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"SOCIAL AND BEHAVIOURAL DETERMINANTS OF HEALTH RELATED QUALITY OF LIFE IN AN URBAN SAMPLE OF PORTUGUESE ADULTS"

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ABSTRACT

Taking into consideration the "*demographic and* epidemiologic transition" it is crucial the development of studies and actions in order to provide to our populations, not only a longer life, but also a good quality of life (QoL).

Health related with Quality of life (HRQoL) essentially consists a subjective, perceived physical, mental and social well-being or distress and describes the ability to engage in daily functions. HRQoL is increasingly being recognized a feature of health. Today, on the discussion about public health, it is recognized more and more the importance of knowing better the biological, physical and social factors associated with an improvement of health and QoL.

The objective of this study was to evaluate the association between demographic, social and behavioural characteristics and HRQoL, in a urban population of Portuguese adults.

From a random sample of 2485 inhabitants of Porto (participation proportion 70%), aged 18 to 90 years, 1322 (59.8% women and 40.2% men) who filled the Short Form (SF-36v2) were included. They also answered a structured questionnaire comprising information on social, demographic, behavioural, and clinical aspects. Anthropometrical measures, blood pressure and fasting blood samples were obtained. Diet was assessed using a semi-quantitative food frequency questionnaire and physical activity was evaluated using a questionnaire exploring all professional, domestic and leisure time activities.

Using the 8 sub-dimensions of SF-36, 2 summary dimensions were previously defined in the same population. Physical health dimension (PHD) includes physical functioning, role limitations due to physical problems, bodily pain, and general health perceptions, and mental health dimension (MHD) includes vitality, social functioning, role limitations due to emotional problems, and emotional well-being. The magnitude of the association between characteristics and PHD and MHD of HRQoL were calculated using linear multiple regression.

In the analyzed sample 36.9% of the women were less than 45 years old, 38.7% had more than 12 years of complete schooling, 59.5% had white-collar occupations, 22.4% were obese, 49.2% were post-menopausal, 14.5% had more than 4 children, 12.5% presented severe depressive simptomatology (BDI-II≥ 19) and 61.9% referred having a chronic disease. In men 35.0% were less than 45 years old, 38.2% had more than 12 years of complete schooling, 70.2% had white-collar occupations, 16.0% were obese, 3.7% presented severe depressive simptomatology (BDI-II≥ 19) and 49.8% referred having a chronic disease.

A significantly higher average score of PHD and MHD dimensions were observed in men when compared with women (52.4±8.5 vs. 48.4±10.6, $p<0.001$ and 52.8±8.0 vs. 48.1±10.7, $p<0.001$).

In both sexes, after adjustment, a negative association remained statistically significant between physical health dimension and age, occupation, depressive simptomatology and, with those who have any chronic disease. Also, in both sexes, significant and positive associations remained for education level and for practice of regular physical exercise and for the consumption of fruit and vegetables only in men. Regarding Mental health dimension, after adjustment, a significant and positive association was found for age, for obese, and for women who intakes between 1824-2210 Kcal of total energy, and total physical activity in men. In addition, a negative association was found with depressive symptomatology in both sexes and also with chronic diseases in men.

In this population younger individuals, those with higher education level, with white-collars occupation, with a minor or without any depressive symptoms, without chronic disease and with regular practices of physical exercise present higher levels of Physical HRQoL. Older people and those without depressive symptoms presented higher mental HRQoL, in both sex.

Local health agencies play a major role in promoting health and quality of life, and community indicators of HRQoL can help to guide planning programs to improve community health.

RESUMO

Tendo em consideração o impacto da "transição demográfica e epidemiológica" é fundamental o desenvolvimento de estudos e acções de modo a proporcionar aos nossos cidadãos, não uma vida mais longa, mas sobretudo com uma boa qualidade de vida.

A qualidade de vida relacionada com a saúde consiste na percepção subjectiva do bem-estar físico, mental e social e descreve a capacidade para realizar as funções do dia-a-dia. A qualidade de vida relacionada com saúde é cada vez mais frequentemente reconhecida como uma característica importante de saúde. Actualmente, a saúde pública, reconhece cada vez mais a importância do conhecimento dos factores biológicos, físicos e sociais relacionados com uma melhor saúde e uma melhor qualidade de vida.

O objectivo deste estudo é a avaliação dos factores sociais e comportamentais que se associam com a qualidade de vida relacionada com a saúde, numa população urbana de adultos Portugueses.

De uma amostra aleatória de 2485, representativa dos residentes na cidade do Porto (participação de 70%), com idades compreendidas entre os 18 e os 90 anos, 1322 (59,8% mulheres e 40,2% homens), responderam a um questionário geral e à versão Portuguesa do questionário Short Form (SF) -36. O questionário geral estava estruturado com informação de aspectos sociais, demográficos, comportamentais e clínicos (foram obtidas medidas antropométricas, de pressão arterial e amostras de sangue), a dieta foi avaliada usando um questionário semi-quantitativo de frequência alimentar e actividade física foi avaliada usando um questionário para registar as actividades realizadas no contexto profissional, trabalhos doméstico e durante as actividades de lazer.

Usando as 8 sub-dimensoes do SF-36, duas dimensões sumárias previamente definidas na mesma população, foram utilizadas. A dimensão física (DF) inclui a função física, o desempenho físico, a dor física e a saúde em geral. Por seu lado, a dimensão mental (DM) é

constituída pela saúde mental, desempenho emocional, função social e pela vitalidade. A magnitude da associação entre as características, da DF e da DM da qualidade de vida associada à saúde, foi calculada usando a regressão linear múltipla.

Na amostra analisada 36,9% das mulheres tinham menos de 45 anos, 38,7% tinham 12 anos ou mais de escolaridade, 59,5% tinham profissões não manuais especializadas, 22,4% eram obesas, 49,2% eram menopausicas, 14,5% tinham mais de 4 filhos, 12,5% apresentavam sintomas severos de depressão e 61,9% tinham uma doença crónica. Nos homens, 35,0% tinham menos de 45 anos, 38,2% 12 anos ou mais de escolaridade, 70,2% tinham profissões não manuais especializadas, 16,0% eram obesos, 3,7% % apresentavam sintomas severos de depressão e 49,8% tinham uma doença crónica.

Foi observado um valor médio mais alto, significativo, nas DF e DMl para os homens quando comparado com as mulheres (52.4±8.5 vs. 48.4±10.6, p <0.001 and 52.8±8.0 vs. 48.1±10.7, p <0.001).

Em ambos os sexos, quando ajustado, é possível constatar que se mantém uma associação negativa, estatisticamente significativa, entre a DF e a idade, a ocupação, os sintomas depressivos e os portadores de doença crónica. Da mesma forma, nos dois sexos uma associação significativa e positiva mantém-se entre a DF e o nível de escolaridade, a prática regular de exercício físico e o consumo de frutas e vegetais, neste caso apenas nos homens. Em relação à DM, após o ajuste, é possível observar uma significativa e positiva associação para a idade, obesidade e no caso da mulheres, para o consumo de 1824 - 2210 Kcal de energia total e com o actividade física total nos homens. Verifica-se ainda, nos dois sexos, uma associação negativa com os sintomas depressivos e com a presença de doença crónica nos homens.

Nesta população os indivíduos, mais jovens, com um nível superior de ensino, com ocupações não manuais especializadas, com poucos ou nenhuns sintomas depressivos, sem doença crónica e com práticas regulares de exercício físico, apresentaram os níveis mais altos de qualidade de vida associada à saúde na componente física. A idade avançada e a ausência

de sintomas depressivos aumentam a qualidade de vida associada à saúde na componente mental.

As agências locais de saúde têm um papel importante na promoção da saúde e qualidade de vida e os indicadores destas duas componentes são um factor decisivo na orientação de programas para o planeamento de saúde nas comunidades.

BACKGROUND

In the last half of XX century, the worldwide population faced important demographic changes, specifically with the decrease of the birth, fertility and mortality rates, what leaded to an increase of the longevity, mainly on the most advanced ages, contributing on this way to the world phenomenon of a population aging [1, 2]. Consequently, this transition led to an increase of life expectancy that in the European Union increased from 67 to 75 years old in the men and from 73 to 81 years old in the women, between the periods of 1960 - 2002. Simultaneously, Portugal, has been accompanying this world tendency [1-3].

The progressive increased number of old persons, especially of the very old ones, has been increasing the probability of incidence of physical, psychological and social dependence situations, emerging the necessity of creating new reactions/answers from the governments and from the civil society [4,5].

This demographic transition has a considerable influence on the social and economical structure of the society, as well as, on the consumption, on the work force and on the social assistance. The increase of costs with the health (better health care, more medicines, more surgeries, etc.) and with the social assistance (more retirements to pay, more social assistance contributions, less active population) has an important weight on state financial figures and on taxpayer's budget [6].

Considering the impact of "demographic and epidemiologic transition" it is crucial that health programs and politics emphasize the importance of a longer life, with higher quality of life. [4, 5, 7, 8].

Despite of being a recent concept, the expression quality of life, nowadays is frequently used in our daily language as well as in technical speeches, being a nuclear subject in different areas of our society [9, 10, 11]. There is no general agreed definition of quality of life[9]. The World Health Organization Quality of Life Group defines this concept as "the individual's

perception of his/her position in life in the context of the culture and value systems in which he/she lives, and in relation to his/her goals, expectations, standards and concerns" [12]. It is a broad-ranging concept, incorporating in a complex way, the person's physical health, psychological state, level of independence, social relationships, personal beliefs and relationship to relevant features of the environment [9-12].

It is understandable as QoL, the individual self-perception of his position in life, considering in on hand, the cultural environment and the system of values that he belong to and in other hand his goals, expectations and worries [4, 6, 7, 9-11]. QoL is a very wide concept affected by different variables, such as physical health of the individual, his psychological status, his social relations and his independence level[8-11]. Moreover, the relation with the most relevant characteristics of his environment, like the family, friends and colleagues are also important in the definition of QoL [4, 7, 9-11].

The concept of QoL includes several aspects combined between them. From material issues related with the satisfaction of the human basic needs, to the immaterial subjects (the security, the civic participation, etc) [12]; to objective aspects related with the individual perception of QoL and with the well being of the individuals; from aspects of more individual nature up to aspects of more collective nature. It is, so, a wide concept in which several approaches and different perspectives are interconnected.

We can study the QoL, considering three different levels of analysis [13]:

A first one, is related with the distinction between the material and immaterial aspects of the QoL [14, 15]. The material aspects are essentially connected to the human basic needs, like as, the houses conditions, water supplying and health system, what means that are aspects of essentially physical nature and infrastructural. Historically and for sub-developed societies, these material questions are decisive or at least very important; nowadays, more and more the immaterial questions regarding the environment, the cultural heritage and the well being became more central [13], mainly in under development and developed countries.

A second perspective does the distinction between the individual aspects and the collective ones [15, 16]. While the individual components are more connected with the

economical condition, the familiar condition and the social relations, are related with the basic services and the public services.

We can still consider, a third perspective, which is the distinction between objective and subjective aspects of the QoL [17, 18]. The first ones would be easily achieved through the definition of quantitative indicators, whereas the second ones would depend from the QoL subjective perception of individuals, what is different in every single person and in different social status [13].

These three extents of analysis are not, obviously, mutually exclusive, but on the opposite they are interconnected in a large extent. The main theoretical contributes for the analyses of the QoL reflects precisely this interdependence, combining the different above-mentioned levels of analysis.

Below we present three of those theoretical contributes, which we consider particularly relevant, not only for the conceptual idea that they propose, but also for the reflections that they cause:

A first contribution of Allardt [17, 18] proposes a distinction in the analysis of the QoL between objective and subjective conditions of life. This author analyses the QoL considering four levels: a first one, which he calls living level, is related with material needs or the human basic needs as we have mentioned above. A second level, which he explicitly nominated as QoL, is associated with all non-materials conditions of life, i.e., aspects more connected with the individual, his relation with the society, with the family, etc. The third level designated as satisfaction, is regarding the subjective perception of the conditions of life. Finally, the author designated the last level as happiness level, what drift from the subjective perception of the QoL.

The second contribute from Gough [16], treats the question of the QoL distinguishing between the necessities and the wishes (aspirations). The necessities are more connected with collective and universal aspects, whereas the wishes, the aspirations would be more related with the individual and contingent aspects.

The third contribute from Nuvolati [15], proposes an analysis of the QoL based on five great areas, crossing the individual/collective dichotomy with the dichotomy of the material/immaterial thing. The first area regards the material collective aspects, in terms of availability of services and goods, involving, so the aspects related with, for example, health, social work, compulsory education, existence of commerce in the cities. The second area, which the author had designated as material individual aspects, concerns the personal and familiar condition of the individuals: the income and wealth of each one, the labour market situation, the mobility conditions on the territory, in other words, aspects that besides its material character are more associated to the individuals needs separately. The non-material collective aspects compose the third area and involve all the recreation services, free services for the leisure time and sports. In the fourth area fit all the non-material individual aspects, such as the private interpersonal relations, the relations with the family, the relations with the friends, the participation of the citizens and the access to information. The fifth area is about the general context and it is related with the peculiarities of the scenario and climate that surround the individual, as well as the characteristics of the historical, cultural and architectural heritage of the object analysed [15].

Quality of Life and Health

Several factors such as environment, income, housing or freedom may adversely affect QoL [19]. However, these problems are often relatively distant from health or medical concern. Therefore, clinicians primarily focus on health-related quality of life (HRQoL) as an outcome measure of a disease and its treatment. HRQoL essentially consists of subjective, perceived physical, mental and social well-being or distress and describes the ability to engage in daily functions [20]. HRQoL is increasingly being recognized a feature of health [11].

Whether or not individuals seek medical attention is less dependent on the "objective" presence of symptoms than on their response to these, or to their general perception that something is wrong with them. Such differences in perception affect utilization of health

services to the degree that one individual may seek medical advice while another may not [21]. Also, as health promotion is the process of helping people take control of, and improve their health, changing people's expectations of health is a core element of health promotion [22].

In the set of the studies devoted to the theme of QoL and wellbeing it is well known, that in the last years, the HRQoL is increasingly being recognized as an important aspect of public health [23-25].

In the health area, the interest for the concept of QoL is relatively recent and, in part, is due to the new paradigms that have been influencing the politics and the practices of the sector in last decades. The determinants and restrictions of the process health-disease are multifactor and complexes. Health and disease are part of a continuum process, linked with economical, social and aspects, personal experience and different ways of life [12]. According to this change of paradigm, the improvement of QoL had started to be one of the goals expected, not only for the assistance areas, but as well for the public politics for the sector in the areas like the promotion of the health and of diseases prevention [11].

The global change on the profile of morbidity-mortality, also in the developing countries, indicates an increase in chronic and degenerative diseases [4, 5, 7]. The improvements in treatments and in the capacity of effective control of these diseases have been bringing the increase of life-expectancy of people with these pathologies.

Two tendencies on the concept of QoL are clearly identified on health area: QoL like as a generic concept and QoL straight connected with health issues (HRQoL).

Focalising our attention in the first case, QoL is a large concept, apparently influenced by sociological studies, without any reference to dysfunctions or injuries.

An important aspect that characterizes studies based on a generic definition of the term QoL is that the studied samples include healthy persons of the population without considering any restriction on the sample to people with specific pathologies are.

The other tendency that straight connected QoL with health issues is very frequent in the literature and it has been used with similar objectives of the generic concept. However, it

seems to implicate other aspects more associated to the illnesses or to the interventions in health.

Evaluation of Quality of Life

To measure the health status in a population is important for the evaluation of interventions and to forecast health and social care needs. The traditional health indicators based on mortality and morbidity, although useful, have certain limitations [26]. It goes beyond direct manifestations of illness to study the patient's personal morbidity, that is to say, the various effects that illness and treatments have on daily life and life satisfaction [27]. Indeed, it is now widely acknowledged, in terms of health, that decisions must take into consideration the subject's point of view and his inner feelings towards the experiences he has lived through, i.e. his QoL [28, 29]. The recognition of QoL as a strong indicator and predictor of health conducted to the development of several instruments to measure health related QoL [29].

QoL measures usually include questions regarding the physical, social, psychological and spiritual domains. Other issues, such as sexual function, body image and financial concerns, may be incorporated as well.

There are two basic types of instruments: disease specific and generic. Disease specific instruments have been developed for one particular disease or a narrow range of related diseases, e.g., arthritis impact measurement scale [14]. They are useful for clinical trials or outcome assessment for specific diseases, but is not enough to study different diseases.

On the other hand, generic instruments are intended to be applicable to a wide range of health problems. They have a broad perspective and are applicable across different types and severity of diseases, across different medical treatments and interventions, and across different cultural subgroups. Some of the most important ones used in a context of mental illness are summarized and critically evaluated by Lehman [30]. The best example of a generic scale for measuring QoL is the one developed by the WHO, named WHOQOL [12]. Developed as a multinational, multicultural and multilingual generic instrument, WHOQOL places emphasis on subjective evaluation of respondents' health and living conditions rather than on their

objective functional status. It produces a multidimensional profile of scores across 6 broad domains and 24 sub-domains (facets) of QoL. These 6 domains are: physical domain; psychological domain; level of independence; social relationships; environment; and spirituality/religion/personal beliefs. Within each domain, several sub-domains (facets) of QoL summarize that particular domain of QoL; e.g., the 'physical domain' includes the facets 'Pain & discomfort' and 'Energy & fatigue' [12].

As we already said, several scales have been used to measure the different domains of HRQoL. Certain scales are generic, such as the "Sickness Impact Profile" (SIP) [31-34] the "MOS 36 item Short Form Health Survey" (SF-36) [31, 35-37], and the "Nottingham Health Profile" (NHP) [31, 32], while others are specific to a disease [38, 39], a particular function (e.g pain) or to a group of patients [40, 41]. The generic scales present the advantage of allowing us to compare the QoL of different populations and/or patients with a variety of diseases, while the specific scales are more sensitive to particular problems of a given population [42-44]. QoL tools must always be validated when used in a new environment [44], because the perception of QoL differs according to the individual situations [42, 43, 45].

The SF-36 is the most widely used generic QoL instrument world wide because of its comprehensiveness, its brevity and its high standard of reliability and validity [35-38].

SF-36 version 2

The SF-36 is a multipurpose, short-form health survey with only 36 questions. It yields an eight-scale profile of scores as well as physical and mental health summary measures. It is a generic measure, as opposed to one that targets a specific age, disease, or treatment group. Accordingly, the SF-36 has been useful in comparing general and specific populations, comparing the relative burden of diseases, differentiating the health benefits produced by a wide range of different treatments, and screening individual patients [46].

The improvements of the SF-12 reflected in version 2.0 of the SF-36, have been translated in more than 40 countries as part of the International Quality of Life Assessment (IQoLA) project, and studies of reliability and validity [47].

The experience to date with the SF-36 has been documented in more than 1000 publications. Those published in 1998 and before have been summarized in an annotated bibliography [46]. The most complete information about the history and development of the SF-36, its psychometric evaluation, studies of reliability and validity, and normative data are available in the first of three SF-36 user's manuals [48].

The usefulness of the SF-36 in estimating disease burden is illustrated in articles describing more than 130 diseases and conditions. Among the most frequently studied conditions, with more than 20 SF-36 publications each, are arthritis, back pain, depression, diabetes, and hypertension [46, 47]. Translation of the SF-36 is the subject of 148 publications, and one or more articles compare results from the SF-36 with those of 225 other generic and disease-specific instruments [47, 48].

The SF-36 was constructed to satisfy psychometric standards necessary for group comparisons. The eight health concepts were selected from 40 concepts included in the Medical Outcomes Study (MOS) [47]. Those chosen represent the most frequently measured concepts in widely used health surveys and those most affected by disease and treatment [37, 47, 49]. SF-36 items also represent multiple operational indicators of health, including behavioural function and dysfunction, distress and well-being, objective reports and subjective ratings, and both favourable and unfavourable self-evaluations of general health status [37].

In 1996, version 2.0 of the SF-36 - the international version - was introduced to improve the two role functioning scales and to achieve other objectives [50]. Compared with the standard SF-36 version 1.0, improvements in version 2.0 included simpler instructions and questionnaire items, an improved layout for questions and answers in the self-administered version greater comparability with widely used translations and cultural adaptations, and five-level response choices in place of dichotomous response choices for items in the two role functioning scales [47].

The translation and cultural adaptation of the scale SF-36 and the correspondent validation of the sub-dimensions of the Portuguese version were already released [51, 52], as well

as it were evaluated the reliability and the validity of the theoretical concepts (construct vality) of the two general dimensions, physical and mental [54].

Determinants of health related quality of life

To live longer, what most people wish for nowadays can result in a life characterized by incapacity and dependency. The challenge of health system is to be able to live longer with a better QoL.

Today, on the discussion about public health, it is recognized more and more the importance of knowing better the biological, physical and social factors associated with an improvement of health and QoL.

There are several factors that can be pointed, as determinants for the well-being: physical and mental health, [8, 24, 54-58] longevity, [59] productivity [8, 24, 58] incapacity absence, [8, 53, 58] positive adaptation, [24] economical factors, [54-57, 59] social, [54, 56, 57, 59] independence, [8, 56, 58] environment and [8, 56-58] behaviour factors [11, 53] (smoking, physical activity, alcohol consuption, healthy way of life) [8]. In order to establish a politics that contributes to a well-succeeded aging, it is fundamental to investigate the causes or determinants that influence the QoL.

Taking into account the concept of public health as "the science and art of disease prevention, prolonging life, and promoting health and well-being through organized community effort for the sanitation of the environment, the control of communicable infections, the organization of medical and nursing services for the early diagnosis and prevention of disease, the education of the individual in personal health and the development of the social machinery to assure everyone a standard of living adequate for the maintenance or improvement of health" [60], it is fundamental to define and develop a promising strategy to face the problems of health that affect the human populations.

This strategy, based on articulation between health and conditions/quality of life, is simply the promotion of the health, that based on the wide concept about the process health-illness and respective determinants, proposes the articulation between technical and popular know how, and the mobilization of private, public, community and institutional resources [61].

In biomedical literature most of the studies developed to assess QoL and their determinants are too much focus into the disease, and not in population based QoL aspects. So, Knowing better which are the main determinants of QoL in general population contributes to better playing health programs.

OBJECTIVE

This study intends to evaluate the association between demographic, social and behavioural characteristics and HRQoL, in a urban population of Portuguese adults.

METHODOLOGY

Participants

During 1999-2003, as part of the baseline evaluation of EpiPorto Cohort study, 2485 Portuguese adults living in Porto, from both sexes, with age equal or higher than 18 years old, were evaluated [62]. Random digit dialling was used to select individuals [63], using as sample a set of individuals' residents in Porto with telephone at home. In 1999 the proportion of residents in Porto with phone at home was estimated in 97 %. Once a household was selected, all residents were identified by age and sex, and one of those who fill the inclusion criteria was randomly selected without being allowed substitution of refusals. A participation rate of 70% was achieved[64].

After being selected, if the individual refuses to participate in the study, he was submitted to some general questions about demographic, social, behaviour and healthy issues.

The evaluation was performed at Department of Hygiene and Epidemiology of University of Porto Medical School. For the participants unable to move, the survey was performed at home.

The Mini-Mental State Examination (MMSE) was used for a rapid evaluation of cognitive impairment in individuals aged over 64 years [65]. Individuals who scored less than 24 in the MMSE were classified as inadequate to provide reliable information, leading to the exclusion of 74 participants, remaining for analysis 2415 participants. The SF-36 questionnaire was obtained from 1439 (59.6%) of the 2415 adults. Of these, 1322 (91.9%) completed at least 50% of the items from each subdimension of the SF-36 and were considered as final sample to the present analysis, 791 female (59.8%) and 531 male (40.2%), aged between 18 and 92 years old. About thirty-six percent were aged less than 45 years, 43.3% between the 45 and 64 years and 20.7% presented age over 64 years (Table 1).

Comparing the social and demographic characteristics of those who filled the SF-36 questionnaire, with the total sample evaluated in EPIPorto study, no significant differences were observed concerning the distribution according to sex and depressive symptoms. However, participants in the remaining sample were significantly younger, more educated and with lower frequency of chronic diseases (Table 1).

Methods

Information was collected by trained interviewers using a structured questionnaire comprising data on social (occupation and income), demographic (age, gender, status marital and education), personal and family medical history (blood pressure, cholesterol, triglycerides, and glucose concentration, prior depression, and others chronic illnesses), bereavement and behavioural characteristics (diet, physical activity, smoking habits, alcohol intake, and number of sleep hours).

From the set of variables collected as part of the EpiPorto study the following variables were used: sex, age, education, occupation, physical activity, total physical activity, body mass index, smoking habits, alcohol consumption, consumption of fruit and vegetables, total energy intake, depressive symptoms, presence of any chronic disease, number of children, still menopausal status and the number of sleeping hours.

The analysis of the social-economical status (SES) was based on an adaptation of the classification used in the UK's Registrar General [42]. Occupations were divided into five groups: I - Professional occupations; II - Managerial and Technical Occupations; IIIa - Skilled occupations - non-manual; IIIb - Skilled occupations -manual; IV - Partly-skilled occupations; V - Unskilled Occupations. Retired and invalid people were included in Category VI, and house-wives and unemployed people were included in Category VII. Categories I, II, and IIIa were subsequently grouped under the category of non-manual occupations (white collar); categories IIIb, IV, and V under the manual occupations category (blue collar); and under a third category were grouped retired, invalid, and unemployed people, as well as house-wives.

Results about education were recorded in a continuous way, as completed years of schooling and afterwards catalogued and divided in three board categories: less than 5 years, between 5-11 and more than 11 years. The number of completed schooling years was also considered as an indirect indicator of SES.

TABLE 1. COMPARISON OF THE DEMOGRAPHIC AND SOCIAL CHARACTERISTICS BETWEEN THE COMPLETE SAMPLE OF THE STUDY AND THE INDIVIDUALS WHO HAD COMPLETED THE QUESTIONNAIRE OF THE SF36.

	ALL (2485) n (%)	SF36 (1322) n (%)	p-VALUE
SEX			
FEMALES	1538 (61.9%)	791 (59.8%)	
MALES	947 (38.1%)	531 (40.2%)	**0.122**
AGE (years)			
<45	795 (32%)	478 (36.2%)	
45-64	1042 (41.9%)	571 (43.2%)	
≥ 65	648 (26.1%)	273 (20.7%)	**<0.001**
EDUCATION LEVEL (years)			
≤ 4	972 (39.1%)	385 (29.1%)	
>4 AND < 12	725 (29.2%)	428 (32.4%)	
≥12	787 (31.7%)	509 (38.5%)	**<0.001**
OCCUPATION			
WHITE-COLLAR	1383 (55.7%)	843 (63.8%)	
BLUE-COLLAR	831 (33.5%)	345 (26.1%)	
OTHER	268 (10.8%)	134 (10.1%)	**<0.001**
Have any Chronic disease			
No	957 (38.5%)	567 (42.9%)	
Yes	1520 (61.2%)	754 (57.1%)	**<0.001**
DEPRESSIVE SYMPTOMATOLOGY			
BDI-II =0 TO 9	825 (71.7%)	785 (71.6%)	
BDI-II =10 TO 18	221 (19.2%)	214 (19.5%)	
BDI-II ≥19	104 (9.0%)	97 (8.9%)	**0.949**

DIFFERENCES ACESSED BY QUI-QUADRADO (X^2) TEST

Physical activity was evaluated using a questionnaire that explores all professional, domestic, and leisure time activities, detailing for each activity the intensity, duration, and frequency [67]. The total activity was quantified as metabolic equivalent per hour, and the participants were classified according tertiles of distribution. The classes in women were {<33.31; 33.31-35.99 and > 35.99 Met.h/day}, while in men were {<32.96; 32.96-37.30 and >37.30 Met.h/day}.

The dichotomous variable regarding the practice of regular physical exercise, including walking was also considered from analysis.

Anthropometric measures were obtained with the participant fasting, in light clothing and no footwear. Body weight was measure to the nearest 0.1 Kg using a digital scale, and height was measured to the nearest centimetre in the standing position using a wall stadiometer [68]. The Body mass index (BMI) was calculated as weight in kilograms divided by square height in meters. Sample distribution of BMI is reported by standard WHO categories and nomenclature [68]: underweight (<18.5 Kg/m^2), normal weight (18.5-24.9 Kg/m^2), overweight (24.9-29.9 Kg/m^2) and obese (≥30 Kg/m^2). Due to the small number of underweight participants in this study underweight group and normal group were considered in the same class.

Information on smoking status, number of cigarettes smoked per day, and smoking initiation age was collected. Smoking status was assigned according to this information and the participants were classified based on WHO categories [69]. Current smokers included both, daily (at least one cigarette per day at the time of the survey) and occasional smokers (less than a cigarette per day). A ex-smoker was a person who was formerly smoker but did not smoke for at least 6 months. Due to the small number of occasional smoker participants in this study, the occasional smoker group and the smoker group were added.

Considering the Alcohol habits, participants were classified as occasional drinkers if drank less than one glass per week, drinkers if drank at least one glass of any kind of alcoholic drink per week and ex-drinkers if had not drank for at least six months. In this study, the occasional drinkers group and the drinker group were added as well the ex-drinkers group with the no drinkers group. The amount of alcohol in grams/day was evaluated using a semi-quantitative food frequency questionnaire [62, 70], considering the last year of recalled frequency of consumption of wine, beer, liquors, and spirits multiplied by media portions sizes of drinks (beer, 330ml, one glass of wine,125ml, or one measure of spirits and liquors, 40ml).

The same validated item semi-quantitative food-frequency questionnaire was used to quantify the total energy intake and the consumption of fruit and vegetables. The conversion

of foods in nutrients was made using the software "Food Processor Plus" version 7.0 [62, 70]. The total energy intake was divided by tertiles and according to sex. So, the groups "<1824", "1824-2210", ">2210" corresponds to the tertiles of energy consumed by women per day, while the groups "<2074", "2074-2495" and ">2495" correspond to the tertiles of energy consumed by men [62, 70].

To quantify the daily consumption of fruit and vegetables the correspondent items of fresh fruit, salads and cooked vegetables, soup and fresh fruit juice were included. The consumption was after grouped in two sets: individuals who consumed below than 5 portion of fruit and vegetables per day and the individuals who consumed 5 or more portion a day.

Depressive symptoms were measured using the Beck Depression Inventory (BDI) [71]. It is a 21-item test presented in multiple-choice format, which purports to measure the presence and degree of depression in adolescents and adults. Each of the 21-items of the BDI attempts to assess a specific symptom or attitude "which appear(s) to be specific to depressed patients, and which are consistent with descriptions of the depression contained in the psychiatric literature. Each of the inventory items corresponds to a specific category of depressive symptom and/or attitude. Each category purports to describe a specific behavioural manifestation of depression and consists of a graded series of four self-evaluative statements. The statements are rank ordered and weighted to reflect the range of severity of the symptom from neutral to maximum severity. Numerical Values of zero, one, two, or three are assigned each statement to indicate degree of severity. Beck admits that there is no arbitrary cut-off score and the specific cut-off depends on the characteristics of the patients used and the purpose for which the inventory is given. An index score of ≤9 is considered to be within normal range, a score of 10 to 18 determines mild-moderate depressive symptoms, scores of 19 to 29 toward moderate-severe depressive symptoms, and scores of 30-67 is in favour of extremely severe depressive symptoms [71]. In this analysis, the participants with the moderate-severe depressive symptoms and the participants with extremely severe depressive symptoms were added in the same classes.

"Number of children", and "Menopausal Status" were also collected for women.

The variable "Number of children", was initially registered as continuous, but after was divided in three different levels : <1; 2-3; >4.

The "Menopausal Status" was classified in a dichotomous variable: "Pre-menopausal" (which means during the last 12 months the interviewed had the menstrual period at least once), and "Postmenopausal" (which means had not the menstrual period during last year).

Despite of being analysed in a categorical form, the results of the variable "Number of hours of sleeping hours" was registered in a continuous form. To achieve to the final results it was created 3 different classes: "<7 hours"; "7-8 hours" and ">9 hours", according to the average of sleeping hour per night.

The Portuguese version of the MOS 36-Short Form (SF-36v2) [51, 52], was self-administered, and was used to measure self-reported HRQoL. The SF-36 included of 8 subscales: physical functioning (10 items), role limitations due to physical problems (4 items), bodily pain (2 items), general health perceptions (5 items), energy/vitality (4 items), social functioning (2 items), role limitations due to emotional problems (3 items), and mental health (5 items) [47-52, 54, 72]. For each dimension items scores are coded, summed, and transformed on to a scale from 0 (worst possible health state measure by the questionnaire) to 100 (best possible health state).

When participants answer only to less than 50% of items from each sub-dimension were excluded. For the others, who filled at least half of the sub-dimension items, a median score of the remaining items was considered for missing items within each sub-dimension. The totality of questions was answered by 1074 (81.2%) participants [54].

An analysis of the questionnaire in the same population used in the present study has suggested that two summary scales can be derived from this measure: the Physical Component Summary Score (PHD) and the Mental Component Score (MHD) [54]. To this study we used the two general dimensions of the SF-36, physical and mental health, defined previously in the same population [54]. The dimension of physical health contains physical functioning, role limitations due to physical problems, bodily pain, general health perceptions; the mental

health dimension contains energy/vitality, social functioning, role limitations due to emotional problems, and mental health [54].

The construction of the summary measures for physical and mental dimensions was done in three phases. Firstly, the eight dimensions of SF-36 were normalized with an average of 0 (zero) and with a standard deviation of 10 (z-scores) being used in calculations, the average and standard deviation of Porto population. On the second phase, the eight sub dimensions were grouped according to the coefficients of the main components after the rotation (sum up of the z- scores of each scale, multiply by the value of correspondent coefficient of main components after the rotation). Finally, the components were normalized with an average of 50 and a standard deviation of 10 [54].

Statistical Analysis

The proportions were compared using the Chi-square test. The average and respectively standard deviations were calculated for the 8 dimensions of SF-36, and comparison of means values of the two dimension of SF-36 (PHD and MHD), according characteristics of participants, by sex, were compared using Kruskal-Wallis test.

Linear multiple regression was computed to estimate the crude and adjusted magnitude of the association. The final model include the following variables: "Age", "education" , "BMI", "Depressive symptoms", "Have any chronic disease", "Regular physical exercise", "Smoking Habits" and "Alcohol drinking".

The different classes of each variable analysed were transformed in Dummies variables. The first class was always select as the reference) in order to be possible to calculate the estimate gross value (Beta coefficient) and the adjusted value for the two dimensions, for each variable on the different levels.

Data were analysed using SPSS (version 14), separately for men and women.

RESULTS

The tables 2 and 3 show the distribution of the demographic, social and behavioral characteristics of participants, stratified by sex.

In this study, 36.9% of the women were less than 45 years old, 38.7% had more than 12 years of complete schooling, 59.5% had white-collar occupations, 22.4% were obese, 49.2% were postmenopausal, 14.5% had more than 4 children, 12.5% presented severe depressive simptomatology (BDI-II≥19) and 61.9% referred having a chronic disease. In men 35.0% were less than 45 years old, 38.2% had more than 12 years of complete schooling, 70.2% had white-collar occupations, 16.0% were obese, 3.7% presented severe depressive simptomatology (BDI-II≥19) and 49.8% referred having a chronic disease.

The table 3 shows that 18.4% of the women were smokers, 72.7% were drinkers, 13.1% consumed more than 15 g/day of alcohol, 52.5% slept 7-8 hours/day and, 38.9% consumed 5 or more portions of fruits and vegetables. In men, 33.6% were smokers, 80.8% were drinkers, 38.1% consumed more than 30 g/day of alcohol, the physical activity is performed by 43.2%, 53.1 slept 7 or 8 hours/day and, 32.3% consumed 5 or more portions of fruits and vegetables.

TABLE 2 DEMOGRAPHIC AND SOCIAL CHARACTERISTICS OF SAMPLE STUDY BY SEX

	FEMALE 791 (59.8%)	MALE 531 (40.2%)
	n (%)	n (%)
AGE (years)		
<45	292 (36.9%)	186 (35.0%)
45-64	353 (44.6%)	218 (41.1%)
≥ 65	146 (18.5%)	127 (23.9%)
EDUCATION LEVEL (years)		
≤ 4	248 (31.4%)	137 (25.8%)
>4 AND < 12	237 (30.0%)	191 (36.0%)
≥12	306 (38.7%)	203 (38.2%)
OCCUPATION		
WHITE-COLLAR	470 (59.4%)	373 (70.2%)
BLUE-COLLAR	207 (26.2%)	138 (26.0%)
OTHER	114 (14.4%)	20 (3.8%)
BMI (Kg/m2)		
≤24.9	334 (43.0%)	195 (37.1%)
25.0-29.9	269 (34.6%)	247 (47.0%)
≥30.0	174 (22.4%)	84 (16.0%)
MENOPAUSAL STATUS		
POSTMENOPAUSAL	388 (49.2%)	--
PRE-MENOPAUSAL	401 (50.8%)	--
Nº OF CHILDREN		
≤1	164 (37.8%)	--
2-3	207 (47.7%)	--
≥4	63 (14.5%)	--
DEPRESSIVE SYMPTOMATOLOGY		
BDI-II =0 TO 9	413 (64.6%)	372 (81.4%)
BDI-II =10 TO 18	146 (22.8%)	68 (14.9%)
BDI-II ≥19	80 (12.5%)	17 (3.7%)
HAVE ANY CHRONIC DISEASE		
NO	301 (38.1%)	266 (50.2%)
YES	490 (61.9%)	264 (49.8%)

TABLE 3. BEHAVIOURAL CHARACTERISTICS OF PARTICIPANTS BY SEX

	FEMALE 791 (59.8%)	MALE 531 (40.2%)
	n (%)	n (%)
SMOKING		
SMOKER	145 (18.4%)	178 (33.6%)
NON SMOKER	539 (71.4%)	154 (29.2%)
EX-SMOKER	101 (13.4%)	196 (37.1%)
ALCOHOL DRINKING		
DRINKER	416 (72.7%)	303 (80.8%)
NON DRINKER	156 (27.3%)	72 (19.2%)
ALCOHOL (g/day)		
0	379 (48.1%)	76 (14.4%)
≤15 (♀); ≤30 (♂)	306 (38.8%)	250 (47.4%)
>15 (♀); >30 (♂)	103 (13.1%)	201 (38.1%)
REGULAR PHYSICAL EXERCISE		
NO	502 (63.9%)	300 (56.8%)
YES	284 (36.1%)	228 (43.2%)
TOTAL PHYSICAL ACTIVITY (MET-h/day)		
<33.31	208 (26.5%)	152 (29.0%)
33.31-35.99	262 (33.3%)	181 (34.5%)
>35.99	316 (40.2%)	192 (36.6%)
SLEEPING HOURS		
<7	152 (19.3%)	114 (21.6%)
7-8	414 (52.5%)	281 (53.1%)
≥9	222 (28.2%)	134 (25.3%)
FRUIT AND VEGETABLES CONSUMPTION (portion/day)		
< 5	480 (61.1%)	357 (67.7%)
≥5	305 (38.9%)	170 (32.3%)
TOTAL ENERGY INTAKE (Kcal)		
<1824	230 (29.3%)	157 (29.8%)
1824-2210	268 (34.1%)	170 (32.3%)
>2210	288 (36.6%)	200 (38.0%)

The table 4 presents the mean values and correspondent standard deviation (SD) of all the eight SF-36 sub-scales and the two groups, physical and mental health dimension, by sex. Women present a significantly lower average score than men in all sub-scales. The higher average values, of the 8 sub scales, in women, were observed in the domain "role limitation due to physical and emotional problems" (73.0±27.4), while in men the higher value was observed in the domain "role limitation only due emotional problems" (85.6±19.7). On the

other hand, the lower average values observed were for the "vitality" in females (52.0±21.1) and, "general health perception" in males (63.1±18.7).

Considering that the average value of 50 represents a level of HRQoL equal than the general population, was possible to observed, that in both dimension, PHD (include physical functioning, role limitations due to physical problems, bodily pain, and general health perceptions), and MHD (include vitality, social functioning, role limitations due to emotional problems, and emotional well-being) men presented an average score higher than the population (52.4±8.5 and 52.8±8.0) and women an lower average score (48.4±10.6 and 48.1±10.7).

TABLE 4. MEAN (SD) SCORES OF SF36 SUBSCALES ACCORDING TO SEX.

	FEMALE		MALE		
	n	MEAN (SD)	n	MEAN (SD)	P-VALUE
PHYSICAL FUNCTIONING	863	71.4 (24.1)	568	81.4 (21.4)	<0.001
ROLE LIMITATIONS DUE TO PHYSICAL PROBLEMS	839	73.0 (27.4)	553	82.0 (23.0)	<0.001
BODILY PAIN	845	58.6 (25.6)	559	76.3 (23.4)	<0.001
GENERAL HEALTH PERCEPTIONS	842	57.0 (20.2)	557	63.1 (18.7)	<0.001
VITALITY	840	52.0 (21.1)	562	65.0 (18.4)	<0.001
SOCIAL FUNCTIONING	858	71.6 (25.8)	568	82.8 (19.5)	<0.001
ROLE LIMITATIONS DUE TO EMOTIONAL PROBLEMS	825	73.0 (27.1)	550	85.6 (19.7)	<0.001
EMOTIONAL WELL-BEING	838	60.5 (23.6)	559	75.2 (16.6)	<0.001
PHD*	791	48.4 (10.6)	531	52.4 (8.5)	<0.001
MHD**	791	48.1 (10.7)	531	52.8 (8.0)	<0.001

*PHD -PHYSICAL HEALTH DIMENSION (include the physical functioning, role limitations due to physical problems, bodily pain, and general health perceptions).

**MHD-MENTAL HEALTH DIMENSION (include vitality, social functioning, role limitations due to emotional problems, and emotional well-being).

In table 5, it is possible to observe that, in both sexes, the average values of physical health dimension changes significantly according to all demographic and social characteristics evaluated. The mean value of PHD decreases significantly with increasing age, BMI, depressive symptomatology score and number of children and increases with increasing educational level. It was also observed that participants classified as "*white-collar*" presents better Physical HRQoL (50.8±9.3 for females and 53.3±8.0 for males) and by the contrary "Blue-collar"

presents worse Physical HRQoL (42.7±11.2 for females and 49.3±9.2 for males), considering the mean level of population. For the third class of occupation the mean value is higher than the population average in male but not in female, probably due to the fact that in the women this class is composed, mainly, by housekeeping and unemployed, while in the men the is composed, mainly by students.

The mean score values of MHD presents only significant by different according to classes of depressive symptomatology maintained the same tendency previously observed for PHD. In both women and men, a decreasing mean value was observed according to increasing values of BDI that represents more depressive symptomatology.

Regarding the variation of HRQoL score according behavioural characteristics (table 6), it was observed that the average values of PHD were significantly different according to smoking, regular physical exercise, total physical activity, number of sleeping hours and total energy intake for both women and men. A significant higher mean values were found for smokers compared with non smokers or ex-smokers (52.3±9.0 vs. 46.9±10.8 vs. 51.0±9.3, $p<0.001$ for females and 53.5±8.2vs. 52.9± 8.1 vs. 51.2±8.8, $p<0.019$ for males), persons who practice regular physical exercise (50.9±9.4 vs. 47.1±10.8, $p<0.001$ for females and 53.6±8.3 vs. 51.6±8.5, $p<0.004$ for males), are more physically active, and those who consumed more energy. Also in women, those who consumed more than 5 portions of fruit and vegetables per day presented higher Physical HRQoL (49.9 ±9.5 vs. 47.6±10.9, $p<0.003$).

Analysing the mental component, the only statistical significant mean differences were observed according the consumption of fruit and vegetables presents in female, showing that women who consume more than 5 portions a day presented a better quality of mental life (49.4 ±10.3 vs. 47.3±11.0, $p<0.011$). In Men, the higher average values of mental component were presented in those who consumed more than 30g of alcohol per day compared with the second or first tertiles (54.3 ±7.0 vs. 52.3±7.69 vs. 51.0±10.0, $p<0.004$).

TABLE 5. MEAN (SD) SF36 SUBSCALES SCORES ACCORDING TO THE DEMOGRAPHIC AND SOCIAL CHARACTERISTICS OF PARTICIPANT, BY SEX.

	FEMALE		MALE	
	PHD	**MHD**	**PHD**	**MHD**
AGE (years)				
<45	53.9 (8.8)	47.3 (10.7)	55.9 (6.8)	52.1 (7.5)
45-64	46.9 (9.5)	48.5 (11.0)	52.2 (8.2)	53.2 (8.2)
≥ 65	40.8 (10.5)	48.9 (10.2)	47.6 (9.0)	53.1 (8.4)
p- value	**<0.001**	**0.388**	**<0.001**	**0.226**
EDUCATION (years)				
≤ 4	41.5 (10.3)	47.7 (10.9)	47.4 (9.4)	52.1 (8.3)
5-11	48.1 (9.2)	47.9 (11.6)	53.2 (7.7)	53.7 (7.8)
≥12	54.1 (8.2)	48.5 (9.9)	55.1 (7.0)	52.5 (8.0)
p- value	**<0.001**	**0.660**	**<0.001**	**0.138**
OCCUPATION				
WHITE-COLLAR	50.8 (9.3)	48.4 (10.8)	53.3 (8.0)	52.7 (8.3)
BLUE-COLLAR	42.7 (11.2)	47.9 (11.1)	49.3 (9.2)	53.3 (75)
OTHER	48.8 (10.6)	47.4 (9.8)	58.0(6.2)	51.8 (6.1)
p- value	**<0.001**	**0.362**	**<0.001**	**0.509**
BMI (Kg/m2)				
<24.9	52.1 (9.1)	48.0 (10.7)	53.3 (8.3)	52.1 (8.2)
25.0-29.9	47.2 (10.8)	47.7 (11.0)	52.7 (8.6)	53.5 (7.5)
>30.0	42.6 (10.2)	49.0 (10.6)	49.4 (7.9)	52.6 (8.6)
p- value	**<0.001**	**0.552**	**<0.001**	**0.244**
DEPRESSIVE SYMPTOMATOLOGY				
BDI-II =0 TO 9	51.7 (8.8)	53.0 (7.6)	53.7 (7.8)	55.1 (5.9)
BDI-II =10 TO 18	45.4 (11.4)	44.8 (9.9)	49.6 (9.0)	46.7 (8.4)
BDI-II ≥19	40.7 (11.0)	34.6 (9.5)	45.3 (10.5)	37.4 (8.3)
p- value	**<0.001**	**<0.001**	**<0.001**	**<0.001**
HAVE ANY CHRONIC DISEASE				
NO	53.0 (8.6)	48.7 (10.4)	54.7 (7.8)	53.5 (7.6)
YES	45.5 (10.7)	47.7 (10.9)	50.0 (8.6)	52.2 (8.4)
p- value	**<0.001**	**0.135**	**<0.001**	**0.074**
Nº OF CHILDREN				
≤ 1	50.3 (10.0)	48.0 (10.9)	---	---
2-3	47.4 (10.6)	48.1 (10.6)	---	---
≥ 4	42.4 (10.5)	48.8 (10.3)	---	---
p- value	**<0.001**	**0.907**		
MENOPAUSAL STATUS				
POSTMENOPAUSAL	43.9 (10.4)	48.3 (10.8)	---	---
PRE-MENOPAUSAL	52.7 (8.9)	47.9 (10.7)	---	---
p- value	**<0.001**	**0.816**		

PHD-PHYSICAL HEALTH DIMENSION; MHD-MENTAL HEALTH DIMENSION; BMI - BODY MASS INDEX; BDI-BECK DEPRESSION INVENTORY; SD-STANDARD DEVIATION

TABLE 6. MEAN (SD) SF36 SUBSCALES SCORES ACCORDING TO THE BEHAVIOURAL CHARACTERISTICS OF PARTICIPANTS, BY SEX.

	FEMALE		MALE	
	PHD	**MHD**	**PHD**	**MHD**
SMOKING				
SMOKER	52.3 (9.0)	46.6 (11.3)	53.5 (8.2)	52.2 (7.8)
NO SMOKER	46.9 (10.8)	48.2 (10.7)	52.9 (8.1)	53.1 (8.1)
EX-SMOKER	51.0 (9.3)	49.8 (10.8)	51.2 (8.8)	52.8 (8.3)
p- value	**<0.001**	**0.067**	**0.019**	**0.274**
ALCOHOL DRINKING				
DRINKER	46.9 (10.5)	48.6 (10.6)	52.6 (8.4)	53.1 (7.7)
NO DRINKER	47.0 (10.5)	46.7 (11.8)	51.2 (8.6)	53.1 (8.3)
p- value	**0.649**	**0.125**	**0.847**	**0.992**
ALCOHOL (g/day)				
0	48.5 (10.9)	47.4 (11.0)	51.1 (10.2)	51.0 (10.0)
≤15 (♀); ≤30 (♂)	49.1 (10.1)	48.7 (10.6)	52.9 (8.5)	52.3 (7.69)
>15 (♀); >30 (♂)	46.4 (10.2)	49.2 (10.1)	52.4 (7.8)	54.3 (7.0)
p- value	**0.082**	**0.106**	**0.481**	**0.004**
REGULAR PHYSICAL EXERCISE				
NO	47.1 (10.8)	47.8 (10.9)	51.6 (8.5)	53.0 (8.1)
YES	50.9(9.4)	48.8 (10.4)	53.6 (8.3)	52.7 (7.9)
p- value	**<0.001**	**0.235**	**0.004**	**0.521**
TOTAL PHYSICAL ACTIVITY (MET-h/day)				
<33.3 (♀); <32.9 (♂)	46.8 (11.2)	46.7 (11.8)	50.1 (9.2)	51.6 (8.6)
33.3-35.9 (♀); 32.9-37.3 (♂)	47.2 (10.5)	48.7 (10.1)	53.4 (8.3)	53.2 (7.9)
>35.9 (♀); >37.3 (♂)	50.5 (9.8)	48.7 (10.4)	53.6 (7.6)	53.5 (7.5)
p- value	**<0.001**	**0.161**	**0.001**	**0.084**
SLEEPING HOURS				
<7	47.9 (10.9)	47.3 (11.0)	54.0 (6.8)	52.9 (7.9)
7-8	50.1 (9.9)	48.7 (11.1)	53.6 (7.9)	53.3 (7.8)
≥9	45.7 (10.9)	48.2 (10.8)	48.9 (9.8)	51.8 (8.6)
p- value	**<0.001**	**0.051**	**<0.001**	**0.139**
FRUIT AND VEGETABLES CONSUMPTION (portions/day)				
<5	47.6 (10.9)	47.3 (11.0)	51.9 (8.7)	52.8 (8.0)
≥5	49.9 (9.5)	49.4 (10.3)	53.6 (7.8)	52.8 (8.1)
p- value	**0.003**	**0.011**	**0.066**	**0.779**
TOTAL ENERGY INTAKE (Kcal)				
<1824 (♀); <2074 (♂)	47.0 (10.7)	47.2 (11.1)	51.3 (9.4)	52.3 (8.4)
1824-2210(♀); 2074-2495 (♂)	47.8 (10.7)	49.1 (9.7)	51.8 (8.3)	53.6 (7.7)
>2210(♀); >2495 (♂)	50.2 (10.1)	47.9 (11.2)	53.9 (7.5)	52.6 (7.9)
p- value	**0.001**	**0.167**	**0.010**	**0.400**

PHD -PHYSICAL HEALTH DIMENSION; MHD-MENTAL HEALTH DIMENSION; SD-STANDARD DEVIATION

The table 7and 8 shows the crude and adjusted linear regression coefficients (¤ and 95% CI), for women and men, respectively c onsidering the PHD and MHD as dependent variables.

In women, In univariated analysis, a significant inverse linear association was found between PHD and age, BMI, depressive simptomatology, having any chronic disease. Also blue-collars workers vs. white-collars, no smokers vs. smokers, individuals in the third tertile of total physical activity vs. first tertile and those who slept 9 or more hours per day vs. less than 7h/day presented a significantly lower level of PHD. Contrarily a positive association was observed between PHD and education level, regular physical exercise, consumption of fruits and vegetables, sleeping 7 or 8 hours a day. Also women in the higher tertile of total energy intake (vs. first tertile) presented a significantly higher level of PHD.

After adjustment for age, education, BMI, depressive symptomatology, have any chronic disease, smoking and regular physical exercise, the negative association remained statistically significant for age, blue-collar occupations, BMI ≥30.0 Kg/m^2, depressive simptomatology and, those who have any chronic disease. A positive association remained statistically significant for education level and for practice of regular physical exercise.

Regarding MHD, in women and after adjustment, a significant and positive association was found for age, for obese, and for women who intakes between 1824-2210 Kcal of total energy. In addition, a significantly negative association was found for depressive symptomatology.

TABLE.7. CRUDE AND ADJUSTED LINEAR REGRESSION COEFFICIENTS (▫ AND 95% CI) FOR FEMALES WITH THE PHD AND MHD AS DEPENDENT VARIABLES

	PHD ▫ (95%CI)		MHD ▫ (95%CI)	
AGE (years)	CRUDE	ADJUSTED*	CRUDE	ADJUSTED*
<45	0	0	0	0
45-64	-6.99 (-8.46; -5.52)	-3.01 (-4.52; -1.50)	1.17 (-0.49; 2.84)	2.43 (0.86; 4.02)
≥65	-13.10 (-14.98; -11.22)	-7.52 (-9.70; -5.33)	1.57 (-0.57; 3.70)	3.85(1.57; 6.12)
EDUCATION LEVEL (years)				
≤4	0	0	0	0
5-11	6.61 (4.97; 8.25)	4.26 (2.50; 6.02)	0.12 (-1.80; 2.04)	-0.20 (-2.03; 1.64)
≥12	12.59 (11.05; 14.14)	6.95 (5.09; 8.82)	0.76(-1.04; 2.56)	-1.49 (-3.43; 0.46)
OCCUPATION				
WHITE-COLLAR	0	0	0	0
BLUE-COLLAR	-8.10 (-9.74; -6.46)	-4.11 (-5.77; -2.46)	-0.55 (-2.31; 1.21)	1.36 (-0.33; 3.05)
OTHER	-1.94 (-3.99; 0.12)	-1.37 (-3.30; 0.55)	-1.00 (-3.21; 1.20)	-0.20 (-2.17; 1.76)
BMI (Kg/m2)				
≤24.9	0	0	0	0
25.0-29.9	-4.87 (-6.47; -3.27)	-0.71 (-2.23; 0.81)	-0.21 (-1.95; 1.52)	-0.69 (-2.28; 0.89)
≥30.0	-9.55 (-11.38; -7.73)	-4.08 (-5.89; -2.26)	1.02 (-0.96; 3.00)	1.96 (0.07; 3.85)
DEPRESSIVE SYMPTOMATOLOGY				
BDI-II =0 TO 9	0	0	0	0
BDI-II =10 TO 18	-6.76 (-8.62; -4.89)	-2.82 (-4.43; -1.20)	-8.16 (-9.79; -6.54)	-9.42 (-11.10; -7.74)
BDI-II ≥19	-10.84 (-13.20; -8.47)	-6.52 (-8.56; -4.47)	-18.00 (-20.06; -15.94)	-19.42 (-21.55; -17.29)
HAVE ANY CHRONIC DISEASE				
NO	0	0	0	0
YES	-7.42 (-8.86; -5.99)	-2.64 (-4.06; -1.23)	-0.99 (-2.53; 0.55)	0.07 (-1.41; 1.54)
REGULAR PHYSICAL EXERCISE				
NO	0	0	0	0
YES	3.77 (2.27; 5.27)	1.85 (0.49; 3.21)	0.98 (-0.59; 2.54)	-0.57 (-1.99; 0.85)
TOTAL PHYSICAL ACTIVITY(MET/day)				
<33.3	0	0	0	0
33.3-35.9	0.42 (-1.47; 2.32)	0.66 (-1.05; 2.38)	2.03 (0.07; 3.98)	-0.13(-1.91; 1.65)
>35.9	3.74 (1.91; 5.56)	1.28 (-0.38; 2.95)	2.05 (0.17; 3.93)	-0.31 (-2.04; 1.42)
SMOKING				
SMOKER	0	0	0	0
NO SMOKER	-5.36 (-7.24; -3.48)	-0.34 (-2.09; 1.40)	1.64 (-0.32; 3.61)	-0.25 (-2.07; 1.57)
EX SMOKER	-1.31 (-3.91; 1.30)	-0.89 (-3.18; 1.41)	3.19 (0.47; 5.92)	0.39 (-2.01; 2.79)
ALCOHOL (g/day)				
0	0	0	0	0
≤15	0.61 (-0.98; 2.20)	0.06 (-1.34; 1.46)	1.31 (-0.31; 2.92)	0.62 (-0.84; 2.07)
>15	-2.05 (-4.34; 0.24)	0.34 (-1.68; 2.35)	1.80 (-0.53; 4.14)	-0.08(-2.18; 2.02)
SLEEPING HOURS				
<7	0	0	0	0
7-8	2.14 (0.21; 4.07)	0.46 (-1.22; 2.14)	1.33 (-0.66; 3.32)	0.06 (-1.68; 1.80)
≥9	-2.19 (-4.33; -0.04)	-0.23 (-2.15; 1.69)	-0.80 (-3.02; 1.41)	-0.89 (-2.88; 1.10)
FRUIT AND VEGETABLES CONSUMPTION				
NUMBER OF PORTIONS/DAY	0.59 (0.26; 0.92)	0.28 (-0.02; 0.58)	0.50 (0.16; 0.85)	0.065 (-0.25; 0.38)
TOTAL ENERGY INTAKE (Kcal)				
<1824 (♀)	0	0	0	0
1824-2210(♀)	0.77 (-1.07; 2.62)	-1.18 (-2.80; 0.45)	1.93 (0.04; 3.82)	1.72 (0.03; 3.41)
>2210(♀)	3.21 (1.40; 5.02)	-0.03 (-1.63; 1.58)	0.13 (-1.10; 2.62)	-0.39 (-2.06; 1.27)

PHD -PHYSICAL HEALTH DIMENSION; **MHD**-MENTAL HEALTH DIMENSION; **BMI** - BODY MASS INDEX; **BDI**-BECK DEPRESSION INVENTORY

*MODAL ADJUSTED FOR AGE, EDUCATION LEVEL, OCCUPATION, BMI, DEPRESIVE SYMPTOMATOLOGY, CHRONIC DISEASE, REGULAR PHYSICAL EXERCISE AND SMOKING.

In men (Table 8), was found a significant linear negative association between PHD and age, white-collars occupation, BMI ≥30.0 Kg/m^2, depressive symptomatology, having any chronic disease, being ex-smokers and, sleeping 9 or more hours per day. Education level, regular physical exercise, total physical activity, fruit and vegetables consumption and intakes of more than 2495 Kcal present a positive association with the physical component of HRQoL before adjustment. When adjusted to age, education, BMI, depressive symptomatology, have any chronic disease and regular physical exercise, the association remained significant and negative for age, white-collars occupation, depressive symptomatology and, for those who have any chronic disease. Also, a significant and positive association remained for education level, regular physical exercise, total physical activity and, fruit and vegetables consumption.

Observing the MHD, in males and after adjustment, a significant and negative association was found for the depressive symptomatology and chronic disease. In addition, age, and total physical activity (32.96-37.30) presents a significant positive association with MHD, after adjustment.

TABLE.8. CRUDE AND ADJUSTED LINEAR REGRESSION COEFFICIENTS (¤ AND 95% CI) FOR MALES WITH THE PHD AND MHD AS DEPENDENT VARIABLES

	SFT		SMT	
AGE (years)	CRUDE	ADJUSTED*	CRUDE	ADJUSTED*
<45	0	0	0	0
45-64	-3.68 (-5.24; -2.13)	-2.54 (-4.16; -0.92)	1.15 (-0.42; 2.72)	2.75 (1.26; 4.24)
≥65	-8.29 (-10.08; -6.50)	-5.53 (-7.65; -3.41)	1.02 (-0.79; 2.83)	3.75 (1.81; 5.69)
EDUCATION LEVEL (years)				
≤4	0	0	0	0
>4 AND < 12	5.84 (4.09; 7.59)	3.40 (1.58; 5.21)	1.56 (-0.19; 3.32)	0.67 (-0.99; 2.33)
≥12	7.68 (5.96; 9.41)	4.37 (2.50; 6.23)	0.37 (-1.37; 2.11)	-0.43 (-2.14; 1.28)
OCCUPATION				
WHITE-COLLAR	0	0	0	
BLUE-COLLAR	-3.92 (-5.54; -2.30)	-3.39 (-4.98; -1.79)	0.54 (-1.02; 2.11)	1.32 (-0.13; 2.77)
OTHER	4.72 (0.98; 8.45)	-0.13 (-3.63; 3.37)	-0.94 (-4.56; 2.67)	-1.17 (-4.35; 2.01)
BMI (KG/M2)				
≤24.9	0	0	0	
25.0-29.9	-0.56 (-2.14; 1.02)	0.91 (-0.57; 2.38)	1.39 (-0.11; 2.89)	0.92 (-0.43; 2.27)
≥30.0	-3.88 (-6.03; -1.73)	-1.72 (-3.77; 0.33)	0.44 (-1.60; 2.48)	1.50 (-0.38; 3.37)
DEPRESSIVE SYMPTOMATOLOGY				
BDI-II =0 TO 9	0	0	0	
BDI-II =10 TO 18	-4.50 (-6.61; -2.40)	-2.92 (-4.84; -1.01)	-8.19 (-9.93; -6.46)	-8.62 (-10.38; -6.87)
BDI-II ≥19	-8.39 (-12.34; -4.44)	-4.92 (-8.54; -1.31)	-17.39 (-20.65; -14.13)	-18.09 (-21.40; -14.78)
HAVE ANY CHRONIC DISEASE				
NO	0	0	0	
YES	-4.72 (-6.11; -3.32)	-2.10 (-3.58; -0.62)	-1.28 (-2.64; 0.08)	-1.37 (-2.72; -0.01)
REGULAR PHYSICAL EXERCISE				
NO	0	0	0	
YES	2.03 (0.58; 3.48)	2.12 (0.75; 3.48)	-0.30 (-1.68; 1.08)	-0.56 (-1.81; 0.69)
SMOKING				
SMOKER	0	0	0	0
NO SMOKER	-0.58 (-2.40; 1.23)	1.05 (-0.68; 2.77)	1.45 (-0.28;3.18)	0.35 (-1.23; 1.92)
EX SMOKER	-2.35 (-4.06; -0.64)	0.53 (-1.22; 2.28)	0.52 (-1.11; 2.15)	-0.43 (-2.03; 1.18)
ALCOHOL (G/DAY)				
0	0	0	0	0
≤30	1.79 (-0.38; 3.97)	1.54 (-0.45; 3.54)	1.27 (-0.77; 3.31)	0.48 (-1.35; 2.31)
>30	1.32 (-0.911; 3.56)	1.64 (-0.48; 3.77)	3.26 (1.16; 5.36)	1.03 (-0.932; 2.98)
TOTAL PHYSICAL ACTIVITY (MET-h/day)				
<32.9	0	0	0	
32.9-37.3	3.22 (1.42; 5.02)	2.44 (0.74; 4.14)	1.66(-0.07; 3.38)	1.62(0.07; 3.17)
>37.3	3.58 (1.80; 5.35)	2.56 (0.82; 4.30)	1.95 (0.25; 3.65)	1.55 (-0.04; 3.13)
SLEEPING HOURS				
<7	0	0	0	0
7-8	-0.42 (-2.21; 1.37)	0.06 (-1.61; 1.73)	0.43 (-1.31; 2.18)	-0.78 (-2.30; 0.73)
≥9	-5.11 (-7.16; -3.06)	-1.62 (-3.74; 0.49)	-1.06 (-3.06; 0.94)	-0.55 (-2.47; 1.37)
FRUIT AND VEGETABLES CONSUMPTION				
NUMBER OF PORTIONS/DAY	0.41 (0.07; 0.757)	0.35 (0.02; 0.67)	0.06 (-0.27; 0.38)	-0.04 (-0.34; 0.25)
TOTAL ENERGY INTAKE				
<2074	0	0	0	0
2074-2495	0.44 (-1.38; 2.27)	-0.71 (-2.42; 1.00)	1.33 (-0.41; 3.07)	0.30 (-1.27; 1.87)
>2495	2.60 (0.84; 4.35)	0.68 (-1.00; 2.37)	0.32 (-1.36; 1.99)	-0.48 (-2.02; 1.07)

PHD -PHYSICAL HEALTH DIMENSION; MHD-MENTAL HEALTH DIMENSION; BMI - BODY MASS INDEX; BDI-BECK DEPRESSION INVENTORY

*MODAL ADJUSTED FOR AGE, EDUCATION LEVEL, OCCUPATION, BMI, DEPRESIVE SYMPTOMATOLOGY, CHRONIC DISEASE, REGULAR PHYSICAL EXERICISE AND SMOKING.

DISCUSSION

Despite of the several studies that deeply analyze the individual HRQoL, most of them are always associated to a specific pathology [28, 30, 39, 73, 74], what does not contribute to an easy comparison of the current data.

In this study a lower mental HRQoL was found in young people and in opposite a higher physical HRQoL, in comparison with older population. A previous German study [75] had already showed the different relation of age with both components of HRQoL. The study compared the HRQoL of patients in an urban surgical emergency department and showed a decrease of 0.2 ± 0.02 points in physical HRQoL by every additional life year. In the same study it was found that by every life year increase there was a small but significant increase in mental HRQoL, in according with the data from the present study. Another study from USA [76], found a decrease in physical HRQoL of 0.45 points points for every additional life year.

Consistent with other previous findings [77, 78], older adults reported lower physical HRQoL, whereas younger adults reported lower mental HRQoL. One explanation could be related to the fact that older adults are more likely to have chronic diseases that impair their physical health. The greater number of mental unhealthy days among young adults might indicate an increased risk for adoption of risky behaviours (e.g., cigarette smoking and, alcohol use) what would have serious consequences for health in young adults [79, 80]. Young adults might be at increased risk for psychological distress also related with the adaptation to new social roles (e.g., occupation and parenthood), because have less resilience in dealing with stressful life events and might have fewer financial resources to buffer them from stress [81-86]. However, older adults who might benefit from the additional resources conferred with age (e.g., income and wealth, access to Social Security and medical care) also might have

stressful life events that account for psychological distress. In addition, the observed age difference in mental health is limited to community-dwelling older adults and under represents older adults who are more likely to live in institutions and who might have poor cognitive or psychologic outcomes [87, 88]. Therefore, mental HRQoL are strongly associated with depression, and several authors [89-92] had already presented the same inverse relation between depression and age. A study in Canada [91] that analysed the relation between depression and socio-demographic factors, has showed that the highest prevalence rate of lifetime depression was seen in the age group of 20 to 24 years and the lowest rate in the age group of 75 years and over.

In our study no association was found between mental HRQoL and education level or occupation, but it was possible to observe that higher education was strongly positively associated with physical HRQoL in both sexes. A higher educational level and being a white-collar worker was associated with improved physical HRQoL. A population-based surveillance of health-related quality of life in USA [93] showed that the percentage of adults with less than a high school education (34.6%) who reported fair or poor health was higher than the high school graduates (15.7%), those with some college (10.7%), and college graduates (6.1%), who also reported fair or poor health. Those with less than a high school education reported lower physical HRQoL, lower mental HRQoL, than those with higher education. A higher educational level and having a white-collar occupation are often associated with higher income, less frequency of disease and more information on health, which can lead to higher quality of life.

In the present study obese females (BMI $\geq$30 Kg/m^2) presented a significant negative association in physical domain and a positive association in mental domain, and in obese males only a negative association was found for Physical HRQoL. A study [94] that determined whether the falls and balance measures were associated with HRQoL in obese adults, showed that obese adults may experience decreased quality of life because excess body fat can interfere with daily activities of physical functioning, such as, walking, bending, stooping and kneeling. A decreased ability to perform these physical tasks can possibly lead to dependency on other

individuals for aid with daily household chores. Consequently, obese individuals may feel a sense of inadequacy or failure that may lower their quality of life in both physical and mental health [94-96]. There are also studies showing that excess weight was related to worse physical, but not mental HRQoL [97, 98].

In this study, a positive association between physical exercise practice and Physical HRQoL was found in both sexes. A community study [99], around the Norman, Oklahoma area, showed that healthy adults, who regularly participated in physical activity at least moderate intensity for more than one hour per week, had higher HRQoL measures in both physical and mental domains than those who were less physically active [99]. Several studies have shown that organized, high-intensity exercise routines can benefit HRQoL in both diseases [100-104] and healthy populations [105, 106]. However, our results showed that men who has a higher total physical activity (>37.30 Met-h/day) have also a higher physical HRQoL while men who have moderate physical activity (32.96-37.30 Met-h/day) have a higher mental HRQoL. Therefore, incorporating more physical activity into the lifestyles of sedentary or slightly active individuals may improve their HRQoL.

As already it was expected [28, 30, 107, 108], the depression simptomatology presents a strong association with the HRQoL, both in the physical and mental component, showing that the questionnaire of the SF-36 and the BDI are strongly related.

In this study, the presence of chronic medical conditions is associated with decreased HRQoL in both domains in men and in only with physical domain in women. Mental health should be routinely assessed when addressing health needs of individuals and communities. Persons with chronic diseases may benefit from targeted health screening and programs that employ treatment approaches that jointly manage physical and mental health and provide improved links and access to services[107].

According a study [109], that analysed the impact of selected risk factors on quality-adjusted life in Denmark, would be expected that smoking and high alcohol consumption, strongly reduce life expectancy and HRQoL. Another study[74] in USA, showed that, smokers had

lower standardized PCS and MCS scores than never smokers (-2.4 to -4.5 points; p<0.01 for all) However, in our study as well as others [110-113] this relation was not observed.

One potential cause for this phenomenon could be related to the fact that in Portugal, particularly alcohol consumption is socially acceptable and globally people have not a good perception of the increased risk of disease according these factors. Also, due to a relatively reduce number of participants in some exposure classes, it was not possible to observe the association according to a large range of categories (for example: daily smokers were grouped with the occasional smokers).

One interesting point that should be highlighted is the positive association of the consumption of fruit and vegetables in men with the increase of the physical HRQoL. A London Study [114], aimed to assess the impact of interventions on quality of life and health status, and associations between changes in fruit and vegetable consumption, plasma vitamins C and E, and quality of life had already showed that the increase of fruit and vegetable intake and plasma vitamin levels may stimulate beneficial changes in physical health status in socio-economically deprived adults, in both sexes. The lack of studies related to HRQoL and the consumption of fruits and vegetables did not allowed to take more inferences about this determinant.

Several other characteristics, like productivity [8, 24, 58] incapacity absence, [8, 53, 58] positive adaptation [24] , economical factors [54-57, 59] ,independence [8, 56, 58] , environment are considerate as determinants of the HRQoL, but were not analysed in the present study.

These results should be interpreted with some caution because of design and measurement limitation. First, the fact that this study was a cross-sectional analysis limit the establishment of relations and its time sequence. The follow-up of the cohort will allow determining the real effect of exposures. However, because most of social and economics characteristics are not changed by QoL, it was possible to assume that the founded relations are not affected for an error of inverse causality. Second, the study reaches only persons who have a telephone and are able and willing to participate in the survey. At the time individuals

were selected to EPIPorto study, 97% of Porto households had telephone at home. Additionally, taking into account that the non-response bias could affect the validation of a study, it was previously performed a comparison between the individuals who accept to participate in the study and those who refused [64]. For the majority of the variables analysed (sex, age, education level, occupation, behavioural characteristics), it was not found any relevant statistical differences between the participants and those who had refused, supports the sample representativeness. Third, as the SF-36 questionnaire was self-administered, the final sample includes younger and more educated people when compared with the general population. So, some care should be made when extrapolating results. The data presented in this paper was based on HRQoL of a group of people, living in a metropolitan area of Northern Portugal. However, using a validated HRQoL measure, this study represents an initial effort to quantify factors, that contribute to characterize a vast group of the Portuguese population, since the socio-demographic profile of the people surveyed, whilst being similar to that of the Porto population of the same age group, represents a certain type of population, from an urban area.

CONCLUSION

The results showed that, in both sexes, younger individuals with higher education level, with white-collars occupation, with a minor or without any depressive symptoms, without chronic disease and with regular practices of physical exercise, present higher levels of physical HRQoL. In men, the spending high levels of energy and consuming more fruit and vegetables are very important components to increase HRQoL in the physical domain. In women having a lower or normal weight also increase physical HRQoL.

Older women with higher BMI, with absence of depressive symptoms and, those who have an intermediate level of energy intake (1824 and 2210 Kcal) present higher mental HRQoL. In men, the increase of age, absence of depressive symptoms, absence of chronic disease and an intermediate level of energy expenditure with physical exercise increases the mental HRQoL.

Local health agencies play a major role in promoting health and quality of life, and community indicators of HRQoL can help to guide planning programs to improve community health.

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ANNEX

ARTICLE:

"SOCIAL AND BEHAVIOURAL DETERMINANTS OF HEALTH RELATED QUALITY OF LIFE IN AN URBAN SAMPLE OF PORTUGUESE ADULTS"

ABSTRACT

Objective: To evaluate the association between demographic, social and behavioural characteristics and health related quality of life (HRQoL), in a urban population of Portuguese adults.

Subjects: A sample of 1322 habitants of Porto (791 women and 531 men) aged 18 to 90 years.

Measurements: All participants answered a structured questionnaire comprising information on social, demographic, behavioural, and clinical aspects. Anthropometrical measures, blood pressure and fasting blood samples were obtained. Diet was assessed using a semi-quantitative food frequency questionnaire and physical activity was evaluated using a questionnaire exploring all professional, domestic and leisure time activities. The Portuguese version 2.0 of the Short Form (SF-36v2), was self-administered, and was used to measure self-reported Health related quality of life. The magnitude of the association between characteristics and Physical (PHD) and Mental (MHD) health dimension of HRQoL were calculated using linear multiple regression.

Results: In both sexes, after adjustment, a negative association remained statistically significant between physical health dimension and age, occupation, depressive simptomatology and, with those who have any chronic disease. Also, in both sexes, significant and positive associations remained for education level and for practice of regular physical exercise and for the consumption of fruit and vegetables only in men. Regarding Mental health dimension, after adjustment, a significant and positive association was found for age, for obese, and for women who intakes between 1824-2210 Kcal of total energy, and total physical activity in men. In addition, a negative association was found with depressive symptomatology in both sexes and with chronic diseases in men.

Conclusion: In this population younger individuals, those with higher education level, with white-collars occupation, with a minor or without any depressive symptoms, without chronic disease and with regular practices of physical exercise present higher levels of Physical

HRQoL. Older people and those without depressive symptoms presented higher mental HRQoL, in both sex.

INTRODUCTION:

Since 1948, when the World Health Organization defined health as being not only the absence of disease and infirmity but also the presence of physical, mental, and social well-being, [1] the quality-of-life issues have become steadily more important in health care practice and research. [2]

Considering the "demographic transition and epidemiologic" it is essential the development of studies and actions in order to provide to all citizens, not only a longer over life, but also a good quality of life. [3-6]

The assessment of quality of life has become increasingly important in health care, particularly as an evaluative method to measure outcomes of the impact of disease and interventions. The expression *quality of life* denotes a relatively recent idea that has grown more complex over time.

There are several elements that can be pointed, as determinants for the well-being: physical and mental health, longevity, productivity incapacity absence, positive adaptation, economical factors, social, independence, environment and behaviour factors (smoking, physical activity, alcohol consumes, healthy way of life) [3, 7, 8, 9, 10]. In order to establish a politics that contributes to a well-succeeded aging, it is fundamental to investigate the causes or determinants that influence the quality of life.

This strategy, based on articulation between health and conditions/quality of life, is simply the promotion of the health, that based on the wide concept about the process health-illness and respective determinants, proposes the articulation between technical and popular know how, and the mobilization of private, public, community and institutional resources [11].

Also, in biomedical literature most of the studies developed to assess QoL and their determinants are too much focus into the disease, and not in population based QoL aspects.

Using a random sample of individuals of both sexes, with 18 or more years and residents in Porto, the present study intends to evaluate the association between demographic, social and behavioural characteristics and HRQoL, in an urban population of Portuguese adults.

PARTICIPANTS AND METHODS

During 1999-2003, as part of the baseline evaluation of EpiPorto Cohort study, 2485 Portuguese adults living in Porto, from both sexes, with age equal or higher than 18 years old, were evaluated [12]. Random digit dialling was used to select individuals [13], using as sample a set of individuals' residents in Porto with telephone at home. Once a household was selected, all residents were identified by age and sex, and one of those who fill the inclusion criteria was randomly selected without being allowed substitution of refusals. A participation rate of 70% was achieved [14].

The Mini-Mental State Examination (MMSE) was used for a rapid evaluation of cognitive impairment in individuals aged over 64 years [15]. Individuals who scored less than 24 in the MMSE were classified as inadequate to provide reliable information, leading to the exclusion of 74 participants, remaining for analysis 2415 participants. The SF-36 questionnaire was obtained from 1439 (59.6%) of the 2415 adults. Of these, 1322 (91.9%) completed at least 50% of the items from each subdimension of the SF-36 and were considered as final sample to the present analysis, 791 female (59.8%) and 531 male (40.2%), aged between 18 and 92 years old. About thirty-six percent were aged less than 45 years, 43.3% between the 45 and 64 years and 20.7% presented age over 64 years.

Comparing the social and demographic characteristics of those who filled the SF-36 questionnaire, with the total sample evaluated in EPIPorto study, no significant differences

were observed concerning the distribution according to sex and depressive symptoms. However, participants in the remaining sample were significantly younger, more educated and with lower frequency of chronic diseases.

Data Collection

Information was collected by trained interviewers using a structured questionnaire comprising data on social, demographic, personal and family medical history, bereavement and behavioural characteristics.

Occupation was classified according categories of the UK's Registrar General classification [16] and subsequently categorized in three different classes. The first correspond to the "White-collar occupations"; the second to the "Blue-collar occupations"; and the last class is composed by retired, invalid, and unemployed people, as well as house-wives and was designated as "Other".

Results about education were recorded in a continuous way, as completed years of schooling and afterwards catalogued and divided in three board categories: less than 5 years, between 5-11 and more than 11 years.

The occupation and the number of completed schooling years was considered as an indirect indicator of social-economical status (SES).

Physical activity was evaluated using a questionnaire that explores all professional, domestic, and leisure time activities, detailing for each activity the intensity, duration, and frequency [17]. The total activity was quantified as metabolic equivalent per hour, and the participants were classified according tertiles of distribution.

Anthropometric measures were obtained with the participant fasting, in light clothing and no footwear. Sample distribution of BMI is reported by standard WHO categories and nomenclature [18]: underweight (<18.5 Kg/m^2), normal weight (18.5-24.9 Kg/m^2), overweight (24.9-29.9 Kg/m^2) and obese (≥30 Kg/m^2). Due to the small number of underweight participants in this study underweight group and normal group were considered in the same class.

Smoking status was assessed and the participants were classified based on WHO categories [19]. Current smokers included both, daily (at least one cigarette per day at the time of the survey) and occasional smokers (less than a cigarette per day). A ex-smoker was a person who was formerly smoker but did not smoke for at least 6 months.

Considering the Alcohol habits, participants were classified as occasional drinkers if drank less than one glass per week, drinkers if drank at least one glass of any kind of alcoholic drink per week and ex-drinkers if had not drank for at least six months. In this study, the occasional drinkers group and the drinker group were added as well the ex-drinkers group with the no drinkers group.

A semi-quantitative food-frequency questionnaire [20] was used to quantify the total amount of alcohol also total energy intake and the consumption of fruit and vegetables.

To quantify the daily consumption of fruit and vegetables the correspondent items of fresh fruit, salads and cooked vegetables, soup and fresh fruit juice were included.

Depressive symptoms were measured using the Beck Depression Inventory (BDI) [21], a test with a 21-item and a multiple choice format. The statements are rank ordered and weighted to reflect the range of severity of the symptom from neutral to maximum severity. An index score of ≤9 is considered to be within normal range, a score of 10 to 18 determines mild-moderate depressive symptoms, scores of 19 to 29 toward moderate-severe depressive symptoms, and scores of 30-67 is in favour of extremely severe depressive symptoms [21].

"Number of children", and "Menopausal Status" were also collected for women.

The "Menopausal Status" was classified in a dichotomous variable: "Pre-menopausal" (which means during the last 12 months the interviewed had the menstrual period at least once), and "Pos-menopausal" (which means had not the menstrual period during last year).

SF-36

The Portuguese version of the MOS 36-Short Form (SF-36v2) [22], was self-administered, and was used to measure self-reported HRQoL. The SF-36 included of 8 subscales: physical functioning (10 items), role limitations due to physical problems (4 items), bodily pain (2

items), general health perceptions (5 items), energy/vitality (4 items), social functioning (2 items), role limitations due to emotional problems (3 items), and mental health (5 items) [22-24]. For each dimension items scores are coded, summed, and transformed on to a scale from 0 (worst possible health state measure by the questionnaire) to 100 (best possible health state).

When participants answer only to less than 50% of items from each sub-dimension were excluded. For the others, who filled at least half of the sub-dimension items, a median score of the remaining items was considered for missing items within each sub-dimension. The totality of questions were answered by 1074 (81,2%) participants.

To this study we used the two general dimensions of the SF-36, physical and mental health, defined previously in the same population [24]. The dimension of physical health contains physical functioning, role limitations due to physical problems, bodily pain, general health perceptions; the mental health dimension contains energy/vitality, social functioning, role limitations due to emotional problems, and mental health.

Statistical Analysis

The proportions were compared using the Chi-square test. The average and respectively standard deviations were calculated for the 8 dimensions of SF-36, and comparison of means values of the two dimension of SF-36 (PHD and MHD), according characteristics of participants, by sex, were compared using Kruskal-Wallis test.

Linear multiple regression was computed to estimate the crude and adjusted magnitude of the association. The final model include the following variables: "Age", "education" , "BMI", "Depressive symptoms", "Have any chronic disease", "Regular physical exercise", "Smoking habits" and "Alcohol drinking".

The different classes of each variable analysed were transformed in Dummies variables. The first class was always select as the reference in order to be possible to calculate the estimate gross value (Beta coefficient) and the adjusted value for the two dimensions, for each variable on the different levels.

Data were analysed using SPSS (version 14), separately for men and women.

RESULTS

The table 1 presents the mean values and correspondent standard deviation (SD) of all the eight SF-36 sub-scales and the two group, physical and mental health dimension, by sex. Women present a significantly lower average score than men for all sub-scales.

The higher average values, of the 8 sub scales, in women, were observed in the domain "role limitation due to physical and emotional problems" (73.0±27.4), while in men the higher value was observed in the domain "role limitation only due emotional problems" (85.6±19.7).On the other hand, the lower average values observed was for the "vitality" in females (52.0±21.1) and, "general health perception" in males (63.1±18.7).

Considering that the average value of 50 represents a level of HRQoL equal than the general population, was possible to observed, that in both dimension (PHD and, MHD) men presented an average score higher than the population (52.4±8.5 and 52.8±8.0) and women an lower average score (48.4±10.6 and 48.1±10.7).

In table 2, it is possible to observe that, in both sexes, the average values of physical health dimension changes significantly according to all demographic and social characteristics evaluated. The mean value of PHD decreases significantly with increasing age, BMI, depressive symptomatology score and number of children and increases with increasing educational level. It was also observed that participants classified as "*white-collar*" presents better Physical HRQoL (50.8±9.3 for females and 53.3±8.0 for males) and by the contrary "Blue-collar" presents worse Physical HRQoL (42.7±11.2 for females and 49.3±9.2 for males), considering the mean level of population. For the third class of occupation the mean value is higher than the population average in male but not in female, probably due to the fact that in the women this class is composed, mainly, by housekeeping and unemployed, while in the men the is composed, mainly by students.

The mean score values of MHD were only significant by different according to classes of depressive symptomatology maintained the same tendency previously observed for PHD. In both women and men, a decreasing mean values were observed according to increasing values of BDI that represents more depressive symptomatology.

Regarding the variation of HRQoL score according behavioural characteristics (table 3), it was observed that the average values of PHD were significantly different according to smoking, regular physical exercise, total physical activity, number of sleeping hours and total energy intake for both women and men. A significant higher mean values were found for smokers compared with non smokers or ex-smokers (52.3±9.0 vs. 46.9±10.8 vs. 51.0±9.3, p<0.001 for females and 53.5±8.2vs. 52.9± 8.1 vs. 51.2±8.8, p<0.019 for males), persons who practice regular physical exercise (50.9±9.4 vs. 47.1±10.8, p<0.001 for females and 53.6±8.3 vs. 51.6±8.5, p<0.004 for males), are more physically active, and those who consumed more energy. Also in women, those who consumed more than 5 portions of fruit and vegetables per day presented higher Physical HRQoL (49.9 ±9.5 vs. 47.6±10.9, p<0.003).

Analysing the mental component, the only statistical significant mean differences were observed according the consumption of fruit and vegetables presents in female, showing that women who consume more than 5 portions a day presented a better quality of mental life (49.4 ±10.3 vs. 47.3±11.0, p<0.011). In Men, the higher average values of mental component were presented in those who consumed more than 30g of alcohol per day compared with the second or first tertiles (54.3 ±7.0 vs. 52.3±7.69 vs. 51.0±10.0, p<0.004).

The table 4 and 5 shows the crude and adjusted linear regression coefficients (¤ and 95% CI) for women and men, respectively considering the PHD and MHD as dependent variables.

In women, in univariated analysis, a significant inverse linear association was found between PHD and age, BMI, depressive simptomatology, having any chronic disease. Also blue-collars workers vs. white-collars, no smokers vs. smokers, individuals in the third tertile of total physical activity vs. first tertile and those who slept 9 or more hours per day vs. less than

7h/day presented a significantly lower level of PHD. Contrarily a positive association was observed between PHD and education level, regular physical exercise, consumption of fruits and vegetables, sleeping 7 or 8 hours a day. Also women in the higher tertile of total energy intake (vs. first tertile) presented a significantly higher level of PHD.

After adjustment, the negative association remained statistically significant for age, blue-collar occupations, BMI ≥30.0 Kg/m^2, depressive simptomatology and, those who have any chronic disease. A positive association remained statistically significant for education level and for practice of regular physical exercise.

Regarding MHD, in women and after adjustment, a significant and positive association was found for age, for obese, and for women who intakes between 1824-2210 Kcal of total energy. In addition, a significantly negative association was found for depressive symptomatology.

In men (Table 5), was found a significant negative association between PHD and age, white-collar occupation, BMI ≥30.0 Kg/m^2, depressive symptomatology, having any chronic disease, being ex-smokers and, sleeping 9 or more hours per day. Education level, regular physical exercise, total physical activity, fruit and vegetables consumption and intakes of more than 2495 Kcal present a positive association with the physical component of HRQoL before adjustment. When adjusted, the association remained significant and negative for age, white-collars occupation, depressive symptomatology and, the one who have any chronic disease. Also, a significant and positive association remained for education level, regular physical exercise, total physical activity and, fruit and vegetables consumption.

Observing the MHD, in males and after adjustment, a significant and negative association was found for the depressive symptomatology and chronic disease. In addition, the age, and total physical activity (32.96-37.30) presents a significant positive association with MHD, after adjustment.

DISCUSSION/CONCLUSION

Despite of the several studies that deeply analyze the individual HRQoL, most of them are always associated to a specific pathology [25,26], what does not contribute to an easy comparison of the current data.

In this study a lower mental HRQoL was found in young people and in opposite a higher physical HRQoL, in comparison with older population. A previous German study [27] had already showed the different relation of age with both components of HRQoL. The study compared the HRQoL of patients in an urban surgical emergency department and showed a decrease of 0.2 ± 0.02 points in physical HRQoL by every additional life year. In the same study it was found that by every life year increase there was a small but significant increase in mental HRQoL, in according with the data from the present study. Another study from USA [28], found a decrease in physical HRQoL of 0.45 points points for every additional life year.

Consistent with other previous findings [29, 30], older adults reported lower physical HRQoL, whereas younger adults reported lower mental HRQoL. One explanation could be related to the fact that older adults are more likely to have chronic diseases that impair their physical health. The greater number of mental unhealthy days among young adults might indicate an increased risk for adoption of risky behaviours (e.g., cigarette smoking and, alcohol use) what would have serious consequences for health in young adults [31]. Young adults might be at increased risk for psychological distress also related with the adaptation to new social roles (e.g., occupation and parenthood), because have less resilience in dealing with stressful life events and might have fewer financial resources to buffer them from stress [32,33]. However, older adults who might benefit from the additional resources conferred with age (e.g., income and wealth, access to Social Security and medical care) also might have stressful life events that account for psychological distress. In addition, the observed age difference in

mental health is limited to community-dwelling older adults and under represents older adults who are more likely to live in institutions and who might have poor cognitive or psychologic outcomes [34, 35]

In our study no association was found between mental HRQoL and education level or occupation, but it was possible to observe that higher education was strongly positively associated with physical HRQoL in both sexes. A higher educational level and being a white-collar worker was associated with improved physical HRQoL. A population-based surveillance of health-related quality of life in USA [36] showed that the percentage of adults with less than a high school education (34.6%) who reported fair or poor health was higher than the high school graduates (15.7%), those with some college (10.7%), and college graduates (6.1%), who also reported fair or poor health. Those with less than a high school education reported lower physical HRQoL, lower mental HRQoL, than those with higher education. A higher educational level and having a white-collar occupation are often associated with higher income, less frequency of disease and more information on health, which can lead to higher quality of life.

In the present study obese females (BMI ≥30 Kg/m2) presented a significant and negative association with PHD and a positive association with MHD. In obese males only a negative association was found with Physical HRQoL. A study [37] that determined whether the falls and balance measures were associated with HRQoL in obese adults, showed that obese adults may experience decreased quality of life because excess body fat can interfere with daily activities of physical functioning, such as, walking, bending, stooping and kneeling. A decreased ability to perform these physical tasks can possibly lead to dependency on other individuals for aid with daily household chores. Consequently, obese individuals may feel a sense of inadequacy or failure that may lower their quality of life in both physical and mental health [37, 38]. There are also studies showing that excess weight was related to worse physical, but not mental HRQoL [39, 40].

In this study, a positive association between physical exercise practice and physical HRQoL was found in both sexes. A community study [41], around the Norman, Oklahoma area,

showed that healthy adults, who regularly participated in physical activity at least moderate intensity for more than one hour per week, had higher HRQoL measures in both physical and mental domains than those who were less physically active [41]. Several studies have shown that organized, high-intensity exercise routines can benefit HRQoL in both diseases [42, 43] and healthy populations [44]. However, our results showed that men who has a higher total physical activity (>37.30 Met-h/day) have also a higher physical HRQoL while men who have moderate physical activity (32.96-37.30 Met-h/day) have a higher mental HRQoL. Therefore, incorporating more physical activity into the lifestyles of sedentary or slightly active individuals may improve their HRQoL.

As already it was expected [45, 46], the depression simptomatology presents a strong association with the HRQoL, both in the physical and mental component, showing that the questionnaire of the SF-36 and the BDI are strongly related.

In this study, the presence of chronic medical conditions is associated with decreased HRQoL in both domains in men and in only with physical domain in women. Mental health should be routinely assessed when addressing health needs of individuals and communities. Persons with chronic diseases may benefit from targeted health screening and programs that employ treatment approaches that jointly manage physical and mental health and provide improved links and access to services [45].

According a study [47], that analysed the impact of selected risk factors on quality-adjusted life in Denmark, would be expected that smoking and high alcohol consumption, strongly reduce life expectancy and HRQoL. Another study [27] in USA, showed that, smokers had lower standardized PCS and MCS scores than never smokers (-2.4 to -4.5 points; $p < 0.01$ for all). However, in our study as well as others [48,49] this relation was not observed.

One potential cause for this phenomenon could be related to the fact that in Portugal, particularly alcohol consumption is socially acceptable and globally people have not a good perception of the increased risk of disease according these factors. Also, due to a relatively reduce number of participants in some exposure classes, it was not possible to

observe the association according to a large range of categories (for example: daily smokers were grouped with the occasional smokers).

One interesting point that should be highlighted is the positive association of the consumption of fruit and vegetables in men with the increase of the physical HRQoL. A London Study [50], aimed to assess the impact of interventions on quality of life and health status, and associations between changes in fruit and vegetable consumption, plasma vitamins C and E, and quality of life had already showed that the increase of fruit and vegetable intake and plasma vitamin levels may stimulate beneficial changes in physical health status in socio-economically deprived adults, in both sexes. The lack of studies related to HRQoL and the consumption of fruits and vegetables did not allowed to take more inferences about this determinant.

These results should be interpreted with some caution because of design and some measurement limitation. First, the fact that this study was a cross-sectional analysis limit the establishment of relations and its time sequence. The follow-up of the cohort will allow determining the real effect of exposures. However, because most of social and economics characteristics are not changed by QoL, it was possible to assume that the founded relations are not affected for an error of inverse causality. Second, the study reaches only persons who have a telephone and are able and willing to participate in the survey. At the time individuals were selected to EPIPorto study, 97% of Porto households had telephone at home. Additionally, taking into account that the non-response bias could affect the validation of a study, it was previously performed a comparison between the individuals who accept to participate in the study and those who refused [23]. For the majority of the variables analysed (sex, age, education level, occupation, behavioural characteristics), it was not found any relevant statistical differences between the participants and those who had refused, supports the sample representativeness. Third, as the SF-36 questionnaire was self-administered, the final sample includes younger and more educated people when compared with the general population. So, some care should be made when extrapolating results. The data presented in

this paper was based on HRQoL of a group of people, living in a metropolitan area of Northern Portugal. However, using a validated HRQoL measure, this study represents an initial effort to quantify factors, that contribute to characterize a vast group of the Portuguese population, since the socio-demographic profile of the people surveyed, whilst being similar to that of the Porto population of the same age group, represents a certain type of population, from an urban area.

In conclusion, the results showed that, in both sexes, younger individuals with higher education level, with white-collars occupation, with a minor or without any depressive symptoms, without chronic disease and with regular practices of physical exercise, present higher levels of physical HRQoL. In men, the spending high levels of energy and consuming more fruit and vegetables are very important components to increase HRQoL in the physical domain. In women having a lower or normal weight also increase physical HRQoL.

Older women with higher BMI, with absence of depressive symptoms and, those who have an intermediate level of energy intake (1824 and 2210 Kcal) present higher mental HRQoL. In men, the increase of age, absence of depressive symptoms, absence of chronic disease and an intermediate level of energy expenditure with physical exercise increases the mental HRQoL.

Local health agencies play a major role in promoting health and quality of life, and community indicators of HRQoL can help to guide planning programs to improve community health.

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TABLE 1. MEAN (SD) SCORES OF SF36 SUBSCALES ACCORDING TO SEX.

	FEMALE		MALE		
	n	MEAN (SD)	n	MEAN (SD)	P-VALUE
PHYSICAL FUNCTIONING	863	71.4 (24.1)	568	81.4 (21.4)	<0.001
ROLE LIMITATIONS DUE TO PHYSICAL PROBLEMS	839	73.0 (27.4)	553	82.0 (23.0)	<0.001
BODILY PAIN	845	58.6 (25.6)	559	76.3 (23.4)	<0.001
GENERAL HEALTH PERCEPTIONS	842	57.0 (20.2)	557	63.1 (18.7)	<0.001
VITALITY	840	52.0 (21.1)	562	65.0 (18.4)	<0.001
SOCIAL FUNCTIONING	858	71.6 (25.8)	568	82.8 (19.5)	<0.001
ROLE LIMITATIONS DUE TO EMOTIONAL PROBLEMS	825	73.0 (27.1)	550	85.6 (19.7)	<0.001
EMOTIONAL WELL-BEING	838	60.5 (23.6)	559	75.2 (16.6)	<0.001
PHD*	791	48.4 (10.6)	531	52.4 (8.5)	<0.001
MHD**	791	48.1 (10.7)	531	52.8 (8.0)	<0.001

*PHD -PHYSICAL HEALTH DIMENSION (include the physical functioning, role limitations due to physical problems, bodily pain, and general health perceptions).

**MHD-MENTAL HEALTH DIMENSION (include vitality, social functioning, role limitations due to emotional problems, and emotional well-being).

TABLE 2 SUBSCALES SCORES ACCORDING TO THE DEMOGRAPHIC AND SOCIAL CHARACTERISTICS OF PARTICIPANT, BY SEX.

	FEMALE		MALE	
	PHD	MHD	PHD	MHD
AGE (years)				
<45	53.9 (8.8)	47.3 (10.7)	55.9 (6.8)	52.1 (7.5)
45-64	46.9 (9.5)	48.5 (11.0)	52.2 (8.2)	53.2 (8.2)
≥ 65	40.8 (10.5)	48.9 (10.2)	47.6 (9.0)	53.1 (8.4)
p- value	**<0.001**	**0.388**	**<0.001**	**0.226**
EDUCATION (years)				
≤ 4	41.5 (10.3)	47.7 (10.9)	47.4 (9.4)	52.1 (8.3)
5-11	48.1 (9.2)	47.9 (11.6)	53.2 (7.7)	53.7 (7.8)
≥12	54.1 (8.2)	48.5 (9.9)	55.1 (7.0)	52.5 (8.0)
p- value	**<0.001**	**0.660**	**<0.001**	**0.138**
OCCUPATION				
WHITE-COLLAR	50.8 (9.3)	48.4 (10.8)	53.3 (8.0)	52.7 (8.3)
BLUE-COLLAR	42.7 (11.2)	47.9 (11.1)	49.3 (9.2)	53.3 (75)
OTHER	48.8 (10.6)	47.4 (9.8)	58.0(6.2)	51.8 (6.1)
p- value	**<0.001**	**0.362**	**<0.001**	**0.509**
BMI (Kg/m2)				
<24.9	52.1 (9.1)	48.0 (10.7)	53.3 (8.3)	52.1 (8.2)
25.0-29.9	47.2 (10.8)	47.7 (11.0)	52.7 (8.6)	53.5 (7.5)
>30.0	42.6 (10.2)	49.0 (10.6)	49.4 (7.9)	52.6 (8.6)
p- value	**<0.001**	**0.552**	**<0.001**	**0.244**
DEPRESSIVE SYMPTOMATOLOGY				
BDI-II =0 TO 9	51.7 (8.8)	53.0 (7.6)	53.7 (7.8)	55.1 (5.9)
BDI-II =10 TO 18	45.4 (11.4)	44.8 (9.9)	49.6 (9.0)	46.7 (8.4)
BDI-II ≥19	40.7 (11.0)	34.6 (9.5)	45.3 (10.5)	37.4 (8.3)
p- value	**<0.001**	**<0.001**	**<0.001**	**<0.001**
HAVE ANY CHRONIC DISEASE				
NO	53.0 (8.6)	48.7 (10.4)	54.7 (7.8)	53.5 (7.6)
YES	45.5 (10.7)	47.7 (10.9)	50.0 (8.6)	52.2 (8.4)
p- value	**<0.001**	**0.135**	**<0.001**	**0.074**
N° OF CHILDREN				
≤ 1	50.3 (10.0)	48.0 (10.9)	---	---
2-3	47.4 (10.6)	48.1 (10.6)	---	---
≥ 4	42.4 (10.5)	48.8 (10.3)	---	---
p- value	**<0.001**	**0.907**		
MENOPAUSAL STATUS				
POSTMENOPAUSAL	43.9 (10.4)	48.3 (10.8)	---	---
PRE-MENOPAUSAL	52.7 (8.9)	47.9 (10.7)	---	---
p- value	**<0.001**	**0.816**		

PHD-PHYSICAL HEALTH DIMENSION; MHD-MENTAL HEALTH DIMENSION; BMI - BODY MASS INDEX; BDI-BECK DEPRESSION INVENTORY

TABLE 3 MEAN (SD) SF36 SUBSCALES SCORES ACCORDING TO THE BEHAVIOURAL CHARACTERISTICS OF PARTICIPANTS, BY SEX.

	FEMALE		MALE	
	PHD	MHD	PHD	MHD
SMOKING				
SMOKER	52.3 (9.0)	46.6 (11.3)	53.5 (8.2)	52.2 (7.8)
NO SMOKER	46.9 (10.8)	48.2 (10.7)	52.9 (8.1)	53.1 (8.1)
EX-SMOKER	51.0 (9.3)	49.8 (10.8)	51.2 (8.8)	52.8 (8.3)
p- value	**<0.001**	**0.067**	**0.019**	**0.274**
ALCOHOL DRINKING				
DRINKER	46.9 (10.5)	48.6 (10.6)	52.6 (8.4)	53.1 (7.7)
NO DRINKER	47.0 (10.5)	46.7 (11.8)	51.2 (8.6)	53.1 (8.3)
p- value	**0.649**	**0.125**	**0.847**	**0.992**
ALCOHOL (g/day)				
0	48.5 (10.9)	47.4 (11.0)	51.1 (10.2)	51.0 (10.0)
≤15 (♀); ≤30 (♂)	49.1 (10.1)	48.7 (10.6)	52.9 (8.5)	52.3 (7.69)
>15 (♀) ; > 30 (♂)	46.4 (10.2)	49.2 (10.1)	52.4 (7.8)	54.3 (7.0)
p- value	**0.082**	**0.106**	**0.481**	**0.004**
REGULAR PHYSICAL EXERCISE				
NO	47.1 (10.8)	47.8 (10.9)	51.6 (8.5)	53.0 (8.1)
YES	50.9(9.4)	48.8 (10.4)	53.6 (8.3)	52.7 (7.9)
p- value	**<0.001**	**0.235**	**0.004**	**0.521**
TOTAL PHYSICAL ACTIVITY (MET-h/day)				
<33.3 (♀); <32.9 (♂)	46.8 (11.2)	46.7 (11.8)	50.1 (9.2)	51.6 (8.6)
33.3-35.9 (♀); 32.9-37.3 (♂)	47.2 (10.5)	48.7 (10.1)	53.4 (8.3)	53.2 (7.9)
> 35.9 (♀); >37.3 (♂)	50.5 (9.8)	48.7 (10.4)	53.6 (7.6)	53.5 (7.5)
p- value	**<0.001**	**0.161**	**0.001**	**0.084**
SLEEPING HOURS				
< 7	47.9 (10.9)	47.3 (11.0)	54.0 (6.8)	52.9 (7.9)
7-8	50.1 (9.9)	48.7 (11.1)	53.6 (7.9)	53.3 (7.8)
≥ 9	45.7 (10.9)	48.2 (10.8)	48.9 (9.8)	51.8 (8.6)
p- value	**<0.001**	**0.051**	**<0.001**	**0.139**
FRUIT AND VEGETABLES CONSUMPTION (portions/day)				
< 5	47.6 (10.9)	47.3 (11.0)	51.9 (8.7)	52.8 (8.0)
≥ 5	49.9 (9.5)	49.4 (10.3)	53.6 (7.8)	52.8 (8.1)
p- value	**0.003**	**0.011**	**0.066**	**0.779**
TOTAL ENERGY INTAKE (Kcal)				
<1824 (♀); <2074 (♂)	47.0 (10.7)	47.2 (11.1)	51.3 (9.4)	52.3 (8.4)
1824-2210(♀); 2074-2495 (♂)	47.8 (10.7)	49.1 (9.7)	51.8 (8.3)	53.6 (7.7)
> 2210(♀); >2495 (♂)	50.2 (10.1)	47.9 (11.2)	53.9 (7.5)	52.6 (7.9)
p- value	**0.001**	**0.167**	**0.010**	**0.400**

PHD -PHYSICAL HEALTH DIMENSION; **MHD**-MENTAL HEALTH DIMENSION; **SD** (STANDARD DEVIATION)

TABLE.4 . CRUDE AND ADJUSTED LINEAR REGRESSION COEFFICIENTS (¤ AND 95% CI) FOR FEMALES WITH THE PHD AND MHD AS DEPENDENT VARIABLES

	PHD ¤ (95%CI)		MHD ¤ (95%CI)	
AGE (years)	CRUDE	ADJUSTED*	CRUDE	ADJUSTED*
<45	0	0	0	0
45-64	-6.99 (-8.46; -5.52)	-3.01 (-4.52; -1.50)	1.17 (-0.49; 2.84)	2.43 (0.86; 4.02)
≥ 65	-13.10 (-14.98; -11.22)	-7.52 (-9.70; -5.33)	1.57 (-0.57; 3.70)	3.85(1.57; 6.12)
EDUCATION LEVEL (years)				
≤ 4	0	0	0	0
5-11	6.61 (4.97; 8.25)	4.26 (2.50; 6.02)	0.12 (-1.80; 2.04)	-0.20 (-2.03; 1.64)
≥12	12.59 (11.05; 14.14)	6.95 (5.09; 8.82)	0.76(-1.04; 2.56)	-1.49 (-3.43; 0.46)
OCCUPATION				
WHITE-COLLAR	0	0	0	0
BLUE-COLLAR	-8.10 (-9.74; -6.46)	-4.11 (-5.77; -2.46)	-0.55 (-2.31; 1.21)	1.36 (-0.33; 3.05)
OTHER	-1.94 (-3.99; 0.12)	-1.37 (-3.30; 0.55)	-1.00 (-3.21; 1.20)	-0.20 (-2.17; 1.76)
BMI (Kg/m2)				
≤24.9	0	0	0	0
25.0-29.9	-4.87 (-6.47; -3.27)	-0.71 (-2.23; 0.81)	-0.21 (-1.95; 1.52)	-0.69 (-2.28; 0.89)
≥30.0	-9.55 (-11.38; -7.73)	-4.08 (-5.89; -2.26)	1.02 (-0.96; 3.00)	1.96 (0.07; 3.85)
DEPRESSIVE SYMPTOMATOLOGY				
BDI-II =0 TO 9	0	0	0	0
BDI-II =10 TO 18	-6.76 (-8.62; -4.89)	-2.82 (-4.43; -1.20)	-8.16 (-9.79; -6.54)	-9.42 (-11.10; -7.74)
BDI-II ≥19	-10.84 (-13.20; -8.47)	-6.52 (-8.56; -4.47)	-18.00 (-20.06; -15.94)	-19.42 (-21.55; -17.29)
HAVE ANY CHRONIC DISEASE				
NO	0	0	0	0
YES	-7.42 (-8.86; -5.99)	-2.64 (-4.06; -1.23)	-0.99 (-2.53; 0.55)	0.07 (-1.41; 1.54)
REGULAR PHYSICAL EXERCISE				
NO	0	0	0	0
YES	3.77 (2.27; 5.27)	1.85 (0.49; 3.21)	0.98 (-0.59; 2.54)	-0.57 (-1.99; 0.85)
TOTAL PHYSICAL ACTIVITY(MET/day)				
<33.3	0	0	0	0
33.3-35.9	0.42 (-1.47; 2.32)	0.66 (-1.05; 2.38)	2.03 (0.07; 3.98)	-0.13(-1.91; 1.65)
> 35.9	3.74 (1.91; 5.56)	1.28 (-0.38; 2.95)	2.05 (0.17; 3.93)	-0.31 (-2.04; 1.42)
SMOKING				
SMOKER	0	0	0	0
NO SMOKER	-5.36 (-7.24; -3.48)	-0.34 (-2.09; 1.40)	1.64 (-0.32; 3.61)	-0.25 (-2.07; 1.57)
EX SMOKER	-1.31 (-3.91; 1.30)	-0.89 (-3.18; 1.41)	3.19 (0.47; 5.92)	0.39 (-2.01; 2.79)
ALCOHOL (g/day)				
0	0	0	0	0
≤15	0.61 (-0.98; 2.20)	0.06 (-1.34; 1.46)	1.31 (-0.31; 2.92)	0.62 (-0.84; 2.07)
>15	-2.05 (-4.34; 0.24)	0.34 (-1.68; 2.35)	1.80 (-0.53; 4.14)	-0.08(-2.18; 2.02)
SLEEPING HOURS				
< 7	0	0	0	0
7-8	2.14 (0.21; 4.07)	0.46 (-1.22; 2.14)	1.33 (-0.66; 3.32)	0.06 (-1.68; 1.80)
≥ 9	-2.19 (-4.33; -0.04)	-0.23 (-2.15; 1.69)	-0.80 (-3.02; 1.41)	-0.89 (-2.88; 1.10)
FRUIT AND VEGETABLES CONSUMPTION				
NUMBER OF PORTIONS	0.59 (0.26; 0.92)	0.28 (-0.02; 0.58)	0.50 (0.16; 0.85)	0.065 (-0.25; 0.38)
TOTAL ENERGY INTAKE (Kcal)				
<1824 (♀)	0	0	0	0
1824-2210(♀)	0.77 (-1.07; 2.62)	-1.18 (-2.80; 0.45)	1.93 (0.04; 3.82)	1.72 (0.03; 3.41)
> 2210(♀)	3.21 (1.40; 5.02)	-0.03 (-1.63; 1.58)	0.13 (-1.10; 2.62)	-0.39 (-2.06; 1.27)

PHD -PHYSICAL HEALTH DIMENSION; MHD-MENTAL HEALTH DIMENSION; BMI - BODY MASS INDEX; BDI-BECK DEPRESSION INVENTORY

*MODAL ADJUSTED FOR AGE, EDUCATION LEVEL, OCCUPATION, BMI, DEPRESIVE SYMPTOMATOLOGY, CHRONIC DISEASE, REGULAR PHYSICAL EXERICISE AND, SMOKING.

TABLE.5 . CRUDE AND ADJUSTED LINEAR REGRESSION COEFFICIENTS (¤ AND 95% CI) FOR MALES WITH THE PHD AND MHD AS DEPENDENT VARIABLES

	SFT		SMT	
AGE (years)	CRUDE	ADJUSTED*	CRUDE	ADJUSTED*
<45	0	0	0	0
45-64	-3.68 (-5.24; -2.13)	-2.54 (-4.16; -0.92)	1.15 (-0.42; 2.72)	2.75 (1.26; 4.24)
≥ 65	-8.29 (-10.08; -6.50)	-5.53 (-7.65; -3.41)	1.02 (-0.79; 2.83)	3.75 (1.81; 5.69)
EDUCATION LEVEL (years)				
≤ 4	0	0	0	0
>4 AND < 12	5.84 (4.09; 7.59)	3.40 (1.58; 5.21)	1.56 (-0.19; 3.32)	0.67 (-0.99; 2.33)
≥12	7.68 (5.96; 9.41)	4.37 (2.50; 6.23)	0.37 (-1.37; 2.11)	-0.43 (-2.14; 1.28)
OCCUPATION				
WHITE-COLLAR	0	0	0	
BLUE-COLLAR	-3.92 (-5.54; -2.30)	-3.39 (-4.98; -1.79)	0.54 (-1.02; 2.11)	1.32 (-0.13; 2.77)
OTHER	4.72 (0.98; 8.45)	-0.13 (-3.63; 3.37)	-0.94 (-4.56; 2.67)	-1.17 (-4.35; 2.01)
BMI (KG/M2)				
≤24.9	0	0	0	
25.0-29.9	-0.56 (-2.14; 1.02)	0.91 (-0.57; 2.38)	1.39 (-0.11; 2.89)	0.92 (-0.43; 2.27)
≥30.0	-3.88 (-6.03; -1.73)	-1.72 (-3.77; 0.33)	0.44 (-1.60; 2.48)	1.50 (-0.38; 3.37)
DEPRESSIVE SYMPTOMATOLOGY				
BDI-II =0 TO 9	0	0	0	
BDI-II =10 TO 18	-4.50 (-6.61; -2.40)	-2.92 (-4.84; -1.01)	-8.19 (-9.93; -6.46)	-8.62 (-10.38; -6.87)
BDI-II ≥19	-8.39 (-12.34; -4.44)	-4.92 (-8.54; -1.31)	-17.39 (-20.65; -14.13)	-18.09 (-21.40; -14.78)
HAVE ANY CHRONIC DISEASE				
NO	0	0	0	
YES	-4.72 (-6.11; -3.32)	-2.10 (-3.58; -0.62)	-1.28 (-2.64; 0.08)	-1.37 (-2.72; -0.01)
REGULAR PHYSICAL EXERCISE				
NO	0	0	0	
YES	2.03 (0.58; 3.48)	2.12 (0.75; 3.48)	-0.30 (-1.68; 1.08)	-0.56 (-1.81; 0.69)
SMOKING				
SMOKER	0	0	0	0
NO SMOKER	-0.58 (-2.40; 1.23)	1.05 (-0.68; 2.77)	1.45 (-0.28;3.18)	0.35 (-1.23; 1.92)
EX SMOKER	-2.35 (-4.06; -0.64)	0.53 (-1.22; 2.28)	0.52 (-1.11; 2.15)	-0.43 (-2.03; 1.18)
ALCOHOL (G/DAY)				
0	0	0	0	0
≤30	1.79 (-0.38; 3.97)	1.54 (-0.45; 3.54)	1.27 (-0.77; 3.31)	0.48 (-1.35; 2.31)
>30	1.32 (-0.911; 3.56)	1.64 (-0.48; 3.77)	3.26 (1.16; 5.36)	1.03 (-0.932; 2.98)
TOTAL PHYSICAL ACTIVITY (MET-				
<32.9	0	0	0	
32.9-37.3	3.22 (1.42; 5.02)	2.44 (0.74; 4.14)	1.66(-0.07; 3.38)	1.62(0.07; 3.17)
>37.3	3.58 (1.80; 5.35)	2.56 (0.82; 4.30)	1.95 (0.25; 3.65)	1.55 (-0.04; 3.13)
SLEEPING HOURS				
< 7	0	0	0	0
7-8	-0.42 (-2.21; 1.37)	0.06 (-1.61; 1.73)	0.43 (-1.31; 2.18)	-0.78 (-2.30; 0.73)
≥ 9	-5.11 (-7.16; -3.06)	-1.62 (-3.74; 0.49)	-1.06 (-3.06; 0.94)	-0.55 (-2.47; 1.37)
FRUIT AND VEGETABLES CONSUMPTION				
NUMBER OF PORTIONS	0.41 (0.07; 0.757)	0.35 (0.02; 0.67)	0.06 (-0.27; 0.38)	-0.04 (-0.34; 0.25)
TOTAL ENERGY INTAKE				
<2074	0	0	0	0
2074-2495	0.44 (-1.38; 2.27)	-0.71 (-2.42; 1.00)	1.33 (-0.41; 3.07)	0.30 (-1.27; 1.87)
>2495	2.60 (0.84; 4.35)	0.68 (-1.00; 2.37)	0.32 (-1.36; 1.99)	-0.48 (-2.02; 1.07)

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