Health and Quality of Life Outcomes

Research

The health related quality of life of the employees in the Greek hospitals: assessing how healthy are the health workers

Yannis Tountas*[1], Panayotes TH Demakakos[2], Yannis Yfantopoulos[2], Jenny Aga[2], Lambrini Houliara[2] and Elpida Pavi[2]

Address: [1]Center for Health Services Research, Department of Hygiene and Epidemiology, Medical School, University of Athens, Athens, Greece and [2]Institute of Social and Preventive Medicine, Athens, Greece

Email: Yannis Tountas* - chsr@med.uoa.gr; Panayotes TH Demakakos - pandim@mailbox.gr; Yannis Yfantopoulos - chsr@med.uoa.gr; Jenny Aga - chsr@med.uoa.gr; Lambrini Houliara - chsr@med.uoa.gr; Elpida Pavi - chsr@med.uoa.gr

* Corresponding author

Published: 27 October 2003

Health and Quality of Life Outcomes 2003, **1**:61

Received: 08 May 2003
Accepted: 27 October 2003

This article is available from: http://www.hqlo.com/content/1/1/61

Abstract

Background: The main aim of the study was to assess the health status and health related quality of life of the personnel of the Hellenic Network of Health Promotion Hospitals. The instrument used was SF-36. An additional aim was to contribute to the validation of the SF-36.

Methods: The study instrument was administered to 347 randomly selected employees from seven hospitals within major Athens area. Completed questionnaire were obtained by 292 employees. The statistical significance of the observed differences was tested with parametric (t-test and ANOVA) and non-parametric tests (Mann-Whitney and Kruskall-Wallis). Also, since the Greek national norms have not been published yet, the mean scores on all eight SF-36 dimensions of this study were compared with the U.S and several European national norms just to assess the extent to what there are significant differences between a Greek healthy population and the general populations of several other countries.

Results: Medical doctors and technical personnel (mostly engineers) reported better health status than nurses and administrative and auxiliary personnel; women reported poorer health status than men on all eight SF-36 dimensions; younger employees reported poorer health status than their older counterpartners. Moreover the mean scores on all SF-36 dimensions reported by the participants on this study were considerably lower than the U.S and many European national norms. Also the study results constitute an indication of the SF-36 construct validity.

Conclusion: The findings of this study show that there are major and intense health inequalities among the employees in Greek hospitals.

Background

In Greece, as elsewhere, both the scientific community and policy makers are interested in measuring the health status and health related quality of life of the population. The instruments used for this purpose are mostly health measures developed in other countries which have been

translated into Greek and applied into the Greek context. The majority of the health related quality of life studies with Greek samples is orientated towards measuring the impact of diseases on patients' quality of life using either disease specific or generic instruments [1–8]. Few studies have attempted to assess the health related quality of life of healthy individuals [9–12].

The SF-36 is a generic instrument which has been used to measure, assess and evaluate the quality of life of different Greek populations [1–3]. This study used Short Form 36 (SF-36) to assess the health of the personnel of hospitals members of the Network of Health Promoting Hospitals. The Network of Health Promoting Hospitals is a WHO initiative [13] and in Greece, the Hellenic Network of Health Promoting Hospitals (HNHPH) was established in 1998.

Table 1: The sociodemographic characteristics of the sample

Characteristics	*n*	%
Sex		
Male	107	36.6
Female	170	58.2
Missing values	15	5.1
Age		
20–29	40	13.7
30–39	130	44.5
40–49	81	27.7
50–59	27	9.2
>60	3	1
Missing values	11	3.8
Occupation		
Administrative personnel	76	26
Medical Doctors	85	29.1
Nurses	83	28.4
Technical personnel	15	5.1
Auxiliary personnel	22	7.5
Missing values	11	3.8
Workplace (Hospital)		
I #	26	8.9
II+	38	13
III**	26	8.9
IV++	15	5.1
V+	107	36.6
VI+	45	15.4
VII++	25	8.6
Missing values	10	3.4

University hospital + National Health System hospital ** Institution of Social Security hospital ++ Private hospitals

The Greek version of SF-36 took its final form after two forward and backward translations and a pilot study conducted to assess its semantics and linguistic adaptation. The feasibility of the Greek SF-36 was evaluated by assessing the response rates of each question both in the initial pilot study and the then conducted main study [3]. The convergent validity and discriminant validity of the instrument were assessed by the multitrait-multimethod matrix. Items and scales like physical functioning (PF) and general health (GH) correlated and converge with all five dimensions (Mobility, Self Care, Usual Activities, Pain/Discomfort, Anxiety/Depression) of the EQ-5D instrument and mental health (MH) scale with its Anxiety/Depression dimension. Discrimination power was also found between dissimilar dimensions of the SF-36 and the EQ-5D. Therefore SF-36 considered being an acceptable and sensitive instrument for measuring health-related quality in Greece.

The main purpose of the present study was to assess the health status and health related quality of life of the personnel of the Hellenic Network of Health Promotion Hospitals. Additionally it aims to contribute to the validation of the SF-36 by contributing to the accumulation of different types of evidence showing that the instrument measures what is supposed and intended to measure [14].

Methods

Sample

In the present study SF-36 was administered to a representative sample of the personnel of seven hospitals (both public and private). These seven hospitals were the first members of the Hellenic Network of Health Promotion Hospitals (HNHPH) in the major area of Athens. The survey took place in 1999–2000. From a sampling population of 7,155 persons working at the seven hospitals, a two-stage proportional stratification was explored; the first stage was based on a workplace criterion (stratification according the hospital each one employee was working) while the second stage was based on a professional criterion (stratification according the occupational group each one employee belonged to) [15,16]. 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. The questionnaire was self-administered and the participants were adults of working age of both sexes. In each hospital the questionnaires were distributed to the participants and then collected by the hospital representative to the Hellenic Network of Health Promotion Hospitals. Then all the completed questionnaires were forwarded by each hospital representative to the researchers. All participants were assigned to the following professional categories:

Table 2: Descriptive statistics and features of scores distribution for SF-36

	Physical Functioning	Role Physical	Bodily Pain	General Health	Vitality	Social Functioning	Role Emotional	Mental Health
Items	10	4	2	5	4	2	3	5
Levels	33	7	22	37	20	9	4	27
Mean	84.2	75.7	74.4	69	63.5	69.5	74.1	66.6
95% CI	86.7–81.4	79.7–71.7	77.3–71.5	71.2–66.7	65.7–61.3	72.3–66.7	78.4–69.8	68.8–64.4
SD	20.2	34.5	24.9	18.9	18.7	24.3	36	19.1
Median	90	100	80	72	65	75	100	68
Range	0–100	0–100	0–100	0–100	0–100	0–100	0–100	0–100
% Floor*	0.4	10	1	0.4	0.7	0.7	12.4	0.7
% Ceiling*	30.4	58.9	33.3	2.6	3.5	21.6	59.5	3.1

*Percentage of participants with worst and best possible score, respectively

administrative, auxiliary and technical, medical doctors and nurses. The technical category included all technical personnel (mostly engineers but not blue collar workers) and the auxiliary occupational category included all the manual hospital workers. Different kind of hospitals participated in this study including a University hospital (I), three hospitals belonging to the National Health System of Greece (II, V and VI), two private hospitals (one profit and another non-profit)(IV and VII) and one belonging to the National Foundation of Social Insurance (III). All seven hospitals included in the present study are located within greater Athens area.

Instrument

The study questionnaire contained – among others instruments – SF-36. The SF-36 was administered first and prior to other instruments. The other instruments administered along with SF-36 referred to health behaviours (e.g. smoking and nutritional habits) and the interaction between work and health. All SF-36 items were coded, summed and transformed on a scale from 0 (worst possible health state) to 100 (best possible health state). This study used the first (initial) version of SF-36. The researchers were aware of the existence of a second (newer) version of the SF-36 [17]. but since, at the time the survey took place, this was still developing and has not been tested in Greece and translated into Greek, it was decided to use the first version of the instrument. The missing values were substituted according to the method the SF-36 developers have suggested in order to gain scores for missing values [18].

Statistical Analysis

The descriptive statistics for all eight scales of SF-36 analyzed by sex, age, profession and workplace (hospital) are provided. An important issue was, also, to assess the construct validity of the Greek version of SF-36; to assess the extent to which the questionnaire supported pre-defined hypotheses and working assumptions. This was done by determining the extent to which scores variations on different dimensions of the questionnaire reflected the expected distribution of health status for the study population. In other words construct validity was assessed by examining the ability of the Greek version of SF-36 to detect expected health differences and variations between the various subgroups of the study population. The expected health differences are: a) men to report higher scores (better health status) than women (according to WHO [19] the expectation of lost healthy years at birth due to poor health for women in Greece was 2.4 years more than the equivalent for men and the percentage of total life expectancy lost due to poor health was 2.4% more for women than it was for men) b) higher professional status employees to have higher scores (better health status) than their lower professional status colleagues, see for example [12,20,21] and c) older participants to report poorer physical health status than the young participants [14,22,23]. Regarding the significance of the observed differences between the various subgroups of the sample both parametric (t-test and ANOVA) and non-parametric (Mann-Whitney and Kruskall-Wallis) tests were performed. The 95% Confidence Intervals for scores of all eight dimensions of SF-36 were calculated in order to assess the statistical precision of the estimates. The level of significance was set at $p = 0.05$ and the Bonferroni correction was used to control for the effect of multiple testing.

Results

Completed questionnaires were obtained from 292 of 395 employees, initially, contacted. The response rate was 74%. The sex distribution of our sample was representative of the population under study. The grouped age mean was 38.29 years old. The age distribution of our sample seems to be consistent with that of the personnel of

Table 3: The means and standard deviations on all SF-36 dimensions broken down by sex, age, occupation and workplace

Characteristics	Physical Functioning	Role Physical	Bodily Pain	General Health	Vitality	Social Functioning	Role Emotional	Mental Health
Sex								
Male	***89.7 (17.7)***	***84.7 (30.5)***	***83.5 (20.8)***	***73.6 (18.8)***	***68 (18.7)***	***75.3 (23.7)***	***80.1 (33.3)***	***70 (19.2)***
Female	***81.3 (20.5)***	***70 (35.5)***	***68 (25.5)***	***66.2 (18.7)***	***61 (18.2)***	***65.8 (24)***	***70 (37.4)***	***64.2 (18.7)***
Age								
20–29	85.3 (18.5)	76.3 (30.7)	71.7 (24)	67.5 (19.3)	62.7 (19.9)	***65.3 (26.5)***	***73 (38.4)***	***62.7 (20.8)***
30–39	85 (19.6)	70.1 (37.4)	72.7 (25)	69 (18.7)	61.3 (18.4)	***66.8 (23)***	***69.3 (36.7)***	***65 (18)***
40–49	85 (18.7)	82.1 (30)	76.9 (23)	71.3 (18.8)	65.5 (18.3)	***73.6 (24.7)***	***76 (36.6)***	***67.4 (20.3)***
>50	78.4 (25.3)	83.3 (31)	77.1 (29.3)	67 (20.4)	70.8 (17.3)	***75.8 (23.4)***	***92.2 (20.9)***	***75.8 (15.2)***
Occupation								
Administrative personnel	***84.4 (20.6)***	***80.6 (31.2)***	***78.2 (23.1)***	***70.3 (18)***	***65.8 (19.1)***	***71.4 (24)***	73.7 (39.8)	65.8 (20.8)
Medical Doctors	***91.5 (12.8)***	***82.2 (32.2)***	***84.9 (16.5)***	***74 (17.7)***	***65.5 (20)***	***75.6 (22.9)***	76.8 (34.6)	70.3 (18.3)
Nurses	***81.6 (20.1)***	***69.5 (35.6)***	***64.1 (27.1)***	***65 (17.8)***	***60.7 (16.5)***	***62.8 (23.3)***	74.1 (34.6)	63.3 (18.1)
Technical personnel	***85.6 (20.6)***	***83.9 (31.9)***	***78.4 (26.5)***	***71.1 (19.7)***	***74.3 (15)***	***73.3 (27.1)***	82 (32.2)	74.1 (16.7)
Auxiliary personnel	***67.9 (27.3)***	***57.5 (35.4)***	***56.4 (25.2)***	***60.3 (22.8)***	***56.1 (18.9)***	***63.6 (26.7)***	63.3 (35.7)	64.2 (20)
Hospital								
I #	75.8 (27.5)	77.9 (31.1)	67.9 (26.8)	70.1 (15.6)	66.9 (19)	70.7 (27.1)	76.9 (29.5)	72.8 (15.7)
II+	82.6 (17.4)	69 (38.8)	70.9 (25)	64.4 (18)	61.3 (13.3)	67.1 (22.6)	63 (40.7)	60 (17.8)
III**	91.1 (9.3)	81.7 (28.8)	77.2 (22)	72 (19)	65.2 (20.7)	72.1 (24)	76.9 (36.2)	66.4 (22.5)
IV++	92.1 (9.8)	92.9 (19.2)	85 (18.5)	71.6 (18.5)	63.7 (20.6)	65.8 (28.9)	80.6 (38.8)	64.4 (21.7)
V+	81 (23.2)	71.9 (35.5)	74.3 (25.6)	65.9 (19.6)	62.1 (19.6)	70.2 (24)	75.5 (34.8)	67.6 (19.8)
VI+	89 (13.5)	78.3 (33.5)	72.6 (24)	74.5 (18.3)	65.1 (18.2)	64.7 (23.6)	69.8 (40.2)	65.1 (18.1)
VII++	91.8 (14.2)	82 (34.2)	80.2 (25.9)	74 (18.3)	68.4 (19.9)	78.5 (22.7)	85.3 (29)	70.6 (17.1)

Bold & italics characters indicate statistical significant scoring differences between the subgroups of the population (after controlling for multiple testing with Bonferroni correction). # University hospital + National Health System hospital ** Institution of Social Security hospital ++ Private hospitals

HNHPH. The majority of the population was from 30 to 49 years old (72.2) and employees of public hospitals belonging to the National Health Service (NHS) of Greece (65.1%). The breakdown of the sample by gender, age, occupation and workplace (hospitals) is shown in table 1.

The scores for the eight dimensions of SF-36 were calculated using algorithms and following the SF-36 developers' instructions [18]. The scores and descriptive statistics for all eight dimensions are reported in table 2. The full range of 0–100 was observed for all scales. As expected the three scales measuring well-being (General Health, Vitality and Mental Health) have lower mean scale scores and the scales measuring health-related limitation apart from the Social Functioning scale (namely Physical Functioning, Role Physical, Bodily Pain and Role Emotional) had higher mean scale scores [24]. The mean scale score for Social Functioning was unexpectedly low and the possible reasons for this inconsistency are discussed further on. Moreover, the median exceeded the mean in all scales. This was expected since our sample consisted of relatively healthy individuals [25]. The distributions were markedly negatively skewed with the participants scoring mostly towards the positive end of the scales. This is, generally, indicative of a better state of health for the majority of our sample. The most negatively skewed scales were Physical Functioning, Role Physical, Bodily Pain and Role Emotional. The least negatively skewed were General Health, Mental Health and Vitality. All scales had 7 or more levels apart from the Role Emotional and Role Physical scales, which had 4 and 5 levels, respectively. Especially as expected [26] Physical Functioning, General Health, Vitality and Mental Health have 20 or more levels. This existence of 7 or more levels for the 6 scales gave reason for treating them as continuous variables [27]. In a healthy population the number of participants scoring the lowest possible level (0) (floor effect) are expected to be very low while that of participants scoring the highest possible

level (100) (ceiling effect) for the functional limitations scales are expected to be high. These expectations were confirmed for all scales in this study. The Role Emotional and Role Physical scales had the most profound floor and ceiling effects. On the Role Emotional 163 participants scored 100 (59.5%) and 34 scored 0 (12.4%). While on the Role Physical the equivalent were 165 participants (58.9) (ceiling effect) and 28 (10%) (floor effect).

Table 3 provides data in the form of descriptive statistics broken down by sex, age, occupational status and hospitals. Also it provides information regarding the statistical significance of the observed differences among the various subgroups of the study population on all SF-36 scales after controlling for the effect of multiple testing with Bonferroni correction. Using both parametric (t-test and ANOVA) and non-parametric (Mann-Whitney and Kruskall-Wallis) tests it was found that all the sex differences, most of the occupation-related differences (apart from these observed on the Role Emotional and the Mental Health scales) and some of the age differences (those observed on the Social Functioning, Role Emotional and Mental Health scales) were statistically significant ($p<0.05$).

Regarding sex differences women reported poorer health status than men on all eight scales of the SF-36. With respect to age, older participants (>50 years old) reported, generally, better health than their younger counter partners. Important scoring differences were found on all scales of SF-36 among the various professional categories. Medical doctors and technical personnel (mostly engineers) reported far better health status than nurses and the auxiliary personnel. The health status of the administrative personnel was of an intermediate level between that of nurses and auxiliary personnel and that of medical doctors and technical personnel.

Some differences were found regarding the impact of the hospital where the participants work (workplace) on their health status but none of them was statistically significant ($p > 0.05$).

Regarding the validation of the instrument our results suggest that it has construct validity since it detects and shows health differences expected to exist between various subgroups of our sample (the health differences between men and women and high and low occupational status employees). The only discrepancy between the expected and observed health differences appears between the age groups. The older participants reported the best scores on some physical health dimensions (e.g. Role Physical and Bodily Pain) and the younger participants reported the worst while the opposite was expected. These non-consistent and unexpected differences are discussed further on.

Discussion

This study constitutes the first attempt to assess the health status and health-related quality of life of such a healthy working population in Greece and is one of the first applications of SF-36 to a healthy population in Greece. SF-36 has been applied only once before to a healthy population in Greece (3)

The data of the present study reveal two major issues. The first issue is the health inequalities existing among employees of Greek hospitals of the Hellenic Network of Health Promoting Hospitals. The second is the considerable differences between the scores of a healthy Greek population reported in this study and those (national norms) reported in studies from Northern America and Western Europe [18,22,23,25]. With respect to that second issue, a comparison between the results of the present study and those of other similar studies assessing the health related quality of life of health professionals (after adjusting for age) would has been more valid and methodologically sounder. Unfortunately the existing literature on health-related quality of life of the health professionals is not rich. Most studies found assessing the health status of health professionals have used other generic health instruments (mostly General Health Questionnaire – GHQ) and therefore a direct comparison between their findings and the results of the present study could not be made. Only one study [28] has been identified reporting scores on SF-36 scales for a sample of registered nurses in New Zealand. The mean scores on six SF-36 scales reported in that study are much higher (difference greater than five points) than these reported by Greek nurses in the present study. The only exceptions were the Vitality and Role Emotional scales where the Greek hospital nurses reported higher scores than their counterparts – with only the difference on Vitality scale to be greater than five points.

The first major issue this study reveals is that of the notable health inequalities among the employees in Greek hospitals. Our results show that the employees included in this study are far from constituting a homogenous group of employees with similar health status and health related quality of life. The greatest inequalities observed were those referring to and reflecting differences in professional status, sex and age among the various subgroups of the study sample.

Specifically, the sex differences in the health status of the participants show similar patterns to those presented in other studies and constitute an indication of the construct validity of the Greek version of SF-36. Men scored higher than women on all 8 dimensions of SF-36 and all these differences were statistically significant ($p < 0.05$). These findings are consistent with normative data from USA and

Table 4: Comparison of the national norms of various countries with the scores of the present study

	Physical Functioning	Role Physical	Bodily Pain	General Health	Vitality	Social Functioning	Role Emotional	Mental Health
Greece*	84.2	75.7	74.4	69	63.5	69.5	74.1	66.6
Sweden	87.9	83.2	74.8	75.8	68.8	88.6	85.7	80.9
Canada	85.8	82.1	75.6	77	65.8	86.2	84	77.5
UK	88	87.2	78.8	71.1	58	82.8	85.8	71.9
USA	84.5	81.2	75.5	72.2	61.1	83.6	81.3	74.8
Italy	84.5	78.2	73.7	65.2	61.9	77.4	76.2	66.6

*the scores of present study do not represent the Greek national norms

Canada (where men scored higher than women on all 8 dimensions of SF-36). But the sex differences observed in this study are much larger than those observed elsewhere [25]. In this study the sex differences observed are greater than five points (difference considered to be clinically and socially relevant [18]) on all 8 SF-36 dimensions. These sex differences to some extent seem to reflect the disadvantageous position of woman in a predominantly male societal structure. Perhaps this is even more the case for Greece which is a Mediterranean country where women social position is traditionally worst than that of men. Nevertheless it is possible the great magnitude of these sex differences observed in this study not only to be a reflection of women's disadvantageous position in society but also a result of professional differences between men (who were mostly medical doctors) and women (who were mostly nurses and auxiliary personnel). This perhaps could also be related to the contradiction, well known both for women in Greece and in many other countries, between their higher than that of men life expectancy and (at the same time) higher morbidity rates [19].

Another interesting finding of this study is the important variability of the scores by age. The oldest group of our sample (<50 years old) reported, generally, a better health status compared to any other age group of the sample whilst the younger participants (20–29 and 30–39 years old) the worst ones. The statistical analysis showed that the only statistically significant scoring differences ($p < 0.05$) were those observed on Mental Health, Social Functioning, Role Emotional dimensions whilst those ones observed on the Vitality dimension was marginally non-significant ($p = 0.054$). Older participants reported higher scores on all mental health dimensions (Mental Health, Social Functioning, Role Emotional and Vitality) and this is consistent with findings of other studies [22] showing that older people reported better Mental Health. But unexpectedly, older participants reported, as well, the highest score on the Role Physical and Bodily Pain scales, which practically means that they had a better than their younger counterpartners state of physical health. Given that these unexpected age-related differences on physical health dimensions are not statistically significant and that the number of the older individuals participating in the study is too small (N = 27) no safe conclusion could be drawn about them and the construct validity of the instrument. These unexpected health differences could be spurious and any relevant conclusion should be considered as preliminary. Nevertheless if this is not the case, a reasonable explanation for these non-consistent physical health differences between the age groups could be that they are a result of the higher professional status of the older participants. The General Health scale although not belonging to the core of the Physical Component [26], gives a more balanced account of physical health between the various age groups. On this scale the great differences between the young workers do not exist and all the age groups have reported similar score a pattern reported, also, in other studies [22].

Interesting findings are, also, those related to the professional status of the participants. It seems that our sample could be divided according to a professional status criterion, into three clearly distinct professional groups. One group with a good state of health consisting mainly of medical doctors and technical staff (mostly engineers); a second professional group consisting of administrative personnel whose scores were satisfactory but lower than those of the first group and a third one consisted of nurses and auxiliary staff which scored lower than the other two occupational groups. The medical doctors had the highest scores on the Physical Health dimensions while the technical personnel had its highest scores on Mental Health dimensions. These two professions (constituting the healthiest professional group of the present study) have reported quite similar results with differences meaningful – greater than 5 points – only on three dimensions of SF-36 (Bodily Pain, Vitality and Role Emotional).

The administrative personnel hold constantly a position between the better offs (medical doctors and technical personnel) and the most disadvantage occupational

groups (nurses and auxiliary staff) on, almost, all the SF-36 dimensions (apart from the Vitality and Role Emotional scales). Their scores are consistent with their professional status in the working environment of the Greek hospitals – not as high as that of the medical doctors but higher and less health damaging than that of nurses and auxiliary personnel.

Nurses who are the second biggest professional group included in this study have scored low on all dimensions of SF-36. Their poor health status and health related quality of life primarily reflect the difficulties they face in their everyday life and most importantly reflects the difficulty of being a woman working a job with a low professional (and consequently social) status in a predominantly male, highly competitive environment. They work a highly stressful and demanding profession [30–32] which is not very well rewarded. A finding strengthening further this assumption about the stressfulness of the nursing profession is that nurses had the lowest scores on Social Functioning scale. In addition it should be taken into account that nurses of our sample were predominantly women and this might have an independent contribution to their higher than men morbidity rates.

The auxiliary personnel seem to have by far the worst health status and poorer health related quality of life. They have reported the lowest scores on all SF-36 dimensions apart from that of mental health where nurses scored worst. The difference of 28.5 points observed on the Bodily Pain scale between the medical doctors (84.9) a profession of high social and professional status and the auxiliary personnel (56.4) who are unskilled manual workers of low social and professional status, is the greatest one observed in the present study. These findings are consistent with recent health research arguing about the impact of social gradient within the workplace and occupational hierarchy on health and well-being of people (see for example [33]) and show that the Greek version of SF-36 should be seen as an instrument having construct validity.

Regarding the workplace no safe conclusions can be drawn on differences among the seven hospitals included in this study. Comparing workplaces requires a different study design. Nevertheless, it seems that there are not any important health differences among the workers of our sample that could be attributed to workplace differences.

The second major issue revealed is that of the observed differences between this study results and the national norms of other countries. Although the population of this study does not represent the general Greek population and its scores do not constitute the national norms of Greece a comparison between the normative data of other countries and those of this study can produce useful – preliminary though, since the sample of this study could be considerably different from the Greek national norm – conclusions regarding the differences between Greece and other countries. Especially since there are not any published normative data for Greece and there is a lack of knowledge about the health related quality of life of the general population in Greece.

The participants in this study scored considerably lower on the 8 domains of the SF-36 than their counter partners in other studies from Western Europe and North America. Table 4 shows a comparison between the Swedish, Canadian, UK, Italian and US normative data and those of the present study. The Greek scores are lower than the Canadian, UK and Swedish norms [22,23,25] almost in every scale. In comparison to the US norms [18] the Greek scores were lower in Role Physical, General Health, Social Functioning, Role Emotional and Mental Health. The Italian norms [29] are higher than those of the present study on the Physical Functioning, Physical Role, Social Functioning and Role Emotional scales and lower on the Bodily Pain, General Health and Vitality while for Mental Health scale both the Italian norms and the results of this study are the same. However the magnitude of the differences between the Italian norms and the Greek results is quite small (the only exemption is the difference observed on the Social Functioning scale – 5.1) indicating a hidden influence of (Mediterranean) culture on health outcomes as measured by SF-36.

The present study has several limitations. The most important is that the comparison between the scores of this study and various national norms is a priori problematic since it is not age-adjusted and the study sample is not necessarily representative of the Greek general population. But as already mentioned this comparison is only indicative and preliminary and is done only because the national Greek norms have not been published. Consequently any conclusion drawn from this comparison should be treated with caution. Another limitation is the de facto small number of older participants which put into question the value of the observed health differences between the age groups of the sample.

Conclusion

This study reveals the existence of considerable health inequalities among the employees in the Greek hospitals. These health inequalities underscore the need for immediate interventions to tackle them and initiatives to support women, young and low professional status workers in the Greek hospitals. Moreover the findings of this study constitute an indication of the construct validity of the Greek version of SF-36.

Authors' contributions

YT conceived of the study, coordinated both the original study and paper drafting and corrected the final draft. PD drafted the manuscript and performed some of the statistical analysis. YY participated in drafting the validity and reliability section of the manuscript and commented on the final draft. JA performed most of the statistical analysis. LH and EP participated in the study and collected the data.

References

1. Pallis AG, Vlachonikolis IG and Mouzas IA: **Quality of life of Greek patients with inflammatory bowel disease. Validation of the Greek translation of the inflammatory bowel disease questionnaire.** *Digestion* 2001, **63(4):**240-246.
2. Pallis AG, Vlachonikolis IG and Mouzas IA: **Assessing health-related quality of life in patients with inflammatory bowel disease, in Crete, Greece.** *BMC Gastroenterol* 2002, **2(1):**1.
3. Yfantopoulos J, Pierrakos G and Zanakis V: **A comparative study of the quality of life of patients with hepatitis C.** *Archives of Hellenic Medicine* 2001, **18(3):**288-296.
4. Katsarou Z, Bostantjopoulou S, Peto V, Alevriadou A and Kiosseoglou G: **Quality of life in Parkinson's disease: Greek translation and validation of the Parkinson's disease questionnaire (PDQ-39).** *Qual Life Res* 2001, **10(2):**159-63.
5. Pallis AG, Vlachonikolis IG and Mouzas IA: **Quality of life of Greek patients with inflammatory bowel disease. Validation of the Greek translation of the inflammatory bowel disease questionnaire.** *Digestion* 2001, **63(4):**240-6.
6. Stahl E, Postma DS, Juniper EF, Svensson K, Mear I and Lofdahl CG: **Health-related quality of life in asthma studies. Can we combine data from different countries?** *Pulm Pharmacol Ther* 2003, **16(1):**53-9.
7. Zissi A and Barry MM: **From Leros asylum to community-based facilities: levels of functioning and quality of life among hostel residents in Greece.** *Int J Soc Psychiatry* 1997, **43(2):**104-15.
8. Kyriaki M, Eleni T, Efi P, Ourania K, Vassilios S and Lambros V: **The EORTC core quality of life questionnaire (QLQ-C30, version 3.0) in terminally ill cancer patients under palliative care: validity and reliability in a Hellenic sample.** *Int J Cancer* **94(1):**135-9. 2001 Oct 1
9. Tsakos G, Marcenes W and Sheiham A: **Cross-cultural differences in oral impacts on daily performance between Greek and British older adults.** *Community Dent Health* 2001, **18(4):**209-13.
10. Pratsidou-Gertsi P, Vougiouka O, Tsitsami E, Ruperto N, Siamopoulou-Mavridou A, Dracou C, Daskas I, Trachana M, Alaleou V, Kanakoudi-Tsakalidou F and Paediatric Rheumatology International Trials Organisation: **The Greek version of the Childhood Health Assessment Questionnaire (CHAQ) and the Child Health Questionnaire (CHQ).** *Clin Exp Rheumatol* 2001, **19(4 Suppl 23):**S76-80.
11. Rabin R and de Charro F: **EQ-5D: a measure of health status from the EuroQol Group.** *Ann Med* 2001, **33(5):**337-43.
12. Koukouli S, Vlachonikolis IG and Philalithis A: **Socio-demographic factors and self-reported functional status: the significance of social support.** *BMC Health Serv Res* **2(1):**20. 2002 Oct 2. Epub 2002 Oct 02
13. Pelikan JM, Krajic K and Dietscher C: **The health promoting hospital (HPH): concept and development.** *Patient Educ Couns* 2001, **45(4):**239-243.
14. Sullivan M and Karlsson J: **The Swedish SF-36 Health Survey III. Evaluation of criterion-based validity: results from normative population.** *J Clin Epidemiol* 1998, **51(11):**1105-1113.
15. Hájek J: **Sampling from a finite population.** *New York: M Dekker*; 1981.
16. Cochran WG: **Sampling techniques.** 3rd edition. *New York & London: Wiley*; 1977.
17. Ware J, Kosinski M and Dewey J: **How to Score Version 2 of SF-36® Health Survey.** *Lincoln, Rhode Island: Qualitymetric* 2000.
18. Ware J, Snow K, Kosinski M and Gandek B: **SF-36 Health Survey. Manual and Interpretation Guide.** *Lincoln, Rhode Island & Boston, Massachusetts: Quality Metric & the Health Assessment Lab* 2000.
19. **Greece. Health Indicators 2001** *Geneva: World Health Organization* 2001 [http://www3.who.int/whosis/country/indicators.cfm?country=GRC&language=english]. Last accessed 27/01/03
20. Cavelaars AE, Kunst AE, Geurts JJ, Helmert U, Lundberg O, Mielck A, Matheson J, Mizrahi A, Mizrahi A, Rasmussen N, Spuhler T and Mackenbach JP: **Morbidity differences by occupational class among men in seven European countries: an application of the Erikson-Goldthorpe social class scheme.** *Int J Epidemiol* 1998, **27(2):**222-230.
21. Schrijvers CT, van de Mheen HD, Stronks K and Mackenbach JP: **Socioeconomic inequalities in health in the working population: the contribution of working conditions.** *Int J Epidemiol* 1998, **27(6):**1011-1018.
22. Hopman WM, Towheed T, Anastassiades T, Tenenhouse A, Poliquin S, Berger C, Joseph L, Brown JP, Murray TM, Adachi JD, Hanley DA and Papadimitropoulos E: **Canadian normative data for the SF-36 health survey. Canadian Multicentre Osteoporosis Study Research Group.** *CMAJ* 2000, **163(3):**265-271.
23. Jenkinson C, Stewart-Brown S, Petersen S and Paice C: **Assessment of the SF-36 version 2 in the United Kingdom.** *J Epidemiol Community Health* 1999, **53(1):**46-50.
24. Ware J and Gandek B: **Methods for testing data quality, scaling assumptions, and reliability: the IQOLA Project approach. International Quality of Life Assessment.** *J Clin Epidemiol* 1998, **51(11):**945-952.
25. Sullivan M, Karlsson J and Ware J: **The Swedish SF-36 Health Survey – I. Evaluation of data quality, scaling assumptions, reliability and construct validity across general populations in Sweden.** *Soc Sci Med* 1995, **41(10):**1349-1358.
26. Ware J: **SF-36 health survey update.** *Spine* 2000, **25(24):**3130-3139.
27. Walters SJ, Campbell MJ and Lall R: **Design and analysis of trials with quality of life as an outcome: a practical guide.** *J Biopharm Stat* 2001, **11(3):**155-176.
28. Budge C, Carryer J and Wood S: **Health correlates of autonomy, control and professional relationships in the nursing work environment.** *J Adv Nurs* **42(3):**260-268.
29. Apolone G and Mosconi P: **The Italian SF-36 Health Survey: translation, validation and norming.** *J Clin Epidemiol* 1998, **51(11):**1025-1036.
30. Estryn-Behar M, Kaminski M, Peigne E, Bonnet N, Vaichere E, Gozlan C, Azoulay S and Giorgi M: **Stress at work and mental health status among female hospital workers.** *Br J Ind Med* 1990, **47(1):**20-28.
31. Lambert VA and Lambert C: **Literature review of role stress/strain on nurses: an international perspective.** *Nurs Health Sci* 2001, **3(3):**161-172.
32. Tan C: **Occupational health problems among nurses.** *Scand J Work Environ Health* 1991, **17(4):**221-230.
33. Marmot MG and Feeney A: **Work and health: implications for individuals and society.** In *Health and Social Organisation: towards a health policy for the twenty-first century* Edited by: *Blane D, Brunner E, Wilkinson R. London: Routledge*; 1996.