The nutrition situation of free-living elderly in Umlazi township, South Africa

Authors:
Xolile Mkhize[1]
Carin Napier[2]
Wilna Oldewage-Theron[3]

Affiliations:
[1]Department of Community Extension, Mangosuthu University of Technology, South Africa

[2]Department of Food and Nutrition-Consumer Sciences, Durban University of Technology, South Africa

[3]Centre of Sustainable Livelihoods, Vaal University of Technology, South Africa

Correspondence to:
Xolile Mkhize

Email:
xmkhize@mut.ac.za

Postal address:
PO Box 12363, Jacobs 4026, South Africa

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The risk for non-communicable diseases such as hypertension, diabetes, stroke and ischaemic heart disease in the elderly continues to be on the increase. It is shaped and modified by factors such as economic status and experiences across the whole lifespan. Although malnutrition in this population could be due to poor dietary practices, the nutrition transition of communities in South Africa is partially responsible for nutritional problems. Because of the degree of dependency on others for help and care in communities, the elderly are at risk for malnutrition. The elderly of the Umlazi community are overburdened with the social responsibility of grandchildren and trying to bring stability by managing various households. This becomes a double burden and puts more strain on their quality of life, further impacting on their nutritional status.

Die risiko vir chroniese siektes soos hipertensie, diabetes, beroerte en hartkwaal is steeds baie hoog in die bejaardes in Suid Afrika. Dit word deur faktore soos ekonomiese status en ervarings oor die hele lewesiklus gevorm en verander. Voedings probleme wat geïndentifiseer is in die studie hou verband met dieettekorte, alhoewel probleme met oorvoeding verband kan hou met die voedings oorgang wat plaasvind in Suid Afrikaanse gemeenskappe. In verskeie gemeenskappe, as gevolg van die graad van afhanklikheid van ander vir hulp en sorg, is die bejaardes blootgestel aan die risiko van wanvoeding. Die bejaardes van die Umlazi gemeenskap is oorlaai met die sosiale verantwoordelikheid van kleinkinders en probeer om verskeie huishoudings te stabiliseer, wat 'n dubbele las op hulle plaas en dit kan hulle lewenskwaliteit affekteer wat dan hul voedingstatus verder kan vererger.

Introduction

Problem statement

South Africa has the fastest-growing elderly population in the southern African region (May 2003:25), but there is a paucity of literature regarding the nutritional status of the elderly in South Africa. In South Africa the elderly made up 8% of the population in 2011 (Statistics South Africa 2011) and this figure is expected to reach 19% by the middle of the century (United Nations Population Division 2006). Elderly women constitute 61.7% of the population aged 60 years and over, a figure that rises to 68.1% in the population aged 80 years and over (Statistics South Africa 2005a, 2006b).

According to Aboderin (2007) and Peltzer, Schneider and Makiwane (2012), there has been limited research on the health and wellbeing of this population group and there are only poor interventional strategies to address their needs, particularly in African countries. Malnutrition continues to be a global problem affecting the elderly as it leads to increased hospital admissions, morbidity and higher rates of mortality (Charlton 2012).

In a study undertaken by Hickson in the United Kingdom, almost two-thirds of general- and acute hospital beds were used by people aged over 65. People over 75 years also stayed in hospital longer (Hickson 2006). The relationship between the underlying causes of malnutrition and food insecurity in South Africa needs urgent attention from researchers since limited empirical data is available for groups such as elderly women and men (Oldewage-Theron *et al*. 2005b).

Lack of physical activity, excessive weight gain and inadequate dietary intake increase the risk of developing non-communicable diseases during old age, especially in urban areas (Vorster 2002:243). According to Charlton, Ferreira and Du Plessis (2008), despite the pension income that the elderly receive, household food insecurity has been found to be the greatest in elderly-headed households in South Africa as a result of higher poverty risk and big household membership. Elderly people, especially women, who share pension income with other household members

may also be at risk of inadequate dietary intake, as they often skip meals in favour of their grandchildren who can then benefit from the food that is available.

The exact prevalence of malnutrition amongst the elderly in South Africa is, however, not clearly defined, because no national surveillance programme exists at present. Little data are available because studies have been undertaken amongst isolated groups (Oldewage-Theron *et al*. 2008:4). Recently, the elderly have been identified as a group in which research is needed in order to determine food and dietary intake patterns in South Africa (Van Heerden & Schonfeldt 2011).

The purpose of this study was, therefore, to conduct a nutrition situational analysis of elderly people on state pension living in Umlazi, KwaZulu-Natal, South Africa in order to determine if this community also suffered from similar problems to those reported in the literature. The researcher decided to investigate the sociodemographic- and health status as well as the food consumption patterns of this community. The study presents possible explanations for the nutrition situation amongst this elderly population group.

Research objectives

The objective of the study was to determine the nutritional situation in free-living elderly-headed households by assessing the socioeconomic status, health status, anthropometric measurements and dietary diversity of the sample.

Contribution to the field

South Africa has the fastest-growing elderly population in the southern African region, particularly in developing areas. This factor in the above literature highlighted the urgent need to study this group. The information obtained can be used to develop relevant nutrition-education programmes for the elderly.

Research method and design

The study was of a descriptive nature with a cross-sectional design. Descriptive nutrition studies describe the occurrence of disease and other health-related problems in communities and quantitative data that was well defined, organised and competently interpreted was gathered in order to identify variables affecting the outcome (Katzenellenbogen & Joubert 2007). The quantitative data were collected using questionnaires during personal interviews.

Population and sampling

The sample was calculated using a power calculation (Cole 1997). The results of the power calculation indicated that a sample size of 263 respondents (from this population base of 17 000 elderly people in Umlazi) was sufficient to generate statistically-significant representative data. The sample size was rounded off to 270 in order to account for possible dropouts. The sample size comprised 224 women and 46 men – systematically- and randomly-selected elderly people within the 12 wards of Umlazi. The inclusion criteria were for elderly persons aged 60 years and older who were permanent residents of Umlazi and registered pensioners with the South African Social Security Agency. People under the age of 60, not resident in Umlazi and disabled persons were not included in the study. Each ward comprised 22 respondents who were interviewed, making a total of 270 respondents in the study. Using a loudhailer (to accommodate those with hearing problems) the researcher made an announcement in the Zulu language. This was done in each ward, in the community halls used as pension paypoints, a month before the study took place in order to orientate the elderly about the fieldwork which would taking place on their next pension date.

The announcement included information regarding the scope and purpose of the research and where it would take place. Consent forms were then signed during the interview process.

Measuring instruments

Fieldworkers trained through Durban University of Technology (DUT) departmental research workshops and qualified nurses completed the questionnaires and measurements in one-on-one interviews with the respondents. The fieldwork was conducted over a period of three months in the various Umlazi ward halls as indicated by the sampling strategy. The measurements and completion of questionnaires took about one hour per person to conduct and body assessments were completed in one session so that the elderly did not have to return for another session.

The food intake data, including dietary intake, were analysed using a standardised method on the FoodFinder software program version 3 developed by the Medical Research Council of South Africa. Food consumption data were analysed by a registered dietician.

Sociodemographic questionnaire

Sociodemographic variables are often used as a poverty indicator, seeing as poverty is a contributing factor to malnutrition, therefore this measuring instrument was an important inclusion for this nutrition study (Alkire & Santos 2010). A pretested and validated sociodemographic questionnaire (Napier 2006) was used for assessment of socioeconomic status and included questions on personal information, accommodation and family composition, work and economic status, income and money spent on food per month, education and language and household assets. Fieldworkers assisted the elderly by translating information where required in order to improve their understanding of the questionnaire.

Medical and health survey

The health questionnaire used was a validated Gauteng Provincial Administration questionnaire that had been tested in an elderly community in Sharpeville (Oldewage-Theron *et al*. 2005a). Questions included self-reported information on

the nature and severity of any health conditions as well as the use of alcohol, traditional medicines and type of healthcare service used. The questionnaire also included the actual blood-pressure measurements of the respondents.

Anthropometry

Anthropometric measurements included height and weight in order to calculate the Body Mass Index (BMI). Waist circumference and height measurements were taken so as to calculate the waist-to-hip ratio (WTHR). These measurements were taken according to World Health Organization (WHO) standard procedures. BMI was calculated by dividing weight (kg) by height squared (m^2). The following cut-off point ranges were used: normal weight (BMI 18.5–24.9), overweight (BMI 25–29.9), obese I (BMI > 30), obese II (BMI > 35) and obese III (BMI > 40) (WHO 2004). Waist circumference calculations were conducted according to standard guidelines (Centers for Disease Control 2002). The waist-to-height ratio was calculated in order to determine the risk of metabolic syndrome in women and men, with a ratio of > 0.5 indicating people at risk (Gibson 2005; Lee & Nieman 2003). Blood pressure measurements were collected from the respondents twice by a registered nurse and the average of the two was recorded according to WHO standard procedures.

Dietary assessment

A 24-hour recall questionnaire (Oldewage-Theron *et al*. 2005a) was used in an interview situation to determine the food consumption of the elderly over 24 hours on three separate days – one weekend day and two weekdays – and a pre-validated food frequency questionnaire (FFQ) was used to determine the variety of food eaten. This questionnaire is a good indicator of the dietary diversity of food consumed over a period of seven days and is used to validate 24-hour recalls (Oldewage-Theron & Kruger 2008). The fieldworkers assisted the elderly in estimating portion sizes, using food models and eating utensils to explain food items in order to assist with the memory of food consumed over the three days.

Data analysis

The Sociodemographic and Health questionnaires as well as the FFQ were captured onto an Excel(R) spreadsheet by the researcher. Descriptive statistics (frequencies, means, standard deviations and confidence intervals) were determined for these variables with the assistance of a biostatistician using the Statistical Package for Social Sciences (SPSS) for Windows version 17.0 software program. The 24-hour recall data were captured and analysed using the FoodFinder version 3.0 computer software program by a Food and Nutrition specialist and presented in the form of means and standard deviations. The dietary reference intakes (DRIs) were used to compare the results for nutrient adequacy for a 51–70-year old population and presented in tables and graphs (FoodFinder3 2002; Langenhoven *et al*. 1991). Correlations were drawn so as to determine the relationship between various variables by using analysis of variance (ANOVA) statistical tests.

Results

Sociodemographic data

Table 1 indicates that the majority of respondents lived in brick houses (229; 84.8%) and their living space generally consisted of more than three rooms (236; 87.4%). However, the majority of households (182; 67.4%) consisted of between four and 10 members whilst only 88 (32.6%) of the households consisted of less than four members. The mean household size was 5.1 (± SD 2.9) people.

The majority of respondents (114; 82.9%) had a total monthly income of R500 – R1500, followed by R1501 – R2500 (31; 14.1%) and only 8 (3%) had more than R2500 total income. Food expenditure for most households (216; 80%) was > R500 of the total income. Food shortages due to limited income were frequent in 146 (54%) of the households, who experienced this problem regularly (Table 2).

TABLE 1: Housing situation and members per household.†

Variables	Number (*n* = 270)	Percentage (%)
Type of house		
Brick	229	84.8
Clay	13	4.8
Grass	1	0.4
Wood	11	4.1
Shack	16	5.9
Total	270	100
Number of rooms per household		
≤ 2 rooms	34	12.6
3–4 rooms	98	36.3
≥ 4 rooms	138	51.1
Total	270	100
Children per household		
Children	183	68.0
No children	87	32.0
Number of other people living with elderly per household		
None	4	1.5
1–3	84	31.1
4–6	107	39.6
7–9	45	16.7
>10	30	11.1

†, Mean and standard deviation (SD) of people living per household = 5.1 (±2.9).

TABLE 2: Household bugdet in relation to food purchases of the respondents.

Variables	Number (*n* = 270)	Percentage (%)
Total income per household		
R500 – R1000	178	65.9
R1001 – R1500	46	17.0
R1501 – R2000	31	11.5
R2001 – R2500	7	2.6
> R2500	8	3.0
Food-buying shortages		
Always	146	54.0
Often	41	15.2
Sometimes	70	26.0
Seldom	7	2.6
Never	6	2.2
Food-expenditure budget per month		
< R250	19	7.0
< R250 – R500	29	11.0
> R500	216	80.0
Don't know	6	2.0

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Dietary intake data

The top three food items consumed included maize-meal porridge (227.33 g), tea (160.96 g) and chicken stew (126.62 g) (Table 3). The frequency of vegetable and fruit intake was very low; the portion sizes were also small and did not meet the recommended daily intake of > 400 g per day (Nishida *et al*. 2004). The first vegetable reflected on the top 20 foods list is cabbage (84.67 g) at number 10, followed by spinach (144.96 g) in 11th position, but these were consumed by only a small number of people. The main sources of protein were chicken (126.62 g) and milk (56.90 g) whilst other sources which were consumed by the minority were beef (139.99 g), beans (125.64 g) and pilchards (133.94 g). Milk, however, was consumed by a large number of respondents (n = 114), but in inadequate quantities.

Table 4 indicates that the energy contribution from carbohydrates was 65% of the total energy intake, which is considered to be on the high side (World Health Organisation (WHO) goals 55% – 75%).

Protein intake was adequate, with a 15% contribution to energy from protein, with 42.73 g and 40.23 g consumed by the women and men respectively (WHO goal 10% – 15%); and fat consumption contributed 20% to the energy for both men and women, meeting the goal set by the WHO, namely, 15% – 30% fat intake (Table 4) (WHO 2003).

Table 5 indicates the mean macronutrient intakes for both men and women. The energy contributions showed that 198 (89.2%) of the women consumed a diet that supplied < 100% of the Estimated Energy Requirements (EERs) and all of the men consumed < 100% of the DRIs for energy. Sixty-three per cent (139) of the women and 91.1% (41) of the men consumed < 100% of the Recommended Daily Allowance (RDA) for protein. The mean carbohydrate intake in the sample was significantly higher than the daily requirements but even so, 9 (4.1%) of the women consumed < 100% of the Estimated Average Requirements (EARs) for carbohydrates and all men consumed > 100%. Table 5 also shows that 86.5% (192) of the women and 33.3% (15) of the men consumed < 100% of fibre requirements.

Table 6 indicates low intakes for the majority of the vitamins for both genders except for vitamin B12 and B6 (in the case of men only). Although the mean vitamin B12 intake was sufficient according to the EARs, 115 (51.8%) of the women and 32 (70%) of the men consumed < 100% of the EARs. The same is true for vitamin B6, where 39 (86%) of the men had insufficient intake, although mean intake for the women was sufficient.

Low intake of the majority of minerals is reflected in Table 7 (as was also seen in Table 6 for vitamins) except for iron (36.6% for men; < 100% requirement) and potassium (39.0% for men; < 100% requirement). These were both consumed

TABLE 3: The mean top-20 food items ranked by total consumption (portion size x number of respondents) as measured by three 24- hour recalls (n = 267).

No	Food item	Total intake	Mean intake (g)	Number
1	Maize meal, cooked crumbly porridge	60 698.33	227.33	267
2	Tea, brewed	42 976.67	160.96	267
3	Chicken stew (with skin)	13 422.66	126.62	106
4	Bread/rolls, white/brown	12 951.66	84.65	153
5	Rice, white, cooked	12 760.40	83.95	152
6	Stew, beef, with vegetables	11 028.33	139.99	79
7	Beans, sugar, dried, cooked	6659.16	125.64	53
8	Fresh milk, full cream	6487.50	56.90	114
9	Samp and beans, 1:1	5685.83	270.75	21
10	Cabbage, cooked with potato, onion and sunflower oil	4403.33	84.67	52
11	Spinach (swiss chard), cooked with potato, onion, sunflower oil	3769.16	144.96	26
12	Steamed bread	32363,33	1348.47	24
13	Sugar, white, granulated	3171.50	14.09	225
14	Fruit punch (alcohol-free)	2916.66	265.18	11
15	Orange, raw (peeled)	2696.66	224.72	12
16	*Mahewu/mageu*, liquid	2483.33	496.66	5
17	Coffee, brewed/instant	2400.00	184.61	13
18	Breakfast cereal	2231.00	123.94	18
19	Pilchards in tomato sauce	2143.16	133.94	16
20	Tomato and onion, stewed (no sugar)	2084.16	184.61	13

TABLE 4: Intakes of macronutrients of the elderly in Umlazi compared against the World Health Organization (2003) nutrient-intake goals.

Nutrient	Goal	Women n = 222	Men n = 45
Total fat (% E)	15% – 30%	20%	20%
Total protein (% E)	10% – 15%	15%	15%
Total carbohydrates (% E)	55% – 75%	65%	65%
Mean sodium (mg/day)	< 2000	549.72	518.51
Dietary fibre (g)	> 25	14.0	14.4

% E, percentage of estimated energy requirement.

TABLE 5: Analysis of three 24-hour recalls: Mean macronutrient intakes (n = 267).

Nutrient	Women (mean ± SD) n = 222	Women (%) < 100% of EAR	Men (mean ± SD) n = 45	Men (%) < 100 of DRIs	DRIs	
					Men	Women
Energy (KJ)	4745.33 ± 1232.55	89.2	4793.07 ± 1092.10	100	8185.8 kJ EER†	6316.8 kJ EER†
Total protein (g)	42.73 ± 14.37	63.1	40.23 ± 11.84	91.1	56 g/day‡	46 g/day‡
Carbohydrates (g)	168.31 ± 43.7	4.1	174.91 ± 47.26	0	100 g/day§	100 g/day§
Total dietary fibre (g)	**14.15 ± 5.82**	**86.5**	**15.41 ± 5.12**	**33.3**	**30 g/day¶**	**25 g/day¶**

Source: Food and Nutrition Board of the Institute of Medicine 2002; NICUS 2003
EAR, Estimated Average Requirements; EER, Estimated Energy Requirements; DRI, Dietary Reference Intakes.
†, EER low-activity individuals 51–70 and > 70 years old.
‡, Recommended Dietary Allowances (RDA).
§, Estimated Average Requirements (EAR).
¶, Adequate Intake (AI).

TABLE 6: Analysis of three 24-hour recalls: Mean vitamin intake in the elderly respondents (n = 267) compared against daily required intakes.

Nutrient	Women (mean ± SD) n = 222	Women (%) < 100% of EAR	Men (mean ± SD) n = 45	Men (%) < 100 of EAR	DRIs	
					Men	Women
Vitamin A	359.20 ± 640.41	89.0	445.92 ± 776.31	100	625.00 µg/day†	500.00 µg/day†
Vitamin D	2.37 ± 2.63	98.2	2.42 ± 2.74	91.00	10.00 mg/day‡	10.00 mg/day‡
Vitamin E	4 .47 ± 2.58	98.6	5.04 ± 3.16	95.6	12.00 mg/day†	12.00 mg/day†
Vitamin K	88.36 ± 133.16	76.6	112.08 ± 145.71	91	120.00 µg/day†	90.00 µg/day‡
Vitamin B12	3.45± 7.25	58.1	2.01 ± 2.14	70	2.00 µg/day†	2.00 µg/day†
Vitamin B6	0.70 ± 0.33	95.5	2.57 ± 7.78	86	1.40 mg/day†	1.30 mg/day†
Vitamin C	33.79 ± 44.7	86.5	32.67 ± 31.32	93	75.00 mg/day†	60.00 mg/day†
Thiamin	0.7 ± 0.26	82.9	0.76 ± 0.29	73	1.00 mg/day†	0.90 mg/day†
Riboflavin	0.61 ± 0.48	82.9	0.63 ± 0.45	89	1.10 mg/day†	0.90 mg/day†
Niacin	9.47 ± 4.66	71.6	9.08 ± 4.58	61	12.00 mg/day†	11.00 mg/day†
Folate	150 ± 89.05	96.8	165.21 ± 83.90	77	320.00 µg/day†	320.00 µg/day†
Panthothenate	3.73 ± 2.06	85.6	4.04 ± 2.45	64	5.00 mg/day†	5.00 mg/day†
Biotin	18.51 ± 14.63	93.7	18.38 ± 13.73	84	30.00 µg/day‡	30.00 µg/day‡

Source: Food and Nutrition Board of the Institute of Medicine 2002; NICUS 2003
DRI, Dietary Reference Intakes.
†, Estimated Average Requirements (EAR).
‡, Adequate Intake (AI).

TABLE 7: Analysis of three 24-hour recalls: Mean micro-mineral intakes of a sample of elderly respondents (n = 266) compared against daily required intakes.

Nutrient	Women (mean ± SD) n = 222	Women (%) < 100% of EAR	Men (mean ± SD) n = 45	Men (%) < 100 of EAR	DRIs	
					Men	Women
Calcium	240.42 ± 175.91	99.5	253.16 ± 165.24	98.0	1200 mg/day	1200 mg/day
Iron	6.11 ± 3.23	47.0	6.68 ± 3.83	38.6	6.00 mg/day†	5.00 mg/day†
Magnesium	641.21 ± 300.96	92.3	189.28 ± 48.34	89.0	350.00 mg/day†	265.00 mg/day†
Potassium	641 ± 212.18	41.4	645.07 ± 180.10	39.0	580.00 mg/day†	580.00 mg/day†
Choline	334 ± 310.11	83.3	384.76 ± 338.75	82	550.00 mg/day‡	425.00 mg/day‡
Zinc	6.06 ± 2.33	67.6	5.61 ± 2.12	77	9.40 mg/day†	6.80 mg/day†
Chromium	23.23 ± 14.56	45.0	21.53 ± 14.07	73	30.00 µg/day‡	20.00 µg/day‡
Selenium	12.95 ± 10.08	98.6	13.05 ± 8.59	95	45.00 µg/day†	45.00 µg/day†
Iodine	13.57 ± 8.98	0	12.19 ± 7.24	0	95.00 µg/day)†	95.00 (µg/day)†

Source: Food and Nutrition Board of the Institute of Medicine 2002; NICUS 2003
DRI, Daily Reference Intakes.
†, EAR, Estimated Average Requirements.
‡, Adequate Intake (AI).

more amongst men than women. Although the majority of respondents had sufficient intake according to the EARs, the mean intake values for iron and potassium were still insufficient.

Health data

The anthropometric indices indicated that the mean weight of the respondents was 76.5 kg (± SD 17.3). The BMI scores for the total group indicated that 143 (53%) of the respondents fell into the obese category (BMI > 30) (WHO 2004) and only 51 (19%) were of normal weight. Although more men (16; 34.2%) were overweight compared with women (49; 21.9%), more women (135; 60.1%) were obese compared with men (9; 18.8%), as can be seen in Table 8.

The majority (186; 83%) of the women were *above* the cut-off point for waist circumference (≥ 88 cm), with 38 (17%) falling within the normal range, whilst 34 (74%) of the men were *within* recommended cut-off points (≥ 102 cm) and only 12 (26%) exceeded the recommended scores, indicating central obesity (Gibson 2005; Lee & Nieman 2003). The overall results indicate that 208 (77%) of the respondents were at risk of developing metabolic syndrome as they had a > 0.5 waist-to-height-ratio, although 62 (23%) fell into a lower-risk category. Women showed a higher risk (87.4%) and men only

47.9% for metabolic syndrome. These results correlate with a WHO-SAGE wave 1 national study by the Medical Research Council and the South African Department of Health which indicated trends of overweight, obesity and central obesity measurements in older women (Peltzer *et al*. 2012).

The blood-pressure data collected indicate that the majority of the elderly population were in various stages of hypertension. Sixteen (6%) were in the pre-hypertension stage, 76 (28%) and 167 (62%) were characterised as being at stage 1 and stage 2 hypertension respectively, whilst only 11 (4%) reflected normal blood pressure (Table 9).

TABLE 8: Body Mass Index (BMI) classification table for men and women.

BMI Classification	% of Men *n* = 46	% of Women *n* = 224
Underweight	4%	4%
Normal Weight	43%	14%
Overweight	34.2%	21.9%
Obese I (30.00–34.99)	18.8%	60.1%
Obese II (35.00–39.99)	-	-
Obese III (≥ 40)	-	-
Total	**100%**	**100%**

TABLE 9: Hypertension classification table for the Umlazi elderly population.

Classification	Parameter		Population (%)
	Systolic Pressure (mm Hg)	Diastolic Pressure (mm Hg)	
Normal	< 129	<80	4.0%
Prehypertension	120–139	80–89	6.0%
Stage 1	140–149	90–99	28.0%
Stage 2	> 160	> 100	62.0%
Total	-	-	**100%**

Ethical considerations

Ethical approval for the study was obtained from the Faculty Research Committee at the Durban University of Technology. The protocol was submitted in accordance with the Medical Research Council guidelines for medical research. Permission was granted by the eThekwini municipality to conduct interviews in municipal halls which are used as pension sites. All voluntary respondents were requested to sign an informed consent form prior to the study being undertaken. Study numbers were allocated to each respondent in order to ensure confidentiality.

Recruitment procedures

The recruitment process was conducted at pension paypoints in Umlazi. Systematic sampling was conducted in this study: a random first number was selected and from then onwards every 10th person on the total list was chosen systematically for inclusion in the sample. This method is technically referred to as a systematic sample with a random start. All 12 wards have a pension day schedule for the month and samples were selected on pension day in each ward.

Informed consent

All the respondents were required to complete a consent form to participate in the study after listening to the researcher explaining the purpose of the study. All participation was on a voluntary basis and respondents understood that they could withdraw at any time.

Data protection

All respondents were allocated a number and no names were used during the study. The names and numbers of the respondents are kept under lock and key at the Durban University of Technology and no one has access to it except for the researchers. After five years the list of names and numbers will be destroyed.

Validity and reliability

Credibility was ensured in terms of the competence of both the supervisors who were trained professionally in the field of nutrition and nutritional assessment and registered with the Health Professions Council of South Africa. The questionnaires used in this study were validated in previous studies as reported in the section on measuring instruments, therefore making them valid and reliable measuring instruments. The weight was measured using a PPS Physician scale from Scales 2000 and the height was recorded using a stadiometer. Both measurements were taken twice to ensure accuracy (Lee & Nieman 2010). The same scale and stadiometer were used for all the respondents in order to ensure the validity of the measuring instruments.

A qualified nurse was contracted to assist with blood-pressure- and waist-circumference measurements. The waist measurements were taken using a non-stretchable measuring tape (cm).

Discussion

The results of this study indicate the prevalence of poverty and food insecurity, as well as poor nutritional status, which compromises the quality of life of the elderly living in this community. Socioeconomic status plays a vital role in quality of life, including the food choices that these elderly are able to make. There are high levels of extreme poverty due to pension being the dominant source of income and the elderly remain the breadwinners in the majority of households within this community (Charlton *et al*. 2008). Poverty, unemployment and the increasing social burden of children (who were mostly unemployed) and grandchildren, who form a major part of many households, are putting a great deal of strain on the limited financial resources of many pensioners. There is a correlation in this observation with a study that observed demographic changes of increasing numbers of people who have been seen playing a significant contribution to family welfare and income, according to the South African Department of Social Development (South African Department of Social Development 2001).

Trends of being overweight, obese and centrally obese were prevalent, particularly in women and the high prevalence

of hypertension continues to be a risk for other lifestyle diseases. High blood pressure has been identified as a risk factor for chronic disease in older persons, amounting to 12–19% of the total burden of disease particularly in developing countries (United Nations Population Fund [UNPF] and Help Age International [HAI] 2012). The results showed a statistically-significant correlation ($p = 0.01$) between BMI and reported blood pressure. Similar observations were made in a study that investigated the relationship between obesity and hypertension in South African Black women (Schutte *et al*. 2008). Degenerating health status is linked to disease progression. This is a public health concern, not only because it increases medical expenses but also because the increased intake of medication, in order to deal with this degenerating health status, affects the wellbeing of the elderly and can compromise their nutritional status (UNDP & HAI 2012). In a similar study conducted in Sharpeville (Oldewage-Theron *et al*. 2008) similar food-consumption patterns were identified.

Low micronutrient intakes were observed amongst both male and female respondents. The results correlate with a study by Charlton, Kolbe-Alexander and Nel (2007) in Cape Town where the consumption of micronutrients in the elderly was also poor. Results confirmed by the nutrient intake data and top 20 list indicate that essential micronutrients such as potassium, magnesium and folate, which are essential in reducing risk for hypertension, were poorly consumed, which could have contributed to the higher prevalence of hypertension amongst this population group.

Lack of published data contributes to the limited reporting of possible explanations that could be relevant in further discussion within this population group.

Limitations of the study

Limitations included getting permission for conducting the research from the Ethekwini municipality, since the authorising members from the Mayor's office were not available. This delayed the implementation of the project. After permission had been obtained to conduct the fieldwork in the municipal halls, these venues became unsafe after the first session as they were also used for pension payouts, which presented security concerns. This made the elderly uncomfortable with regard to participating fully for long periods. The fieldwork was moved to outside the pension payout venues where a gazebo was erected and screens were put in place to ensure privacy. Because of time constraints and the elderly coming from various households to the research venue it was decided to capture all three of the 24-hour recall questionnaires on one day. This was done as close as possible to the previous weekend and the fieldworkers assisted the respondents by questioning in such a way that it would help the elderly to remember what they ate over the previous three days. Food models and household utensils such as plates, bowls, glasses and cups were used to assist with portion sizes estimation.

Recommendations

The elderly should be a priority in social development, health and nutrition programmes of countries in the Southern African Development Community (SADC) which currently target children, women (lactating and pregnant) and people living with HIV (Kimokoti & Hamer 2008).

Effective nutrition intervention programmes need to consider economic, health, social and demographic factors and future research is needed to address the growing needs of this population group. More interventions are therefore needed: collaborative research between the Department of Social Welfare, Department of Health, Senior Citizens' Sector within municipalities and non-governmental organisations is essential for the success in rolling out any community programmes. Partnerships need to incorporate other organisations already involved in research and programme development.

Further research is required on the role of social grants with regard to the nutritional status of the elderly and the role of health services in South Africa in addressing malnutrition in the elderly.

Conclusion

Nutritional needs of the elderly in South Africa cannot be ignored as this problem continues to affect the elderly with compromised lifestyles due to physical-, psychological- and socioeconomic status. Risk factors are, however, multifaceted and numerous and can be instrumental in creating health concerns which interfere with nutritional status. Older adults, especially women (Puoane *et al*. 2002), are more vulnerable to malnutrition and to being overweight or obese, both of which contribute to a double burden of disease. More assistance programmes need to be implemented at both national- and community levels and should address all determinants of nutritional status in the elderly.

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Competing interests

The authors declare that they have no financial or personal relationships which may have inappropriately influenced them in writing this article.

Author's contributions

X.M. (Mangosuthu University of Technology) collected the data in the community, C.N. (Durban University of Technology) was the supervisor of the student and contributed to the writing of the manuscript and W.O-T. (Vaal University of Technology) was the external supervisor of the student and contributed to the writing of the manuscript.

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