

Short Communication

Fruit and vegetable consumption in older individuals in Northern Ireland: levels and patterns

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Low intakes of fruit and vegetables have previously been reported in the older population of Great Britain, particularly among certain socio-demographic groups. Levels and patterns of consumption in the older population of Northern Ireland, however, remain unknown. A representative sample of 1000 members of the older population of Northern Ireland were contacted by telephone to assess average intake of all fruits and vegetables and various demographic details. Data from 426 individuals (representative of the whole population) reported a mean consumption of 4.0 (SD 1.3) and 4.1 (SD 1.3) portions of fruit and vegetables per weekday and per weekend day respectively. Regression analyses revealed greater consumption on weekdays by females (B 0.53; $P < 0.01$), younger individuals (B -0.02; $P = 0.01$) and those living in less deprived areas (B -0.01; $P = 0.04$), and greater consumption at weekends by females (B 0.54; $P < 0.01$) and younger individuals (B -0.03; $P = 0.01$). The amount of fruit and vegetables consumed is slightly higher than that reported in older populations in Great Britain, possibly as a result of differences in farming practices and rural activities, although levels of consumption remain below current recommendations for health. Patterns of consumption are similar across the UK, and suggest that strategies to increase fruit and vegetable consumption should target males, older individuals and those living in more deprived areas.

Fruit and vegetables: Older individuals: Northern Ireland: Demographics: Lifestyle

The health benefits of a high consumption of fruit and vegetables are now well recognised⁽¹⁾, resulting in global recommendations that adults should be consuming at least 400 g (five servings) of fruit and vegetables per d⁽¹⁾.

Current reports suggest that intakes in the UK lie below this recommended amount, in the general population⁽²⁾, but also specifically in older individuals⁽³⁾. The National Diet and Nutrition Survey (NDNS) for older people reports an average consumption of 2.5 portions of fruit and vegetables plus one portion of fruit juice per d, excluding soups⁽³⁾. These data, however, were gathered in England, Scotland and Wales, and while differences in consumption are found in different regions of Great Britain (GB)^(3–5), consumption levels in Northern Ireland (NI) remain unknown.

Previous reports also suggest different consumption levels in different individuals. In the NDNS survey of older adults⁽³⁾, greater intakes of fruit and vegetables were reported by women compared with men, younger compared with older individuals, and those from non-manual compared with manual backgrounds, and similar patterns have been found elsewhere^(5–9). Consumption patterns in NI also remain unknown. Consumption levels and patterns may

differ in NI compared with the rest of the UK, as a result of differences in farming directives, rural practices, rural activities and proximity⁽¹⁰⁾.

Knowledge of the level of fruit and vegetable consumption by older individuals in NI could highlight a need for interventions to improve fruit and vegetable consumption in this population, as is suggested by the reported low levels of intakes from GB. Furthermore, patterns of consumption (i.e. differing consumption levels in different individuals) will be informative to allow potential interventions to target those most at risk of low intakes. The present study aimed to describe fruit and vegetable consumption in the older population of NI.

Methods

Fruit and vegetable consumption was assessed in a representative sample of older individuals from NI, from January to April 2008, using a telephone survey.

Names, addresses and telephone numbers for 1000 individuals over the age of 65 years living in NI were obtained from a data-sampling company (SampleAnswers, London, UK). Individuals were representative of the population of NI over

Abbreviations: GB, Great Britain; NDNS, National Diet and Nutrition Survey; NI, Northern Ireland.

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the age of 65 years with respect to gender (male/female), age (65–74 years; 75–79 years; 80–84 years; 85–89 years; 90+ years), marital status (married/unmarried) and area of residence (Belfast, North East NI, South East NI, South NI, West NI), in line with the 2001 census data (www.nicensus2001.gov.uk). All variables have previously been identified as of potential impact on fruit and vegetable intake^(4–7). Ethical approval for the study was obtained from the Ethics Committee of the School of Psychology, Queen's University, Belfast.

All individuals were telephoned during working hours, and asked for fruit and vegetable intakes and demographic variables as part of a larger questionnaire. Telephone interviews lasted for approximately 20 min. Fruit and vegetable intake was assessed at the start of the questionnaire, to improve accuracy and avoid contamination from other questions in the questionnaire (questions on barriers and solutions to increasing intakes); demographic variables were requested towards the end. Telephone interviewing was used to ensure complete completion and encourage engagement with individuals who may have been unlikely to volunteer of their own accord⁽¹¹⁾. If the telephone call was unanswered or the time was unsuitable, individuals were called once more at a different time.

Fruit and vegetable consumption was measured using direct questioning. Individuals were asked to report the fruits and vegetables they typically consumed (type and amount) for breakfast, morning snacks, lunch, afternoon snacks, dinner and evening snacks, on both weekdays and at the weekend. Individuals were asked for the name of each fruit or vegetable, and how much of that fruit or vegetable was consumed (for example, on a normal weekday, how many fruits and vegetables do you eat for breakfast? What fruits and vegetables are they, and how many or much do you eat?). Verification of a food item as a fruit or vegetable was undertaken at the time of asking by the researcher. Quantities consumed were also converted into portions of fruit and vegetables by the researcher at the time of asking using Department of Health guidelines⁽¹²⁾. Detailed report of fruit type and quantity, and subsequent conversion into portions was used to improve accuracy surrounding portion sizes, following research that suggests that many individuals are unclear of the quantity of fruit or vegetable in 'a portion'⁽¹³⁾. Complete recall was assisted using prompts⁽¹⁴⁾ requesting specific consideration of: fruit juice, fresh fruit and vegetables, frozen fruit and vegetables, canned fruit and vegetables, dried fruit and vegetables. Composite dishes (for example, stews) were not prompted specifically, due to the variable quantities of fruit and vegetables in these items depending on manufacturer, and the likelihood that composite items that were heavy in fruit and vegetables would be mentioned elsewhere due to the clear focus on fruit and vegetables. Consumption on weekdays and at weekends were investigated separately following previous reports that diets can vary between weekend and weekdays⁽¹⁴⁾. Only fruit and vegetable consumption was assessed to ease and quicken completion.

Various demographic and lifestyle characteristics of possible direct impact on food consumption^(4–9) were also requested. Demographic variables were gender, age, marital status (married/not married), living status (living with anyone else/not living with anyone else), region of residence and deprivation score based on residential postcode⁽¹⁵⁾. Marital status was requested to allow comparison with census

data. Living status was also requested, as recent work suggests that effects apparently due to marriage are usually a result of cohabitation⁽⁷⁾. Lifestyle characteristics were distance travelled for food shopping, frequency with which individuals received help with food shopping, frequency with which individuals received help with food cooking, frequency with which individuals had food delivered, and frequency with which individuals consumed food out of the house. Frequency question responses were converted into number of d per year (0–365).

Data were initially investigated to ensure that the sample was representative using χ^2 tests. Levels of fruit and vegetable consumption were investigated using descriptive statistics for consumption on both weekdays and at weekends. Patterns of fruit and vegetable consumption on weekdays and at weekends were assessed using multiple regression, where fruit and vegetable consumption was predicted using demographic and lifestyle variables. Continuous data were used for all variables where possible. Marital status was not used in regression models, due to high co-linearity with living status.

Results

A total of 426 (43%) individuals completed the survey and provided data that could be used. Of the remaining 574 individuals, 338 (59%) individuals did not answer their telephones or were not available when called, 190 (33%) individuals did not wish to participate in the study, twenty-five (4%) individuals provided invalid telephone numbers, nine (2%) individuals were deceased, seven (1%) individuals provided data, but then withdrew, and five (1%) individuals provided data that could not be used.

Of the 426 individuals whose data could be used, based on self-report, 159 (37%) were men, 267 (63%) were women, 244 (57%) were aged 65–74 years, eighty-eight (21%) were aged 75–79 years, fifty-five (13%) were aged 80–84 years, twenty-six (6%) were aged 85–89 years, and thirteen (3%) were aged 90 years or over. A total of 213 (50%) were married, 213 (50%) were unmarried, 226 (53%) were living with someone else, 200 (47%) were not living with anyone else and eighty-one (19%) were living in Belfast, ninety-five (22%) were living in North East NI, 108 (25%) were living in South East NI, seventy-nine (19%) were living in South NI, and sixty-three (15%) were living in West NI. None of these percentages differed significantly from those of the 2001 census (largest χ^2 0.70; $P > 0.05$).

For all individuals, mean distance to the shops was 4.1 (SD 4.6) miles (6.6 (SD 7.4) km), ranging from 0 to 30 miles (0 to 48 km). During 1 year, individuals were helped with their shopping on a mean of 173 (SD 178) d (range 0–365 d), individuals were helped with their cooking on a mean of 136 (SD 173) d (range 0–365 d), individuals had food delivered on a mean of 11 (SD 53) d (range 0–365 d) and individuals went out to eat on a mean of 30 (SD 41) d (range 0–365) d.

Levels of fruit and vegetables

Mean fruit and vegetable intake on weekdays was 4.0 (SD 1.3) portions, ranging from 0 to 8 portions. A total of 148 (35%) individuals reported consuming five portions per d or more (for distribution, see Fig. 1). Mean fruit

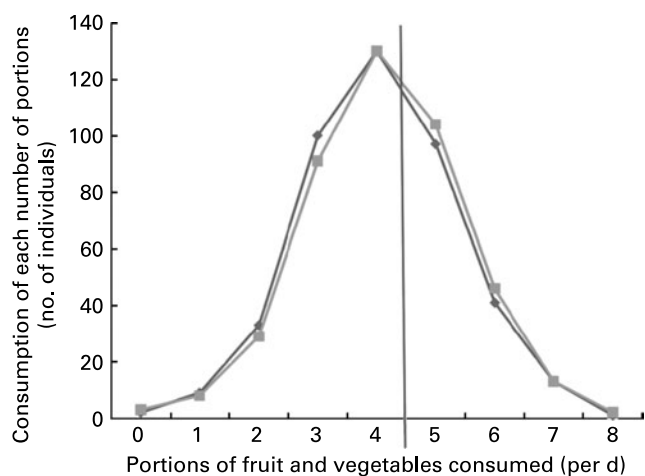


Fig. 1. Number of individuals consuming 0–8 portions of fruit and vegetables per weekday (◆) and per weekend day (■).

and vegetable intake on weekend days was 4.1 (SD 1.3) portions, ranging from 0 to 8 portions. A total of 161 (38%) individuals reported consuming five portions or more per d (see Fig. 1). Consumption was significantly greater at weekends ($t(425) 3.95; P < 0.01$). The greatest consumption was from apples (one portion per d consumed by 60% of the sample on weekdays and on weekend days), fruit juice (consumed by 49 and 50% of the sample on weekdays and on weekend days respectively), bananas (consumed by 45 and 46%), carrots (consumed by 43 and 44%) and broccoli (consumed by 35 and 36%).

Patterns of consumption

Levels of fruit and vegetable consumption on weekdays were significantly predicted by the regression model ($R^2 0.08$; adjusted $R^2 0.06$; $F(10,418) 3.63$; $P < 0.01$). Regression coefficients for all variables in the regression equation are shown in Table 1. Significant predictors were gender (B 0.52; $P < 0.01$), age (B -0.02 ; $P = 0.01$) and deprivation score based on residential postcode (B -0.01 ; $P = 0.04$), where greater fruit and vegetable consumption was associated with females, younger individuals and those living in less deprived

areas. Lower fruit and vegetable consumption was found in males, older individuals and those living in more deprived areas. Logistic regression to predict those consuming five or more portions per d v. those consuming less than five portions per d confirmed these findings, although age was no longer significant in analyses to predict those consuming four or more portions per d v. those consuming less than four portions per d (data not shown).

Levels of fruit and vegetable consumption at weekends were significantly predicted by the regression model ($R^2 0.08$; adjusted $R^2 0.06$; $F(10,418) 3.50$; $P < 0.01$). Regression coefficients for all variables in the regression equation are also shown in Table 1. Significant predictors were gender (B 0.53; $P < 0.01$) and age (B -0.03 ; $P = 0.01$), where greater fruit and vegetable consumption was associated with females and younger individuals. Logistic regression again confirmed these results, although again age was no longer significant in analyses to predict those consuming four or more portions per d v. those consuming less than four portions per d (data not shown).

Discussion

Levels of consumption

These data suggest that older individuals in NI are consuming about four portions of fruit and vegetables per d. These levels are below those recommended by current dietary guidelines for optimal health. It is reassuring that 35% of the older population of NI in 2008 are consuming fruit and vegetables at a level recommended for health, but 65% of individuals are still not reaching this target.

These levels of consumption, however, are higher than those in similar populations in the rest of the UK, as reported in 1998. These differences may demonstrate genuine differences in the consumption of fruit and vegetables in the four countries of the UK, where a greater proximity to farming and agriculture in NI may result in a greater availability and accessibility of fruit and vegetables for the NI population⁽¹⁰⁾. These differences, however, may also result from the time period and the methodology used to collect the data. First, data from England, Wales and Scotland were collected in 1994–5⁽³⁾, while data from NI were collected in 2008.

Table 1. Coefficients for all variables in the regression equation predicting fruit and vegetable intake on weekdays and at weekends

Variable	Weekdays				Weekends			
	B	β	<i>t</i>	<i>P</i>	B	β	<i>t</i>	<i>P</i>
Gender	0.52	0.20	3.63	<0.01	0.53	0.20	3.65	<0.01
Age	-0.02	-0.14	2.63	0.01	-0.03	-0.14	2.64	0.01
Living status	0.04	0.02	0.26	0.79	0.06	0.02	0.37	0.71
Region	-0.03	-0.03	0.58	0.56	-0.03	-0.03	0.52	0.60
Deprivation score	-0.01	-0.10	2.05	0.04	-0.01	-0.07	1.44	0.15
Distance to shops	-0.00	-0.01	0.20	0.84	-0.01	-0.02	0.39	0.70
Help with food shopping	0.00	0.05	0.81	0.42	0.00	0.08	1.20	0.23
Help with food cooking	0.00	-0.03	0.38	0.70	0.00	-0.05	0.77	0.44
Food delivered	-0.00	-0.04	0.83	0.41	-0.00	-0.05	0.98	0.33
Food consumed out of the house	0.00	0.08	1.72	0.09	0.00	0.07	1.40	0.16

B, unstandardised coefficient; β , standardised coefficient.

Within this time frame, many public health strategies have promoted the consumption of fruit and vegetables⁽¹⁰⁾, and it is feasible that these strategies have resulted in an increase in fruit and vegetable consumption throughout the UK since 1994–5. It is also possible that these strategies have resulted in an increased awareness of current recommendations resulting in an increased reporting of consumption while actual consumption may not have changed⁽¹⁶⁾. Also related to methodology, dietary intakes in the NDNS⁽³⁾ were assessed using food diaries which are susceptible to under-reporting, possibly resulting in a greater consumption of fruit and vegetables than reported⁽¹⁴⁾. Conversely, fruit and vegetable consumption in the present study was assessed using self-report, which may be more susceptible to inflation than under-reporting⁽¹⁴⁾, possibly resulting in a lower consumption than that reported.

Patterns of consumption

While levels of consumption differ, patterns of consumption are similar in NI and the rest of the UK. Greater fruit and vegetable intakes were found in females, younger individuals and those living in less deprived areas. Gender differences in fruit and vegetable consumption in the older population have previously been attributed to differences in traditional gender roles, where females are more likely to be responsible for food shopping and preparation, and are thus likely to have had more education, tuition and experience with food shopping and cooking, resulting in greater skills in these areas⁽⁷⁾. Decreases in fruit and vegetable consumption as a result of age have previously been considered a part of general decreases in food consumption as a result of age-related decreases in appetite, taste acuity, gastrointestinal function and energy requirement⁽⁷⁾. Differences dependent on socio-economic status have largely been attributed to the cost of fruit and vegetables and the cost of obtaining, storing and preparing these items for consumption. Fruit and vegetables are traditionally perceived as poor-value foods (in terms of energy provided per penny), can be weighty and bulky to carry, and may be more difficult to store, prepare and cook than other food items^(5,17). Work conducted specifically in low-income groups suggests that these reasons may be over-simplifications⁽¹⁷⁾, but some of these concerns may be particularly pertinent to older individuals^(6,7).

These findings suggest that interventions to increase fruit and vegetable consumption should target males, older older individuals and those living in more deprived areas. Similar suggestions have been made elsewhere^(4–7). The subsidiary analyses, however, also suggest that focusing on males and those living in more deprived areas may be more important than focusing on older older individuals, as these individuals are typically consuming the lowest amounts of fruit and vegetables. Lesser effects of age have also been reported elsewhere⁽³⁾.

The absence of effects of other variables investigated here is possibly unsurprising. The absence of effects of living status are most plausibly a reflection of the close family ties and social support networks found in NI. Close social support networks have previously been linked with increased fruit and vegetable consumption^(9,18), and in a recent survey, family

visits were notably more frequent in NI compared with GB, and more prevalent⁽¹⁹⁾. Informal neighbourly and local social support networks are also typically more prevalent and more active in NI compared with GB⁽¹⁹⁾. Indeed, it is noticeable that the members of the population sampled here were helped with their food shopping and cooking on average approximately every other day. The absence of effects of region is unsurprising given recent large-scale studies suggesting no differences between urban and rural areas in food price, availability or access to supermarkets⁽²⁰⁾. The absence of differences in the present study may also be a reflection of the availability of fruit and vegetables in rural areas of NI as a result of home-grown produce, local sellers and local markets⁽¹⁰⁾. This suggestion may also be supported by the large consumption here of fruits and vegetables that are grown in NI (apples, vegetables)⁽¹⁰⁾. The lack of relationship between fruit and vegetable consumption and distance travelled for food shopping may also be explained as a result of help received⁽¹⁹⁾ or the few differences between urban and rural areas in access to foods and supermarkets^(20,21). An absence of association between fruit and vegetable consumption and number of meals delivered or eaten out of the house has previously been explained as a result of the typically low fruit and vegetable content of meals prepared out of the home compared with those prepared in the home⁽²²⁾. Other lifestyle characteristics (for example, dentition), however, were not measured, and these may have an impact on fruit and vegetable intakes⁽¹¹⁾.

While levels of consumption may have been affected slightly by the methodology used here, patterns of consumption are unlikely to have been similarly affected. The population sampled was representative of the general population of NI, the use of telephone interviewing allowed inclusion of individuals who may not normally volunteer for research, and the use of repeated calling at different times of the day allowed inclusion of as many individuals as possible⁽¹¹⁾. The use of interviewing and diet history also maximised inclusion of individuals in the survey due to reduced participant demand⁽¹⁴⁾, and allowed increased detail and accuracy through the use of prompts and questioning on specific amounts eaten⁽¹⁴⁾. Accurate intake data can be difficult to obtain in older populations due to declines in memory and cognitive abilities, but asking for typical diets and use of prompts are likely to minimise these inaccuracies due to the habitual nature of an older individual's diet^(13,14). The conduct of the survey in January–April is also unlikely to have resulted in biases in the levels or patterns of fruit and vegetable consumption. While season may affect individual fruits and vegetables consumed, it is unlikely to greatly alter overall levels or patterns of consumption^(5,14).

Conclusion

The findings of the present study suggest that fruit and vegetable intake in the older population of NI lies below those currently recommended for health, and that intakes are particularly low in males, in older older individuals and in those living in deprived areas. These findings suggest that interventions aimed at increasing fruit and vegetable intakes in older individuals should focus particularly on these groups.

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There are no conflicts of interest.

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