Int J Public Health 52 (2007) 341–347
1661-8556/07/060341-7
DOI 10.1007/s00038-007-6079-9

Original article

Relationship between basic protective health behaviours and health related quality of life in Greek urban hospital employees

Yannis Tountas[1], Yannis Manios[2], Christine Dimitrakaki[1] & Chara Tzavara[1]

[1] *Center for Health Services Research, Medical School, University of Athens, Greece*
[2] *Department of Nutrition and Dietetics, Harokopio University of Athens, Greece*

Submitted: 26 June 2006; Revised: 10 April 2007; Accepted 17 July 2007

Summary

Objective: The study aimed to explore the association between the presence of several protective health behaviors and physical and mental wellbeing/functioning among healthy hospital employees in Greece.
Method: A randomly selected representative sample of 395 employees working in seven hospitals, both public and private, within the wider region of Athens participated in the study. Participants were assigned to the following professional categories: administrative, auxiliary and technical personnel, medical doctors and nurses. Four basic protective health behaviors were examined: following the Mediterranean diet, exercising, no smoking and moderate alcohol drinking. Employees' health related quality of life was assessed with the self-administered SF-36 generic health status measure.
Results: Technical and administrative hospital personnel reported more healthy behaviors than medical and auxiliary personnel. There was an increased likelihood of scoring higher in almost all SF-36 Physical health subscales in the accumulation of the above four protective heath behaviors. In terms of mental health, even the presence of two or more protective health behaviors significantly increase the score on most SF-36 Mental health subscales.
Conclusion: Results indicate that the protective role of basic health behaviors extends beyond physical health to mental wellbeing.

Keywords: Hospital employees – Health related Quality of Life – Health behaviors – Greece – Healthy adults.

In recent years, besides health status emphasis has also been placed on Health Related Quality of Life (HRQL) of the general population. Measures of HRQL can capture people's subjective evaluations of their current health status – somatic, emotional and social – that may be well related to health promoting activities and health care systems quality, equity and promotional orientation. Such assessment can be used as an index of effectiveness in research related to preventive and curative medicine, rehabilitation and terminal care. The population's trends to progress or not towards healthier behaviors and the impact of socio-economic determinants on health could be equally explored with the ultimate goal to inform health and economic policies.

Most of the research conducted so far has primarily focused on measuring the impact on disease on patients' HRQL (Chang 2004; Wandell 2005). From the studies attempted to assess HRQL of healthy individuals, little emphasis has been placed on the association between protective lifestyle behaviours and HRQL outcome. In the current study the Greek version of the 36-Item Short-Form (SF-36) was used to measure, assess and evaluate HRQL of employees working in several hospitals of the Hellenic Network of Health Promoting Hospitals (HNHRH). The appropriateness of this widely used generic instrument to assess subjective quality of life for the Greek population has been confirmed in a previous validation study (Kododimopoulos et al. 2004).

Adverse dietary habits, physical inactivity, smoking and higher than recommended alcohol intake are the most common risk behaviors in the developed world, the combined effect of which contributes to the rising mortality rates from chronic diseases. Following this trend, Greece has one of the most rapidly rising death rates due to chronic diseases, particularly cardiovascular disease, which now constitutes the primary cause of morbidity and mortality (Kafatos & Papoutsakis 1998; Pitsavos et al. 2003). However, only few studies have attempted to examine the association of such behaviors with HRQL among healthy adults in Greece and other developed

countries (Kern et al. 2004; Sofi et al. 2005). Moreover, the majority of previous research has described mainly the association between health risk behaviors and poor physical health. The need of evaluating the existence of both physical and psychosocial health is even more essential, when considering that worse HRQL has been associated with higher mortality and greater use of healthcare services (Connelly et al. 1989; Siu et al. 1993).

The primary objective of the current study was to evaluate the association between the presence of four basic protective health behaviors, such as following the Mediterranean diet, exercising, no smoking and moderate alcohol drinking and higher HRQL scores, assessed by the SF-36 instrument, in a representative sample of hospital employees. Furthermore, the current study aimed at reporting the distribution of these behaviors by gender and occupational group.

Measures and methods

Sampling and Procedure

The survey took place in 2000, in seven hospitals (both public and private) within the wider region of Athens. These seven hospitals were the first members of the Hellenic Network of Health Promotion Hospitals (HNHPH). From the sampling population of 7155 persons working at the seven hospitals, a two-stage proportional stratification was explored; the first stage was based on a workplace criterion (stratification according to the hospital each one employee was working) while the second stage was based on a professional criterion (stratification according to the occupational group each one employee belonged to) (Cochran 1977; Hajek 1981). The study sample was drawn – using alphabetical lists – proportionately to the number of employees in each hospital and professional category (stepwise technique). The final stratified random sample consisted of 395 employees who constitute about 5 % of the experimental population. In each hospital the questionnaires were distributed to the participants and then collected by the hospital representative of the HNHPH. Participants were assigned to the following professional categories: administrative, auxiliary and technical personnel, medical doctors and nurses. The technical category included all technical personnel (mostly engineers but not blue collar workers), while the auxiliary category included all manual hospital workers.

Assessment of Health Related Quality of Life

HRQL was assessed with the use of a self-administered questionnaire, the SF-36 (Greek standard version 1.0). The SF-36 is a generic measure of health status, which is not age or disease specific and assesses eight domains: physical functioning (PF); role physical (RP); bodily pain (BP); general health perception (GH); vitality (VT); social functioning (SF); role emotional (RE); and mental health (MH). Scores of physical component summary (PCS-36), mental component summary (MCS-36) and the eight domains were calculated from raw data, according to SF-36 manual. The domain scores were scale data of 0–100 and the summaries were deviation scores of mean 50. Missing values were treated according to procedures suggested in the SF-36 manual (Ware et al. 2000).

Anthropometrical Assessment

Self reported measures of weight (kg) and height (m) were obtained by the questionnaire. Body mass index (BMI) was calculated as weight/(height)^2.

Dietary assessment

Consumption of 15 food groups was measured as an average per week using a semi-quantitative questionnaire (Katsouyanni et al. 1997). The average monthly consumption of food items was recorded. The dietary pattern describing the adherence to the Mediterranean diet (20) consists of: 1) daily consumption of non refined cereals and products (8 servings per day), vegetables (6 servings per day), fruits (3 servings per day), olive oil (as the main added lipid), low fat dairy products (2 servings per day), 2) weekly consumption of potatoes (3 servings per week), fish (5–6 servings per week), olives, beans and nuts (3–4 servings per week), poultry (4 servings per week), eggs and sweets (3 servings per week) and 3) monthly consumption of red meat and meat products (4 servings per month). Following the Mediterranean tradition, wine can be enjoyed in moderation (1–2 wine glasses per day) primarily with meals, while consumption of large quantities of water and regular physical activity are recommended. In order to assess the adherence to the Mediterranean diet, we used a score scale from zero to five. A score zero was assigned for rare or no consumption of food items close to this dietary pattern, one for one to four servings per month, two for five to eight servings per month, three for nine to twelve servings per month, four for thirteen to eighteen servings per month and five for almost daily consumption. For food items not included in this dietary pattern, we used a reversed score scale, from five to zero (i.e. five for rare or no consumption of red meat). Higher values of the total dietary score indicates adherence to the Mediterranean diet.

Lifestyle factors and health status

Information on lifestyle factors and health status were collected through a questionnaire. Questions were asked about smoking habits, alcohol consumption patterns and physical activity. Respondents were also asked whether they suffered

Int J Public Health 52 (2007) 341–347

from diabetes, hypertension, hypercholesterolaemia or other chronic diseases. Number of chronic diseases of the responders was evaluated.

The exact number of cigarettes that the responders smoked was recorded. Current smokers were defined as those who smoked at least one cigarette per day. Daily alcohol consumption was measured by ethanol intake in units (i.e. one unit equals 330 ml of beer, 150 ml of wine, 30 ml of sprits). For the evaluation of physical activity participants were asked the frequency (times per week), duration and intensity of physical activity (i.e. sports, household). A total score was obtained and for the classification of physical activity tertiles were used. The upper, medium and lowest tertile classified physical activity as high, intermediate and low respectively.

A lifestyle index ranging from 0 (poor) to 4 (good) was calculated by adding the scores obtained from four life style factors:

1) diet (diet score higher than the median (coded 1) and diet score lower than the median (coded 0));
2) physical activity (the intermediate and high tertile of physical activity (coded 1) and the low tertile (coded 0));
3) smoking (no smokers (coded 1) and current smokers (coded 0));
4) alcohol intake (intake of three or less wineglasses per day (coded 1), while intake of more than three wineglasses per day (coded 0)).

Statistical analysis

Continuous variables are expressed as mean ± standard deviation. For the comparison of means between two groups Student's t-test was used. Chi-square and Fisher's exact tests were used to explore the association of two categorical variables. The association between lifestyle index and HRQL was modeled using multiple linear regression analyses. All models were adjusted for sex, age, occupation, BMI and chronic diseases. Regressions coefficients with a 95 % confidence interval were computed from the results of the linear regression analyses. All reported p values are two-tailed. Statistical significance was set at 0.05, and analyses were conducted using STATA statistical software (version 6.0)

Results

Complete feedback data from lifestyle health behaviors and HRQL were obtained from 262 of the 395 employees initially contacted (Response rate: 66 %). The sex distribution of the under study sample was representative of the overall population of the HNHPH employees. The mean age of the study participants was 38.3 years.

Table 1 presents the main socio-demographic, anthropometrical, chronic disease and lifestyle characteristics of the study population by gender. Notable gender differences were observed with respect to subjects' occupational status, since there were significantly more male than female medical doctors (51 % vs. 21 %) and more female than male nurses (41 % vs. 18 %). Furthermore, the prevalence of overweight and obesity was almost two-fold higher in men than women (65 % vs. 34 %). Although more women than men were found to have lower physical activity levels (48 % vs. 30 %) the same difference between women vs. men was observed for higher physical activity levels, as well (22 % vs. 11 %). Finally, significantly more men than women were found to have a hi-

Table 1 Socio-demographic and lifestyle characteristics of the study participants presented by gender.

	Men (n=101)	Women (n=161)	p
	%	%	
Age (Years)			0.13[a]
20–29	9	16	
30–39	44	48	
40–49	32	28	
>50	15	8	
Professional Category			<0.001[b]
Administrative personnel	20	29	
Medical doctors	51	21	
Nurses	18	41	
Technical personnel	6	2	
Auxiliary personnel	5	7	
Body Mass Index (kgr/m^2)			<0.001[a]
<20	1	14	
20–25	34	52	
25–30	53	25	
≥30	12	9	
No of chronic diseases			0.572[a]
0	64	70	
1	28	24	
≥2	8	6	
Smoking status			0.771[a]
Never	54	57	
Less than 10 cigarettes per day	16	17	
More than 10 cigarettes per day	30	26	
Physical Activity Level			<0.001[a]
Lower	30	48	
Intermediate	59	30	
Higher	11	22	
Alcohol intake (>3 wineglasses/day)	53	30	<0.001[a]
	Mean (SD)	Mean (SD)	
Diet score	34.7(4.0)	34.1(3.8)	0.195[c]

[a] chi-square test
[b] Fisher's exact test
[c] Student's-test

gher than recommended daily alcohol intake (more than 3 wineglasses) (53 % vs. 30 %). No other significant differences were observed.

More women than men reported having at least one healthy lifestyle behavior (27 % vs. 21 %). On the other hand, more men (5 %) than women (3 %) had four unhealthy behaviors. 34 % of men and 31 % of women had two healthy lifestyle behaviors. The same proportion of men and women had three (31 %) and four (9 %) healthy lifestyle behaviors.

Table 2 displays the proportion of subjects in each professional category with lifestyle index scores ranging from 0 to 4. According to these data, in almost all professional categories, with the exception of auxiliary personnel, a greater proportion of employees reported two healthy lifestyle behaviors, ranging from 20 % for the auxiliary personnel to 36 % for nurses. Furthermore, 66 % of technical personnel employees reported having more than 2 health protective behaviors, while 47 % of auxiliary personnel reported having less than 2 health protective behaviors. Equal proportions of medical doctors were found to have more and less than 2 protective health behaviors (33 % and 34 %, respectively), while the proportions of nurses and administrative personnel that reported having more than two protective health behaviors were approximately twice the proportions of their counterparts with less than two protective health behaviors (41 % vs. 23 % and 42 % vs. 26 %, respectively).

Tables 3 and 4 summarize the coefficients derived from the linear regression analysis, indicating the association of heal-

Table 2 Distribution of protective life style behaviors by professional category.

Lifestyle Index[a]	Administrative personnel (%)	Medical doctors (%)	Nurses (%)	Technical personnel (%)	Auxiliary personnel (%)
0	7	6	0	0	0
1	19	28	23	0	47
2	32	33	36	34	20
3	31	26	34	33	20
4	11	7	7	33	13

[a] Lifestyle Index: no of protective health behaviors

Table 3 Regression coefficients – 95 % confidence intervals derived from multiple linear regression models that evaluated the association of diet physical activity, alcohol intake and smoking (lifestyle index) with dependent variables. Dimensions of health status related to physical health.

	PF	RP	BP	GH	PCS-36
	β (95 % CI)	β (95 % CI)	β (95 % CI)	β (95 % CI)	β (95 % CI)
Protective health behaviors					
0(reference)					
1	16.8(1.3, 32.3)*	15.9(–8.3, 40.1)	6.5(–10.8, 23.8)	10.1(–3.9, 24.1)	14.5(1.0, 27.9)*
2	19.6(4.5, 34.7)*	18.6(–5.1, 42.3)	8.3(–10.9, 27.5)	10.9(–3.0, 24.9)	14.9(1.7, 28.0)*
3	21.2(4.4, 37.9)*	20.3(–3.5, 44.0)	10.9(– 6.5, 28.3)	12.2(–2.0, 26.5)	17.3(4.1,30.5)*
4	25.5(10.2, 40.7)*	22.5(3.7, 41.3)*	13.6(– 4.0, 31.3)	15.1(1.2, 29.0)*	17.8(3.1, 32.4)*

*p ≤ 0.05
β = regression coefficient
CI = confidence interval
All coefficients reported are adjusted for sex, age, occupation, BMI and chronic disease.

Table 4 Regression coefficients – 95 % confidence intervals derived from multiple linear regression models that evaluated the association of diet physical activity, alcohol intake and smoking (lifestyle index) with dependent variables. Dimensions of health status related to mental health.

	VT	SF	RE	MH	MCS-36
	β (95 % CI)	β (95 % CI)	β (95 % CI)	β (95 % CI)	β (95 % CI)
Protective health behaviors					
0(reference)					
1	16.4(1.9, 30.9)*	16.8(–1.2, 34.9)	24.1(–2.4, 50.7)	21.6(7.5, 35.7)*	18.8(15.2, 32.5)*
2	19.0(4.8, 33.2)*	22.2(3.7, 40.6)*	28.2(2.2, 54.2)*	21.8(7.4, 36.1)*	19.9(6.5, 33.3)*
3	19.3(5.0, 33.6)*	23.9(3.9, 43.9)*	30.2(4.2, 56.3)*	22.1(8.0, 36.1)*	21.6(8.2, 35.1)*
4	22.7(7.0, 38.5)*	26.5(8.4, 44.6)*	37.5(8.4, 66.7)*	28.2(12.7, 43.8)*	25.8(11.0, 40.6)*

*p ≤ 0.05
β = regression coefficient
CI = confidence interval
All coefficients reported are adjusted for sex, age, occupation, BMI and chronic disease.

Int J Public Health 52 (2007) 341–347

thy index with SF-36. According to the data presented in Table 3 mean score on PF and PCS-36 scales increases as the lifestyle index increases from 0 (reference category) to 4. The regression coefficients were ranging from 16.8 to 25.5 for PF and from 14.5 to 17.8 for PCS-36. Furthermore subjects with four protective factors had 22.5 and 15.1 greater mean score on RP and GH scales respectively, compare to those with none protective factor. According to the data presented in Table 4 the presence of more than two protective health behaviors significantly increased the score on the SF and RE scales with regressions coefficients ranging from 22.2 to 26.5 and from 28.2 to 37.5, respectively. The same applied for VT, MH and MSC-36 scales, since the aforementioned coefficients were ranging from 16.4 to 22.7, from 21.6 to 28.2 and from 18.8 to 25.8, respectively, in the presence of more than one protective health behavior.

Discussion

Over the last decades considerable interest has been expressed in the association between certain lifestyle parameters (i.e. diet, physical activity, smoking, alcohol intake) and physical health status. However, much less emphasis has been placed on the association between lifestyle and HRQL. Baring this in mind the current study represents the first attempt in Greece to evaluate the association between the presence of several protective health behaviors and HRQL among healthy hospital employees. Furthermore, the current work aimed at evaluating any possible differences in the presence of certain health behaviors between genders and among professional categories.

According to these data the prevalence of overweight and obesity was found to be higher for men compared to women. These gender differences are consistent with similar findings reported by other studies conducted in Greece and other developed countries (Zhang & Wang 2004; Manios et al. 2005). It seems that in developed societies women hold a more negative attitude towards obesity than men and they are more heavily influenced by the public negative view towards obesity. Therefore, women are more likely to invest time, effort and money resources to pursue a thinner ideal body weight than men, thus helping explain the gender differences in the prevalence of obesity. Up to a certain extent these suggestions could provide an explanation for the greater proportion of women with higher physical activity levels than men (22 % vs. 11 %). However they cannot support the opposite finding of the current study with respect to the higher proportion of women with lower physical activity levels compared to men (48 % vs. 30 %). In most industrialized societies leisure time left for working-women to engage in any kind of physical activity is often very limited, especially when employment is also combined with motherhood and housekeeping (Blackburn et al. 2002; Schor, 2003). Finally, higher alcohol intake by men than women is a common finding by several other studies (Kraus et al. 2000; White et al. 2001) and reflects the independent relationship between male gender and alcohol use, abuse and dependence (Wilsnack & Wilsnack 1997). However the considerably high rate of alcohol intake reported for female subjects cannot be overlooked, probably indicating a narrowing of the gender gap with respect to drinking behavior (Nelson et al. 1998).

Another interesting finding of the current study was the different distribution in the presence of protective health behaviors among the different professional categories (Table 2). More specifically, most of the technical personnel examined (66 %) reported more than two protective health behaviors, followed by the administrative personnel (42 %) and nurses (41 %). On the contrary, most of the auxiliary personnel (47 %) and medical doctors (34 %) reported less than two favourable health behaviours. These diversities could stem from differences in the working environment, as well as to cultural, hierarchical and socioeconomic inequalities among hospital employees (Chyun et al. 2003). Most often, working conditions for technical and administrative staff are less stressful and demanding compared to medical staff, thus leaving them space and time for healthier lifestyle choices (i.e regular home meals, workout etc). On the other hand medical doctors do not often practice what they preach, thus failing to follow preventive health guidelines for protecting their own physical health (Kay et al. 2004). Finally, the poorer lifestyle index score observed for most of the auxiliary personnel could be supported by the impact of social gradient within the workplace and occupational hierarchy on health and well-being (Marmot & Feeney 1996), since this particular professional group mainly consists of unskilled manual workers of low social and professional status.

The scores for all eight domains of SF-36 by sex, age, professional category and workplace have been reported in a previous publication (Tountas et al. 2003). According to these data most participants scored towards the positive end of almost all SF-36 scales, a finding indicative of the better state of health for the majority of the study participants. Furthermore and according to these previous findings (Tountas et al. 2003), one can suggest the presence of a positive association between the SF-36 scores and the presence of favourable health behaviours, particularly in the employees of certain professional categories (i.e. technical and auxiliary personnel). In order to investigate more thoroughly the existence of such an association for the overall study population a linear regression

analysis was conducted, after adjusting for several potential covariates (i.e. sex, age, occupation, BMI, chronic disease). The analysis revealed an increased score on almost all SF-36 domains in the accumulation of protective heath behaviors. Therefore, these results indicate that the protective role of certain health behaviors extends beyond physical health to HRQL.

These observations are partly consistent with those reported by recent studies conducted among populations of different ethnic background, socioeconomic and health status (Avis et al. 2003; Stewart et al. 2003; Wyshak 2003; Cassidy et al. 2004; Demark-Wahnefried et al. 2004; Kimura et al. 2004). After using SF-36 to assess HRQL most of these studies have reported significant associations between HRQL and certain lifestyle factors. Among these not smoking, exercising, eating breakfast, consuming adequate amounts of fruits and vegetables, as well as low dietary fat and prudent alcohol intake were positively related with almost all profiles of the SF-36 instrument, thus indicating better HRQL.

Certain limitations of this study should be taken into account when interpreting its findings. Firstly because of the cross-sectional design of the current study, causality cannot be inferred. Nonetheless the current findings do demonstrate a strong association between protective health behaviours and HRQL, which should not be neglected by public health authorities when designing interventions to improve quality of life. Finally, most of the analyses were based on self-reported data and therefore they could be influenced by reporting biases (Newell et al. 1999).

In conclusion the current study suggests that a healthy lifestyle, besides producing physical health benefits, may also be associated with the increased likelihood of a better mental quality of life among Greek hospital employees. Lifestyle factors should be considered as potential targets for future interventions designed to improve quality of life not only in high-risk population groups (i.e patients, older people), but also in healthy individuals.

References

Avis NE, Ory M, Matthews KA, Schocken M, Bromberger J, Colvin A (2003). Health-related quality of life in a multiethnic sample of middle-aged women: Study of Women's Health Across the Nation (SWAN). Med Care *41:* 1262–76.

Blackburn RM, Browne J, Brooks B, Jarman J (2002). Explaining gender segregation. Br J Sociol *53:* 513–36.

Cochran WG (1977). Sampling Techniques. 3rd edition. New York & London: Wiley.

Cassidy K, Kotynia-English R, Acres J, Flicker L, Lautenschlager NT, Almeida OP (2004). Association between lifestyle factors and mental health measures among community-dwelling older women. Aust N Z J Psychiatry *38:* 940–7.

Chang L (2004). Review article: epidemiology and quality of life in functional gastrointestinal disorders. Aliment Pharmacol Ther *20(Suppl 7):* 31–39.

Chyun DA, Amend AM, Newlin K, Langerman S, Melkus GD (2003). Coronary heart disease prevention and lifestyle interventions: cultural influences. J Cardiovasc Nurs *18:* 302–318.

Connelly JE, Philbrick JT, Smith GR, Jr., Kaiser DL, Wymer A (1989). Health perceptions of primary care patients and the influence on health care utilization. Med Care *27:* S99–109.

Demark-Wahnefried W, Clipp EC, Morey MC et al. (2004). Physical function and associations with diet and exercise: Results of a cross-sectional survey among elders with breast or prostate cancer. Int J Behav Nutr Phys Act *1:* 16.

Hàjek J (1981). Sampling from a finite population. New York: M Dekker.

Kafatos A, Papoutsakis G (1998). Mortality rates in Greece and their relationship to the Mediterranean diet and ti health and nutrition education. Iatriki *73:* 287–301.

Katsouyanni K, Rimm EB, Gnardellis C, Trichopoulos D, Polychronopoulos E, Trichopoulou A (1997). Reproducibility and relative validity of an extensive semi-quantitative food frequency questionnaire using dietary records and biochemical markers among Greek schoolteachers. Int J Epidemiol *26(Suppl 1):* S118–127.

Kay MP, Mitchell GK, Del Mar CB (2004). Doctors do not adequately look after their own physical health. Med J Aust *181:* 368–370.

Kern J, Ivanovic D, Sogoric S, Vuletic S (2004). What was the lifestyle of people who died by cardiovascular diseases? Med Arh *58(6):*351–3.

Kimura T, Ogushi Y, Takahashi M, Munakata Y, Ishii S (2004). Association of health-related quality of life with health examination including organic functions and lifestyles in Japanese employees. Qual Life Res *13:* 519–529.

Kododimopoulos N, Fraguli D, Papa E, Niakas D (2004). Statistical tests of the validity of the Greek SF-36. Archives of Hellenic Medicine *21(5):* 541–462.

Kraus L, Bloomfield K, Augustin R, Reese A (2000). Prevalence of alcohol use and the association between onset of use and alcohol-related problems in a general population sample in Germany. Addiction *95:* 1389–1401.

Manios Y, Panagiotakos DB, Pitsavos C, Polychronopoulos E, Stefanadis C (2005). Implication of socio-economic status on the prevalence of overweight and obesity in Greek adults: the ATTICA study. Health Policy *74:* 224–232.

Marmot M, Feeney A (1996). Work and health: implications for individuals and society. In: Blane D, Brunner E, Wilkinson R, (eds.). Health and Social Organisation: towards a health policy for the twenty-first century. London: Routledge.

Nelson CB, Heath AC, Kessler RC (1998). Temporal progression of alcohol dependence symptoms in the U.S. household population: results from the National Comorbidity Survey. J Consult Clin Psychol 66: 474–483.

Newell SA, Girgis A, Sanson-Fisher RW, Savolainen NJ (1999). The accuracy of self-reported health behaviors and risk factors relating to cancer and cardiovascular disease in the general population: a critical review. Am J Prev Med *17:* 211–229.

Pitsavos C, Panagiotakos DB, Chrysohoou C, Stefanadis C (2003). Epidemiology of cardiovascular risk factors in Greece: aims, design and baseline characteristics of the ATTICA study. BMC Public Health *3:* 32.

Ries AL, Kaplan RM, Limberg TM, Prewitt LM (1995). Effects of pulmonary rehabilitation on physiologic and psychosocial outcomes in patients with chronic obstructive pulmonary disease. Ann Intern Med *122:* 823–832.

Schor EL (2003). Family pediatrics: report of the Task Force on the Family. Pediatrics *111:* 1541–1571.

Siu AL, Reuben DB, Ouslander JG, Osterweil D (1993). Using multidimensional health measures in older persons to identify risk of hospitalization and skilled nursing placement. Qual Life Res *2:* 253–261.

Sofi F, Vecchio S, Giuliani G et al. (2005). Dietary habits, lifestyle and cardivuscular risk factors in a clinically healthy Italian population: the 'Florence' diet is not Mediterranean. Eur J Clin Nutr *59(5):* 784–91.

Stewart KJ, Turner KL, Bacher AC et al. (2003). Are fitness, activity, and fatness associated with health-related quality of life and mood in older persons? J Cardiopulm Rehabil *23:* 115–121.

Panagiotakos DB, Pitsavos C, Stefanadis C (2006). Dietary patterns: a Mediterranean diet score and its relation to clinical and biological markers of cardiovascular disease risk. Nutr Metab Cardiovasc Dis *16(8):* 559–68.

Tountas Y, Demakakos PT, Yfantopoulos Y, Aga J, Houliara L, Pavi E (2003). The health related quality of life of the employees in the Greek hospitals: assessing how healthy are the health workers. Health Qual Life Outcomes *1:* 61.

Wandell PE (2005). Quality of life of patients with diabetes mellitus. An overview of research in primary health care in the Nordic countries. Scand J Prim Health Care *23:* 68–74.

Ware J, Snow K, Kosinski M, Gandek B (2000). SF-36 Health Survey. Manual and Interpretation Guide. Lincoln, Rhode Island & Boston, Massachusetts: Quality Metric & the Health Assessment Lab.

White M, Harland JO, Bhopal RS, Unwin N, Alberti KG (2001). Smoking and alcohol consumption in a UK Chinese population. Public Health *115:* 62–69.

Wilsnack RW, Wilsnack SC (1997). Gender and alcohol : individual and social perspectives. New Brunswick, N.J.: Rutgers Center of Alcohol Studies, Publications Division.

Wyshak G (2003). Health ratings in relation to illnesses, physical functioning, general mental health and well-being: self-reports of college alumnae, ages <40-80 and older. Qual Life Res *12:* 667–674.

Zhang Q, Wang Y (2004). Socioeconomic inequality of obesity in the United States: do gender, age, and ethnicity matter? Soc Sci Med *58:* 1171–1180.

Address for correspondence

Yannis Tountas
Center for Health Services Research
Medical School, University of Athens
25 Alexandroupoleos str,
115 27 Athens -Greece
Tel.: +30 210 7482015
Fax.: +30 210 7485872
e-mail: chsr@med.uoa.gr