International Journal of Health Research and Innovation, vol. 3, no. 2, 2015, 21-36
ISSN: 2051-5057 (print version), 2051-5065 (online)
Scienpress Ltd, 2015

Correlation of Quality of Life related to Health and Physical Activity in Greek Patients with Chronic Diseases

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Abstract

During the last 20 years, chronic diseases constitute the main cause of mortality, morbidity and disability worldwide. The cost of therapy is also increased substantially. The quality of life is poor and there is limited physical activity.68 women and 65 men suffering from renal disease, diabetes and beta-thalassaemia, participated in a cross sectional, correlation study aiming into investigation of subjective assessment of quality of life related to health (QLrH) in relation to their level of physical activity. Data were collected in the respective outpatient clinics in primary health care settings of Peloponnese using: a) the short form of the Quality of Life questionnaire (SF-36), b) the short form of the International Physical Activity Questionnaire (IPAQ). From these patients, 62 (46.6) are kidney patients undergoing dialysis, 46 (34.6) are patients from the diabetes outpatients' clinics and 25 (18.5) are patients with beta-thalassaemia. 51.1% of the participants were women, 33.8% were graduates from Colleges/ Universities, and the majority of the participants are married, to a percentage amounting to 59.4%. More than half of them were working for 6-8 hours daily (53.0%) and 68.9% consider their income to be insufficient for their living and personal needs. Furthermore, some seem to be affected from various other organic disorders, comorbidities. Apart from the body disorders known from the bibliography, we statistically remark a significant negative influence of all levels – dimensions of the quality of life in all three groups of patients. In particular: the majority of the participants had low physical activity (52.6%).
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. Moreover, the participants that used to work 6-8 hours daily

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had considerably higher marks in the synoptic scale of physical health from other participants. Men got considerably lower marks in the synoptic scale of mental health.

Keywords: Quality of life, exercise, patients with chronic diseases

1 Introduction

People suffering from chronic diseases, apart from long-term treatments and ill-health challenges face additional difficulties in their everyday life such as maintaining a good emotional balance and self-esteem, self-control, good relationships with family and friends and an uncertain future. In addition, diagnostic uncertainties, helplessness, dependency, stigma and lifestyle changes put additional pressure on people suffering from chronic diseases [1].

Renal failure is considered to be one of the biggest public health problems in Greece and worldwide. Prevalence of final phase of renal failure in Greece in 2009 was 12.018 people. The numbers of patients who undergo substitution therapy in Greece are about 8,800 individuals in total of whom 75% receive hemodialysis and 8% peritoneal dialysis. Incidence of people under substitution therapy is about 8% per year [2].

Regarding Diabetes Mellitus, in Greece, approximately one million people were reported to suffer in 2009. These data as well as the rising projections for the coming decades indicate a severe disease burden with multiple complications and, unless action is taken, it is predicted to affect all age groups of the population as well as the national health system [2]. Another epidemiological study conducted in Greece, indicated significantly higher prevalence rates and an increasing trend for DT 2 from 2.8% in 1970 to 7.6% in 2002. Moreover, there is an additional 5% of the population who is unaware that they suffer from the disease [3]. Also, in Greece about 5,000 people suffer from beta-thalassaemia while 5%-10% of general population is heterozygotic [4,5].

Increase of longevity, decrease of morbidity and wellbeing of patients as this is expressed by WHO aims [6], for example “adding years in life” and “life in years”, are the purposes of the evaluation of QoL. Main applications of Qol on the level of population [6-8] are:

Surveillance of population, evaluation of health needs, of the results of health policies’ application, distribution and follow up of public health’s budget.

Whereas on the level of group or a personal level are: estimation of personal health needs, tracing of psychosocial problems, diagnosis of diseases, prognosis, evaluation of the effectiveness of a therapy, comparison of alternative treatment interventions, clinical trials, analysis of cost-benefit, and medical audit [7,8].

In clinical practice, evaluation of QoL is applied mostly for the surveillance of patients with chronic diseases or the evaluation of health needs of a special group. Emphasis is given to disease’s consequences in different levels of life, taking into consideration their role into the family, work efficiency, participation in social activities, and access to services etc [9].

Scientific contribution into decision making process has to do with solving a complex equation that is called to answer to the question: what is the relationship between quality of life of a patient as a dependent variable with the possible outcome of an application or a clinical decision. This equation is related to inadequate and subjective knowledge on how each one of the desired and undesired outcomes contribute to the total level of QoL [10]. Based on the above, the patient estimated effect of the disease or therapy on health

and on QoL, is an important methodological approach into the efficacy of a clinical action [11].

Evidence based decision making process referring to chronic health problems, is more difficult, since both positive and negative outcomes of a disease or a therapy have to estimated in the long run. Event of results in a short time, is good for positive outcomes but bad for side effects [12]. Chronic diseases through destabilization of basic physical activities may invert dramatically mental, social and financial balance between a person and her/his family. Longitudinal therapies call for financial and social restraints. Retention of mental balance, self esteem and self control has to be highly prioritized referring to the QoL of chronically patients. These are aims that require supportive and personalized actions, which focus on the obviation of difficulties of access to health services, on the limitation of physical inability, of addiction and of social stigma [14].

It is an accepted fact that physical activity decreases the risk of cardio vascular diseases and cancer, improves metabolism and decreases body fat [14,15]. In a study of Pitsavos et al (2005) [16] women and men that do have physical activity had fewer possibilities to have depressive symptoms.

Influence of exercise into QoL, is important for most social groups and especially for young people, since it provides them biological support and socialization [17].

However, despite the facts that HRQoL is of significant use for people suffering from NCSs and for health professionals as well, in Greece there is limited information and empirical research on the correlation of chronic diseases on QoL and especially in relation to physical activity.

This study aims to assess the eight dimensions of HRQoL to three categories: a) of people suffering from chronic diseases, renal failure, diabetes type 2 and beta-thalassaemia. Additional objectives are the correlation of HRQoL with physical activity and the role socio-demographic characteristics play in both (HRQoL and physical activity).

2 Material and Methods

Study Design and participants

A descriptive, cross sectional design was adopted. A convenience sample was used, studying 189 patients with chronic diseases, who were cared for in four general hospitals in the district of Peloponnese, especially in renal dialysis or beta-thalassaemia units, in oncology departments and in diabetes outpatients' clinics, during the period of 2010-2011. The inclusion criteria for the volunteers in the study were: a) to be at least 18 years old, b) have completed primary school at minimum (in order to comprehend the questions of the psychometric tests), c) to agree to voluntarily participate to the study.

Instruments

Data collection was done through two questionnaires that were validated in Greek. They are free for research use and not require permission.

A) The short form of the questionnaire regarding the quality of life (SF-36), with 36 questions on 8 dimensions of QoL: physical functioning (10 items), role limitations caused by physical problems (4 items), role limitations caused by emotional problems (3 items), bodily pain (3 items), general health perceptions (5 items), social functioning (2 items), emotional well-being (5 items), vitality (4 items). The response options used were

2-graded (1=yes, 2=no), and 3-graded (1=yes, much limited, 3=no, not at all limited), 5-graded (1-not at all, 5=very much), and 6-grade (1=all the time, 6=none of the time) scales. The scores for each scale are coded, summed and transformed into a scale ranging from 0 (worst possible health) to 100 (best possible health) [18,19].
B) The short form of the international physical activity questionnaire (IPAQ), which employs different approaches to the type of physical activity (work, moving, resting and homework) done by the participants. This tool consists of 5 parts in the 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 first last one, time of sedentary activities is written down. This results to a continuous score of physical activity minutes per week [20].
C) Items on demographics and chronic disease characteristics were added.
The questionnaires were filled in by the participants of the research themselves, with simultaneous recording of their demographic information, as well as their personal medical history regarding to the following diseases: diabetes mellitus, chronic renal insufficiency, and beta-thalassaemia.

Ethical Dimensions
Before dissemination of the questionnaires, the participants were informed of the purpose of the study and were asked if they wanted to participate, they were assured about the confidentiality and the anonymity of the procedure. Permission for the implementation of the study was required and provided by all Hospitals' Scientific Committees, where the study was implemented.

Statistical analysis
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.

3 Main Results

Demographic characteristics
133 patients with chronic diseases participated to the study, with the response rate (70.4%). From these, 56 individuals suffered from diabetes type 2, 25 from beta-thalassaemia and 62 from renal failure receiving hemodialysis. The mean age was 47.6 years (SD$\pm$14.3 years) and 51.1% were women. About one in three participants to

the study (31.1%) responded that their income was sufficient for their personal needs, while almost half of them (53.4%) had co-existing health problems and used medicines (52.6%). Regarding the perceived factors for the good QoL, health seemed to be the most significant (85.7%) the peace of mind came to the second position (50.4%) and the family peace to the third (46.6%).

Physical Activity

Only 10.5% of the participants had high level of physical activity, while 36.8% had average levels. 60% of people with beta-thalassaemia had average/high level of physical activity, while this rate in patients with diabetes was 45.7% and for patients receiving hemodialysis 43.5%, although statistical significance was not observed between the three groups (p=0.365). Men (p=0.004), younger individuals (p=0.002), people without co-existing health problems (p=0.021) and participants not taking medication (p=0.004) had average/high levels of physical activity. There were no statistically significant differences between the levels of physical activity and other socio-economical factors, such as educational level, income and daily working hours. The uni-variate analysis showed that the participants with average/high levels of physical activity had considerably higher means in the HRQoL dimensions "Physical Functioning" (p=0.002) and "Role Emotional" (p=0.008) (table 2).

Health Related Qualtiy of Life (HRQoL)

In table 3, minimum value, maximum value, mean, $\pm$SD and median of the dimensions of HRQoL are presented. It seems that Physical Functioning and Emotional Role take the highest means while Bodily pain, Physical health component summary and mental health component summary the lowest ones.

A significant difference in the participants' score in all the dimensions of quality of life related to health between the groups was observed, except from the dimensions "Vitality", "Social functioning" and "Mental health". In particular, patients from the beta-thalassaemia unit had considerably lower mean (worse health related quality of life) regarding the dimensions "Bodily pain" (p=0.002), "General health" (p<0.001) and Physical health component summary (p<0.001) and Mental health component summary (p=0.002) compared to patients from the diabetes unit. Additionally, patients receiving hemodialysis have considerably lower means (worse quality of life related to health) regarding the dimensions "Physical functioning", "Physical role", "Bodily pain", "General health" and "Emotional role", as well as the "Physical and Mental health component summary scales" compared to patients with DM2. Finally, patients receiving hemodialysis unit had considerably lower score (worse quality of life related to health) regarding the dimensions "physical functioning" (p<0.001), "physical role" (p<0.001), "bodily pain" (p<0.001), and "emotional role" (p<0.001), as well as the summary dimension of physical health (p<0.001) compared to patients from the thalassaemia unit (tables 4,5,6).

According to the results of the uni-variate analysis of the dimensions of HRQoL, men had higher means in Physical Functioning (p=0.002) and in Physical health component summary dimension (p=0.004), while women had higher mean of mental health component summary (p=0.050 (tables 4, 5, 6).

Younger age was related to higher mean of Physical Functioning (p<0.001) Physical role (p<0.001), Bodily pain (p=0.038), Emotional role (p<0.001) and Physical health component summary (p<0.001).

Higher levels of education were positively correlated with higher means of Physical functioning ($p<0.001$), Physical role ($p<0.001$), Emotional role ($p<0.001$), and Physical Health component summary ($p<0.001$) (tables 4, 5, 6).
Hours of daily working correlated with higher means in dimension of Physical functioning ($p<0.001$), Physical role ($p<0.001$), Emotional role ($p<0.001$), and Physical Health component summary ($p<0.001$).
People considering professional recognition significant factor of a good QoL, had higher means in Physical role ($p=0.33$), while people considering family peace as significant factor of a good QoL had higher means in Mental Health component summary ($p=0.017$) and when culture was considered as significant factor of good QoL participants had higher means in Bodily pain dimension ($p<0.001$), and in Physical health component summary ($p=0.005$) and Mental Health component summary ($p=0.029$) (tables 4, 5, 6).
People with coexisting health problems had lower means in the dimensions of Physical Functioning ($p<0.001$), Physical role ($p=0.002$), bodily pain ($p=0.029$), general health ($p=0.012$), emotional role ($p=0.007$) and Physical Health component summary ($p<0.001$) (tables 4, 5, 6).
People under medication had lower means in Physical Functioning ($p<0.001$), Physical role ($p=0.004$), bodily pain ($p=0.010$), General health ($p=0.006$), Social functioning ($p=0.024$), emotional role ($p=0.021$) and Physical Health component summary ($p<0.001$) (tables 4, 5, 6).
According to multivariate analysis of the linear regression analysis with the gradual stepwise procedure and dependent variables the dimensions of SF-36, age ($\beta=-0.32\pm0.13$), the 6-8 daily working hours ($\beta=9.30\pm4.07$), the physical activity ($\beta=7.66\pm3.00$), the type of main disease (Persons with diabetes $\beta= 24.68\pm3.65$, people with beta-thalassaemia $\beta=17.82\pm4.12$, and people receiving hemodialysis $\beta=0.00$) and the existence of additional health problems ($\beta=-8.30\pm3.59$) were independently related to the dimension of Physical Functioning (tables 4,5).
Also, as shown in tables 4 and 5, age and the daily working hours were found to be independently related to “Physical Role”. The type of disease was the only predictive factor for the dimension “Bodily Pain” and the co-existing health problems was the only predictive factor for General Health dimension. None of the studied factors was independently associated with the dimensions “Vitality”, “Social functioning”, and “Mental Health”.
Regarding the socio-demographic factors, educational level and daily working hours and physical activity were found to have a predictive ability in the multivariate analysis for the dimension “Emotional Role”. Physical activity was also found to independently predict the Emotional Role dimension. Finally, age and the main disease and consideration of culture as a significant factor for good QoL is independently correlated with the “Physical Health component summary” while gender was independently correlated with “Mental Health component summary” (tables 4, 5, 6).

4 Labels of Figures and Tables

Table 1: Demographic data of the participants

Demographic data	**N (%)**
Type of Disease	
Type 2 Diabetes	46 (34.6)
Beta-Thalassaemia	25 (18.8)
Hemodialysis	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)
Daily working hours	
2-5 hours	31 (23,5)
6-8 hours	70 (53)
>8 hours	31 (23.5)
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)
Coexisting health problems	
No	62 (46.6)
Yes	71 (53.4)
Receiving medicines	
No	63 (47.4)
Yes	70 (52.6)

Table 2: Correlation of the levels of physical activity with demographic factors

	Physical Activity		
	Low	**Average/High**	
Demographic Characteristics	**N (%)**	**N (%)**	**P – x^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)	
Daily working hours			
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)	
Coexisting health problems			
No	26 (41.9)	36 (58.1)	**0.021**
Yes	44 (62)	27 (38)	
Receiving medicines			
No	26 (41.3)	37 (58.7)	**0.004**
Yes	44 (62.9)	26 (37.1)	
Type of Disease			
Type 2 Diabetes	25 (54.3)	21 (45.7)	0.365*
Beta-Thalassaemia	10 (40.0)	15 (60.0)	
Hemodialysis	35 (56.5)	27 (43.5)	

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

Table 3: Dimensions of HRQoL and descriptive measures

	Minimum Value	**Maximum Value**	**Mean±SD**	**Median**
Physical Functioning	0,0	100,0	77,2±24,7	85 (65 - 95)
Physical Role	0,0	100,0	66±40,3	75 (25 - 100)
Bodily Pain	0,0	100,0	42,3±19	42 (31 - 64)
General Health	5,0	87,0	46,5±17,5	42 (32 - 57)
Vitality	20,0	75,0	46,1±12,4	45 (35 - 55)
Social Functioning	0,0	100,0	57,9±22,4	62,5 (37,5 - 75)
Emotional Role	0,0	100,0	74,7±34,9	100 (66,7 - 100)
Mental Health	32,0	76,0	54±8,4	56 (48 - 60)
Physical Health Component Summary	16,7	60,3	42,3±8,4	42,9 (37,8 - 48,7)
Mental Health Component Summary	28,8	55,1	41,6±5,1	41,7 (38,4 - 45)

Table 4: Correlations of between the studied variables and the dimensions of Physical Functioning, Physical Role and Bodily Pain, according to univariate and multivariate analysis.

	Physical Functioning			**Physical Role**			**Bodily 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, mean (SD)	-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	60.5±29.7[B,Γ]	**<0.001** ╒		43.8±43 [B,Γ]	**<0.001** ╒		38.2±21.4	0.140 ╒	
Lyceum	78.5±20.7			75±34.9			41.8±16.4		
College/ University/ Master Degree	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		
Daily working hours									
2-5 hours	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	84.1±16.6		9.30±4.07*	77.1±34.5		34.1±8.41***	42.6±18.9		
>8 hours	82.3±25.7		9.12±4.56*	72.6±37.3		30.52±9.55**	45.2±18.7		
Coexisting 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		
Receiving medicines									
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		
Type of Disease									
Type 2 Diabetes	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***
Beta-Thalassaemia	85.8±11.9		17.82±4.12***	81±29.1			42.2±17.4[A]		10.32±3.71**
Hemodialysis	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 5: Correlations of between the studied variables and the dimensions of General Health,Vitality, Social Role and Mental Health, according to uni-variate and multivariate analysis.

	General Health			Vitality		Social Functioning		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, mean (SD)	-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	
Daily working hours									
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	
Coexisting 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	
Receiving medicines									
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	
Type of Disease									
Type 2 Diabetes	54.1±16[B,Γ]	**<0.001** ╒		43.4±11.3	0.116 ╒	60.9±21	0.339 ╒	53.9±7.9	0.755 ╒
Beta-Thalassaemia	43±13.1			45.4±13.6		60±20.7		55±8.4	
Hemodialysis	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 6: Correlations of between the studied variables and the dimensions of Emotional Role, Physical Health Component Summary and Mental Health Component Summary, according to uni-variate and multivariate analysis.

	Emotional Role			**Physical Health Component Summary**			**Mental Health Component Summary**		
	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, mean (SD)	-0.28	**0.001**		-0.47	**<0.001**	-0.15±0.03**	0.04	0.646	
Educational level									
Primary/ High School	53.3±40.5 $^{B,\Gamma}$	**<0.001** ╒	0.00‡	37.2±10.5 $^{B,\Gamma}$	**<0.001** ╒		41.5±4.8	0.968 ╒	
Lyceum	81.4±30.3		19.7±7.19**	42.9±6.9			41.8±5.4		
College/ University/ Master Degree	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		
Daily working hours									
2-5 hours	47.3±42.8 $^{B,\Gamma}$	**<0.001** ╒	0.00‡	35.8±10.2 $^{B,\Gamma}$	**<0.001** ╒		41.3±6.3	0.329 ╒	
6-8 hours	85.7±23.8		27.38±7.65***	44.2±6.5			42.1±5		
>8 hours	76.3±33.5		18.53±8.68*	44.4±7.5			40.5±3.9		
Coexisting 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		
Receiving medicines									
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		
Type of Disease									
Type 2 Diabetes	84.1±26	**<0.001** ╒		50.5±3.5 $^{B,\Gamma}$	**<0.001** ╒	13.63±0.89***	39.5±4.9 $^{B,\Gamma}$	**0.002** ╒	
Beta-Thalassaemia	89.3±23			43.9±2.1 $^{\Gamma}$		7.86±1.04***	42.6±4.3		
Hemodialysis	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

5 Discussion

Chronic diseases have an impact on QoL. Patients with renal failure have the lowest level of QoL compared to those people with diabetes type 2 or thalassaemia. They lack in physical functioning, social functioning, emotional role and range of daily activities, which affect 5 from 6 dimensions respective to: physical, social and mental health. There was a significant positive relation among almost all dimensions of QoL which may mean that the more QoL rises up in one dimension, the better it gets for the rest of them as well.

Patients with diabetes type 2 and thalassaemia have a more satisfying consideration of daily activities, which probably is a result of non existence of other serious problems or painful symptoms and complications caused by the nature of the disease or medication [21]. In previous studies, moving restraints and difficulties in daily activities were factors that negatively influence QoL in patients with diabetes type 2 and b-thalassaemia [22,23]. Patients with diabetes have maintained their social role at the previous level that may lead to better physical health and QoL, in general. Sufficient information patients get and their compliance to medication as well as change of their lifestyle, have been highlighted as facilitating factors in recent studies [24,25].

Patients receiving hemodialysis had significantly worse QoL in dimensions of Bodily pain, General health and Physical and Mental health component summaries than the other groups of patients. More specifically, patients receiving hemodialysis had lower means in Bodily functioning, Physical role, Bodily pain, General health, Emotional role and in Physical and Mental health component summaries, comparing to patients with thalassaemia and diabetes type 2. Also, patients with co-existing health problems had significantly lower scores in Physical health component summary comparing to patients with no other health problems. The low mean in the above dimension of QoL may indicate a restraint in all activities, including self-care. Patients with renal failure possibly have physical problems that influence not only physical health but also and in mental health. This finding is in line with finding from previous studies in Greece and other countries [26-29].

Patients with renal failure scored low level in Social functioning and in Emotional role probably due to the limitation of social activities or physical and psycho-emotional 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 [30].

Regarding demographics and their effect to chronic diseases and to exercise in QoL, gender, age, level of education and daily working hours correlate with QoL and low levels of physical activity in patients with chronic diseases.

The percentage with low levels of physical activity is higher in women. Women with lower levels of activity have also lower levels of physical functioning and additionally they have lower levels of quality of life in the Physical and Mental health components summaries. In Greece, at a similar study, the percentage of women who do not take exercise is equal to the present study [31]. The findings of respective studies from other countries show higher rates of women having physical activity [7,32]. In USA, for example, the rate of women who exercises is twice higher than that of our study [33]. In Europe, also the rate of women who exercise is higher than that of our sample, but lower than the respective one of USA [34]. In Greece, probably women have not been conscious about the benefits of exercise or have not realised the benefits of exercise in their QoL. Another possible explanation for which Greek women probably do not exercise might be

lack of time to devote to physical activity as they give priority to other tasks such as family care, work, income – and not to their health and their quality of life.

Age, in this study, seemed to be an important determinant for QoL and lack of exercise. The younger age is related – as expected – to the higher levels in various dimensions of quality of life. As expected, people are more able to easily adapt to the changes required after the disease diagnosis than aged people do. According to the Social Production Functions (SPF) theory, aged people are not being able to adapt easily to the new conditions and therefore their quality of life is affected in a negative way [30]. Older age have been indicated as a factor that often influence HRQoL and brings changes in everyday life. However, women who have physical independence and maintain social relations have higher levels of physical activity and better QoL [35].

High educational level is also related to higher values in several dimensions of the quality of life and physical activity in the present study. Other studies resulted in similar conclusions where high educational level has positive impact on the quality of life and the state of health [23]. Education is usually considered as a health asset of patients empowering them to manage effectively their disease thus leading to a better health outcome.

Long daily working hours, correlates negatively with QoL in this study. Higher values in several dimensions of QoL were detected for people who work less than 6 hours daily; this is possibly connected to their state of health. These amounts of working hours maybe entail a stable income. On the other hand, it must also be noted that Greek patients receiving hemodialysis and suffering from thalassaemia are able to be treated in public hospitals without being obliged to pay by themselves while they are provided with an allowance from the state for this handicap and possibly early retirement, if their state of disease requires.

6 Conclusion

Although there is, internationally, an improvement of living conditions and quality of health services, important risks that affect human health exist and are connected with psychosocial factors and chronic diseases in modern way lifestyle. Diagnosis of a chronic disease like renal failure, diabetes and b-thalassaemia, brings up a series of challenges that a human being has to deal with, except of surviving. Assurance of a satisfying level of QoL is an important life's work for chronic patients.

Referring to the social production theory, QoL of chronic patients depends on the physical condition, which is the base for the other two dimensions, social and mental. Therefore, evaluation of QoL involves three dimensions, physical, social and mental well-being.

This study showed that there are differences between three groups of patients concerning the three dimensions of evaluation of QoL. Based on the results, patients with renal failure are characterized by limited physical activity, physical autonomy and self care activities that have negative influence in physical well being. Limited physical well being affects on psycho social well being, having as a result a lower level of QoL in relation with those that have diabetes.

These results offer useful information about the social-demographic profile of a patient and its correlation with her/his QoL. Except disease, other factors act on QoL, such as, age, sex, level of physical activity, level of education and professional status. Findings

agree with literature review that show that social-demographic elements may contribute up to a point to the account of total QoL.

Health professionals may take the initiative and commit to the society and its sections, in order to intercept any threats of chronic diseases and to promote health and wellbeing worldwide. Furthermore, they can intervene into the promotion of education and physical exercise of people, in order to contribute to the improvement of level of QoL. Scientific validation and designation of critical conditions of improvement of life conditions may be proven as necessary asset of policymaking.

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