the out-of-home setting and one in the health care setting. Solutions are discussed in relation to multiple barriers and supports that could influence each other.

A mentioned support was being satisfied with the training, because the participants learned a lot and thought the training was fun. Making the training fun and useful for the participants might help to develop a positive perception of the intervention. These trainings made the participants feel confident to make changes and knowledgeable about how to implement the intervention.

Another mentioned support is giving the staff incentives for implementing the intervention. This might be a good temporary solution to motivate the staff to attend training or education, especially if staff needs to attend a training or education in their lunch break or own time. However, this might not be a solution for the long term or if the staff has work to do that has higher priorities for them. When using incentives the staff might go back to their way of working as before the intervention when incentives stop. Alternatively, staff might not be motivated by incentives because they just do not have the time to participate in training.

Recommendations

One of the barriers mentioned in both settings is negative perceptions of staff toward the intervention, in which the staff indicated that they did not believe in the benefits of the intervention. This could be solved by educating the staff about the benefits of the intervention before they start implementing it. Furthermore, the staff could be supported (before and) throughout the implementation of the intervention to stay motivated to be engaged. A lack of support is mentioned as a barrier in both settings. If the staff has knowledge about the benefits of the intervention, they could possibly explain these benefits to customers who are not happy with the changes. To educate and support the staff, communication might be needed from the management and between the staff. Reminding each other of the benefits could be motivating to work on the intervention. However, a lack of communication is mentioned as a barrier in both settings. Additionally, the staff could be persuaded by communicating information about the intervention in a positive and inspiring way, which creates the opportunity to develop positive feelings towards the intervention.

Another important barrier in both settings was lack of time. Enabling staff to have more time for the intervention can be done by more support from their supervisors to create time (which is also one of the supports mentioned in this review) or by creating a policy or regulation, for example one in which rules are made for when and how much time staff can spend on implementing interventions. Lack of staff, which was mentioned as a barrier, could possibly add to a lack of time for the remaining staff. When hiring (temporary) staff is not an option, enabling staff to create time to implement the intervention could also mean supporting the staff with certain services, like online training. The staff could engage in competing priorities without missing valuable information or training, because they can do this online when it suits them.

Recommended action points

In this section a list of recommendations is presented. This list is an overview of action points derived from the recommendations from the previous pages. Because these actions are based on the earlier supports and barriers, it is likely that they influence each other and should be implemented together (within the limitations of the company).

- Make training fun and useful for staff to develop a positive perception of the intervention
- Give incentives if staff needs to participate in a training in their lunch break or own time, but combine incentives with other actions to stimulate changes in the future
- Educate the staff on the benefits of the intervention before they start implementing it
    - Support the staff throughout the implementation of the intervention to stimulate their motivation to be engaged
    - Support them by communicating the benefits of the intervention
- Communicate the intervention in a positive and inspiring way
- Enable the staff to create time for the intervention
    - Create a policy, in which rules are made about how much time the staff can spend on training and implementing the intervention
- Hire temporary staff to take over tasks until the intervention has become a habit
- Support the staff with services like online education or training so they can choose when to follow it

Limitations

First, there are not many studies that (also) examine the effect that a field study in a health care setting or in a out-of-home setting has on the staff that implements the intervention and how this can influence the effectiveness of the intervention. The studies that we did found were unequally divided over different settings, for example in the out-of-home setting, most studies focused on school settings and less on restaurant or work canteen settings. So there is not a very clear picture on how interventions affect the staff that implements it.

Second, within a health care context, studies tend to focus on patients eating more proteins or increase their energy intake, while in the out-of-home setting studies focus on a more general healthy diet of students or customers. It is not known if this difference in focus of the interventions might influence how the staff views the intervention, although one may expect that the focus of the interventions matches the problems that play a role in these settings.

Moreover, there were a few studies that based their results on interpretations from the researchers who delivered the intervention, and thereby discussing the results from the perspective of the researcher, instead of from the staff.

Finally, it should be addressed that the results as shown in this report might be affected due to publication bias. Publication bias causes certain studies to be published more.

Implications and conclusion

Implications

From the studies that do take a closer look at the staff, we observed that there seem to be more barriers for health care and out-of-home staff to implement an intervention than there are supporting factors. Although more barriers were observed, more research should be done to examine if each barrier has the same impact and whether barriers weigh more heavily than supporting factors, when an intervention is implemented. Nevertheless, based on this review more barriers might indicate that there is a need for more emphasis on taking away these barriers and on increasing the supporting factors when implementing interventions in the field. In both settings, lack of time is an important barrier for staff, which could be addressed by making the implementation of the intervention as simple as possible. In the health care setting, inflexibility of the food system is mentioned as a barrier. This could be addressed by discussing possibilities with the location in advance. In the out-of-home setting a lack of communication amongst and to the staff about execution is mentioned as a barrier. Thus making sure that everything is well communicated can be important. For both settings, a positive opinion about the intervention is an important supporting factor, so more emphasis on how the staff views the intervention is needed. Finally, specifically for health care staff, a greater involvement with the patients can be a supporting factor, thus this can be used to particularly motivate health care staff.

Conclusion

From the studies that were included in this literature review, we can conclude that it is important to consult the staff about how to overcome their barriers when developing an intervention. There are some indications of how the staff can be motivated, however, given the small number of studies, the amount of evidence is lacking. Furthermore, this research field is relatively new, studies are mostly from after 2015, so more research could be done to increase the amount of evidence for how to motivate the staff. Looking into how barriers can be taken away and how staff can be more supported can help to improve behavioural interventions in health care and out-of-home settings.

Appendix 1: Tables with included real-life intervention studies in *out-of-home settings*

Appendix 1: Tables with included real-life intervention studies in *out-of-home settings*

Appendix 2: Tables with included real-life intervention studies in *health care settings*

Appendix 3: Final search strings used to retrieve articles

Appendix 1: included out-of-home staff studies

Author(s)	Year	Setting	Target group	Staff occupation	Goal intervention	Role of staff in intervention	Staff insights
Bean, Theriault, Grigsby, Stewart, & LaRose	2019	School canteen	Students	Canteen managers and staff	to disseminate the Smarter Lunchroom approach to changing the school food environment within an urban public school district serving a low-income student population. The overall goal is to capitalise on choice architecture to make healthier food more accessible, and less healthy food less accessible, thereby positively shaping students' dietary selection and consumption patterns.	All canteen managers within the district were required to participate in 2 training sessions. Managers were then asked to train the canteen staff at their respective schools on principles of behavioral economics and choice architecture designed to enhance students' food selections via modifications to the canteen environment. This intervention used a 'train-the-trainer' model.	Overall adherence to Smarter Lunchroom principles increased 6.47% at post-intervention and 6.93% at follow-up. **Support:** ▪ Most staff and managers were (very) satisfied about the training they had received ▪ Managers expressed high confidence in abilities to make changes and staff was confident or very confident ▪ Knowledge of intervention was higher than before intervention for managers and staff ▪ Managers reported that they had the support necessary to implement changes and reported high levels of behavioral intention to implement a change **Barriers:** ▪ Lack of time and staff to implement changes ▪ Competing priorities ▪ Negative perception of intervention Stated by the researchers: This approach was designed to promote managers' self-efficacy and autonomy; it also allowed for a wide range of acceptable changes, and overcame time and cost barriers to training the entire food service staff in the district, enhancing dissemination potential.
Economos et al.	2009	Restau-rants	Families and young children	Restaurant owners and managers	Environmental factors at the community level may play a role in the development and maintenance of obesity. Because many US families frequently eat meals outside of the home, restaurants are an environmental factor that can affect their health. The purpose of this project was to test the feasibility of a community-based restaurant initiative that targets families and young children, designed to improve energy balance by making small changes in all aspects of a child's environment.	Implementing initiative Must offer: ▪ Smaller-sized portions ▪ Fruits/vegetables available as side dishes and/or entrees ▪ Low-fat or nonfat dairy products (Asian restaurants exempted) Must highlight healthier options on a menu board, the menu itself, a laminated sign, or a table tent Must display an SUS seal of approval in the restaurant door or window	**Support:** ▪ The strategy of publicizing approved restaurants facilitated participation in the programme: ▪ Seven of 10 believed that it had been beneficial for them to participate in the programme because of publicity, although only 3 indicated that the programme had drawn a new base of customers to their restaurants. ▪ Seven of 10 indicated that they were more aware of nutrition as a result of participating in the programme. ▪ Half thought their staff was more aware of nutrition **Barriers:** ▪ Owners and managers expressed considerable concern about half-sized portions because they were not able to offer them at half the price. ▪ Waste was also an issue because several items had to be made whole and cut to half size. For example, making a half-size burrito or wrap was problematic because of the wrap size and shape. ▪ Owners and managers also had concerns about replacing fries and chips with vegetables, which are expensive and perishable. ▪ Many managers were concerned about the possible effect on profits. They indicated that any publicity resulting from participation would be an attractive incentive. ▪ Barriers to participation included lack of time and interest and concerns about potential profit losses. Stated by researchers: crowded menus, menu boards, and table tops hindered implementation, and owners and managers lacked the time and will to overcome these barriers.

Appendix 1: included out-of-home staff studies

Author(s)	Year	Setting	Target group	Staff occupation	Goal intervention	Role of staff in intervention	Staff insights
Gittelsohn et al.	2003	Schools	School children	school administrators (principals), food service managers and staff, classroom teachers, and physical education instructors	Pathways was a multisite school-based study to prevent obesity in American Indian school children by encouraging healthy eating and physical activity.	Food service managers and staff were trained and prepared meals for pathway classes and other events. The teachers gave for example tasting classes and limited bake sales and rewarding with sweets and so on. Administrators scheduled classes and coordinating the implementation.	**Support:** ▪ Teachers who supported Pathways were highly motivated to carry out the objectives of the programme. ▪ The food service managers and staff were somewhat positive and enjoyed the trainings ▪ With support and enthusiasm from food service staff many of the guidelines were implemented ▪ Comments about the food service staff's support for the Pathways programme were positive. Many of the teachers indicated that the food service staff members were cooperative and supportive of requests for special foods needed for particular Pathways lessons. ▪ The food service supported the programme by following the guidelines and being flexible when needed. ▪ The most frequently mentioned support by teachers was working together and supporting each other throughout the programme (positive school climate) **Barriers:** ▪ Teachers: lack of time to teach Pathways was the most commonly cited barrier ▪ Some teachers and school staff indicated that the activities were difficult to schedule and that it took time away from other important curricula. ▪ No participation school administration ▪ Lack of motivation of teachers ▪ The intervention/curriculum being too much work ▪ Lack of support for pathway objectives 'the attitude of the instructors' was a barrier, because 'two instructors here believe in sweets. . .bake sales etc.,' and other teachers 'still rewarded [the students] with candy when asked not to ▪ Scheduling conflicts, turnover in administration, the administration being too busy, and lack of communication among staff and administration ▪ The most common comments made about the food service referred to scheduling conflicts and not following Pathways guidelines ▪ It is important to note that both the food service manager and other kitchen staff needed to support the intervention for proper/successful implementation, and barriers to successful implementation were observed where this was not the case.

Appendix 1: included out-of-home staff studies

Author(s)	Year	Setting	Target group	Staff occupation	Goal intervention	Role of staff in intervention	Staff insights
Haesly et al.	2014	Schools	School children	Principal, assistant principal, head maintenance, local foodservice managers, district foodservice directors, and a school nurse, teachers	Project BREAK! was designed to test the efficacy of an intervention to increase student participation in the reimbursable School Breakfast Program (SBP). Two schools developed grab-n-go menus, added convenient serving locations, and allowed eating in the hallway, each school created a 'Breakfast to Go' line near the main entrance. There is significant evidence of increased frequency of breakfast consumption protecting against overweight or obesity and breakfast consumers having a lower body mass index (BMI). Breakfast consumption is associated with enhanced academic performance and cognitive ability.	Implementing intervention, support and facilitating of principal, teachers as role models.	**Support:** ▪ Minimal time and work ▪ Staff could create new recipes and ideas for the programme ▪ The role of the principal was to be supportive and help to facilitate the changes, whereas the role of teachers was to be a role model for students with regards to eating breakfast and encouraging breakfast consumption. **Barriers:** ▪ Communication about the programme, doing marketing campaigns earlier within the school, so everyone knows what is going on ▪ Logistics of making changes, technical difficulties, such as electricity at the main entrance and having the right equipment such as coolers and moving them around.
Hildebrand et al.	2018	Schools	Students	School site manager/cooks, head cooks, or cooks with work experience ranging from <1 to >20 years.	Schools are a focal point for implementing policies and practices aimed at preventing obesity and reducing food insecurity increase the amount and variety of fruits, vegetables, and whole grains while decreasing saturated fats and sodium.	Development of the culinary training intervention, was guided by findings of the pretraining readiness assessment and recommendations that third-party trainers such as chefs be contracted to administer training and technical assistance. The culinary training programme included an overview of the link between the school nutrition patterns and the Dietary Guidelines for Americans, use of herbs and spices to build flavor, mise en place (ie, time management), Smarter Lunchroom strategies, and basic culinary skills (eg, knife skills, standardised recipes, using various equipment for multiple cooking methods). Consistent with adult learning, the training used interactive and experiential learning approaches.	**Support:** ▪ At posttraining, school nutrition staff members were more motivated to make changes because they understood better how the updated meal standards affected students' health and academic outcomes, instead of how a meal should look but not knowing why. ▪ After training, staff members had a heightened sense of support from the local programme directors in preparing meals to meet the standards **Barriers:** ▪ School nutrition staff members did not feel supported by school stakeholders such as teachers and parents. So the dimension of climate did not change from pre- to post-training. ▪ The second dimension that did not change significantly from pre- to posttraining was resources. School nutrition staff were quick to point out that changing food preparation methods to align better with updated regulations was problematic because of limited staff, time, and the lack of available experts. After the training, staff members acknowledged chefs as resources, but they felt the need for ongoing support that would require financial resources.

Appendix 1: included out-of-home staff studies

Author(s)	Year	Setting	Target group	Staff occupation	Goal intervention	Role of staff in intervention	Staff insights
Ma et al.	2018	Chinese take-out restaurants in Philadelphia (at or below the poverty ZIP codes)	Costumers	Owner and chef	HCTI was a unique citywide effort to prevent and mitigate Cardiovascular disease among racial/ethnic minority groups in Philadelphia by decreasing the sodium content in meals served at 206 Chinese take-out restaurants.	Participate in training to Lower use of sodium in meals. Reduce sodium in chinese take-away meals, make changes in chefs' and owners' knowledge about the health risks of sodium overconsumption, perceptions of the need for sodium reduction, self-efficacy for lowering sodium use, and perceptions of training needs for sodium-reduction strategies. The HCTI intervention consisted of (1) professionally led, culturally tailored training on healthy low-sodium cooking training; (2) distribution of low-sodium cooking materials, including low-sodium recipes, cooking utensils, and standard measuring spoons; (3) a citywide sodium-reduction mass-media campaign; and (4) annual one-on-one booster trainings and compliance checks with chefs.	Post hoc tests indicated that knowledge increased significantly from baseline to posttraining and was maintained from posttraining to 36 months after baseline. **Support:** ▪ Perceptions of the need for preparing and offering low-sodium dishes and self-efficacy increased significantly from baseline to posttraining and then returned to baseline levels at 36 months after baseline. ▪ Our results suggest that the training, low sodium ▪ recipes, healthier cooking methods, and booster sessions provided to the chefs and owners were effective and more important, sustainable, ▪ Our study demonstrated the importance of incorporating behavioral strategies (eg, distributing standard spoon sizes and new recipes for low-sodium dishes), culturally appropriate training, and ongoing support. **Barriers:** ▪ Perceptions of the need for training did not change significantly from baseline to posttraining and returned to baseline levels at 36 months after baseline. Researchers: This finding indicates that knowledge may be associated more with the sustained reductions in sodium content than were perceptions and self-efficacy. ▪ Another cause of these changes in knowledge, perception, and self-efficacy may have been change of ownership in more than 2 dozen restaurants, which might have affected the continuity of the intervention effect.

Appendix 1: included out-of-home staff studies

Author(s)	Year	Setting	Target group	Staff occupation	Goal intervention	Role of staff in intervention	Staff insights
Milford and Kildal	2019	Norwegian Armed Forces camps	Soldiers	Military kitchen staff chefs: two heads of kitchens in charge of daily operations and procurement, cooks: five cooks from two different military camps; and decision makers: two nutritionists and one director from the military logistics organization	introduce the Meatless Monday campaign in their camps the nutritionists also wanted soldiers and staff to learn more about sustainable and healthy food consumption, with reference to one of the objectives of the mandatory military service: the formation of moral and ethical values. In order to reduce the negative environmental impact from food consumption and production, there is a call for a change in diets towards less meat and more plant-based food. Such a dietary change could also be positive for public health, as meat consumption has been found to increase the risk of cardiovascular diseases and strokes, and several types of cancer	Chefs were asked to reduce meat in their kitchens which was formulated as a request. The request presented three possible alternatives on how to reduce the consumption of meat, which were: one regular meat-free day per week; meat-free meals several times a week; or, less meat in the served dishes. Apart from the letter with this request, the decision makers did not provide any information to chefs, cooks or soldiers about the Meatless Monday initiative.	**Support:** ▪ Younger cooks were more positive towards the initiative and when not mentioning vegetarian while using meat substitutes received less complains from soldiers ▪ Those who have experienced meat free days in the military kitchen are more prone to claim that joining the military has given them a more positive view on vegetarian food ▪ Stated willingness to eat more vegetarian food is higher among soldiers who believe in the environmental and health benefits of meat reduction **Barriers:** ▪ Information about the environmental and health benefits of reduced meat consumption was not given in organised, well-prepared manners. Therefore, a lack of conviction about benefits of meat reduction, especially because the army has bigger polluters (airplanes) than their diet and diet is not a priority, ▪ Some chefs explained that they were reluctant because of the way they first learned about the project: through the newspaper, chefs and cooks did not receive training or information on how to cook vegetarian meals. Few chefs and cooks had experience with cooking or eating vegetarian food, and many were skeptical towards its taste and nutritional value. this made that kitchen staff did not feel ownership to the project, ▪ Because the cooks thought vegetarian was boring and soldiers wanted meat, they were afraid soldiers would eat somewhere else.

Appendix 1: included out-of-home staff studies

Author(s)	Year	Setting	Target group	Staff occupation	Goal intervention	Role of staff in intervention	Staff insights
Pitts, et al.	2016	Federal worksite and hospital canteens	Clients and employees	Foodservice managers and operators	The North Carolina Institute for Public Health was working with Partnership for a Healthier America and the Centers for Disease Control and Prevention to better understand the experiences of foodservice operators' with the implementation of healthy food service guidelines, to increase overall health of clients and employees who bought food in the canteens.	Foodservice managers and operators of four federal government worksites and five hospitals who were most knowledgeable about implementing the Guidelines or Initiative participated in a quantitative survey and subsequent in-depth qualitative interview	**Supports:** *participants found guidelines very easy or somewhat easy to implement, because of:* ▪ Agency/client support (costumers found it important) ▪ Health education (e.g. a registered dietitian to explain the Guidelines) ▪ Communication among stakeholders (everyone knew what was expected) ▪ Dietetic interns (helped with developing new marketing materials) **Barriers:** Major challenges with implementation as reported on the quantitative survey included customer dissatisfaction with changes; concerns about cost implications; lack of dedicated foodservice staff; and contracts, permits and obligations that are difficult to change. *Implementation difficulties:* ▪ Training staff on preparation (cost and time) ▪ Customer complaints ▪ Menu labelling can be time-consuming and difficult ▪ Difficulty developing and selling wellness meals ▪ Comfort foods (people want them)
Rajbhandari-Thapa et al.	2017	School canteens	Children/ students	Nutrition managers and staff members	The goal of the Strong4Life School Nutrition Program is to promote healthy eating in school canteens in Georgia by training school nutrition managers and staff members to implement changes in the canteens to nudge children to make healthier choices. 1. Sell: Through promotions and signage, make healthy food selections more appealing to students and nudge students toward selecting healthier options. 2. Taste: Enhance students' taste expectations by ensuring that food items are presented in an attractive and visually appealing way. 3. Visibility: Make the healthiest choices the most visible. 4. Convenience: Make healthy choices quick and easy to reach and include grab-and-go options. 5. Price: Give healthy items an advantage by making them more affordable than less healthy options.	Participating in training and implementing the Strong4Life School Nutrition Program. The training programme included a 90-minute, in-person, interactive training session; 4 videos; a training manual; and a take-home toolkit including bright, colorful, and functional posters, floor decals, stickers, buttons, ceiling danglers, menu item labels, and fruit bowl stickers to help school nutrition staff members and managers enhance the school canteen environment	**Support:** ▪ Participant knowledge of Strong4Life Smart Serving Strategies increased with training (enhancing taste perception by using of creative menu item names, understanding that food placement influences food selection) ▪ Participation in training had a significant effect on the beliefs and self-efficacy of school canteen managers and staff members ▪ Beliefs and self-efficacy (that obesity is a problem, meals play an important role in prevention, like to encourage changes and feeling confident to do so) ▪ Changes that tended to be easily implemented, environmental changes that managers and staff members could do on their own **Barriers:** ▪ Perception: the proportion of respondents who agreed that offering choices was a strategy for increasing consumption and reducing waste did not change significantly. ▪ Managers and staff members were less likely to implement strategies that took more time and resources or that required greater behaviour change.

Appendix 1: included out-of-home staff studies

Author(s)	Year	Setting	Target group	Staff occupation	Goal intervention	Role of staff in intervention	Staff insights
Thomas et al.	2016	School canteens	In middle school canteens (grades 6-8, typically children ages 10-14 years)	School food service staff	This RCT was developed in response to a United States Department of Agriculture (USDA) Agriculture and Food Research Initiative request for proposals to target obesity reduction and prevention among middle school age children the primary goal was to increase selection and consumption of fruits, vegetables, or unflavored milk offered to students as part of the National School Lunch Program (NSLP).	Participating in training and Implementing the SLM intervention Interventionists were responsible for recruiting schools, training school food service staff (referred to as providers) in the SLM protocol, and conducting weekly contact with providers to answer questions, troubleshoot challenges, and encourage treatment fidelity during the intervention period. 15 items were included in the fruit protocol, 13 in the vegetable protocol, and nine in the milk protocol. These items were grouped into three domains: 1) placement and display, which included positioning vegetables after the entrée and offering fruit at multiple points on the service line, 2) creative naming, which entailed posting cards with creative names for fruits, vegetables, and milk on service lines and incorporating names into school menus, and 3) nutrition messaging that included new, rotating nutrition factoid posters in the canteen.	**Support:** *Interventionist:* ▪ Detailed and well organised training, hands-on nature of training and materials, enjoying training *Staff:* ▪ Seeing effect/reaction of intervention on students ▪ Food service director communicated that intervention participation was mandatory ▪ Both interventionists and providers mentioned the need to generate excitement about the project and potentially offer incentives for providers. ▪ Fun in creating signs and names for fruits that appeal to students ▪ Being well-trained: effectively prepared them to execute the intervention and that they did not find the intervention to be too complicated. **Barriers:** *Interventionist:* ▪ Other programmes from the curriculum/government: Findings indicated potential contamination by other nutrition-related activities in the lunchroom and larger school environment may have affected the intervention impact. ▪ Not having access to the complete set of intervention materials needed to train the providers, which negatively impacted their ability to effectively train the providers for successful implementation of SLM in a timely manner. ▪ Interventionists requested the development of a module with guidance on how to increase buy-in from reluctant or less enthusiastic providers. ▪ Time constraints for interventionist to deliver training to staff/provider, usually the training was during lunch and staff left earlier. Furthermore, staff viewed it negative, because it interrupted the lunch break. *Staff:* ▪ Not enough information about the benefits for health for the staff, which lowered priority ▪ Time consuming and space constraints in canteens, budgetary cuts which leads to less staff ▪ Some providers questioned intervention effectiveness and/or expressed negative attitudes related to the perceived ineffectiveness of their efforts. ▪ There was a strong sense among providers that they did not have a lot of input in the execution of the intervention

Appendix 1: included out-of-home staff studies

Author(s)	Year	Setting	Target group	Staff occupation	Goal intervention	Role of staff in intervention	Staff insights
Thorsen et al.	2010	Worksite canteen	Canteen customers	Canteen staff, management and a consultant	Increase in fruit & vegetables (F&V) consumption of canteen customers	Baseline measurements (grams of total F&V consumption per lunch meal per customer) were followed by 8 h training, goal setting and strategy development by the staff and managers at each canteen. End-point measurements were performed 6 months after the beginning of strategy development, and follow-up measurements were performed within 1 year from baseline (4 months from end point). After the baseline measurements, a period of 2 months was spent preparing the F&V intervention, goal setting, deciding on F&V strategies and running courses for the staff. The 6-month intervention was followed by a 4-month period of no F&V measurements before the 1-year follow-up was conducted. Furthermore, during the period of intervention, achievements at the canteens were shared in short newsletters and the canteen managers were encouraged to network with other canteen managers in order to share ideas and support each other.	**Supports:** The authors believe that some of the key elements for sustaining this tailored intervention were management involvement, empowering the canteen staff, getting everyone in the canteen involved in a proactive way and providing networking opportunities between canteen managers. Furthermore, the goals and strategies of worksite interventions were decided individually by each of the canteens' staff. All staff members participated in monitoring, goal setting and decision making, which increased their commitment to the project. The novelty of the study lies in the involvement of the canteen staff already in the initial steps of the intervention. (Nb. Reported staff insights are based on interpretation of researchers, not based on qualitative insights by staff members themselves).

Appendix 2: Tables with included real-life intervention studies in *health care settings*

Appendix 1: Tables with included real-life intervention studies in *out-of-home settings*

Appendix 2: Tables with included real-life intervention studies in *health care settings*

Appendix 3: Final search strings used to retrieve articles

Appendix 2: included health care staff studies

Author(s)	Year	Setting	Target group	Staff occupation	Goal intervention	Role of staff in intervention	Staff insights
Batchelor-Murphy et al.	2015	Nursing home	Nursing home residents with dementia	Nursing home staff (NH staff)	Improvement of meal intake of nursing home residents to prevent malnutrition.	The intervention staff received webbased dementia feeding skills training with coaching. For the treatment group, training provided examples of common mealtime problems and discussed appropriate use of evidence-based nursing interventions. The training contained a 30-min narrated PowerPoint presentation, followed by a 4-min video demonstrating implementation of the problem-solving approach. NH staff were offered in-person group coaching sessions during the lunch meal that followed the training at Weeks 3 and 5. The coaching sessions were to provide support for practicing use of the hand under hand technique, and to answer questions regarding individual resident challenges NH staff faced.	**Barriers:** ▪ The **time required** to complete the training module proved to be the biggest burden for the intervention group. It was time consuming for the study staff to negotiate time off the unit with the NH staff **without an immediate incentive**. ▪ Only 4 of the 17 intervention NH staff completed coaching, **most did not appear open to coaching sessions when approached individually**. Furthermore, only 1 NH staff member completed the entire study protocol.
Collins et al.	2017	Hospital	Hospital patients	Hospital foodservice supervisors (i.e. staff who complete administrative duties and supervise the department) and foodservice assistants (i.e. staff responsible for cleaning kitchen areas, serving and delivering meals)	Improvement of nutritional status of subacute patients by increasing food intake (increase of energy intake, kJ).	The intervention required staff to change their usual job tasks, specifically: (i) prepare and plate nonstandard food and drink items and (ii) use a visual menu and encourage patients' selection at mid-meals. Foodservice staff were asked to encourage patients to choose a food and drink item at mid-meals.	**Supports**: ▪ **Informal competition** among foodservice staff to see who could 'sell' the most items from the higher energy menu acted as an **incentive** for staff to do their best. ▪ Participants (staff) described that they were able to be **more involved with patients** during the pilot: seen as benefit by staff (rewarding). **Barriers:** ▪ The hospital foodservice system was viewed as linear and rigid, which has the downside of **inflexibility in response to change**. ▪ The participants reported that additional tasks associated with the nutrition intervention took extra **time** to complete, but there was no time to manage this. Managing the additional tasks associated with the nutrition intervention when **time and workforce capacity (lack of staff) were limited** was expressed as the biggest barrier. ▪ **Patients' resistance and (extra) food waste** appeared to be a source of negative feedback for foodservice staff and may have generated a perception that the nutrition intervention, or aspects of it, was futile. ▪ **Feelings of guilt, time pressure, lack of collegial support and perceptions of high food waste** reported by some participants (staff) meant they were disapproving of the intervention.

Appendix 2: included health care staff studies

Author(s)	Year	Setting	Target group	Staff occupation	Goal intervention	Role of staff in intervention	Staff insights
Howsen et al.	2018	Hospital	Hospital patients (aged > 70)	Ward staff and mealtime volunteers	Prevention of malnutrition of patients	The volunteers attended a standardised half-day training session delivered by the research team on nutrition in older patients, safe feeding strategies, a practical session on feeding and assessment of competency prior to independent practice as previously described. Mealtime assistance was provided to patients.	**Supports:** ▪ Volunteers felt that preparing patients for their meal was important, and both staff and volunteers identified the **importance of the social aspects** of the volunteer role to patients. ▪ Volunteers **valued the training** they received. **Barriers:** ▪ Ward staff reported that a **lack of assistance** at mealtimes was a factor in patients not eating enough prior to the introduction of the volunteers. ▪ Volunteers also recognised this as a problem and described the **competing priorities** that nurses had to face at mealtimes. ▪ **Staff wished volunteer numbers could be increased**, but recognised that recruiting and maintaining a volunteer workforce was challenging. ▪ Volunteers reported that **situations could arise that had not been discussed** in the training session.
Lassen et al.	2004	Hospital (endocrinology ward)	Hospital patients	Occupational groups: nurses, nurse aides, clinical dieticians, catering officer	Improvement of patients' intake of protein and energy	**Nurses:** The nurses in charge received information a) specifying to which degree the patients' protein and energy requirements were being met before intervention and b) detailing the Danish Recommendations for Hospitalised Patients. The nurses had to continuously register a patient's nutritional status via food records. **Clinical dieticians & Catering officer:** During the intervention period the kitchen changed the production to two different diets: one diet for the elderly and people with little appetite ('hospital diet') and one diet for all patients with ischemic heart disease and diabetes mellitus ('normal diet'). The 'hospital diet' contained 10000 kJ and 90 gram of protein with 18, 40 and 42% of energy from protein, fat and carbohydrates. The 'normal diet' contained 9000 kJ and 80 gram of protein with 10–15, 30 and 55–60% of energy from protein, fat and carbohydrates.	**Barriers:** ▪ The staff had not taken 'ownership' of the intervention study because the decision to participate in the project had not been a staff decision but one taken by the central management (lack of communication to staff). ▪ Several care providers thought that it was a sizeable extra workload to use the food records for recording patients' nutritional statuses and that this had constituted a barrier to their active participation in the process. Time was a limiting factor in nutritional care. ▪ Some nurses were not interested in any new initiatives and in tools for nutritional care. ▪ Individual nutritional care was also hampered by the fact that the kitchen ran a 24-hour nutrition schedule: inflexibility in food service system. ▪ Different groups had different priorities and showed neither insight nor any understanding of the professional competences of the other groups. ▪ The responsibility for the practical aspects of nutritional care could not be precisely located because many different staff groups were involved (+ large staff turnover). This increased the risk that responsibility was diluted.

Appendix 2: included health care staff studies

Author(s)	Year	Setting	Target group	Staff occupation	Goal intervention	Role of staff in intervention	Staff insights
Simmons & Schnelle	2004	Nursing home	Nursing home residents	Nursing home staff: skilled nurses	Improvement of oral food and fluid intake in nursing home residents.	Nurses received a 2-day trial of one-on-one feeding assistance during 6 meals.	**Barriers:** ▪ The **staff time** required to implement either intervention was significantly greater than the staff time that is spent on feeding assistance care under usual NH conditions for the participants in this study. ▪ It is likely that the low amount of feeding assistance care delivery during meals and the inconsistent delivery of oral nutritional supplements and snacks, particularly fluids, between meals observed in this study under usual NH care conditions is a result of **limitations in staffing resources** to render these time-intensive, daily care activities (**Nb. Interpretation of researchers, not based on qualitative insights by staff members themselves**).
Suominen et al.	2007	Nursing homes (dementia wards)	Residents of nursing homes (dementia wards)	Professionals: nurses and food service personnel	Improvement of energy intake of dementia ward residents to prevent malnutrition	The aim of the nutrition education was to facilitate the professionals' understanding of aged nursing home residents' nutritional problems and to internalise the aims of good nutritional care. The educational process took place in five nursing homes and lasted for 6 months. The education included six training sessions (each 2–3 h) with lectures, small group discussions, homework tasks and personal feedback. Small group discussion, teamwork and discussions with the nutritionist were used in learning to respond individually to the problems in the residents' nutrition. The professionals were also able to study literature on nutrition available to them so that they could apply the information individually to the nursing home residents. The nurses assessed the residents' nutritional status with the MNA test. Furthermore, residents' energy and nutrient intake was calculated from food diaries.	**Supports:** ▪ After learning about these issues, they felt that it was **easier to respond to the nutritional problems** and accordingly to make the proper changes to the residents' diets: **confidence to make changes**. ▪ The professionals were very **motivated** to respond to residents' nutritional problems after calculating their diets and nutritional status. The **work in multi-professional teams was found to be very useful: satisfied with education**. **Barriers**: ▪ A **lack of time** and **problems in the flow of information** were the most difficult points of the project.

Appendix 3: Final search strings used to retrieve articles

Appendix 1: Tables with included real-life intervention studies in *out-of-home settings*

Appendix 2: Tables with included real-life intervention studies in *health care settings*

Appendix 3: Final search strings used to retrieve articles

Appendix 3: Final search strings used to retrieve articles

Search term literature review: Setting out of home

TS=((intervention OR 'field experiment' OR 'field experiments' OR RCT OR 'randomized controlled trial' OR 'randomized controlled trials' OR 'randomised controlled trial' OR 'randomised controlled trials' OR 'natural experiment' OR 'natural experiments' OR quasi-experiment OR 'independent group design' OR 'non-randomized trial' OR 'non-randomized trials')

AND
(behav* OR intent* OR intake OR consum* OR choice OR choos* OR decid* OR 'decision making' OR buy* OR purchas* OR eat* OR drink* OR WTP OR 'willingness to pay' OR cook* OR prepar* OR dispos* OR spend* OR 'behavior change' OR 'behaviour change')

AND
(food OR vegetable OR fruit OR meat OR dairy OR fish OR snack OR breakfast OR lunch OR dinner OR dessert OR meal)

AND
(restaurant OR school OR canteen OR hotel OR 'fast food' OR cafeteria OR 'train station' OR 'train stations' OR 'gas station' OR 'gas stations' OR airport OR 'on the go' OR 'vending machine' OR 'vending machines')

AND
(staff OR employee* OR volunteer* OR waiter OR waitress OR manager OR cook OR chef OR host OR 'serving staff' OR server*))

Appendix 3: Final search strings used to retrieve articles

Search term literature review: Setting health care

TS=((intervention OR 'field experiment' OR 'field experiments' OR RCT OR 'randomized controlled trial' OR 'randomized controlled trials' OR 'randomized controlled trial' OR 'randomized controlled trials' OR 'natural experiment' OR 'natural experiments' OR quasi-experiment OR 'independent group design' OR 'non-randomized trial' OR 'non-randomized trials')

AND
(behav* OR intent* OR intake OR consum* OR choice OR choos* OR decid* OR 'decision making' OR buy* OR purchas* OR eat* OR drink* OR WTP OR 'willingness to pay' OR cook* OR prepar* OR dispos* OR spend* OR 'behavior change' OR 'behaviour change')

AND
(food OR vegetable OR fruit OR meat OR dairy OR fish OR snack OR breakfast OR lunch OR dinner OR dessert OR meal)

AND
(hospital* OR 'health-care centre' OR 'health-care center' OR disabilit* OR disable* OR 'mental health clinic' OR 'mental health hospital' OR 'mental health institution' OR 'psychiatric hospital' OR 'psychiatric institution' OR 'nursing home' OR 'retirement home' OR 'residential care center' OR 'residential care centre' OR 'retirement community')

AND
(staff OR employee* OR volunteer* OR nurse* OR doctor* OR dietitian OR dietician OR 'health practitioner' OR assistant OR host*))

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More information

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