



Original Article

Comparison of Nutritional Habits, Physical Activity Levels and Quality of Life among Normal Cognition Elderly Individuals Living in Nursing Homes or at Their Residence

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SUMMARY

Background: The process of ageing affects an individual's nutritional status, quality of life and physical activity level. This study aimed to compare these parameters among elderly individuals living either in nursing homes or at their residence.

Methods: The study included 88 elderly individuals aged ≥ 65 years, 59 living at their residence and 29 in a official nursing home. The patients' sociodemographic characteristics, quality of life, physical activity levels, hand-grip strength and nutritional habits were evaluated.

Results: The mean ages of those individuals living in nursing homes and at their own residence were 72.58 ± 6.62 and 68.39 ± 3.89 years, respectively. Those living in nursing homes skipped meals less frequently. Therefore, their energy and nutrient intake levels were significantly higher than in those living at their residence ($p < 0.05$). Regarding quality of life, those living in nursing homes provided more favourable responses to questions regarding emotional role difficulties and social functioning subscales ($p < 0.05$). No difference was observed between the two groups in terms of physical activity levels and hand-grip strength ($p > 0.05$).

Conclusion: Compared with those living at their residence, elderly individuals living in official nursing homes were less likely to skip meals and therefore had better energy and nutrient intake levels. They also demonstrated better quality of life in terms of social functioning subscales and emotional role difficulties.

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1. Introduction

Ageing is a complex and inevitable process involving changes in physiological, psychological and social factors.¹ With increasing life expectancy around the globe and in our country, the increase in the number of elderly individuals in the population is well known, indicating the need for institutional care worldwide.

The process of ageing affects an individual's nutritional status, quality of life and physical activity levels.^{1,2} Nutritional problems and undernutrition are more common among elderly individuals. Early detection of undernutrition is important because failure to address it increases the risk of poor outcomes.^{3,4}

Quality of life is an important parameter in determining the health status of an ageing individual.⁵ The quality of life is reportedly better among the elderly individuals living at their residence than for those living in nursing homes.⁶

The level of physical activity is one of the most important parameter affecting optimal health status in elderly individuals; it is also associated with quality of life.^{5,7} Nutritional factors also play active roles in maintaining an individual's quality of life.⁸

This study aimed to compare the nutritional habits, physical

activity levels and quality of life among normal cognition elderly individuals living in official nursing homes or at their residence. Our results will serve as valuable information to improve these parameters in both groups.

2. Materials and methods

This cross-sectional study was conducted in 2017 in Trakya University Faculty of Health Science, Department of Nutrition and Dietetics and Physiotherapy and Rehabilitation, in Edirne/Turkey. A total of 88 ambulatory elderly individuals aged ≥ 65 years (59 living at their residence and 29 in official nursing homes) with a score of ≥ 25 on the Standardised Mini-Mental State Examination (MMSE) were included. According to the "Country Report Republic of Turkey" in 2016, conditions of acceptance to the official nursing homes are to be 60 or older, do not have any disorders, being capable of carrying out daily activity and have sound mental health.⁹ Data regarding sociodemographic characteristics and nutritional habits were collected using questionnaires and by face-to-face interviews. The quality of life was assessed using the Short Form-36 (SF-36) health survey questionnaire for the evaluation of the quality of life, the International Physical Activity Questionnaire-Short Form for the physical activity level, and the JAMAR hand dynamometer for hand-grip strength.

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2.1. Measurements

2.1.1. Mini-Mental State Examination (MMSE)

The MMSE was developed by Folstein et al. The validity and reliability of the Turkish translation of this test was verified by Güngen et al. The MMSE was employed to select participants at the beginning of the study. Only elderly individuals with a score of ≥ 25 on the test were included.¹⁰

2.2. Nutritional Habits

The elderly individuals' daily food consumption was recorded using the 24-hour recall method. Energy and nutrient intake levels were measured using a nutritional database software (BeBis).¹¹ The obtained results were compared with reference dietary intakes according to age groups and sex.¹² Nutrient intake levels below two-thirds (67%) of the recommended level were considered insufficient.¹³

2.2.1. Physical Activity Questionnaire-Short Form (IPAQ-SF)

Physical activity levels were measured using the International Physical Activity Questionnaire-Short Form (IPAQ-SF). This questionnaire is valid and reliable in several languages, including Turkish.¹⁴ Using a questionnaire comprising seven questions, we obtained data about the individuals' time spent sitting, walking and performing moderate and vigorous activities. When calculating the total score, the duration (minutes) and frequency of the various activities were recorded. Activities performed for at least 10 min at one stretch were evaluated. The duration, number of days of physical activity per week and metabolic equivalent (MET) values were multiplied to yield the 'MET-minute/week' value. The duration in minutes of walking time, moderate activity and vigorous activity were multiplied by 3.3, 4 and 8 METs, respectively.¹⁴

2.2.2. The Short Form-36 health survey questionnaire (SF-36)

The Short Form-36 (SF-36) health survey questionnaire was used to assess the quality of life. It comprised eight sub-dimensions, including physical function, physical role difficulties, pain, general health perception, vitality, social function, emotional role function and mental health. The validity and reliability of the Turkish translation of this scale have been confirmed.¹⁵ A separate score was calculated for each subdimension; higher scores indicate better health-related quality of life.¹⁶

2.3. Hand-grip strength

With the person seated in a chair with the back supported and the feet in contact with the floor, hand-grip strength was measured with a JAMAR brand hand dynamometer in kilograms (kg) with the arm at 90° of flexion, the forearm in the neutral position and the other arm extended at the side of the trunk. The mean of two measurements performed with a 1-minute break in between was recorded. It was considered advisable to not require three repetitive measurements in elderly individuals.

2.4. Ethical procedures

Ethics Committee approval was obtained from the Scientific Researches Ethics Committee of the Faculty of Medicine of Trakya University prior to study initiation. The study was conducted in accordance with the principles of the Declaration of Helsinki. The

participants were informed about the aim of the study and the evaluations to be performed, and their informed consent was obtained.

2.5. Statistical analysis

Data were analysed using IBM SPSS Statistics 21.0 (SPSS Inc., Chicago, IL, USA). Data are expressed as mean, standard deviation and median values. Relationships between categorical variables were evaluated using the Spearman correlation coefficient. The t-test and non-parametric Mann–Whitney U-test were used to compare quantitative variables. $p < 0.05$ was considered statistically significant.

3. Results

The socio-demographic characteristics of the participants are presented in Table 1. The mean age of the individuals living in nursing homes was 72.58 ± 6.62 years and that of those living at their residence was 68.39 ± 3.89 years. The mean body mass index (BMI) was 26.96 ± 0.97 kg/m² for those living in nursing homes and 28.64 ± 0.68 kg/m² for those living at their residence. There was no significant difference in BMI between the groups ($p > 0.05$).

There was a statistically significant difference between the two groups in terms of skipping meals ($p < 0.001$; Table 2); however, there were no significant differences in the answers to the question 'Do you think your eating habits are adequate and balanced?' ($p > 0.05$). The average daily energy intake of elderly individuals living in nursing homes was 1549.0 kcal compared with 1117.9 kcal for those living at their residence. The mean macro- and micronutrient intake levels of the participants are presented in Table 3. Energy, carbohydrate, protein, cholesterol, dietary fibre, phosphorus, iron, zinc, vitamin A, vitamin B6, vitamin B12 and folic acid intake levels significantly differed between the two groups ($p < 0.05$), whereas dietary fat, calcium, magnesium, vitamin B1, vitamin B2 and vitamin C intake levels did not ($p > 0.05$).

The SF-36 quality of life subscale scores, IPAQ-SF scores and hand-grip strength data are presented in Table 4. A significant difference was found between the groups in terms of emotional role difficulties and social functioning subscales ($p = 0.026$). There were no statistically significant differences between the groups in terms of hand-grip strength or physical activity levels ($p > 0.05$). For the entire sample ($n = 88$), a significant relationship was observed between the hand-grip strength in both hands and all the SF-36 subscales ($p < 0.05$). Similarly, a positive correlation was found between physical activity levels and hand-grip strength in the entire sample ($p < 0.05$; Table 5). In addition, there was a statistically significant relationship between the body mass index and physical function subscales ($r = -0.334$, $p = 0.001$; $r = 0.203$, $p = 0.058$, respectively).

4. Discussion

This study aimed to compare the eating habits, physical activity levels and quality of life of elderly individuals living at their residence or in official nursing homes. Several studies have separately examined each of these parameters. However, no study has yet compared all the three parameters at the same time among elderly individuals living in nursing homes or at their residence.

Of the 88 elderly individuals in this study, the 29 living in official nursing homes had more regular meal consumption. The 59 living at their residence were more likely to skip meals, particularly lunch. In general, the energy intake of the nursing home residents was higher than that of those living at their residence. In addition, carbohy-

Table 1
Socio-demographic characteristics of participants.

	Living in nursing home		Living at their residence		p
	n	%	n	%	
Gender					0.010*
Female	12	41.4	29	49.2	
Male	17	58.6	30	50.8	
Education					0.540
Illiterate	2	6.9	1	1.7	
Literate	19	65.5	3	5.1	
Elementary school	5	17.2	36	61.0	
Middle school	3	10.3	6	10.2	
High school	0	0	8	13.6	
University or more			5	8.5	
Smoking					0.026*
Yes	14	48.3	12	20.3	
No	15	51.7	47	79.7	
Alcohol consuming					0.049*
Yes	0	0	8	13.6	
No	29	100	51	86.4	
Specific diseases					0.548
No	7	24.1	11	18.6	
Yes	22	75.9	48	81.4	
Diabetes mellitus	5	22.7	17	35.4	
Hypertension	12	54.5	33	68.8	
Cardiovascular diseases	8	36.4	20	41.7	
Cancer	2	9.1	1	2.1	
Chronic obstructive respiratory disease	0	0	2	4.2	
Inflammatory diseases	7	31.8	13	27.1	
Hormonal disorders	0	0	5	10.4	
Psychological disorders	2	9.1	2	4.2	
Gastrointestinal diseases	2	9.1	8	16.7	
Neurologic disorders	0	0	5	10.4	
Nutritional difficulties based on oral or dental problems					0.566
Yes	8	27.6	13	22.0	
No	21	72.4	46	78.0	
Medication					1
Yes	21	72.4	44	74.6	
No	8	27.6	15	25.4	

Chi-Square test * p < 0.05.

Table 2
Dietary habits of participants.

	Living in nursing home		Living at their residence		p
	N	%	N	%	
Skipping a meal					< 0.001**
Yes	1	3.4	23	39.0	
No	27	93.1	25	42.4	
Sometimes	1	3.4	11	18.6	
Skipping meal					0.002*
Breakfast	2	100	2	5.9	
Lunch	0	0	27	79.4	
Dinner	0	0	5	14.7	
Answer to "Do you think your eating habits are adequate and balanced"					0.395
Yes	24	82.8	44	74.6	
No	5	17.2	15	25.4	

Independent samples t test * p < 0.05; ** p < 0.001.

drate, protein, fibre, phosphorus, iron, zinc, vitamin B6, vitamin B12 and folic acid intake levels were higher among those living in nursing homes. The fact that more meals were consumed by nursing home residents and that their diets were under professional management and supervision likely accounts for their better intake levels. Cholesterol and vitamin A intake levels were significantly lower among those living in nursing home (p < 0.05). Cholesterol intake level was below the recommended value (300 mg) in both groups.¹⁷ These results are valuable in drawing attention to this particular issue. Sumathi et al.¹³ reported inadequate energy, protein, folic acid, vitamin B12, iron, zinc and magnesium intake levels in this population.

Inadequate calcium intake levels were observed in both groups and sexes, and this is thought to result from inadequate consumption of milk and milk products by elderly individuals. The risk

of osteoporosis is particularly high in the elderly individuals.¹⁸ In a study involving nursing home residents living in Turkey, calcium and vitamin B1 deficiencies were observed, whereas another study reported energy, calcium and magnesium deficiencies in elderly individuals.^{19,20} Sumathi et al.¹³ reported insufficient folic acid and magnesium intake levels in this population, a finding that agrees with our results. By contrast, a study conducted in Turkey in 2005 reported that the elderly living at their residence had higher nutrient intake levels compared with those living in nursing homes.²¹ However, improvements in nursing home standards and food quality over time may have improved the previously observed deficits. In addition, the provision of catering services by nursing staff and residents' easy access to these services may have led to the observations of higher energy and nutrient intake levels in the in-

Table 3
Macro and micro nutrient intakes of participants.

	Living in nursing home Median (% 25–75 IQR)	Living at their residence Median (% 25–75 IQR)	p
Energy (kcal)	1549.0 (1311.1–1880.8)	1117.9 (996.3–1469.3)	< 0.001**
Carbohydrate (g)	209.2 (164.6–277.4)	123.9 (104.7–147.3)	< 0.001**
Carbohydrate (%)	56.0 (48.5–61.5)	45.0 (36–51)	< 0.001**
Protein (g)	61.7 (53.3–71.4)	46.6 (37.1–60.7)	0.001*
Protein (%)	16.0 (14–17)	16.0 (14–19)	0.691
Fat (g)	49.6 (44.4–61.1)	48.9 (38.4–65.8)	0.870
Fat (%)	28.0 (23–35)	38.0 (34–43)	< 0.001**
Cholesterol (mg)	215.5 (92.7–271.0)	286.2 (138.2–376.2)	0.005*
Calcium (mg)	564.5 (475.0–782.8)	601.4 (483.1–773.2)	0.585
Magnesium (mg)	193.6 (142.8–246.4)	191.7 (153.1–262.9)	0.975
Phosphorus (mg)	903.6 (780.8–1112.8)	776.1 (641.2–991.9)	0.021*
Iron (mg)	9.7 (7.5–10.8)	7.0 (5.6–9.7)	0.001*
Zinc (mg)	8.6 (6.6–10.4)	7.3 (5.3–9.8)	0.037*
Vitamin A (IU)	524.8 (406.1–689.7)	730.3 (538.8–948.4)	< 0.001**
Vitamin B1 (mg)	0.74 (0.62–0.91)	0.57 (0.47–0.85)	0.066
Vitamin B2 (mg)	1.1 (0.87–1.28)	1.04 (0.85–1.42)	0.706
Vitamin B6 (mg)	0.99 (0.84–1.32)	0.78 (0.64–1.09)	0.006*
Vitamin B12 (mcg)	3.6 (2.69–4.68)	2.4 (1.86–3.24)	0.001*
Folic acid (mcg)	297.1 (255.9–354.8)	227.1 (188.5–310.5)	0.006*
Vitamin C (mg)	104.4 (53.6–153.7)	75.1 (52.7–109.9)	0.159
Fiber (g)	24.01 (18.09–28.23)	13.80 (8.51–18.15)	< 0.001**

Mann-Whitney U test. IQR: Interquartile range. * $p < 0.05$; ** $p < 0.001$.

Table 4
Comparison of SF-36 Quality of Life Subscales Scores, Physical Activity (IPAQ-SF) Scores and Hand Grip Strength Scores between the groups.

	Living in nursing home Median (% 25–75 IQR)	Living at their residence Median (% 25–75 IQR)	P
Domains of SF-36			
Physical function	85 (72.5–92.5)	80 (45–95)	0.160
Physical role difficulty	100 (75–100)	100 (0–100)	0.057
Emotional role difficulty	100 (83.5–100)	100 (0–100)	0.026*
Vitality	75 (60–80)	65 (40–80)	0.263
Mental health	76 (66–80)	72 (56–80)	0.370
Social functioning	100 (81.5–100)	88 (50–100)	0.013*
Pain	90 (68–100)	78 (45–100)	0.640
General health perception	70 (57.5–75)	65 (45–80)	0.349
IPAQ-SF Score (MET)	693 (255.75–2289)	693 (264–1876)	0.814
Dominant Side Hand Grip Strength	26.46 ± 1.64	31.05 ± 1.34	0.058 [‡]
Nondominant Hand Grip Strength	24.27 ± 1.70	28.22 ± 1.31	0.080 [‡]

Mann-Whitney U testi. IQR: Interquartile range (çeyrek değerler genişliği). * $p < 0.05$; ** $p < 0.001$.

[‡] Independent samples t test was used. [‡] Mann-Whitney U test.

Table 5
Relationship between hand grip strength, physical activity level and quality of life

	Hand grip strength right (kg)	Hand grip strength left (kg)	IPAQ Score (MET)
Physical function	$r = 0.385$ $p < 0.001$	$r = 0.393$ $p < 0.001$	$r = 0.677$ $p < 0.001$
Physical role difficulty	$r = 0.393$ $p < 0.001$	$r = 0.381$ $p < 0.001$	$r = 0.289$ $p = 0.006$
Emotional role difficulty	$r = 0.305$ $p = 0.004$	$r = 0.250$ $p = 0.019$	$r = 0.164$ $p = 0.127$
Vitality	$r = 0.416$ $p < 0.001$	$r = 0.393$ $p < 0.001$	$r = 0.361$ $p = 0.001$
Mental health	$r = 0.374$ $p < 0.001$	$r = 0.320$ $p = 0.002$	$r = 0.141$ $p = 0.191$
Social function	$r = 0.316$ $p = 0.003$	$r = 0.315$ $p = 0.003$	$r = 0.303$ $p = 0.004$
Pain	$r = 0.457$ $p < 0.001$	$r = 0.538$ $p < 0.001$	$r = 0.331$ $p = 0.002$
General health perception	$r = 0.299$ $p = 0.005$	$r = 0.352$ $p = 0.001$	$r = 0.485$ $p < 0.001$

individuals living in nursing homes in this study.

The concept of quality of life refers to the happiness, satisfaction and well-being of an individual within the cultural and environmental system in which the individual lives.² Previous research has shown that the quality of life among the elderly is low and is related to sociodemographic factors. Undernutrition, physical disabilities, emotional concerns, depression and cognitive impairment have also been identified as predictors of poor quality of life.⁸ In geriatric individuals in institutional care, the quality of life has been found to be lower than that in community-dwelling people; further, it is associated with the level of dependence.²² In contrast, in the present study, we found better scores on the emotional quality and social functioning subscales of the SF-36 among participants living in official nursing homes. We believe that institutional support, sharing the same environment with their peers who are dealing with similar problems and socialisation may play a role in our findings. By contrast, the fact that the participants were volunteers who met our inclusion criteria and therefore had better physical and mental

capacity than the remaining general nursing home population may have introduced some bias in our results. The study showed the differences between nursing home and general residence. For this reason, it is insufficient to reach the causal result that the elderly who are staying in a nursing home have a better health. It may be not suitable for causal conclusions. Conditions of acceptance to the official nursing homes are to be 60 or older, do not have any disorders, being capable of carrying out daily activity and have sound mental health. That might cause the difference in socio-demographic characteristics of participants and the result.

When the risk of poor nutrition increases in elderly individuals, there is a decrease in the quality of life. Individuals with a moderate body mass index level have the highest quality of life.²³ Some of our findings in nursing home residents, namely the higher intake levels of all nutrients except for fat, cholesterol and vitamin A, higher quality of life and the relationship between physical function and body mass index, support that conclusion.

Sarcopenia, a known geriatric syndrome, is a complex, multifactorial condition causing decreases in muscle mass and function.²⁴ It is a public health problem that predicts low quality of life and high mortality. Muscle strength plays a predictive role in the assessment of physical performance. A linear relationship between low hand-grip strength and poor mobility and dependence in activities of daily living has been reported.²⁴ In this study, hand-grip strength was found to be somewhat better in individuals living at their residence, but not significantly so.

Sarcopenia reportedly adversely affects balance in the elderly, thereby increasing the risk and fear of falling. Loss of balance and falling sometimes leads to death in elderly individuals.²⁵ In the present study, the relationship between hand-grip strength and balance and the fear of falling were not investigated; however, a moderate-to-strong relationship was found between hand-grip strength and all subscales of the SF-36.

In elderly individuals, regular exercise at moderate and high intensity levels may prevent subsequent decline in the quality of life.²⁶ Exercise and nutritional support are useful for the prevention and treatment of sarcopenia which, as noted above, is associated with quality of life, poor balance and falls.²⁴

Our study demonstrated that elderly people living in official nursing homes have a better meal pattern, higher energy and nutrient intake levels and skip fewer meals than those living at their residence. It is very important for elderly individuals not to skip meals and to consume the nutrients they need in their diet. If micronutrient requirements are not met by food intake, it may be necessary to provide supplements. In addition, we found that individuals living in nursing homes had a better quality of life in terms of social functioning and emotional role difficulties. However, their physical activity level and muscle strength did not differ from those of the community-dwelling elderly individuals. Our small sample size was the limitation of our study. We believe there is a need for similar studies conducted in a larger population.

Conflict of interest

No financial and non-financial conflict of interest.

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