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# "It could probably help someone else but not me": a feasibility study of a snack programme offered to meals on wheels clients

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# "It could probably help someone else but not me": a feasibility study of a snack programme offered to meals on wheels clients

## **Abstract**

Objectives Community-based services, such as Meals on Wheels (MOW), allow older adults to remain in their homes for as long as possible. Many MOW recipients experience decreased appetite that limits intake at mealtimes. This pilot study aimed to determine the feasibility of providing high protein high energy snacks to improve nutrient intakes of MOW clients in a regional centre of New South Wales, Australia.

Participants A convenience sample of 12 MOW clients.

Intervention Participants received snacks five times a week, in addition to their usual MOW order, for four weeks.

Measurements Nutritional status was assessed using the Mini Nutritional Assessment tool. Pre-post changes in dietary intake were assessed using a diet history and food frequency questionnaire. Qualitative interviews conducted in clients' homes were digitally recorded, transcribed verbatim, and themes identified.

Results Post-intervention, there was a trend for an increased energy (mean = +415kJ (SD=1477)/day) and protein (+7.2 ( $\pm$ 14.06) g/day) intake. MNA scores significantly increased ( $P= 0.036$ ) and proportion of respondents categorised as 'malnourished' or 'at risk of malnutrition' decreased from 17% to 8%, and 67% to 25%, respectively ( $P$

Conclusion Provision of an additional daily mid-meal snack may be a useful addition to existing MOW services, for improved energy and protein intakes. However, not all MOW clients at risk of malnutrition perceived the snacks to be beneficial to them.

## **Keywords**

probably, help, someone, wheels, else, but, not, me, programme, clients, offered, could, meals, feasibility, study, snack

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# ***“It could probably help someone else but not me”*: A feasibility study of a snack programme offered to Meals on Wheels clients**

Karen Charlton, Karen Walton, Leah Moon, Kelly Smith, Anne McMahon, Faye Ralph, Melinda Stuckey, Fiona Manning, Jacque Krassie.

**Keywords:** Meals on Wheels, snacks, energy, protein, malnutrition, qualitative methods

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## **Abstract**

**Objectives:** *Community-based services, such as Meals on Wheels (MOW), allow older adults to remain in their homes for as long as possible. Many MOW recipients experience decreased appetite that limits intake at mealtimes. This pilot study aimed to determine the feasibility of providing high protein high energy snacks to improve nutrient intakes of MOW clients in a regional centre of New South Wales, Australia.*

**Participants:** *A convenience sample of 12 MOW clients.*

**Intervention:** *Participants received snacks five times a week, in addition to their usual MOW order, for four weeks.*

**Measurements:** *Nutritional status was assessed using the Mini Nutritional Assessment tool. Pre-post changes in dietary intake were assessed using a diet history and food frequency questionnaire. Qualitative interviews conducted in clients' homes were digitally recorded, transcribed verbatim, and themes identified.*

**Results:** *Post-intervention, there was a trend for an increased energy (mean = +415kJ (SD=1477) /day) and protein (+5.6 (18.8) g/day) intake. MNA scores significantly increased (P= 0.049) and proportion of respondents categorised as ‘malnourished’ or ‘at risk of malnutrition’ decreased from 17% to 8%, and 67% to 25%, respectively (P <0.05). Mean body weight increased from 67.1 (14.3) to 67.8 (14.7) (P= 0.008), while Body Mass Index (BMI) increased by a mean of 0.83 (±1.12) kg/m<sup>2</sup> (P = 0.039). Only half of participants indicated interest in continuing with the program. Reasons included the role of snacks serving as a reminder to eat, as well as their perceived nutritional value. Identified barriers included perceived lack of need for additional food, ability to self-provide such items, and a perceived adequate health status.*

**Conclusion:** *Provision of an additional daily mid-meal snack may be a useful addition to existing MOW services, for improved energy and protein intakes. However, not all MOW clients at risk of malnutrition perceived the snacks to be beneficial to them.*

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## **1. INTRODUCTION**

Many older people living at home experience difficulties with meeting their nutrient requirements, due to a myriad of risk factors. These may include dementia, depression, decreased visual acuity, poor dentition, pain from acute or chronic diseases, especially cancer, polypharmacy, social isolation, depression and financial burden (1). Age-related

physiological changes also increases an older individual's susceptibility to an inadequate food intake, and impaired nutrient absorption (2). Best estimates of the prevalence of malnutrition in community-dwelling older adults, assessed using the validated Mini Nutritional Assessment, is 6 % (2). In Australia, between 5 % (3) and 8 % (4) of older people at home are reported to be malnourished. An additional 35-39 % have been categorised as at risk of malnutrition. Malnutrition increases the risk of falls, osteoporosis, fractures, chronic disease, prolonged hospitalisation, and increased complications, all of which heighten the risk of mortality (5-7). Meals on Wheels (MOW), Australia, is a non-for-profit organization that provides both hot and frozen meals to frail older people, as well as younger people living with disabilities. By supporting the nutritional status of older adults, MOW aims to promote independence and improve quality of life (8). However, studies from Australia and other countries have demonstrated that even with the provision of home-delivered meals, some MOW clients still have poor nutritional status due to their multiple medical and social risk factors (9-11).

In a large sample (N = 2076) of older patients admitted to Australian rehabilitation hospitals, most were classified as either malnourished (33 %) or at risk of malnutrition (52 %) (12). Of these, over half of malnourished patients and 76 % of those at risk of malnutrition were discharged home from hospital, and would thus be in need of nutritional support during their period of convalescence. Meals can be provided immediately within the Meals on Wheels (MOW) service, thereby addressing the critical two-week period of recovery following hospital discharge (13).

There is a paucity of research focused on improving the nutritional status of some older adults receiving MOW (14). Provision of energy and nutrient dense foods is one approach to address the age-related decline in appetite and decreased hunger cues in older adults (15).

The aim of this study was to determine the impact of providing a high energy, high protein daily mid-meal snack to MOW clients in a regional centre of New South Wales, Australia, both in terms of nutrition-related outcomes, as well as client acceptability of the program.

## **2. METHODS**

A mixed-methods design, including qualitative and quantitative components, was used. A convenience sample of 13 MOW clients agreed to participate in the study, following invitations distributed by MOW managers via volunteer drivers performing meal deliveries. Inclusion criteria included clients from two MOW services who had previously been identified as being malnourished or at risk of malnutrition (16) in an earlier exploratory study (17). Exclusion criteria included cognitive impairment, a texture modified or specialised medical diet, cow's milk allergy or lactose intolerance, and terminal illness. Signed written consent forms were collected and appointments made by MOW managers. Two trained researchers interviewed clients in their homes at baseline and following receipt of the snack program for four weeks. A semi-structured question guide was used to explore the client's attitudes and perceptions surrounding the meals on wheels service, snacks provision and relevant costs involved.

## 2.1 Intervention

For a period of four weeks each participant received a snack for Monday through Friday, in addition to their standard MOW delivery. Five types of commercially available sweet and savoury snack options were provided each week (a different one randomised to each week-day), as shown in Table 1, including three flavours of enriched sweet biscuits and three flavours of frozen enriched desserts, tinned tuna and crackers, and cheese and savoury biscuits. If participants disliked any of the options provided, they were given substitutes from the remaining choices. The snacks provided a mean of 620 kJ and 6.6g of protein per serve (Table 1). Snack deliveries varied with the usual meal delivery pattern. Clients who received a daily hot meal delivery had a snack delivered with the meal, while those who received frozen meals had either a week's or fortnight's supply of snacks delivered at a time. All snacks were provided with clearly labelled storage advice for products that required refrigeration and/or freezing. Regardless of current MOW ordering routines, clients were encouraged to consume one snack daily in addition to their regular food intake.

**Table 1:** Nutritional content of snacks provided, per serve

	Pre-packaged tomato and basil tuna & crackers	Pre-package d cheese & crackers	Commercial enriched biscuits			Commercial enriched frozen desserts			
			Triple Chocolate Cookie	Date & Coconut Cookie	Vanilla Shortbread	Chocolate Mousse	Mango Mousse	Crème Caramel	Banana Custard
Serve size	61g	30g	40g ( 1)	40g (1)	40g (1)	70g	75g	120g	120g
Number of snacks provided	1 per week	1 per week	1 per week			2 per week			
Energy (kJ)	596	531	821	732	760	506	483	568	569
Protein (g)	7.8	5.9	6.0	6.0	6.5	6.2	5.3	5.4	8.0
Fat (g)	6.1	8.3	20.4	8.0	12.0	2.9	2.5	3.2	3.2
Saturated Fat (g)	1.6	4.9	7.9	5.5	8.4	2.3	2.0	2.0	1.5
Sodium (mg)	363	203	113	131	46	51	46	71	80
Calcium (mg)	9	153	107	100	110	161	141	142	169

## 2.2 Outcomes

Nutritional status was assessed using the validated Mini Nutritional Assessment (16); participants were categorized as well nourished (>23.5), at risk of malnutrition (17.5-23.5) or malnourished (<17.5). Standing height was measured using a stadiometer, and weight measured using electronic scales (Tanita TBF-622). At baseline, dietary intake was assessed through the use of a combined 24hr recall and food frequency questionnaire (FFQ), administered by a trained researchers. A 24hr recall was conducted again on the last day of the four-week intervention. Estimated energy requirements were calculated using the Schofield equation and a physical activity factor of 1.4, while protein requirements were estimated as 1g per gram body weight (18-19). Clients' responses to the snack intervention program were obtained during a digitally recorded, semi-structured individual interview conducted by a second trained researcher.

### 2.3 Data Analysis

Data from the two diet histories were entered into a computerised dietary assessment package (FoodWorks version 6.2, Xyris Software, Highgate Hill QLD) to assess energy and protein intakes, based on the AusNut 2007 nutrient composition database (20). Nutrition information panels from MOW suppliers were used to estimate the nutrient composition of MOW main meals and snacks consumed during the study period. All data were analysed using SPSS (Version 17, Chicago, ILL). Paired t-tests assessed pre-post differences in anthropometry, nutritional status (MNA score), and energy and protein intakes.

For qualitative data analysis, each interview (that lasted between 15 and 30 minutes) was digitally recorded, transcribed verbatim and checked for accuracy by reviewing the typed manuscript record against the recording for each individual. Interviews were systematically coded using the Qualitative Theory Grounded Approach (QTGA) to enable possible categorization of the main emergent issues (themes) that were discussed by participants with regard to their snacking behaviours. Thematic analysis was undertaken by two researchers (KS, AM) who identified potential subthemes to distinguish variations in responses. Through the iterative process of constant comparison, the two researchers agreed on final themes and selected exemplar quotes.

Ethics approval was granted by the University of Wollongong Human Research Ethics Committee.

## 3. RESULTS

Twelve participants completed the intervention (n = 7 women, n = 5 men). Mean age of participants was 81.3 (SD 10.9) years, range = 52-92 years. All participants lived in their own homes and were able to eat independently. Eight clients (67%) were living alone and 5 (42%) were living with other family members or partners. Most participants had been receiving MOW for a number of years, and most longer than 5 years with only one participant receiving the service for less than a year. Three participants were receiving hot meals while nine were receiving frozen delivered meals.

Acceptability of the snacks provided was high, however two participants substituted the fish-based snack and milk-based desserts for other options, because of dislike and reported milk intolerance, respectively. The snacks that were provided would have cost the participants between \$1.45 and \$1.55, compared to an average cost of meal options, as follows: Main meal (\$5.50); main meal + dessert/soup (\$7.00); salad + dessert (\$7.50); sandwich + dessert (\$5.00); soup+dessert+juice (\$3.50); omelette (\$2.50). Two of the 12 participants that received the snack intervention still order snacks that are offered on the menu (eg. cake and omelette) a year on (Melinda Stuckey, personal communication).

At baseline, mean energy intake was significantly lower than estimated requirements by a mean of 1529 kJ/day (P = 0.001) and this remained post-intervention (mean deficit of -1114 kJ/day; P = 0.026) (Table 2). Mean protein intake was adequate both at the beginning and end of the intervention (Table 2). Post-intervention, there was a trend for energy intake to increase by an average of 415kJ/day, but this change was not significant (P = 0.351). Similarly, a non-significant increase in protein intake of 5.2 g/day to 72g ( $\pm$ 21)/day (P = 0.105) was reported. Overall, the number of respondents meeting their energy and protein requirements increased from 1/12 to 2/12, and 8/12 to 9/12, respectively.

**Table 2** Mean estimated daily requirements and consumption for energy and protein.

Category	Protein (g/day)	Energy (kJ/day)
Estimated Requirement mean (SD)	66.4 (±18.3)	7756 (±1197)
Consumed Baseline† mean (SD)	64.8 (±17.3)	6227 (±1671)**
Consumed Post† mean (SD)	72.0 (±21.5)	6642 (±1467)*

†Differences between estimated intakes and actual intakes: Paired sample t tests; \*P<0.001; \*\*P<0.05.

Following the intervention, MNA scores significantly increased (P= 0.049) and proportion of respondents categorised as ‘malnourished’ decreased from 17% (n = 2) to 8% (n = 1), those categorised as ‘at risk of malnutrition’ decreased from 67% (n = 8) to 25% (n = 3) (P <0.05), and the proportion ‘well-nourished’ increased from 17% (n = 2) to 67% (n = 8).

Mean body weight increased from 67.1 (14.3) to 67.8 (14.7) (P= 0.008), while Body Mass Index (BMI) increased from by a mean of 0.83 (±1.12) kg/m<sup>2</sup> (paired t test; P = 0.039) (Table 3).

**Table 3** Changes in weight , BMI & MNA score from baseline to post intervention

	Baseline	Post intervention	Mean change from baseline
<b>Weight (kg)</b>	67.1 (14.3)	67.8 (14.8)*	+0.75 (0.80)
<b>BMI (kg/m<sup>2</sup>)</b>	24.6 (3.2)	25.4 (3.2)*	+0.78 (1.16)
<b>MNA score</b>	21.4 (4.4)	23.2 (3.9)*	+1.79 (2.60)

Client no.	Weight Change (kg)	BMI Change (kg/m <sup>2</sup> )	MNA score change
1	-1,0	-0.5	+3.0
2	+2.0	+0.7	+5.5
3	+1.8	+1.5	+4.0
4	+0.6	+2.1	+1.5
5	+1.0	+3.1	-4.5
6	+0.4	+2.2	+4.0
7	+1.2	+0.2	+3.5
8	+1.0	+0.2	+2.0
9	0	0	+0.5
10	+0.8	+0.4	+1.0
11	+0.2	+0.1	+0.5
12	0	0	+1.5

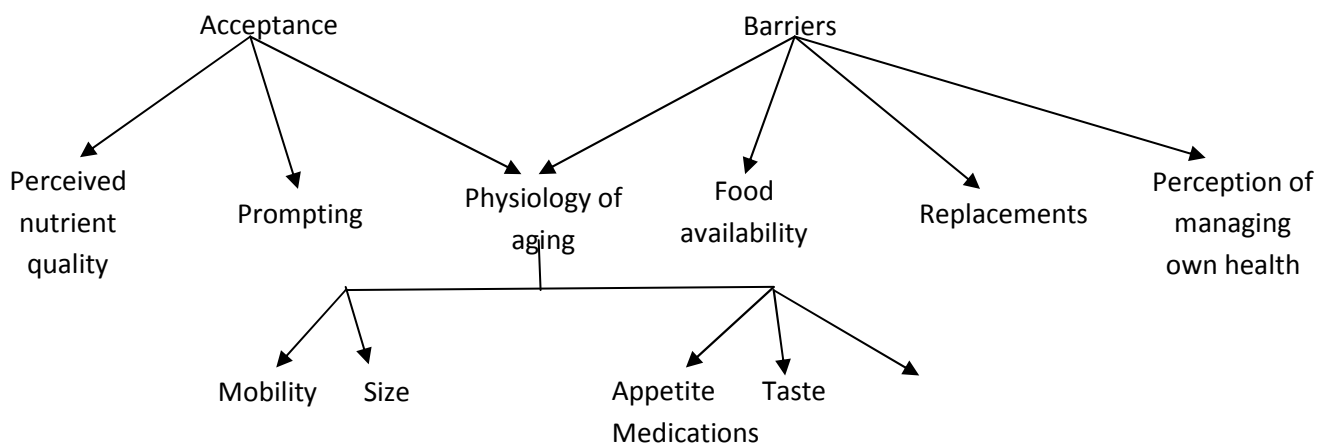
\*P<0.05; paired t-test

In order to determine the acceptability of the snacks, clients were asked if they would continue with the program, half of whom responded affirmatively. Anecdotally, there has been an observed increase in the number of people ordering more than one meal delivery, which includes extra meals, sandwiches, extra dessert, soup, or an omelette for other meals, has increased as a whole for the two MOW services involved in the research in the 1-year period following the research (Melinda Stuckey, personal communication).

The qualitative interviews identified two major themes and numerous sub-themes, related to acceptance and barriers to uptake of the snack program (Figure 1), as outlined below.

### 3.1 Main theme 1: Acceptance

Acceptance factors were categorised into three sub-themes: physiology of aging, prompting to eat, and perceived nutrient quality.



**Figure 1:** Schematic of interrelationship of themes from clients' responses to the snack program

#### 3.1.1 Physiology of aging

Delivery of snacks has the potential to alleviate some of the burden of shopping and food preparation, as evidenced in the following quotes:

*'Well I liked that I didn't have to do the shopping and that I didn't have to find out if I had enough, you know the little details. And... ah... then again they were available and I really feel that... ah... I find it hard to get anything in the house any pantry items I'm short of ingredient and have little choice of if I do feel like anything, so I was glad to have some things available' (Client 9)*

Decreased appetite may necessitate availability of small, but nutrient dense options:

*'I didn't have any trouble with them. (Moderator: Ok sure) Cause they're only small you know just a snack.'* (Client 1)

#### 3.1.2 Prompting

Clients indicated that having snack options in the household encouraged food consumption.

*'...well knowing the snacks were there I'd come out and say do you feel like a snack.'* (Client 12)



### 3.1.3 Perceived nutrient quality

Some of the clients expressed that they recognised the snacks to be of nutritional benefit to them.

*'I wouldn't mind continuing with them... I like the taste of them mainly and there should be some good vitamins and nutrition in there.'* (Client 8)

However, a number of clients had reservations about the nutritional value of snacks.

*'As long as it doesn't make me fat otherwise I don't want any more (Giggles)'* (Client 5).

## 3.2 Main theme 2: Barriers

Identified barriers included adequate food availability within the home, perceived adequate health status, and physiological changes associated with aging.

### 3.2.1 Food availability

Most clients reported ample access to food and snack options within the home environment and some felt there was no need for the extra snack:

*'We've got stacks of food, we've got so much food here'* (Client 12)

*'Well I couldn't see the point myself, what that was doing to change anything that I've always been doing, you know'* (Client 6)

### 3.2.2 Perceived adequate health

A number of clients believed that their health status was adequate and nutritional intake was inadequate.

*'But no, all in all we're quite happy with what we get already. Well I dunno, I honestly don't believe we need it you know, I think the way we are is ok and what we've been doing must be alright'* (Client 12)

### 3.2.3 Perceived adequate food

Some clients believed that they could provide a similar type of snack option for themselves.

*'We could do the same thing ourselves, in fact I went out and bought cheese and crackers myself.'* (Client 2)

### 3.2.4 Food replacement

Some clients replaced nutrient-poor foods with the more nutrient dense provided snacks, but others used snacks to replace a main meal or an existing snack option, rather than being eaten in addition to usual intake:

*'Oh yes, sometimes it did yes (replace other foods), this little bloke here (biscuit) it did. I would usually make lunch, come in from what I was doing and I'd open the fridge door and see them and grab that instead of making the (salmon) sandwich (Client 8).'*

Convenience of the snacks and lack of preparation required was highlighted.

*'That's mainly because well my day is busy and it's good to just have these there'* (Client 8)

### 3.2.5 Physiology of aging

Many participants indicated factors related to loss of appetite, a decreased lack of smell and taste, and the impact on appetite of various medications.

*'I'm never hungry, sometimes I eat when mum does just because, but I don't enjoy it, I'm not hungry.'* (Client 12)

*'I'll tell you, I have no taste and no smell, yes I don't get hungry and that's my trouble I think.( Client 6)*

*'...it is the medication.'*

While a number of clients rejected the snack program, they were still able to identify some inherent value:

*'I think it could probably help someone else but not me' (Client 7)*

#### **4. DISCUSSION**

This pilot study aimed to test the potential benefit of a snack program to improve the intake and reduce the risk of malnutrition in a group of elderly clients receiving MOW. Provision of one nutritious, tasty snack per day to the study participants resulted in increases in weight and BMI over four weeks, but by a lesser magnitude than interventions that provided high energy, high protein commercial supplements (21). The trend for an increased energy and protein intake suggests that the snack program did not result in reduced intakes at mealtimes, however larger samples are required to confirm this outcome. Ordering patterns of meals received from MOW did not change during the intervention period (data not shown) which further indicates that the provision of snacks may be a useful complementary service to meal delivery. As would be expected from the poor nutritional status of participants, few were meeting their energy requirements at baseline, as has been reported in Danish MOW clients (22), thus highlighting a need for additional strategies to improve nutritional intake of clients.

Improvements in MNA score over the four week period were found, which is a similar finding reported by other authors who offered a 6-month snack program within MOW services (23). Despite improvements in body weight and overall nutritional status, and a trend for improved dietary intake, qualitative data highlighted barriers to acceptability of the snack program. Surprisingly, within the home environment, the researchers noted that each participant had ample food available as snacking options, such as fruit, biscuits, cheese, confectionary and chocolates, but regardless of this, intakes at baseline were still poor. We have previously reported MOW menu options provide, on average, 34 (4.9)% and 44 (8.2)% of energy and protein requirements, respectively if the main meal, soup and dessert is ordered, as recommended(24). This complies with the nutritional targets set by MOW of providing 33 % of daily energy requirements and half of daily protein requirements(25). However, actual ordering patterns of clients results in a meal providing only 23 (7.6) % and 34 (6.7)% of daily energy and protein requirements, respectively(24). In addition to offering a snack program to complement MOW meals, there may also be a need to investigate a need by clients for smaller portions of meals, that are enriched to be more nutrient dense.

Clarification of how Meals on Wheels clients source their food in their home environment will better inform the development of community-based services to meet their nutritional needs. Further research in this topic area is warranted, but requires specific methodologies to monitor purchasing patterns.

In frail elderly, lack of access to food does not seem to be as problematic as inability to prepare meals (26). A lack of perception about their high risk for malnutrition, and adverse impact thereof on health status, was evident, which is consistent with findings from older Europeans, who mostly believed their health to be good, despite high levels of malnutrition (27). In addition, despite the existence of clinical guidelines in Australia that recommend routine nutrition screening to be incorporated into General Practice for all older patients (28-

29), this does not happen (30). Awareness of both health care providers and older adults themselves regarding the importance of maintaining an adequate nutritional status is poor (31), as evidenced by our finding that participants had inappropriate concerns about weight gain associated with additional snacking. Loss of independence is one of the main barriers cited by older adults to commencing various MOW services (32) and this theme emerged in the present study. Snack program options may need to be marketed to clients within current MOW choices, as having the potential to contribute to improved overall nutritional intakes, without disempowering individual food choice. Snacking frequency has been shown in epidemiological studies of older Americans to be associated with higher intakes of magnesium, copper, and potassium (33) and provision of healthy snack options has been recommended as a strategy to improve diet quality in this age group. In the current study, the snack program met an identified need for small portions of nutrient-dense options (8) that were able to be consumed despite poor appetites. Pre-portioned snack options eliminated the need for further preparation, a benefit identified by participants. Having ready-prepared snacks available also served as a prompt to remind some individuals to eat between meals, a finding that has been reported by others (8, 11).

Limitations to the study included a small, non-representative convenience sample and a relatively short period of intervention. Clients were not asked to financially contribute towards the cost of the snacks, which limits interpretation of the findings to real-life experience whereby a higher value may have been placed on the service had it required payment. The cost of the snacks was low, at about a fifth of the cost of a main meal and soup or dessert but willingness to pay this additional amount was not explored. Usual ordering practices of the study participants did not change during the 4-week intervention (data not shown) which suggests that the increase in weight may be due to direct provision of the snacks themselves. However, it is also possible that participation in the study may have increased client's awareness of how little they were previously consuming and thus encouraged dietary change. A strength of the study was the insights obtained through qualitative interviews with MOW clients.

Future research is needed to explore the identified issues related to factors that influence food choice and eating patterns in both a positive (physiological changes of aging, needing prompts as reminders to eat regularly, and perceived nutrient quality of certain foods) and negative (inappropriate perceptions of adequate food availability within the home, and lack of awareness of health status) manner. It may be pertinent to also interview primary carers, as well as key informant clients in this group, who may be willing and more resilient to provide the time to explore these findings more fully.

In conclusion, this pilot study indicates that for some MOW clients, provision of snacks may be a desirable addition to the service, while for others, different ways to improve nutrient intake may be more appropriate, such as social interaction at mealtimes and nutrient fortification of existing meals provided by the MOW service. However, the impact of such interventions would need to be tested in larger samples.

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