Short Communication

Nutrition risk: cultural aspects of assessment

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Aim: To assess a nutrition risk screening tool amongst Māori and non-Māori of advanced age. Method**:** A cross sectional feasibility study was conducted in three North Island locations. One hundred and eight community-living residents aged 75- 85 years were assessed for nutrition risk using 'the validated questionnaire 'Seniors in the Community: Risk Evaluation for Eating and Nutrition', Version II (SCREENII) and level of physical activity using the 'Physical Activity Scale for the Elderly' (PASE). Physical assessments included height and weight. Results: Fifty-two percent of participants were assessed to be at high nutrition risk (SCREENII score <50; range 29-58; out of maximum score 64). Nutrition risk factors amongst Māori and non-Māori respectively differed for weight change in the previous six months (45.2% and 18.7%, p=0.005), skipping meals (54.8% and 13.3%, p<0.001), fruit and vegetable intake (77.4% and 18.7%, p<0.001) and the use of meal replacements (28.1% and 9.3%, p=0.013). Process evaluation showed that Māori took different meaning from the individual question items in SCREENII. Level of physical activity (PASE score) was higher for Māori, median (IQR): 125 (74) than non-Māori, 72 (74) (p<0.001) especially for leisure-time and household related activity. BMI was higher for Māori median (IQR): 31.5 kg/m^2 (6.8) compared to non-Māori 24.7 kg/m^2 (5.4) (p<0.001). Conclusions: The nutrition risk tool suggested that Māori were at high risk for malnutrition despite higher BMI and higher levels of activity. Several items of the screening tool were interpreted differently among Māori compared to non-Māori. Further development is needed to ensure accurate assessment.

Key Words: nutrition assessment, malnutrition, aged, culture, New Zealand

INTRODUCTION

As with other Organisation for Economic Co-operation and Development OECD countries, people over age 85 years are the fastest growing population group in New Zealand and have the highest expenditure on personal health and disability support.[1] About 12 percent of the population are aged 65 years and over, of which 4% are Māori.[2] New Zealand Māori have tangata whenua (people of the land) rights defined in New Zealand's founding constitutional document and the United Nations declaration on the Rights of Indigenous peoples.[3] Māori make up a much smaller proportion of the older population over 65 years (3.9%) than they do for the total population (14%).[4] This is partly due to consistently higher fertility rates amongst Māori but also to higher mortality rates in younger age groups for Māori, and hence a lower life expectancy.[5] Within the population of 65+ years, there are more Māori compared to non- Māori who are overweight or obese, are less likely to consume the recommended servings of fruits and vegetable per day and participate in regular physical activity. The majority of both older Māori and non-Māori live independently in the community.[6] The growth in numbers of older people along with the government 'ageing in place' policy,[7] highlights the need to understand the factors related to successful ageing**.** Nutrition is a key determinant of successful ageing. Older people are vulnerable to a poor nutritional status and have an increased risk of developing health problems as a result of an inadequate food intake.[8] Food is not only critical to physiological well-being but also contributes to social, cultural and psychological quality of life.[9] Nutrition risk screening is a useful process to identify factors related to nutritional status that could lead to malnutrition. Its purpose is to identify individuals who are malnourished or at nutrition risk.[10] As pathways to nutritional health in older people are complex and multifactorial, no one screening tool can be used as a gold standard to identify malnutrition.[11] The 'Seniors in the Community: Risk Evaluation for Eating and Nutrition' (SCREENII) is a simple method for identifying nutrition risk. From an assessment of 21 tools which aim to screen or assess the nutritional status of older adults, SCREENII was the only tool specifically designed for community living older people.[12] Based on comprehensive nutrition assessments (including anthropometric and biochemical data) SCREENII has been validated among older people in Canada against the criterion of a dietitian's clinical judgement of risk and has high inter-rater and test-retest reliability, as well as excellent sensitivity and specificity in detecting malnutrition.[13] Although the validation sample

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Manuscript received 30 November 2010. Initial review completed 5 April 2011. Revision accepted 14 June 2011.

was recruited from the community and included frail elders (over 85 years), it did not include indigenous people. For a nutrition screening tool to be of benefit in the New Zealand setting, it must be acceptable to both Māori and non-Māori older people.

Traditional Māori foods differ from food usually eaten by non-Māori. The 2002/03 New Zealand Health Survey indicated that Māori women aged over 65 years were significantly less likely than their non-Māori counterparts to report consumption of the recommended number of servings of vegetables and fruit per day.[14] However the cultural practice of a 'boil-up' where meat, greens such as puha, watercress or cabbage, and kumara or potatoes are boiled together may result in different reporting for food group items. The most frequently consumed traditional foods among the 2,669 Māori (mean age 48±13 years) who participated in the "Te Wai o Rona: Diabetes Prevention Strategy" were: kaimoana (seafood) at 55%, puha at 26%, watakerehi (watercress) at 24%, hangi at 18% and paraoa parai (Māori bread/ rewana/ fried bread) at 18%.[15] Traditional Māori foods are generally compatible with the Food and Nutrition Guidelines,[16] and their inclusion into the diet is promoted within the Māori and general communities.[17]

Nutrition and physical activity go hand in hand to provide strong, simultaneous and continuous benefits to health. Regular physical activity is essential for healthy ageing.[18] The 2006/07 New Zealand Health Survey (NZHS),[19] found that older people are the population group least likely to be meeting the physical activity guidelines. Physical activity helps an older person to improve muscle strength, balance, mobility, energy expenditure and energy intake, and thereby maintain the ability to perform Activities of Daily Living -ADL. Whilst the physical activity levels of Māori and non-Māori in the oldest old are unknown, the 2002/03 New Zealand Health Survey found that Māori men aged 50 to 64 years were significantly more likely to undertake physical activity than their non-Māori counterparts.[14]

The aim of this study was to assess the SCREENII tool for identifying nutrition risk and to describe nutrition risk factors, level of physical activity and BMI for Māori and non-Māori of advanced age.

MATERIALS AND METHODS

This cross-sectional study was intended as a feasibility study for all aspects of a longitudinal cohort study of the oldest old (85 years and over) in New Zealand. This study began recruitment in January 2008 and was completed in August the same year. The study was approved by the Multi-Region Ethics Committee, Ministry of Health, New Zealand. Participant recruitment was carried out in three North Island locations, including the rural and urban areas of Rotorua, Whakatane and Opotiki, and was stratified by ethnicity. The inclusion criterion for Maori was birth date between January 1st 1929 and December 31st 1933, aged 75 to 79 years old, and for all other ethnicities birth date between January 1st and December 31st 1922, aged 85 years. Younger Maori participants were recruited as the gap in life expectancy between Maori and non-Maori was 8.2 years for males and 8.8 years for females.[20]

Demographic data and responses to validated questionnaires (SCREENII and PASE) were ascertained during a face to face interview. Interviewers (both Māori and non-Māori) were trained by the research team over two days. Māori interviewers were fluent in Te Reo.

Nutrition risk was determined using the 14-item validated questionnaire SCREENII. This provides information on weight change, food intake and risk factors for food intake (meal frequency, diet restriction, appetite, chewing and swallowing difficulties, meal replacement, eating alone, meal preparation and shopping difficulties). Items are scored from 0 to 4 with high scores indicating lower risk and scores of 2 or less indicating potential risk. The total score ranges from 0 to 64. A cut-off of less than 50 is considered to identify high nutrition risk.[21]

A Physical Activity Scale for the Elderly (PASE),[22] was used to assess physical activity. PASE consists of ten items used to identify leisure (walking, sports, muscular strength/endurance), household (housework, home repair, lawn work, outdoor gardening, caring for others) and occupational related activity, and duration of activity over a one-week period. The total PASE score was derived by multiplying the duration of each activity (hours/week) or participation (yes/no) by the empirically derived item weights and summing over all activities. Physical assessments which included measures of height and weight were conducted in local health centres using standardised procedures. Height and weight measurements were used to calculate BMI.

Data analysis

Descriptive analyses were completed for sociodemographic data, each item of the SCREENII as well as the total score, PASE scores and BMI. Distribution of these variables was examined using the Kolmogorov-Smirnov test. Variables with a normal distribution are presented as mean and standard deviations (SD), or medians and interquartile ranges (IQR) for variables with a skewed distribution. Associations between the SCREENII and PASE scores and BMI for Māori and non-Māori were examined using the Mann Whitney-U test. For differences between the nutrition risk factor items for Māori and non-Māori a Chi-square test was used. Statistical analyses were performed using SPSS 15.0 for Windows. A p-value less than 0.05 was considered to be significant.

RESULTS

Participants

Overall, one hundred and eighty six older people were invited to participate in the study and one hundred and twelve participants were recruited. Of these participants, 33 were Māori aged 76.6±1.8 and 79 non-Māori aged 85.2±0.6 years; the response rate was 60%. During the course of the study, four participants withdrew consent and one died. Forty four percent were male and 46% lived alone. Seventy four percent of the participants had completed secondary school. Ninety six percent of the participants (108) completed the questionnaire and 93% had physical assessments including height and weight.

Nutrition risk

Table 1. Nutrition risk items and proportion of non-Māori and Māori at risk

Nutrition risk items †	Risk factor scores ≤ 2‡ n (%)		*p*-value
	Non-Māori	Māori	
Weight change (gain/loss)	14 (18.7)	14 (45.2)	0.005
(% gain ≥2kg)	41.7	61.5	
(% loss ≥2kg)	58.3	38.5	
Unintentional weight change	10 (13.3)	2 (6.5)	0.309
Thinks weight more/less than it should be	29 (38.7)	11 (35.5)	0.758
Skips meals (sometimes/often/almost every day)	10 (13.3)	17 (54.8)	<0.001
Restricts food	22 (29.3)	10 (32.3)	0.765
Poor appetite	10 (13.3)	2 (6.5)	0.309
Fruit and vegetable intake (<3 servings a day)	14 (18.7)	24 (77.4)	<0.001
Meat and alternatives intake	41 (54.7)	19 (61.3)	0.531
Milk product intake	61 (81.3)	22 (71.0)	0.239
Fluid intake	10 (13.3)	9 (28.1)	0.067
Swallowing difficulty	8 (10.7)	5 (15.6)	0.472
Chewing difficulty	12 (16.0)	8 (25.0)	0.274
Use of Meal replacements (Shakes, puddings, energy bars)	7 (9.3)	9 (28.1)	0.013
Eating alone	37 (49.3)	12 (37.5)	0.261
Cooking difficulty	27 (36.0)	7 (21.9)	0.151
Shopping difficulty	8 (10.7)	3(9.1)	0.803

† SCREEN II items are the questions from SCREEN II. ‡SCREEN II items with scores less than or equal to two, out of a maximum score of four, potentially lead to 'nutrition risk'.

Table 2. Physical activity scores for non-Māori and Māori Participants

	Non-Māori n=79			Māori n=33			p-value
	Median	Range	IQR	Median	Range	IQR	
Total PASE score	72.2	0-282	73.9	125.125??	41.1-240	74.2	<0.001
PASE -leisure-time exercise activity	8.60	0-85.8	23.6	25.8	6.4-102	39.9	0.002
PASE -work related activities	0.00	0-60	0	0.00	0-120	0	0.811
PASE -household related activity	47.5	0-146	56	93.0	25-151	47.3	<0.001

Half (51%) of the all the participants were found to be at nutrition risk (SCREENII score <50). The median score was 49 (range 29–58; maximum score of 64) for the total, 50 for non-Māori (range 29–58) and 47 for Māori (range 35–55) (p=0.109). There were significant differences in four nutrition risk items for non-Māori and Māori participants: weight change, skipping meals, fruit and vegetable intake and the use of meal replacements. Nineteen percent of non-Māori and 45% of Māori participants had risk factor scores ≤2 for weight change (gain or loss) (p=0.005). The 'at risk' scores for weight gain were higher for Māori (61.5%) than non-Māori (41.7%) whilst lower for weight loss, 58.3% of non-Māori and 38.5% of Māori. Over half (54.8%) of Māori had 'at risk' scores for skipping meals compared to 13.3% of non-Māori (p<0.001). 'At risk' scores for low fruit and vegetable intake were higher for Māori (77.4%) than non-Māori (18.7%) (p<0.001). Twenty eight percent of Māori compared to 9% of non-Māori participants were 'at risk' for using meal replacements or drink supplements (such as Boost, Ensure, Ensure Pudding and Sustacal) (p=0.013) (Table 1).

Physical Activity

For all of the participants the median (IQR) score for physical activity (PASE) was 83.9 (86.4). The median (IQR) PASE score was significantly higher for Māori, 125 (74) than non-Māori, 72 (74) (p<0.001). In particular the median (IQR) score for Leisure-time exercise activity was significantly higher for Māori 25.8 (48) than for non-Māori 8.6 (24) (p=0.002). Similarly Māori participants had a significantly higher median (IQR) score for Household related activity 93 (47) than non-Māori 48 (56) (p<0.001) (Table 2).

Body mass index (BMI)

The median (IQR) for BMI was 27.1 kg/m^2 (7.1) for all of the participants. BMI was significantly higher for Māori participants [31.5 kg/m^2 (6.8)], than non-Māori participants [24.7 kg/m^2 (5.4)] (p<0.001).

DISCUSSION

We found half of our participants to be at high nutrition risk as determined by SCREENII. Although this prevalence of nutrition risk was higher than among community-living older people in Christchurch,[23] participants from Christchurch were slightly younger (mean age 79.5 years) and non-Māori. Results from these New Zealand studies are similar to those conducted in community living older adults in Canada, where the prevalence of nutrition risk assessed by SCREEN ranged from 39 to 69%.[24-26] SCREENII has been a useful tool to identify the most common items that lead to nutrition risk. For Māori these

appear to be low intake of fruit and vegetables, meat and alternatives, milk products, as well as unintentional weight change, however interpretation of the fruit and vegetables intake and meal replacement items may have spuriously elevated the risk for Māori. For non-Māori, risk factor items also included low milk product, meat and alternative intakes, unintentional weight change as well aseating alone. Similar risk factor behaviours were observed in older people at high nutrition risk in Christchurch (unintentional weight change, eating alone, perception that weight is more or less than it should be and low milk product intake).[23]

Tools developed for a mainstream group may not be appropriate for different cultural groups[27-28] Culturally related foods may differ according to the setting in which older people live,[29-30] and the particular cultural group involved.[31] Formative evaluation of the responses on the SCREENII items was conducted with Māori. The Kaitiaki group and Kaumatua and Kuia from all regions reviewed and commented on all aspects of the questionnaire and provided culturally appropriate comment. Discussion about wording of the questions which were part of astandardised and validated questionnaires emphasised the need for interviewers to understand the reasoning for the question items to enable them to communicate this with older Māori.

A low intake of fruit and vegetables appeared to be a nutrition risk factor for many (77.4%) of our Māori participants who consumed less than the current recommended guidelines of at least two servings of fruit and at least three servings of vegetables per day.[32] The reasons for a lower intake are unknown but formative evaluation suggests that fruit and vegetable intake may be systematically underreported for Māori because of the way vegetables are prepared and thus counted. Vegetables are often combined for inclusion in a "boil up" and reported as a single serving although two or more vegetables may be consumed as part of one meal. More detailed dietary assessment is necessary to accurately assess true intake.

A low milk product intake among our participants was not surprising. This finding was reported in the 1997 National Nutrition Survey (NNS97),[33] for people over the age of 75 years. Participants may have had ample milk product intake in their earlier years when milk was a staple food at a subsidised cost. Current pricing may be a barrier. Older adults in a community wellness programme in the US reported they would drink more milk if it were less expensive.[34] Lactose intolerance may also be a factor. Although the prevalence of primary (inherited) lactose intolerance in the New Zealand adult population has yet to be formally documented, it appears that the prevalence may be significantly increased in Māori communities.[35] A low consumption of milk products places older people at risk for a low calcium intake and may compromise bone health. The NNS97 reported that milk products contributed more than half (53%) of the dietary calcium for those over 75 yearsand are an important food source to protect against age-related osteoporosis.

A further nutrition risk factor for over half of our Māori and non-Māori participants was a low intake of meat or protein alternatives (eggs, fish, poultry, legumes, nuts, peanut butter or tofu). Meat products (beef, veal, pork, poultry, fish) provide 28% of protein for New Zealanders over the age of 75 years.[33] As dietary protein intake is associated with lean mass change in older adults and is a modifiable factor for sarcopenia,[36] The types and amounts of foods which contribute to protein intake need to be explored.

Eating alone was a risk factor for 38% of Māori and nearly half of non-Māori (49%) participants. De Castro has shown that meals eaten with others tend to be larger by up to 44 percent than when eaten alone.[37] Meal sharing increases food intake and dietary variety which is positively correlated with nutritional quality as well as health outcomes.[38] Eating may be facilitated by the companionship an older person receives when someone else is present.[39] In accordance with the current Food and Nutrition Guidelines for Healthy Older People,[40] encouragement is needed for older people to take opportunities to eat meals with others.

There was a significant difference in unintentional weight change (over the previous six months) for Māori and non-Māori. For 62% of Māori the direction of unintentional weight change related to ≥2 kg weight gain whereas 58% of non-Māori experienced ≥2 kg weight loss. Risk of malnutrition is more commonly associated with weight loss rather than weight gain.[41] A key contributor is widowhood through the profound grief reaction, its impact on appetite and change in eating habits or as a result of the practical aspect of shopping and cooking food.[42] More than half of all Māori and non-Māori were widowed in this study. The cause of these associations cannot be explored in this small cross sectional study.

The finding that our_Māori participants had a significantly higher BMI than non-Māori is expected as Māori people are known to have a higher proportion of lean body mass,[43] compared to non-Māori. Although it has been suggested higher BMI thresholds be used for Māori, the same WHO BMI thresholds of 25 kg/m^2 (overweight) and 30 kg/m^2 (obesity) for all adults were used in the New Zealand Health Survey.[14] There are limited data on BMI and body composition in older Māori because survey samples are generally too small. However, older adults who are overweight or obese may be at a healthy weight for their age.[44] Recent evidence suggests that for all persons older than 70 years a very low BMI is associated with the highest mortality.[45] The association between BMI and mortality tends to become decreasingly U-shaped with advancing age, [46] with age related weight loss related to higher risk of health issues and increasing frailty.

Our Māori participants also had significantly higher scores for physical activity than non-Māori. This may reflect the younger age group of the Māori participants. However the 2002/03 NZHS showed Māori men aged 50 to 64 years were significantly more likely to undertake physical activity than non-Māori.[15] In the current study Māori had a threefold higher median score for leisure-time activity than non-Māori. Participation in leisure activities included walking outside the home, sport and recreation and muscle strengthening. The median score for household related activity was almost twice that for Māori compared to non-Māori. This included recordings for lawn work/yard care, home repair, outdoor gardening and caring for others. These activities signal particular

importance for Māori of "growing food to be plentiful for all" and "to provide and offer manaakitanga or hospitality".[47,48] Both Māori and non-Māori participants were not involved in work related activities which involved paid or unpaid work. Among Dutch older people, women had greater engagement in very high scoring activities as housework and taking care of others which resulted in higher PASE scores than men (97.9 and 71.9).[49] However the PASE scores for the Dutch women were lower than that for our Māori participants. The higher leisure and household related activity undertaken by Māori may be associated with dietary intake and their higher BMI. This will be explored in the longitudinal study.

Further nutrition risk factors items which differed for Māori and non-Māori, respectively, were skipping meals and the use of meal replacements. Sometimes or often skipping meals was reported by over half of our Māori participants. This was less of a problem for 13% of both non-Māori participants and older people at high nutrition risk in Christchurch.[23] Dietary quality may be compromised when meals are missed as older people tend not to adjust their food intake after underfeeding.[50] We believe the higher use of meal replacements by our Māori participants is an anomaly.Older people who use meal replacements usually report a poor appetite,[25] which was not evident among our participants. The description for commercial nutrition replacements or supplements included "puddings" as a prompt. This may have been misinterpreted as dessert by Māori who indicated they commonly took "puddings".

The cross sectional design of this study does not allow us to comment on causality in factors related to nutrition risk and the findings should be interpreted cautiously. The objective was to establish the feasibility for a longitudinal cohort study. The small sample of older people invited to participate in this study were recruited from three North island regions and the age group of Māori and non-Māori differed due to differing longevity. As there are over 1000 people aged 85 years who live in these regions, our sample population is not representative. We have found SCREENII to be a useful tool to identify nutrition risk factors in the community living very old. However SCREENII is a self report of nutrition risk factors and responses for items such as weight change are not based on recorded weights. Nutrition risk factor items, levels of physical activity and BMI differed for Māori and non-Māori. As a result of this study, the question items in SCREENII were adapted to improve their meaning for older Māori. The longitudinal cohort study will provide further insight into the influence of nutrition status on the health of these population groups with the inclusion of a detailed nutritional assessment and investigation of the importance of traditional Māori foods.

ACKNOWLEDGEMENTS

This research was supported by project grant 06/068B from the Health Research Council of New Zealand. We acknowledge all participants for their commitment to this study and all community organisations that facilitated the study (He Korowai Oranga Rotorua; Māori Health Services, Whakatāne Hospital; Whakatohea Iwi Social and Health Services; Rotorua General Practice Group; and Kaitiaki Advisory Group, Ngā Pae O Te Māramatanga).

AUTHOR DISCLOSURES

No conflict of interest of authors.

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Short Communication

Nutrition risk: cultural aspects of assessment

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營養風險：評估的文化觀點

目的：評估一個年邁的毛利人和非毛利人營養風險的篩檢工具。方法：在北島的三個地方進行橫斷面可行性研究。使用經過效度驗證過的 SCREENII 問卷評估 108 名 75-85 歲社區老人的營養風險，並利用 PASE 問卷評估這群老人的體能活動程度。身體評估包括體重和身高。結果：五成二的參與者被評估為高營養風險(SCREENII 分數<50; 範圍 29-58; 總分 64)。毛利人和非毛利人不同的營養風險因素分別為：過去六個月的體重變化(45.2%及 18.7%, p=0.005)、誤餐(54.8%及 13.3%, p<0.001)、蔬果攝取(77.4%及 18.7%, p<0.001)和使用代餐(28.1%及 9.3%, p=0.013)。過程評估發現 SCREENII 中的個別項目對毛利人有不同的意義。體能活動程度(PASE 分數)中毛利人得分比非毛利人高，尤其是休閒時間和家庭相關活動部分。毛利人的 PASE 分數的中位數和四分差分別為 125 和 74。非毛利人的 PASE 分數的中位數和四分差分別為 72 和 74(p<0.001)。毛利人和非毛利人的 BMI 中位數和四分差為 31.5 kg/m^2 (6.8)和 24.7 kg/m^2 (5.4) (p<0.001)。結論：儘管毛利人的 BMI 和體能活動程度較高，但使用上述工具評估結果為營養不良的高風險群。毛利人和非毛利人的某些評分項目的解釋不同。需要更進一步的發展，以確保營養評估的準確性。

關鍵字：營養評估、營養不良、老年人、文化、紐西蘭