ORIGINAL PAPER

The Effects of Exercise Standards on the Quality of Life to People with Chronic Disease

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Abstract

Background: The World Health Organization describes the chronic disease as "disease of long duration and generally slow progression" and the chronic conditions as "health problems requiring continuous management for years or even decades". The needs of patients suffering from chronic diseases continuously change and are related to their health and quality of life.
Objective: The exploration of the collective interpretation of the quality of life and the role of exercise at it, as well as the respective image that patients with chronic diseases present through their subjective appreciation.
Methodology: 133 patients (51.1% were women) in four general hospitals in the district of Peloponnese, from the Renal Dialysis Unit, the beta-thalassaemia units and the diabetes outpatients' clinics, filled in structured questionnaires: the short form of the international physical activity questionnaire (IPAQ), the short form of the quality of life questionnaire (SF-36) and a questionnaire with demographics and chronic diseases' characteristics, during the period of 2010-2011.
Results: Participants seem to be affected from various other organic disorders, co morbidities, such as cardio logical, psychological, endocrinologic disorders, as well as from complications of the main disease. We remark a statistically significant negative influence of all levels– dimensions of the quality of life in all three groups of patients. In particular: 52.6% of the participants had low physical activity. Men had considerably higher marks in the synoptic scale of physical health a fact that indicates better physical health in comparison to women. Additionally, there was a significant difference in the marks of the participants at the synoptic scale of physical health in accordance with their level of education, both of the high school graduates and the graduates of Universities/ Colleges/Master courses ($p= 0.003$, $p=0.001$ respectively). Moreover, the participants that used to work 2-5 hours daily had considerably lower marks in the synoptic scale of physical health in comparison both to the participants who worked 6-8 hours and to those who worked for more than 8 hours ($p=0.001$, $p=0.001$ respectively). Women got considerably higher marks in the synoptic scale of mental health, which indicates better mental health in comparison to men.
Conclusion: Results' analysis shows that for all three groups of patients there was significant correlation between all the dimensions of quality of life. Therefore, the higher the quality of life one person has, regarding one dimension, the better it becomes regarding all the others, too.

Key Words: quality of life, exercise, patients with chronic diseases

Introduction

The quality of life (QoL) has a multidimensional character, including the needs and the wishes of people (Sevastaki & Dilintas, 2005). The classical socio-economic indexes of quality of life cover a part of the objective dimension and they are not enough for the field of health, thus new indexes and assessment tools have been designed (Holmes, 2005, Valassi-Adam, 2001; Fayers & Machin, 2000; Yfantopoulos & Sarris, 2001). The appreciation of the patients themselves regarding their health condition and the way it affects their life is considerably different to the remarks of health professionals, a fact that has lead to the continuously more often use of tools for the assessment of the subjective dimensions of health related quality of life (HRQL) (Nakou 2001; Van der Wilk & Jansen 2005). The muscle reinforcement and in general the exercise improves the balance, thus reducing the falls of senior citizens and improving their functionality (WHO, 2004). However, the most significant result is that -through the aforementioned mechanisms- the duration of their lives is increased, as well as its quality.

Chronic diseases bring patients confronted with long-term treatments and challenges such as maintaining a good emotional balance and self-esteem, self-control, strengthening of relationships with family and friends and the compromise with an uncertain future. In addition, diagnostic uncertainties, helplessness, dependency, stigma and lifestyle changes are characteristic of chronic diseases. According to the concept of adaptive capacity in Alzheimer, individuals with chronic diseases maintain a satisfactory level of emotional, physical and social activity which is recorded in the assessment of quality (de Ridder & Schreurs, 2001).

Individuals who suffer from chronic conditions see their everyday standard of living to decline. Failure self-esteem coupled with feelings of incapacity are created, leading to the devastation of their self-esteem. They need continuous care from family and friends to help them maintain their dignity which is reduced in terms of their own QoL and careers.

In recent decades, the interest of sociologists and health professionals about the impact of chronic disease on QoL has increased. Patients with chronic and serious illnesses have begun to care not only for survival but also for the QoL (Burckhardt, Archenholtz & Bjelle, 1993; McKinley, Ouellette & Winkel, 1995). This interests researchers not only for subjective assessments of patients about their situation, but also for the ability for activities of daily living (McKinley, Ouellette & Winkel, 1995). However, despite the fact that this is such an important topic and the interest of patients themselves is huge, there is little information and research studies on the impact of the disease on QoL of these individuals.

WHO (2004) reported a constantly deteriorating health and performance capacity of the adult population and considers as a primary objective in all the member countries, the significant increase in behaviors that promote health, such as a balanced diet, not smoking, adequate physical exercise and coping with stress.

The rapid development and introduction of therapeutic medical procedures for extending or improving the lives of terminally ill and people suffering from chronic diseases attracted the interest of doctors and other health professionals to study the QoL of these patients in order to investigate any risks or benefits of medical acts and their impact on their lives (Fayers & Machin, 2000). The QoL is now used extensively as a marker for evaluation of therapeutic interventions and is studied especially in cases of patients suffering from chronic diseases or patients suffering from mental disorders and terminally ill patients (Yfantopoulos & Sarris, 2001).

Physical activity plays an important role in the prevention of obesity, helps treat cardiovascular diseases and diabetes, is beneficial in the prevention of osteoporosis, and reduces significantly the risk of colon cancer and breast cancer. Also strength training and general exercise improve balance, reduce falls in the elderly population and thus improve their functionality. But, the most important result of exercise is that -via the above mechanisms- longevity is not only increase but it also improves the QoL.

This study aims to explore the collective interpretation of the QoL and the role of exercise to it, as well as the relative image of the patients with chronic diseases through their subjective perception. The opinion of patients with chronic diseases

regarding the QoL and the role of exercise to it have been examined and, also, whether there are any transgender differences regarding the HRQL. The possible relation between characteristics of chronic diseases and demographics with the different dimensions of QoL were examined, as well.

Methodology

A descriptive, cross sectional design was adopted.

A convenience sample was used, concerning 189 patients with chronic diseases, who were cared for in four general hospitals in the district of Peloponnese, especially in renal dialysis, beta-thalassaemia units, in oncology departments and in diabetes outpatients' clinics, during the period of 2010-2011.

Participants filled in the following tools:

1. a structured questionnaire with demographics and chronic disease characteristics

2. the short form of the international physical activity questionnaire (IPAQ), where different approaches to the kind of physical activity (work, moving, resting and homework) are employed. This tool consists of 5 parts (Craig et al., 2011) in first four, frequency (hours/day and days/week) and density of physical activity are measured, which is correlated with work, moving, homework-family care and resting/exercise. In the last one, time of sedentary activities is written down. This results to a continuous score of physical activity minutes per week.

3. the short form of the questionnaire regarding the quality of life (SF-36), with 36 questions on 8 dimensions of QoL which exam natural function, physical pain, health, vitality, social function, intellectual health, physical and emotional status. This tool measures general health situations with no relation to a special disease or cure. It consists of 36 questions, whose answers are from 1 ('Yes" or "No") to 6 (relative to the severity of symptoms), which compose 8 scales, with 2 to 10 questions each (Medical Outcomes Study, MOS) (Ifantopoulos, 2004). The last two were weighted in Greek, were free for research use and did not require permission.

The inclusion criteria for the volunteers in the study were:

a) People over 18 years old.

b) Their educational level: at least graduates of primary school in order to comprehend the questions of the psychometric tests.

c) Their voluntary participation. The questionnaires were filled in by the participants of the research themselves within a framework of their selection, with simultaneous recording of their demographic information, as well as data regarding their personal medical history referring to the following diseases: diabetes mellitus, chronic renal insufficiency, and beta-thalassaemia. Furthermore, the participants were previously informed regarding the purpose of the study and were asked if they wanted to participate and were assured about the confidentiality and the anonymity of the procedure. Permissions for the study were asked and provided by the Hospitals' Scientific Committees, where it took place.

Statistical analysis

Finally 133 people were included in the study (70.4%). The means and the standard deviations (SD) were used for the description of the quantitative variables. There were used the absolute (N) and the relative (%) frequencies for the description of the quantitative variables. For the proportions' comparison the χ^2 test and the Fisher's exact test were used. The Student's t-test was used for the comparison of quantitative variables between two groups. The parametric analysis of variance (ANOVA) was used for the comparison of quantitative variables between more than two groups. The Bonferroni correction was used for the error type I, due to multiple comparisons and according to it the significance level is $0.05/\kappa$ (κ = number of comparisons).

For the control of the relation between two quantitative variances, the Pearson (r) correlation coefficient was used. The linear regression analysis with the gradual stepwise procedure was used for the finding of independent factors related to the dimensions of quality of life from which resulted the dependence coefficients (b) and their standard errors (SE).

The significance levels are bilateral and the statistical significance was set to 0.05. The statistical program SPSS 18.0 was used for the analysis.

Results

In Tables 1 & 2, and in Chart 1, descriptive characteristics of the sample are shown. The sample comprised 133 persons of mean age 47.6 years (SD=14.3 years), with a small supremacy of women (51.1%) and the majority of them from the renal dialysis units. The minority of them (31.1%) declared that their income was sufficient in order to cover their living and personal needs, while almost half of them (53.4%) had associated health problems and used drugs (52.6%).

Regarding the factors for the good QoL, as they were evaluated by the respondents, health seems to be the most significant (85.7%) and follow the peace of mind (50.4%) and the family peace. Regarding the levels of physical activity (see Chart 1) only 10.5% of the participants had high level, while 36.8% had average levels. Men, people with health problems or people under medication mostly had low levels of

physical activity (Table 2). Furthermore, people with low levels of physical activity were older. There were no statistically significant differences between the levels of physical activity according to the socio-economical factors, such as the educational level, the income and the working hours.

The results of the uni-variate analysis regarding the aspects of QoL that are related to health (Tables 3,4,5) showed that men had higher levels of Physical Functionality and higher values in summary scales of Physical and Mental Health.

Additionally, the prices of Physical Functionality, Physical Role, Physical Pain, Sentimental Role aspects and in the summary scale of Physical Health were decreased as the age increases. Primary or high school graduates had lower prices of Physical Functionality, Physical Role, Sentimental Role and the summary Health Scale in comparison to the more educated and the participant with two to five hours of professional occupation in comparison to those who had six or more.

Furthermore, people who considered their professional recognition significant factor of the good QoL, had higher levels of the dimensions Physical Role, while people who considered family peace as a significant factor for good QoL had higher levels at the 'Mental Health" summary scale. It is also interesting the fact that those who considered their culture as a significant factor for good QoL had higher levels of QoL regarding the "Physical Pain" and higher values in Physical and Mental Health summary scales.

People with associated health problems had lower values in the dimensions of "Physical Functionality", "Physical Role", "Physical Pain", "General Health", and "Sentimental Role" and in "Physical Health" summary scale.

The aforementioned results applied also for those who were under medication except the fact that they had lower values in the dimension "social role". Regarding the physical activity, the
uni-variate analysis showed that the participants with low levels of physical activity had considerably lower values in the dimensions "Physical Functionality" and "Sentimental Role". There was a significant difference in the participants' score in all the dimensions of quality of life between the groups, except from the dimensions "vitality", "social role" and "mental health". In particular, patients from the beta-thalassaemia unit had considerably worse quality of life (lower score) regarding the dimensions "physical pain" and "general health" and at the summary scales of physical and mental health compared to patients from the diabetes unit. Additionally, patients from the renal dialysis unit have considerably worse quality of life (lower score) regarding the dimensions "physical functionality", "physical role", "physical pain", "general health" and "sentimental role", as well as the summary scales of "physical and mental health" compared to patients from the diabetes unit. Finally, patients from the renal dialysis unit had considerably worse quality of life (lower score) regarding the dimensions "physical functionality", "physical role", Sentimental Role and the summary Health Scale in comparison to the more educated and the participant with two to five hours of professional occupation in comparison to those who had six or more.
Furthermore, people who considered their professional recognition significant factor of the good QoL, had higher levels of the dimensions Physical Role, while people who considered family peace as a significant factor for good QoL had higher levels at the 'Mental Health" summary scale. It is also interesting the fact that those who considered their

culture as a significant factor for good QoL had higher levels of QoL regarding the "Physical Pain" and higher values in Physical and Mental Health summary scales. People with associated health problems had lower values in the dimensions of "Physical Functionality", "Physical Role", "Physical Pain", "General Health", and "Sentimental Role" and in "Physical Health" summary scale.

The aforementioned results applied also for those who were under medication except the fact that they had lower values in the dimension "social role". Regarding the physical activity, the uni-variate analysis showed that the participants with low levels of physical activity had considerably lower values in the dimensions "Physical Functionality" and "Sentimental Role".

There was a significant difference in the participants' score in all the dimensions of quality of life between the groups, except from the dimensions "vitality", "social role" and "mental health". In particular, patients from the beta-thalassaemia unit had considerably worse quality of life (lower score) regarding the dimensions "physical pain" and "general health" and at the summary scales of physical and mental health compared to patients from the diabetes unit.

Additionally, patients from the renal dialysis unit have considerably worse quality of life (lower score) regarding the dimensions "physical functionality", "physical role", "physical pain", "general health" and "sentimental role", as well as the summary scales of "physical and mental health" compared to patients from the diabetes unit. Finally, patients from the renal dialysis unit had considerably worse quality of life (lower score) regarding the dimensions "physical functionality", "physical role", "physical pain" and "sentimental role", as well as the summary scale of physical health compared to patients from the thalassaemia unit.

When a multivariate analysis of the linear regression analysis with the gradual stepwise procedure and dependent variables the dimensions of SF-36 (Table 3), we found that the gender, the occupation hours, the physical activity, the type of main disease and the existence of associated health problems were independently related to the dimension of Physical Functionality.

The female gender, the associated health problem, the few occupation hours and the lack of physical activity show lower levels of "Physical Functionality". Moreover, the patients from the renal unit had worse levels of "Physical Functionality". Regarding the "Physical Role", the gender and the occupation hours were found to be independently related (Table 3).

The type of disease was the unique predictive factor for the dimension "Physical Pain", while for the dimension "General Health" the associated problems were the unique predictive factor (b=-7.61, SE=2.98). The dimensions "Social Role", "Vitality" and "Mental Health" were found not to be independently associated with any of the studied factors (Table 4).

The socio-demographic factors, such as the educational level and the occupation hours were found to have a predictive ability in the multivariate analysis for the dimension "Sentimental Role". The higher educational level and the occupation hours indicate higher levels of QoL related to the "Sentimental Role" (Table 5).

The physical activity was also found to independently predict the Sentimental Role. People with average or high levels of activity had higher values in the aforementioned dimension in comparison to people with low activity levels (b=12.38, SE=5.38). Furthermore, the multivariate linear regression showed that with the summary scale of "Physical Health" are independently correlated the gender, the main disease and the consideration of culture as a significant factor for good QoL, while the summary scale of "Mental Health" is independently correlated with the gender and the consideration of culture as a significant factor for good QoL.

Table 1: Descriptive characteristics of the sample

	N (%)
Group of patients	
Diabetes clinic	46 (34.6)
Thalassaemia Unit	25 (18.8)
Renal dialysis unit	62 (46.6)
Gender	
Men	65 (48.9)
Women	68 (51.1)
Age, mean (SD)	47,6 (14.3)
Educational level	
Primary/ High School	40 (30.1)
Lyceum	43 (32.3)
College/ University/ Master Degree	50 (37.6)
Married	
No	54 (40.6)
Yes	79 (59.4)
Hours of occupation	
2-5 hours	31 (23,5)
6-8 hours	70 (53)
>8 hours	31 (23.5)
Total annual income	
0-12,000	27 (20.5)
12,001-20,000	51 (38.6)
Over 20,000	54 (40.9)
Is your income enough so as to cover your living and personal needs?	
No	91 (68.9)
Yes	41 (31.1)
Significant factors for good quality of life	
Security	44 (33.1)
Professional recognition	34 (25.6)
Social distinction	10 (7.5)
Clean environment	31 (23.3)
Family peace	62 (46.6)
Culture	18 (13.5)
Health	114 (85.7)
Peace of mind	67 (50.4)
Associated health problems	
No	62 (46.6)
Yes	71 (53.4)
Medication	
No	63 (47.4)
Yes	70 (52.6)

Table 2: Correlation of the levels of physical activity with demographic characteristics and concepts of the participants regarding the quality of life

	Physical activity		
	Low	Average/ High	
	N (%)	N (%)	P χ^2 test
Gender			
Men	26 (40)	39 (60)	**0.004**
Women	44 (64,7)	24 (35.3)	
Age, mean (SD)	51,1 (14.4)	43,7 (13.1)	**0.002****
Educational level			
Primary/ High School	24 (60)	16 (40)	0.077
Lyceum	26 (60.5)	17 (39.5)	
College/ University/ Master Degree	20 (40)	30 (60)	
Married			
No	32 (59.3)	22 (40.7)	0.206
Yes	38 (48.1)	41 (51.9)	
Hours of occupation			
2-5 hours	19 (61.3)	12 (38.7)	0.544
6-8 hours	36 (51.4)	34 (48.6)	
>8 hours	15 (48.4)	16 (51.6)	
Total annual income			
0-12,000	18 (66.7)	9 (33.3)	0.223
12,001-20,000	27 (52.9)	24 (47.1)	
Over 20,000	25 (46.3)	29 (53.7)	
Is your income enough so as to cover your living and personal needs?			
No	45 (49.5)	46 (50.5)	0.220
Yes	25 (61)	16 (39)	
Significant factors for good quality of life	()	()	
Security			
No	49 (55.1)	40 (44.9)	0.426
Yes	21 (47.7)	23 (52.3)	
Professional recognition			
No	53 (53.5)	46 (46.5)	0.722
Yes	17 (50)	17 (50)	
Social distinction			
No	66 (53.7)	57 (46.3)	0.516*
Yes	4 (40)	6 (60)	

Continues	Low	Average/ High	P χ^2 test
	N (%)	N (%)	
Clean environment			
No	52 (51)	50 (49)	0.489
Yes	18 (58.1)	13 (41.9)	
Family peace			
No	41 (57.7)	30 (42.3)	0.206
Yes	29 (46.8)	33 (53.2)	
Culture			
No	63 (54.8)	52 (45.2)	0.209
Yes	7 (38.9)	11 (61.1)	
Health			
No	10 (52.6)	9 (47.4)	1.000
Yes	60 (52.6)	54 (47.4)	
Peace of mind			
No	32 (48.5)	34 (51.5)	0.342
Yes	38 (56.7)	29 (43.3)	
Associated health problems			
No	26 (41.9)	36 (58.1)	**0.021**
Yes	44 (62)	27 (38)	
Medication			
No	26 (41.3)	37 (58.7)	**0.004**
Yes	44 (62.9)	26 (37.1)	
Group of patients			
Diabetes clinic	25 (54.3)	21 (45.7)	0.365*
Thalassaemia Unit	10 (40.0)	15 (60.0)	
Renal Dialysis Unit	35 (56.5)	27 (43.5)	

***Fisher's exact test **Student's t-test**

Table 3: Results of univariate and multivariate analysis about the relation between the variables of the studies and the dimensions Physical Functionality, Physical Role and Physical Pain

	Physical Functionality			Physical Role			Physical Pain		
	Mean ±SD	P t-test	β ±SE╡	Mean ±SD	P t-test	β± SE╡	Mean ±SD	P t-test	β ±SE╡
Gender									
Men	83.9±22	**0.002**		71.5±37.5	0.120		45.6±19.1	0.057	
Women	70.8±25.6			60.7±42.4			39.3±18.5		
Age, r	-0.50	**<0.001**	-0.32 ±0.13*	-0.37	**<0.001**	-0.65±0.24**	-0.18	**0.038**	
Educational level									
Primary/ High School [A]	60.5±29.7[B,Γ]	**<0.001** ╒		43.8±43 [B,Γ]	**<0.001** ╒		38.2±21.4	0.140 ╒	
Lyceum [B]	78.5±20.7			75±34.9			41.8±16.4		
College/ University/ Master Degree [Γ]	88.8±15.4			76±35.7			46.1±18.7		
Married									
No	75.3±26.3	0.464		62±43.1	0.353		42.1±19.2	0.921	
Yes	78.5±23.7			68.7±38.3			42.5±19		
Hours of occupation									
2-5 hours [A]	56.2±28.7[B,Γ]	**<0.001** ╒	0.00‡	33.9±40.1 [B,Γ]	**<0.001** ╒	0.00‡	39.5±19.6	0.498 ╒	
6-8 hours [B]	84.1±16.6		9.30±4.07*	77.1±34.5		34.1±8.41***	42.6±18.9		
>8 hours [Γ]	82.3±25.7		9.12±4.56*	72.6±37.3		30.52±9.55**	45.2±18.7		
Total annual income									
0-12,000	74.8±34.1	0.122 ╒		67.6±44.3	0.926 ╒		43.2±21.2	0.961 ╒	
12,001-20,000	72.9±23.4			64.2±41.6			42.7±17.3		
Over 20,000	82.5±19.8			66.7±37.9			42±19.7		
Is your income enough so as to cover your living - personal needs?									
No	77.4±26.5	0.884		66.5±40.3	0.809		40.9±19.3	0.160	
Yes	76.8±20.9			64.6±41.1			46±18		
Significant factors for good quality of life									
Security									
No	77.4±25.2	0.910		66±40.3	0.989		41.8±19.8	0.652	
Yes	76.9±24.1			65.9±40.7			43.4±17.5		
Professional recognition									
No	75.8±24.7	0.279		61.6±41.4	**0.033**		41.9±18.1	0.623	
Yes	81.2±24.7			78.7±34.3			43.7±21.8		
Social distinction									
No	76.4±24.7	0.218		64.6±40.4	0.178		42.5±18.8	0.817	
Yes	86.5±23.8			82.5±37.4			41±22.8		
Clean environment									
No	76.6±25.9	0.583		65.7±41.5	0.880		41.1±19.2	0.171	
Yes	79.4±20.6			66.9±36.7			46.5±18		

	Physical Functionality			Physical Role			Physical Pain		
	Mean ±SD	β ±SE⁼	β ±SE⁼	Mean ±SD	P t-test	β ±SE⁼	Mean ±SD	P t-test	β ±SE⁼
Culture									
No	76.2±24.9	0.219		63.9±40.7	0.136		39.8±18.8	**<0.001**	
Yes	84.1±23			79.2±35.6			58.6±11.2		
Health									
No	82.1±18.6	0.353		81.6±32.1	0.068		44.4±19.1	0.618	
Yes	76.4±25.6			63.4±41			42±19.1		
Peace of mind									
No	76.9±25.7	0.882		72.7±37.9	0.055		43.7±20.5	0.413	
Yes	77.5±23.9			59.3±41.7			41±17.5		
Associated health problems									
No	90.9±12.1	**<0.001**	0.00‡	77.4±35.6	**0.002**		46.2±19.6	**0.029**	
Yes	64.9±26.7		-8.30±3.59*	56±41.7			39±17.9		
Medication									
No	91±11.7	**<0.001**		76.6±35.9	**0.004**		46.8±19.3	**0.010**	
Yes	64.5±26.8			56.4±41.9			38.3±17.9		
Physical activity									
Low	70.9±27.6	**0.002**	0.00‡	61.4±43.5	0.171		41.4±19	0.541	
Average/ High	84.3±18.9		7.66±3.00*	71±36			43.4±19.1		
Group of patients									
Diabetes clinic [A]	94.7±6.2	**<0.001** ╒	24.68±3.65***	92.9±16.4	**<0.001** ╒		56.5±15	**<0.001** ╒	24.54±3.04***
Thalassaemia unit [B]	85.8±11.9		17.82±4.12***	81±29.1			42.2±17.4[A]		10.32±3.71**
Renal dialysis unit [Γ]	60.3±26.4[A,B]		0.00‡	39.9±40.6 [A,B]			31.9±15.4 [A,B]		0.00‡

╒ANOVA: A, B, Γ declare the significant differences between the groups

‡reference categories

⁼ dependence coefficient ± typical errors for the factors indicated as significant by the multivariate linear regression analysis with the gradual stepwise procedure

*p<0.05, **p<0.01, ***p<0.001

Table 4: Results of univariate and multivariate analysis for the relation between the variables of the studies and the dimensions General Health, Vitality, Social Role and Mental Health

	General Health			Vitality		Social Role		Mental Health	
	Mean ±SD	P t-test	β ±SE╡	Mean ±SD	P t-test	Mean ±SD	P t-test	Mean ±SD	P t-test
Gender									
Men	47.6±14.9	0.469		44.1±10.6	0.071	59.2±21	0.504	55±8	0.179
Women	45.4±19.7			47.9±13.7		56.6±23.8		53±8.6	
Age, r	-0.14	0.109		-0.09	0.295	-0.13	0.139	-0.03	0.690
Educational level									
Primary/ High School	43.8±18.2	0.453 ╒		46.5±13.7	0.963 ╒	57.5±23.6	0.460 ╒	54±7.5	0.917 ╒
Lyceum	46.7±20.4			45.9±12.6		54.9±22.7		54.3±9	
College/ University/ Master Degree	48.5±13.8			45.8±11.2		60.8±21.3		53.6±8.6	
Married									
No	46.5±16.5	0.992		48±12.5	0.141	58.6±24.4	0.777	54.5±7.7	0.523
Yes	46.5±18.2			44.7±12.2		57.4±21.1		53.6±8.8	
Hours of occupation									
2-5 hours	40,7±18.9	0.101 ╒		47.9±11.2	0.262 ╒	54±23.8	0.482 ╒	53.5±7.3	0.591 ╒
6-8 hours	48.5±16.6			44.4±13		59.6±21.8		54.7±8.5	
>8 hours	48.1±17.4			47.9±11.8		56.5±21.6		53±9	
Total annual income									
0-12,000	42.8±17.6	0.447 ╒		48.9±9.4	0.239 ╒	59.7±24.8	0.602 ╒	55±7.8	0.634 ╒
12,001-20,000	47.8±19.7			46.6±14.7		55.1±22		54.4±8.6	
Over 20,000	47.4±15.2			44.1±11.2		58.8±21.3		53.3±8.4	
Is your income enough so as to cover your living - personal needs?									
No	46.8±18.3	0.829		47.3±12.4	0.076	55.5±22.4	0.109	54.1±8.6	0.920
Yes	46.1±15.9			43.2±12.1		62.2±21.4		54±7.8	
Significant factors for good quality of life									
Security									
No	44.7±16.1	0.081		46±12.9	0.898	60.3±21.2	0.085	53.8±8.6	0.759
Yes	50.2±19.7			46.3±11.4		53.1±24.3		54.3±7.9	
Professional recognition									
No	47.1±18.3	0.551		46.4±12.6	0.622	56.7±21.9	0.293	54.1±8	0.662
Yes	45±14.9			45.1±11.7		61.4±23.9		53.4±9.4	
Social distinction									
No	46.2±17.2	0.503		46.1±12.2	0.989	57.8±22.7	0.901	54±8.2	0.868
Yes	50.1±21.4			46±14.5		58.8±20.5		53.2±10.8	
Clean environment									
No	46.4±17.9	0.871		45.5±11.7	0.343	57.4±22.8	0.615	53.5±8.3	0.289
Yes	47±16.4			47.9±14.2		59.7±21.6		55.4±8.5	

	General Health			Vitality		Social Role		Mental Health	
	Mean ±SD	P t-test	β ±SE╡	Mean ±SD	P t-test	Mean ±SD	P t-test	Mean ±SD	P t-test
Family peace									
No	46.5±17.2	0.991		44.2±11.9	0.058	55.5±23.3	0.181	54.1±7.3	0.785
Yes	46.5±17.9			48.2±12.6		60.7±21.2		53.7±9.5	
Culture									
No	46.1±18.2	0.447		46.2±12.6	0.776	57.6±23	0.712	53.7±8.5	0.385
Yes	49.4±11.5			45.3±10.6		59.7±18.5		55.6±7.5	
Health									
No	51.1±17.8	0.223		44.7±14.9	0.618	61.2±19.5	0.492	56.6±7.8	0.132
Yes	45.8±17.4			46.3±12		57.3±22.9		53.5±8.4	
Peace of mind									
No	47.1±16.8	0.724		47±11.9	0.398	57.4±23.6	0.796	54.8±9.3	0.256
Yes	46±18.2			45.1±12.8		58.4±21.4		53.1±7.3	
Associated health problems									
No	50.6±16.4	**0.012**	0.00‡	47.2±11.7	0.328	60.7±22.2	0.181	54.1±9.1	0.888
Yes	43±17.8		-7.61±2.98*	45.1±12.9		55.5±22.5		53.9±7.8	
Medication									
No	50.8±16.1	**0.006**		47.2±11.8	0.308	62.5±21.7	**0.024**	54±9.4	0.920
Yes	42.6±17.9			45±12.8		53.8±22.5		53.9±7.4	
Physical activity									
Low	46±19.1	0.698		46.6±13.6	0.612	55.5±23.4	0.202	53.4±8.4	0.399
Average/ High	47.1±15.6			45.5±11		60.5±21.2		54.6±8.4	
Group of patients									
Diabetes clinic [A]	54.1±16[B,Γ]	**<0.001** ╒		43.4±11.3	0.116 ╒	60.9±21	0.339 ╒	53.9±7.9	0.755 ╒
Thalassaemia unit [B]	43±13.1			45.4±13.6		60±20.7		55±8.4	
Renal dialysis unit [Γ]	42.3±18.4			48.3±12.3		54.8±24		53.5±8.7	

╒ANOVA
‡reference category
╡ dependence coefficient ± typical errors for the factors indicated as significant by the multivariate linear regression analysis with the gradual stepwise procedure
*p<0.05, **p<0.01, ***p<0.001

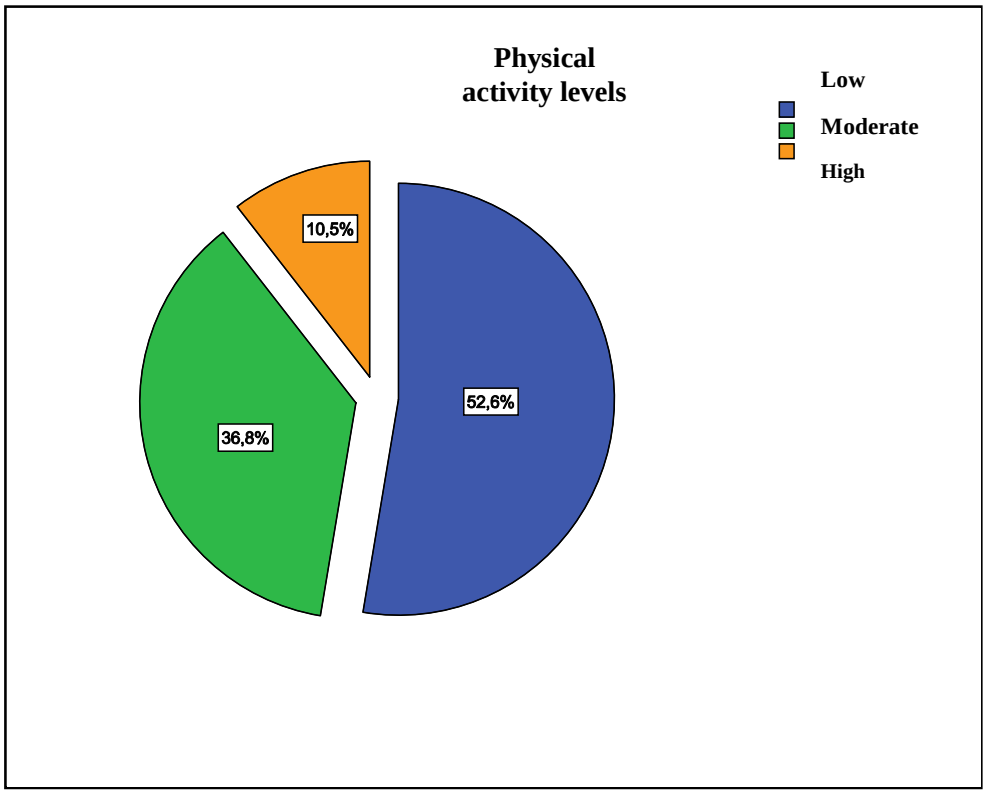
Table 5: Results of univariate and multivariate analysis regarding the relation between the variables of the study and the dimension Sentimental Role and Physical and Mental Health Summary Scales

	Sentimental Role			Physical Health Summary Scale			Mental Health Summary Scale		
	Mean ±SD	P t-test	β ±SE╡	Mean ±SD	P t-test	β ±SE╡	Mean ±SD	P t-test	β ±SE╡
Gender									
Men	74.9±37.3	0.953		44.4±7.8	**0.004**		40.7±5.3	**0.050**	0.00‡
Women	74.5±32.6			40.2±8.5			42.5±4.8		1.75±0.89*
Age, r	-0.28	**0.001**		-0.47	**<0.001**	-0.15±0.03**	0.04	0.646	
Educational level									
Primary/ High School [A]	53.3±40.5 [B,Γ]	**<0.001** ╒	0.00‡	37.2±10.5 [B,Γ]	**<0.001** ╒		41.5±4.8	0.968 ╒	
Lyceum [B]	81.4±30.3		19.7±7.19**	42.9±6.9			41.8±5.4		
College/ University/ Master Degree [Γ]	86±25.3		17.4±7.77*	45.6±5.7			41.6±5.2		
Married									
No	69.8±37.3	0.178		41.8±9.1	0.625		41.9±5.5	0.607	
Yes	78.1±32.9			42.6±8			41.4±4.9		
Hours of occupation									
2-5 hours [A]	47.3±42.8 [B,Γ]	**<0.001** ╒	0.00‡	35.8±10.2 [B,Γ]	**<0.001** ╒		41.3±6.3	0.329 ╒	
6-8 hours [B]	85.7±23.8		27.38±7.65***	44.2±6.5			42.1±5		
>8 hours [Γ]	76.3±33.5		18.53±8.68*	44.4±7.5			40.5±3.9		
Total annual income									
0-12,000	66.7±40.3	0.180 ╒		42.3±12	0.705 ╒		41.8±5.8	0.952 ╒	
12,001-20,000	71.9±37.3			41.6±7.5			41.5±5		
Over 20,000	80.9±28.7			43±7.2			41.4±5		
Is your income enough so as to cover your living and personal needs?									
No	72.9±35.8	0.435		42.4±8.8	0.869		41.3±5.3	0.474	
Yes	78±33			42.1±7.7			42±4.6		
Significant factors for good quality of life									
Security									
No	71.9±35.1	0.192		42.1±8.8	0.756		41.4±5.2	0.516	
Yes	80.3±34			42.6±7.6			42±5		
Professional recognition									
No	72.7±36.4	0.270		41.7±8.2	0.165		41.6±4.9	0.988	
Yes	80.4±29.7			44±9			41.6±5.7		
Social distinction									
No	74.8±35.3	0.899		42±8.3	0.134		41.8±5.2	0.245	
Yes	73.3±30.6			46.1±9.5			39.8±4.7		
Clean environment									
No	74.2±34.4	0.764		42±9	0.534		41.4±4.9	0.482	
Yes	76.3±36.7			43.1±6.2			42.2±5.9		
Family peace									
No	71.4±37.5	0.240		42.7±7.7	0.568		40.6±5.1	**0.017**	
Yes	78.5±31.4			41.8±9.1			42.7±5		

	Sentimental Role			Physical Health Summary Scale			Mental Health Summary Scale		
	Mean ±SD	P t-test	β ±SE⊧	Mean ±SD	P t-test	β ±SE⊧	Mean ±SD	P t-test	β ±SE⊧
Culture									
No	75.7±35.1	0.421		41.5±8.4	**0.005**	0.00‡	42±5	**0.029**	0.00‡
Yes	68.5±33.3			47.6±6.7		2.43±1.15 *	39.1±5.3		-2.9±1.31*
Health									
No	75.4±31.1	0.920		45.2±6.3	0.101		41.5±6.4	0.899	
Yes	74.6±35.6			41.8±8.6			41.6±4.9		
Peace of mind									
No	76.8±35.6	0.496		42.9±8.7	0.373		41.8±5.6	0.593	
Yes	72.6±34.3			41.6±8.1			41.4±4.7		
Associated health problems									
No	83.3±28.1	**0.007**		46.5±6.1	**<0.001**		41.2±5.4	0.424	
Yes	67.1±38.4			38.5±8.5			41.9±4.9		
Medication									
No	82±28.6	**0.021**		46.6±6	**<0.001**		41.3±5.4	0.464	
Yes	68.1±38.7			38.3±8.4			41.9±4.8		
Physical activity									
Low	67.1±37.4	**0.008**	0.00‡	41±9.9	0.074		41.2±5.2	0.297	
Average/ High	83.1±29.9		12.38±5.38*	43.7±6.2			42.1±5.1		
Group of patients									
Diabetes clinic [A]	84.1±26	**<0.001** ⊩		50.5±3.5[B,Γ]	**<0.001** ⊩	13.63±0.89***	39.5±4.9 [B,Γ]	**0.002** ⊩	
Thalassaemia unit [B]	89.3±23			43.9±2.1[Γ]		7.86±1.04***	42.6±4.3		
Renal dialysis unit [Γ]	61.8±40[A,B]			35.3±6.4		0.00‡	42.8±5.1		

⊩ ANOVA. A, B, Γ declare the significant difference between the groups
‡reference category
⊧ dependence coefficients ± typical errors for the factors indicated as significant by the multivariate linear regression analysis with the gradual stepwise procedure
*p<0.05, **p<0.01, ***p<0.001

Chart 1: Physical activity levels



Discussion

The objective of the present study was to explore the subjective evaluation of patients with some chronic diseases (chronic renal failure, diabetes, B thalassaemia) referring to the effect of physical activity in QoL and to find out which demographic or other factors may be associated, as well. In Greece, there is no similar study until today.

Results referring to demographics and their effect to chronic diseases and the influence of exercise in QoL. Sex, age, level of education and profession correlate with QoL and low levels of physical activity in patients with chronic diseases. The percentage with low levels of physical activities is big and essentially for women. Women with lower levels of activity have also lower levels of physical functionality and additionally they have lower levels of quality in the physical and mental health summary scales. The findings of respective researches in other countries demonstrate that the percentage of women who practise physical activity is higher than in this study (Johnson, 2009, Farid & Dabiran, 2012). In USA, for example, the percentage of women that exercises is twice higher than in this study (Schipper & Levitt, 1985). In Europe, studies have shown a higher percentage of women that exercise themselves, but lower than that of USA (Siegrist & Junge, 1990). In Greece, at a similar research, the percentage of women who do not take exercise is equal to this study (Filippidis et al., 2011).

In Greece probably women have not been deeply informed about the benefits of exercise or have not realised the benefits of exercise in their QoL. Another reason for which women probably do not practice concerns the priority they give to their other obligations – work, income, family care – and not to their health, their quality of life and their occupation with themselves, while in other countries women enjoy a safer life and more time for themselves.

Age, in this study, is an important determinant for QoL and lack of exercise. The increased age is related – as expected – to the low levels of quality of life in various dimensions, while the associated health problems and the medication are related with most dimensions of quality of life. Aged people are not able to easily adapt to the changes required by the disease diagnosis, neither are they able to cover the losses they suffered so easily as young people can. According to the SPF (Social Production Functions) theory, this restriction may affect negatively the quality of life (Sevastaki & Dilintas, 2005). Moreover, if moving and activity restraints are added, then this hypotheses is stronger as it is shown in other studies, as well (de Ridder & Schreurs, 2001). So, limited social activities, home nursing due to disease symptoms and complications possibly lead to the deterioration of good psychosocial conditions and a low level of QoL.

The low educational level as a socio-economical factor is also connected to low values in several aspects of the quality of life and the physical activity in this study. The same conclusion was reached in respective studies, where the low educational level negatively affects the quality of life and the state of health (Saroglou, 1999). Education may be a privilege for the patient, providing them the possibility to manage more effectively the conditions of real life, thus leading to a more positive evaluation of reality. Also, spiritual culture may be directly connected to mental health, since it affects the handling of stressful situations and, consequently, physical health.

Professional status, correlates negatively with QoL in this study. Low values in several aspects of QoL were detected for people who work less than 6 hours; this is possibly connected to their state of health. Public servants and free professionals possibly feel safe when their financial status will not be influenced by a possible loss of employment, whereas, when a pension, is secured, future financial problems and stress in the family will be eliminated. It must also be noted that Greek patients with renal failure and thalassaemia, visit and are being treated in public hospitals where they receive relative medication and treatment, with a parallel allowance for this handicap and a possibility for early retirement.

Referring to the scoring of each dimension of QoL, there was a statistically significant difference among all of them, except “vitality”, “social role” and “mental health”. Referring to the dimensions of “physical pain”, “general health” and in summary scales “physical and mental health”, patients with renal failure had significant bad QoL (lower score). More specifically, these patients had smaller score referring to “physical functionality”, “physical role”,

"physical pain", "general health", "sentimental role" and in summary scales of "physical and mental health", comparing to patients with thalassaemia and diabetes. Also, patients with an additional health problem had significantly lower score in summary scale of "physical health" comparing to patients with no added health problem. The low score in this category shows a significant restraint in all activities, including self-care. This entails the existence of problems with work or other activities due to bad physical health. Patients with renal failure possibly have physical problems that influence physical health which is a requisite for any mental health- QoL. This hypotheses is enhanced from findings of previous studies (Theofilou 2011; Kourakos et al., 2012; Burckhardt, Archenholtz & Bjelle, 1993, McKinley, Ouellette & Winkel, 1995, Jacobson, de Groot & Samson, 1997).

Patients with diabetes and thalassaemia have a more satisfying range of daily activities, which probably is due to lack of other problems and complications cause to their medication (Tzinieris et al., 2003; CDC, 1982). This good level of QoL has to do with the lack of heavy symptoms and complication. In older studies, moving restraints and daily difficulties were factors that had negative influence in QoL in patients with diabetes and b-thalassaemia, which have been reduced or disappeared with improved medication (Hickson & Frost, 2004, Saroglou, 1999, CDC, 1982). Patients with diabetes have maintained the social activities' range at an acceptable level which leads to good physical health and activities, in general. This is probably due to sufficient information they get and their compliance to the cure and a change of lifestyle, which is also found in recent studies as well (Barnes & Hong, 2012, Krepia et al ., 2012).

Patients with renal failure, scored low level in "social behavior" and in" sentimental balance" probably due to the limitation of social activities or physical and psycho-sentimental health problems and to feelings of depression or anxiety.

The fact that these patients have lower level of QoL has to do with the low score in the dimension of "mental health", which according to the theory of social production of functioning, is identified by QoL (Sevastaki & Dilintas 2005)

Chronic disease correlates with QoL. Patients with renal failure share the lowest level of QoL than those with diabetes or thalassaemia. They lack in physical autonomy, control of movement, social behavior, sentimental balance and range of daily activities, which results to 5 from 6 categories that refer to three dimensions: physical, social and mental health. Finally, there was a significant positive relation between almost all dimensions of QoL. That means that the more QoL rises up in one dimension, the better it gets for the rest of them as well.

Conclusions

Although financial development and evolution in technology and medicine have assisted in the decrease of infectious diseases, some aspects of globalization contributed in the increase of unhealthy way of life, which leads to an increase of non infectious diseases and mental illness.

Diagnosis of chronic disease, like renal failure, diabetes and thalassaemia, brings people confront with a number of challenges. Safe keeping of a satisfactory level of QoL is an important goal for people with chronic disease.

This study shows differences between three groups of patients with chronic disease, referring to three dimensions of QoL. These results offer useful information regarding the socio-demographical profile of the patient and the connection to their quality of life. In this study, it is obvious that the older, the less educated patient, living without a companion is connected to a lower quality of life. The findings agree with the data of the international bibliography which show that the socio-demographical factors may greatly contribute to the explanation of the total QoL and can be used in engraving.

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