



Original / Ancianos

Non-institutionalized nonagenarians health-related quality of life and nutritional status: is there a link between them?

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Abstract

Introduction: Nonagenarian population, clearly increasing, shows different characteristics from the rest of elderly people. Health-related quality of life is a way to study population health in physical, psychological and social dimensions.

Objectives: To examine the relationship between nutritional status and health-related quality of life in a group of free-living nonagenarians. Differences with octogenarians were also studied.

Methods: Within Villanueva Older Health Study, 20 non-institutionalized people (92.5±3.5 years; 80% women) make the nonagenarian subsample. Nutritional risk was assessed by Mininutritional Assessment questionnaire, dietary intake by a 24-hour dietary recall and health-related quality of life by EuroQoL-5D questionnaire. SPSS was used for statistical analysis.

Results: 40% nonagenarians were at risk of malnutrition. Dietary assessment showed magnesium, zinc, potassium, folic acid, vitamin D and vitamin E deficiencies. Problems in mobility were more frequently reported (80%). EQ-5D_{index} was associated with MNA (p<0.05). Self-care dimension was associated with calcium and niacin (p<0.05), retinol and cholesterol (p<0.01) intake. Usual activities dimension was associated with niacin (p<0.01) and cholesterol (p<0.05) intake. Pain/discomfort dimension was associated with protein (p<0.01), energy, selenium and niacin (p<0.05) intake. Anxiety/depression was associated with protein (p<0.01) and selenium (p<0.05) intake.

Conclusions: Risk of malnutrition is a factor associated to health-related quality of life. Results suggest that energy and some nutrient intakes could be possibly associated to health-related quality of life but further research on this influence is required.

(Nutr Hosp. 2014;30:602-608)

DOI:10.3305/nh.2014.30.3.7174

Key words: *Free-living nonagenarians. Health-related quality of life (HRQoL). EuroQol-5D (EQ-5D). Mininutritional Assessment (MNA). Dietary intake.*

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Recibido: 27-XI-2013.

1.ª Revisión: 9-II-2014.

2.ª Revisión: 4-IV-2014.

Aceptado: 24-VI-2014.

CALIDAD DE VIDA RELACIONADA CON LA SALUD Y ESTADO NUTRICIONAL EN NONAGENARIOS NO INSTITUCIONALIZADOS: ¿ESTÁN RELACIONADOS?

Resumen

Introducción: La población nonagenaria, en claro crecimiento, muestra características diferentes del resto de la población anciana. La calidad de vida relacionada con la salud es una forma de estudiar la salud de la población en sus dimensiones física, psicológica y social.

Objetivos: Observar la relación entre el estado nutricional y la calidad de vida relacionada con la salud en un grupo de nonagenarios de vida independiente. También se estudian las diferencias con los octogenarios.

Método: Dentro del Estudio sobre Salud en Mayores de Villanueva de la Cañada, 20 personas (92,5±3,5 años; 80% mujeres) forman la submuestra de nonagenarios. El riesgo nutricional fue valorado mediante el Mininutritional Assessment, la ingesta dietética mediante un recuerdo de 24 horas y la calidad de vida relacionada con la salud usando el cuestionario EuroQoL-5D (EQ-5D). Para el análisis estadístico se utilizó el programa SPSS.

Resultados: 40% de los nonagenarios presentaban riesgo de malnutrición. Se detectaron posibles deficiencias de magnesio, cinc, potasio, ácido fólico, vitamina D y vitamina E. Los problemas de movilidad fueron los más frecuentes (80%). El EQ-5D_{índice} se asoció con el MNA (p<0,05). La dimensión de cuidado personal se asoció con la ingesta de calcio y niacina (p<0,05), retinol y colesterol (p<0,01). La presencia de problemas al realizar las actividades cotidianas se asoció con la ingesta de niacina (p<0,01) y colesterol (p<0,05). La dimensión de dolor/malestar se asoció con la ingesta de proteína (p<0,01), energía, selenio and niacina (p<0,05). Ansiedad/depresión se asoció con la ingesta de proteína (p<0,01) y selenio (p<0,05).

Conclusiones: El riesgo de malnutrición es un factor asociado a la calidad de vida relacionada con la salud. Los resultados sugieren que la ingesta de energía y algunos nutrientes podrían estar asociados a la calidad de vida relacionada con la salud pero se requiere más investigación sobre esta influencia.

(Nutr Hosp. 2014;30:602-608)

DOI:10.3305/nh.2014.30.3.7174

Palabras clave: *Nonagenarios de vida independiente. Calidad de vida relacionada con la salud (CVRS). Mininutritional Assessment (MNA). Ingesta dietética.*

Abbreviations

EQ-5D: EuroQoL-5Dimensions.
EQ-VAS: EQ-5D visual analogue scale.
HRQoL: Health-related quality of life.
MMSE: Mini Mental State Examination.
MNA: Mini Nutritional Assessment.
RI: recommended intakes.

Introduction

According to the Spanish statistical office in 2011 the population aged 90 and above was 363,997 (0.78%) and was composed of 27% men and 73% women. In 2018, it is estimated to reach 427,519 (0.87%). Life expectancy at birth for males (79.4) and females (85.4) is projected to increase by about 7.7 years and 5.7 years over the period 2011 to 2051¹. In this population segment, whose size is progressively growing, health needs are much greater than among the young. The oldest old show an extreme frailty situation in all physical, mental and social spheres with illness, functionality, psychosocial difficulties, health related assistance and health target burdens somewhat different from those of the lower decades.² The relationships between nutrition, aging, and quality of life are recursive. Aging-caused or aging-associated factors alter certain aspects of nutrition, such as the sense of smell and taste, ability to chew and swallow, and gastrointestinal and bowel function, and these in turn may influence quality of life. At the same time, poor nutrition and lack of physical activity can lead to lack of appetite, inability to perform activities of daily living, changes in quality of life, morbidity, and mortality.³ However, there are few studies of the relationship between quality of life and nutritional status⁴⁻⁹ and less of nonagenarians⁸. Regarding the relationship between nutritional status and Health-related quality of life (HRQoL), the evidence in the literature is mixed due to the different approaches to how to measure the nutritional status. Nutritional status is evaluated using the Mini Nutritional Assessment, the body mass index, or even mid-arm muscle circumference, presence of appetite and swallowing problems are used as nutritional variables⁷. The association between Mini Nutritional Assessment (MNA) and HRQoL has been studied previously^{4, 7-9}, but studies of the relationship between HRQoL and energy and nutrient intake are lacking.

Objectives

The aim of this study was to examine the relationship between nutritional status and HRQoL in a group of free-living nonagenarians. Besides, the differences with younger elders (80-90 years) were studied.

Material and methods

A cross-sectional survey -Villanueva Older Health Study- was carried out, in 2011, in very old women and men living in Villanueva de la Cañada (16,804 inhabitants registered), Madrid (Spain). All non-institutionalized inhabitants aged 80 years and over (264) were invited by letter to participate and finally 98 people composed the main study sample. There were no significant differences in age or gender between participants and non-participants. 27 people aged 90 years and over made the nonagenarians subsample. Data was collected from February to June 2011 by interview using comprehensive geriatric and nutritional assessment. Interviews were carried out by two geriatricians and one nutritionist at the primary health care centre or at subjects' homes when displacement was not possible. Dementia was detected by neuropsychological study by Mini Mental State Examination (MMSE), Clock test, MIS- Buschke and Photo test. The carer or a relative was interviewed only if cognitively impaired subject was detected. In all cases, informed consent was obtained from subject or cohabiting next of kin. When assessing HRQoL, it was emphasised that the responses related to how the patient was feeling on that day, rather than in general. Cognitively impaired people were excluded when studying HRQoL because their responses to the EQ-5D questionnaire are considered unreliable¹⁰ as the EQ-5D questionnaire measures self-perception. After exclusion (9 due to cognitive impairment, 6 due to lack of response to the EQ-5D or to the EQ VAS scale), 83 people constituted the final sample and 20 subjects made the nonagenarian subsample. Everybody completed the study.

The study was conducted under collaboration agreement between Complutense University of Madrid and Villanueva de la Cañada City Council. It was done according to the guidelines laid down in the Declaration of Helsinki and all procedures were approved by the Research Committee of the Faculty of Pharmacy (Complutense University of Madrid).

The Mini Nutritional Assessment (MNA)

The MNA is a clinical tool that can be used to identify geriatric subjects at risk for malnutrition (17-23.5 points) and malnourished (< 17 points). The subjects are well-nourished when scored 24 points and over. The MNA includes eighteen items involving anthropometrical, dietary and subjective measurements. The MNA is well validated and correlates highly with clinical assessment and objective indicators of nutritional status¹¹.

Dietary assessment

The evaluation of nutritional patterns of the elderly was conducted using the 24-hour dietary recall me-

thod. Consumption data were classified using the Spanish Food Composition Tables of Moreiras et al.¹² and later energy and nutrient content was calculated using the same database. Intakes were compared to Spanish recommended intakes (RI)¹² to judge the adequacy of the diet.

Health Related Quality of Life assessment

The EuroQol EQ-5D¹³ is a standardised non-disease-specific instrument for describing and valuing health-related quality of life. The EuroQol-5D consists of two parts: the EQ-5D descriptive system and the EQ-5D visual analogue scale (EQ-VAS). EQ-5D describes health status in terms of five dimensions: mobility, self-care, usual activity, pain or discomfort, and anxiety or depression. Each of these dimensions is divided into three levels of severity (no problems, some problems and extreme problems). These data are then converted to a single overall score (EQ-5D_{index}) using a predefined table of values. The EQ-VAS is a scale marked 0-100. Zero represents the worst imaginable health state and 100 the best imaginable health state.

Data Analysis

All data were analysed using SPSS 19.0. A descriptive statistical analysis was carried out. The results were expressed as mean and standard deviation for quantitative variables and with frequencies for qualitative variables. Statistical significance was assessed, as

appropriate, with the Student's t test, the Mann-Whitney U test or the chi-square test. Correlation study between variables was completed using Pearson's r for normal distributions and Spearman's rho for non-parametric analysis.

Results

Nonagenarian group was composed of 20 subjects of 90-102 years (92.5±3.5 years; 80% women) and the 80-90 group of 63 participants (84.0±2.7 years; 58.7% women) all non-institutionalised (table I). No significant differences between genders were found in the studied nonagenarian characteristics.

Forty percent of the nonagenarians were found to be at risk for malnutrition and no malnourished subjects were detected (table I). No significant gender differences were seen in nonagenarians' nutritional status measured by the MNA. On the other hand, 22.2% of younger elders were at risk for malnutrition and 3.2% malnourished.

Dietary assessment (figure 1) showed that the average intake of magnesium, zinc, folic acid, vitamin D and vitamin E did not reach 80% of RI. Nonagenarians dietary assessment showed higher selenium (p=0.037) and vitamin E (p=0.029) intake and better compliance with energy (p=0.013), protein (p=0.033), selenium (p=0.009), niacin (p=0.016) and vitamin E (p=0.029) RIs than the 80-90 group.

HRQoL was poorer in nonagenarians than in younger elders when assessed by the EQ-5D_{index} and EQ-5D_{vas} (table I) but the difference was non-significant.

Table I
Characteristics of the sample

	Nonagenarians	80-90
N (women, %)	20 (80)	63 (58.7)
Age (years), mean (SD)	92.5 (3.5)	84.0 (2.7)
Without studies, %	5.0	3.2
Secondary school education (> 12 years), %	5.0	28.6*
Widowed, %	85.0**	5.2**
Married, %	10.0	41.9*
Living alone, %	0.0	27.0**
EQ-5D index, mean (SD)	0.609 (0.280)	0.712 (0.240)
ED-5D vas, mean (SD)	62.00 (18.58)	65.98 (18.23)
No problems involving any of the five dimensions, %	15.0	22.2
MNA. Mean (SD)	24.33 (2.99)	25.33 (3.43)
MNA. Normal nutritional status (>23.5), (%)	60.0	74.6
MNA. At risk of malnutrition (17-23.5), (%)	40.0	22.2
MNA. Malnourished (<17), (%)	0.0	3.2

** p<0,01; * p< 0,05. Comparisons were estimated using two-sample t-test or chi-square test.

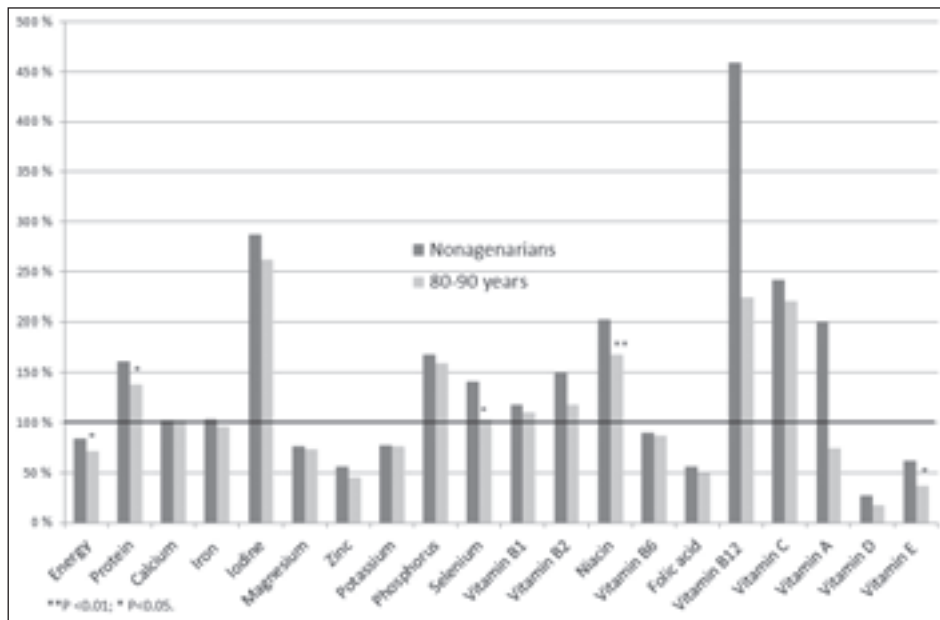


Fig. 1.—Mean energy and nutrient intake contribution to Recommended Intakes (RIs).

Fifteen percent of nonagenarians (22.2%, <90) had no problems relative to any of the five dimensions (table I). Figure 2 shows the proportion of participants reporting problems in the EQ-5D dimensions. No significant differences between nonagenarians' genders were found.

Nonagenarians MNA results and energy and nutrient intakes were correlated against EQ-5D_{index}, EQ-5D_{vas} and the five EQ-5D dimensions. EQ-5D_{index} was associated with MNA (p= 0.012). Correlations between EQ-5D dimensions and energy and nutrient intakes are

shown in Table 2. EQ-5D mobility dimension showed no association with energy or nutrient intakes.

Discussion

The aim of the present study was to examine the relationship between nutritional status (MNA and dietary assessment) and HRQoL (EQ-5D) in a group of free-living nonagenarians. Differences with younger elders (80-90 years) were also studied.

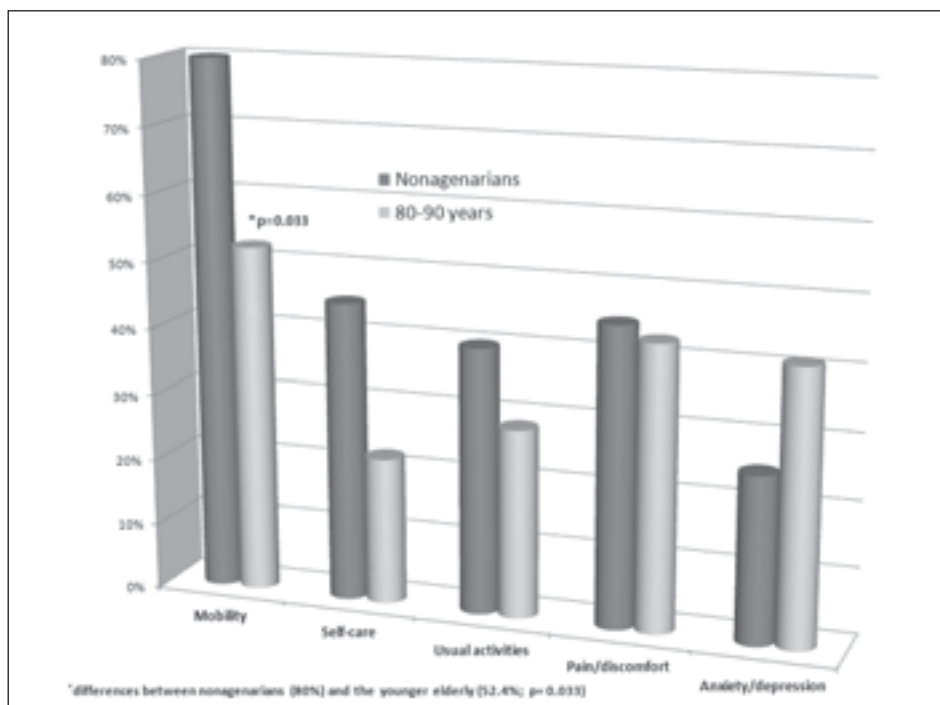


Fig. 2.—The proportion of individuals reporting problems in the EQ-5D descriptive system.

Table II
Spearman's correlation coefficients between EQ-5D dimensions and energy and nutrient intakes

Self-care	Calcium intake*	r_s	0.456
		P	0.043
	Niacin intake*	r_s	-0.456
		Sig. (2-sided)	0.022
	Retinol intake**	r_s	-0.601
Sig. (2-sided)		0.005	
Cholesterol intake**	r_s	-0.624	
	Sig. (2-sided)	0.003	
Usual activities	Niacin intake**	r_s	-0.638
		Sig. (2-sided)	0.002
	Cholesterol intake*	r_s	-0.459
		Sig. (2-sided)	0.042
Pain/discomfort	Energy intake*	r_s	-0.444
		P	0.050
	Protein intake**	r_s	-0.619
		Sig. (2-sided)	0.004
	Selenium intake*	r_s	-0.479
		Sig. (2-sided)	0.032
	Niacin intake*	r_s	-0.549
		Sig. (2-sided)	0.012
Anxiety/depression	Protein intake**	r_s	-0.566
		Sig. (2-sided)	0.009
	Selenium intake*	r_s	-0.528
		Sig. (2-sided)	0.017

**p<0.01, *p<0.05

Over the past years, several studies have examined the prevalence of malnutrition in Spanish elderly people¹⁴ but only the NonaSantFeliu, a population-based study of nonagenarian inhabitants of Sant Feliu de Llobregat (Barcelona, Spain), studied the oldest old group^{7,15}. In the first cross-sectional survey of this study¹⁵, 28.5% of nonagenarians were at risk for malnutrition, being this percentage smaller than the result obtained in our study (40%). In another study of 85 years population, the Octabaix study¹⁶, the prevalence of the risk of being undernourished was 34.5% that is a value closer to ours. Octogenarians' MNA results were similar to the data shown in Guidoz's review (24% at risk and 2% malnourished)¹¹. In our study, like in other studies¹⁷⁻¹⁹, it is noticed that as age advances, the risk for malnutrition increases.

Spanish nonagenarians' dietary intake studies are lacking and therefore comparisons with younger elders. The Spanish participants in the Euronut-SENCA Study²⁰, a reference study of elderly people, were

aged 71-80 years old. In a German study²¹ that describes energy and nutrient intake of elderly people living in private households with special focus on aged-related differences, there is a very-old elderly group (≥ 85 years). In this study, it is observed that more than 10% of participants were at high risk for deficiency of fibre, calcium, vitamin D and folate²¹. Our study showed risk for deficiency of zinc, magnesium, folic acid, vitamin D and vitamin E. Both studies share risk for deficiency of folate and vitamin D. Deficiency of vitamin D in elderly Spanish women (70-74 years) is also described in The Five Countries Study of Optiford Project²².

HRQoL was poorer in nonagenarians than in younger elders but the difference was non-significant (EQ-5D_{index} & EQ-5D_{vas}). Mobility dimension differed between nonagenarians (80%) and younger than 90 years old (52.4%; p=0.033) showing that with age the problems that increase more are mobility problems. Nonagenarians reported more problems in all dimensions than the younger elders except for anxie-

ty/depression dimension. Problems in mobility were the most frequently reported and anxiety/depression problems were the least reported being these results similar to the results obtained in the NonaSantFeliu study⁷. In our study, 15% of nonagenarians (22.2%, 80-90 years) had no problems relative to any of the five dimensions while in the European Study of the Epidemiology of Mental Disorders, which included the study of HRQoL and was conducted in six European countries²³, 18.9 % of respondents aged 85 and over (30.8% aged 80-84) had no problems relative to any of the five dimensions. The EQ-5D_{index} score in our study (62.0) was higher than in the European study²³, 60.5 for the elderly people 85 years and over. On the other hand, our score was lower compared to the value obtained in SantFeliu study⁷ (63.0) and higher than the Octabaix study¹⁶ (60.0) that included people of 85 years. Regarding the relationship between nutritional status and HRQoL, previous studies indicated that significant association exists between the risk of malnutrition and reduced HRQoL.^{5,7,9,17,24-27} In our report, EQ-5D_{index} was also associated with MNA (p= 0.012). Association between EQ-5D_{index} and MNA was not found for nonagenarian subsample but for total sample²⁴. The correlation study of energy and nutrient intakes against the five EQ-5D dimensions is a different approach (table II). In other studies, it is also observed a relationship between nutritional status and self-care assessment²⁸, depression^{29,30}, performance of activities of daily living⁴ and pain/discomfort dimension^{8,31} but in these studies, nutritional status is assessed in different ways (MNA, BMI, vitamin B₁₂ deficiency, etc.). We observed that when energy and various nutrient intakes increased, the EQ-5D dimensions, except for mobility dimension, improved and when calcium intake increased, the EQ-5D self-care worsen. Dependence is not high and, thus, this significant correlation requires further investigation.

The small sample size and the small number of men, a common situation when studying an older population, should be considered limitations of the study. In 2011 the Spanish population aged 90 and above was composed of 27% men and 73% women¹, so our sample did not differ too much from real situation. Inhabitants were not excluded but they did not want to participate in the study. Another issue to be taken into account is the fact that the sample consists solely of non-institutionalized elderly people. Neither should be forgotten the limitations consequence of the use of the 24-hour recall as the method chosen for the dietary assessment³². In this study which very old people underwent many tests in the same appointment this method was considered as the more suitable due to its simplicity and its relatively little burden on the respondents that could be helped by their relatives improving thus the quality of the answers.

In conclusion, nonagenarians have a poorer perception of their HRQoL and are found to be more at risk for malnutrition. Risk of malnutrition is associated

with quality of life in elderly people. Energy and some nutrient intakes could be possibly associated to HRQoL but further research on this influence is required.

Financial disclosure: None of the authors had any financial interest or support for this paper.

Acknowledgements: The authors acknowledge José Manuel Ávila on behalf of Villanueva de la Cañada City Council and the two geriatricians (Johanna Gaviña y Laureany Guzmán).

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