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The nutritional status and energy and protein intakes of MOW clients and the need for further targeted strategies to enhance intakes

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ABSTRACT

There is a paucity of literature about the nutritional status and energy and protein intakes of Meals on Wheels (MOW) clients. The current study aimed to determine the nutritional status and the adequacy of energy and protein intakes of MOW clients. Forty-two clients were recruited from two MOW services in the Illawarra region of Australia for assessment of their nutritional status, using the Mini Nutritional Assessment (MNA®). Estimated energy and protein intakes for a MOW day were compared to a non-MOW day and average daily energy and protein intakes were assessed against estimated daily requirements. A single dietitian performed all assessments and home based interviews to explore the client's perception of the service. Mean daily energy intake (7593 (±2012) kJ) was not significantly different to estimated requirements (7720 (±975) kJ) ($P = 0.480$), while mean daily protein intake was higher (78.7 (±23.4) g) than calculated requirements (68.4 (±10.8) g; $P = 0.009$). However 16 clients were identified as at risk of malnutrition and 2 were malnourished; consuming 2072 kJ ($P = 0.000$) less energy and 20.4 g less protein ($P = 0.004$) per day compared to well-nourished clients. MOW clients are at risk of being poorly nourished and meals delivered by the service provide an important contribution to overall intakes. These findings support the need for regular nutrition screening and dietary monitoring in this high risk group, to identify those for whom additional strategies may be indicated.

1. Introduction

Australia has an ageing population, with 24% of the population expected to be aged over 65 years in 2056, compared to 13% in 2007 (ABS, 2009). The demand for community based services such as Meals on Wheels (MOW) will increase in the future and it is estimated that 10–30% of people residing in the community are malnourished, with the prevalence rates likely to be higher for some groups, including the aged (Watterson et al. 2009). Malnutrition is associated with reduced functionality, increased risk of illness, reduced quality of life, and increased independence and mortality in older people (Johansson, Sidenvall, Malmberg, & Christensson, 2009; Keller, Østbye, & Goy, 2004; Vetta, Ronzoni, Taglieri, & Bollea, 1999).

Meals on Wheels is a community-based organization that has operated since 1952 in Australia. The organization's logo in Australia, *'More than just a meal'*, reflects its aim to provide a nutritious meal, in the context of increased social interaction, in order to support independence and to allow people to remain at home for as long as possible. Over 14.8 million meals are delivered annually to approximately 53,000 clients in Australia (http://www.mealsonwheels.org.au/About-Us/About-Us.aspx). The service also allows clients to customize both the number of meals delivered per week and the type of meal (hot, chilled or frozen). Clients are often referred to the service as a result of ill health or social circumstances placing them at increased nutritional risk, as their ability to access adequate meals may be reduced (Krassie, Smart, & Roberts, 2000).

Despite being a group at high nutritional risk, there is a paucity of information on the dietary intakes, usage and storage of meals by MOW clients. A few small studies from Australia (Charlton et al. 2013; Galea, Walton, Charlton, & McMahon, 2013; Winterton, Warburton, & Oppenheimer, 2013), New Zealand (Wilson & Dennison, 2011) and Ireland (O'Dwyer et al., 2009) highlight a need for further evaluations of MOW services and better marketing to health professionals and potential clients, as well as a range of

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strategies to enhance dietary intakes. The aims of this exploratory study were to: determine the nutritional status of MOW clients and to estimate the adequacy of their daily protein and energy intakes.

2. Materials and methods

A convenience sample of forty-two clients from two Meals on Wheels services in New South Wales, Australia agreed to take part in the study in early 2011. These MOW services obtain a range of frozen meals, soups and desserts from three commercial suppliers via an order form. MOW clients can order their preferences for delivery in the heated or frozen state as required. Hot meals are available on weekdays and frozen meals are delivered to clients each week. Dishes may include pumpkin soup or minestrone soup; roast lamb and vegetables or beef and bacon casserole and vegetables; and blueberry sponge crumble and custard or baked rice pudding. Clients choose their meals; whether they want the hot or frozen type and what days of the week they require deliveries.

The managers from each of the services distributed participant information sheets and consent forms to eligible clients via volunteer MOW drivers and then followed up telephonically. Consenting clients were visited in their homes once by a single dietitian (FM) at a convenient time and couples were interviewed together. Exclusion criteria included those with a terminal illness and non-English speaking clients. We have previously reported on the views and perceptions of MOW clients, which involved in-depth interviews with the same clients and is a companion to the current paper (Evans et al. 2014).

2.1. Assessment of nutritional status

The validated Mini Nutritional Assessment-Full Form (MNA®) was used to determine the nutritional status of each client aged 65 years and over (Guigoz, Vellas, & Garry, 1996). The MNA® includes a review of anthropometry, living situation, mobility, diet, medical history and self-perception of health and provides a score out of a possible 30, with less than 17 indicating malnutrition, 17–23.5 indicating 'at risk' and 24 and above indicating 'nourished' (Guigoz et al. 1996). Subjective Global Assessment (SGA) was used to determine nutritional status for each client aged less than 65 years. This valid assessment method involves a review of weight history, dietary intake, gastrointestinal symptoms, functional capacity and physical examination. Scoring is categorical to determine if a patient is 'A' well nourished, 'B' moderately malnourished or 'C' severely malnourished (Detsky et al. 1987). Both methods of assessment involved taking some physical measurements (e.g. weight, height, review of interosseous muscle and scapula for SGA and calf circumference for the MNA®); and also asking clients questions about themselves (e.g. In comparison to other people of a similar age, how would the person rate their health? – MNA, and Over the last month how would you rate your activity? – SGA).

2.2. Dietary assessment

An interviewer administered combined diet history interview and 24 h recall was conducted by a single dietitian (FM). As the dietitian was keen to obtain information about MOW days and non-MOW days, components of a 24 h recall was used at times to prompt intakes from the most recent day, usually a MOW day, which was often of a similar format, and to compare to intakes on a non-MOW day. These methods have been used by others to estimate dietary intakes in older adults who may have some memory deficits (O'Dwyer et al. 2009; Soini, Routasalo, & Lauri, 2006; Galea et al. 2013). Estimation of usual energy and protein intakes from foods and beverages were determined for days on which a MOW meal was delivered (MOW day), a non-MOW day and the average daily intakes were also determined. At times, couples were interviewed, and on occasion a client had a partner, or other family member present, who would also add to the interview discussion regarding dietary assessment and the assessment of nutritional status.

2.3. Estimating dietary protein and energy requirements and intakes

All dietary intake data were analysed using FoodWorks nutrient analysis software (Version 6.2: 2006; Highgate Hill, QLD) to estimate the daily energy and protein intakes of the clients on an average MOW day, average non-MOW day and an average day overall. Estimated daily energy requirements were calculated using the Schofield Equation with an average physical activity level (PAL) factor of 1.4 applied (NHMRC, 2006). Recommended Dietary Intakes (RDIs) for protein for men (1.07 g/kg) and women (0.94 g/kg) above 70 years were used to determine estimated daily protein requirements for each client in that age group. Age and gender appropriate RDIs for protein were used for the younger clients (NHMRC, 2006).

2.4. Data analyses

Descriptive statistics (mean ± SD) were calculated. Differences between the mean dietary intakes of energy and protein on a MOW day and a non-MOW day; as well as comparison to the estimated daily requirements were determined for individuals, men, women and total group. Paired t-tests for normally distributed data and the Wilcoxon Signed Rank test for non-parametric data were undertaken for differences between the MOW day, non-MOW day and estimated requirements. Comparisons were also made for energy and protein intakes, as well as MNA scores for those 'at risk' and malnourished compared to those who were nourished, with independent t-tests used for the parametric data and Mann–Whitney U tests for the non-parametric data. All data were normally distributed, with the exception of the estimated energy requirement (EER) for men, the age and the BMI scores for the comparison between nourished, and malnourished/'at risk' groups. The level of significance was set at $p < 0.05$. The Statistical Package for the Social Sciences (SPSS V17.0:2009, SPSS Inc. Chicago II, USA) was used for all analyses. The number of individuals meeting their personally estimated daily energy and protein requirements were also determined and reported.

Ethics approval was obtained from the University of Wollongong Human Research Ethics Committee (HREC. No.10/417) and written informed consent was obtained from all clients and/or their next of kin.

3. Results

Forty-two MOW clients from the Illawarra region of New South Wales took part in the study; 26 women and 16 men. Mean age was 81.9 (±9.4) years, ranging from 50 to 91 years. Only four clients were younger than 65 years (50, 59, 61 and 63 years). Most (28/42) clients reported eating their meals alone, and six clients had some degree of cognitive impairment, but took part in the study and were accompanied at the interview by a partner or family member. Their usage of MOW varied from 6 to 14 meals per fortnight, with the mean being 10 meals per fortnight.

4. Nutritional status

The mean (±SD) MNA score was 23.6 (±3.4), range = 14.5–29.5,