Association of low back pain on physical, sociodemographic and lifestyle factors across a general population sample within Greece

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Abstract.
BACKGROUND: Although low back pain (LBP) is a debilitating problem internationally, there is not a lot of research on its impact on physical, psychosocial and lifestyle factors. Especially in Mediterranean countries, such as Greece, it is not sufficiently explored whether physical (pain location, activity limitation etc.), sociodemographic (education, smoking etc.) or lifestyle factors (i.e. quality of life or anxiety) are influenced by LBP.
OBJECTIVE: To estimate LBP prevalence in the Greek general population and explore its association with particular sociodemographic, physical and lifestyle factors.
METHOD: A sample of 3125 people of the Greek adult population was randomly selected by stratified sampling encompassing rural and urban representation within the Greek mainland. An extended survey form was developed entailing three sections; personal (sociodemographic) information, questions on symptomatology and physical factors (i.e. pain characteristics, recurrence, physical disability etc.) and 3 self-administered questionnaires (including mostly lifestyle factors); Hospital Anxiety and Depression (HAD) scale for anxiety and depression, SF-12 for quality of life (QoL) and Roland-Morris for disability.
RESULTS: A total of 471 (15%) people reported LBP (210 males, mean age: 47.04 ± 15.03). Amongst them 60% reported sciatica, 76% suffered recurrent LBP and 70% received specialist care. Low disability levels, moderate to high pain intensity, gender differences and good self-reported QoL and psychosocial status were reported. Sociodemographic characteristics (income, smoking, marital status etc.) were not associated with LBP physical factors, apart from age which correlated with physical disability and wellness (r being 0.446 and 0.405, respectively, $p < 0.001$). Physical factors (particularly pain intensity and location) correlated with lifestyle factors (QoL) and disability (r ranging between 0.396 and 0.543, $p < 0.001$). Mental wellness, anxiety and depression (as lifestyle factors) were not associated with sociodemographic or physical factors.
CONCLUSIONS: Physical parameters were amongst the most prevalent characteristics of the Greek sample, thus offering a direction towards a more targeted treatment and rehabilitation planning. Unlike previous literature, most sociodemographic characteristics were not correlated with any LBP physical or lifestyle factors, thus possibly indicating a different socioeconomic background and aetiology domain to that of the usual non-specific LBP spectrum.

Keywords: Low back pain, prevalence, physical, sociodemographic, lifestyle, Greece

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1. Introduction

Low back pain is one of the commonest musculoskeletal entities, notorious in causing physical, economic, functional, psychosocial, behavioural and lifestyle problems. It is suggested to affect up to 60–80% of the general adult population at some point in their lifetime [1–4]. High prevalence rates are internationally widespread [3,5–7], from the most developed parts of the world, including US [8,9], North America [5], Australia [2], Great Britain [10,11] and other European countries [11–16], to developing ones [17,18], such as Pakistan [19], Turkey [20] and Nigeria [21,22].

LBP appears to be a highly prevalent problem within Greece, too. It is considered ninth in the list of the most common reasons requiring hospital admission [23] and first in the list of orthopaedic conditions being encountered in an emergency department [24]. It also seems to be the most common musculoskeletal problem amongst the Greek population [25]. In an extensive cross-sectional study across Greece, a group of rheumatologists investigated the prevalence of rheumatic diseases, and found that the most common one was LBP, with a point prevalence of 11% [25]. Stranjalis et al. [15] in a cross-sectional study encompassing mainly urban population, found a one-month prevalence rate of 32%. A more recent smaller-scale study investigated the annual prevalence patterns of musculoskeletal diseases in rural primary care settings in Crete, the largest Greek island [26]. LBP presented with the highest prevalence rate of approximately 57% amongst the various musculoskeletal conditions studied. A more recent study within an urban setting reported 40% LBP and 25% sciatica [27]. Some other epidemiological studies have also investigated occupational LBP in Greece, in nursing staff [28], shipyard employees [29], dentists [30], public office workers [31], all of which reported high prevalence rates.

In terms of reported physical factors, such as pain intensity and location, disability, chronicity, information on symptoms, work absence and care-seeking or other lifestyle parameters, such as quality of life or psychosocial impact, there is scarcity of relevant research within the Greek setting. Spyropoulos et al. [31] reported an 11% of his affected population (public office workers) suffering from severe LBP, 43% of which suffered from recurrent episodes. Within the occupational studies, work absence ranged between 10% and 30% [28–30] whereas, Stranjalis et al. [15] reported a sick leave rate of 19% amongst the general population with a mean duration of 5 days off work. In terms of healthcare utilisation, approximately 30% of the affected LBP samples consulted a physician doctor or a general practitioner for their symptoms [15,26].

From the above, it is evident that in Greece, LBP is a debilitating problem, however, there is not a lot of available research on its impact on physical factors, such as pain parameters and physical disability, or on lifestyle factors, such as quality of life (QoL) and other psychosocial parameters. Furthermore, as LBP is acknowledged as a health problem with not only biomedical, but also social, psychological, economic and functional consequences, it is important to explore how several sociodemographic (i.e. marital status, smoking, education etc.) and lifestyle factors (i.e. anxiety or physical quality of life) within the Greek setting are influenced by LBP.

Given the above, the aims of the present study were to estimate LBP prevalence in a Greek general population sample and explore its association with several physical, sociodemographic and lifestyle factors.

2. Methods

2.1. Sample

The sample included Greek citizens over the age of 16, which were selected by multistage sampling with definition of the sample quotas based on sex, and geographical type of residence (urban, semi-urban, rural), according to the results of the 2011 National Census of the Hellenic Statistical Authority (ELSTAT), the Greek official statistical authority. The geographical area covered included central and western Greece, and according to the 2011 National Census, urban representation corresponded to cities with more than 10.000 inhabitants, semi-urban to towns with population between 2000 and 10000 people, and rural areas corresponded to villages with less than 2000 inhabitants. In order to obtain a representative sample of Greek citizens, the sample was stratified according to geographical location, to obtain as greatest representation as possible. For the geographical location, central and western Greek mainland was divided into 5 urban areas, encompassing 2 large (Athens, Patras), 2 medium sized (Ioannina, Trikala) and one smaller city (Korinthos). In addition, 20 rural areas (10 towns and 10 villages) surrounding each selected city except for Athens were picked up for the study.

The survey was conducted and administered by 8 physiotherapists, well trained in this questionnaire administration procedure, who attended a full-day training by the principal investigator (EB) on interview administration utilising the presenting assessment form.

The study was approved by the Scientific Committee of the Technological Educational Institute (TEI) of Western Greece (former TEI of Patras).

2.2. Survey development

An extended survey form based on current literature was developed. The survey form which was developed *(Greek survey)* was self-reported including personal (sociodempgraphic) information (age, education, marital status, annual income, smoking history etc.) and 18 questions on physical features, that is, symptoms, functionality and LBP-associated history (recurrence, treatment, other musculoskeletal etc.), which according to the literature have been found to be strongly associated with LBP [3,4,15,32]. The majority of the questions were taken from an assessment sheet *(Greek proforma)*, which has previously been tested for its reliability and has already been utilised among Greek LBP samples [33,34]. Questions on symptoms included pain areas by numbered areas on a body chart), pain intensity on a visual analogue scale (VAS) being reported on three levels; average pain (i.e. what is their pain on average), pain at its 'worst' (i.e. what is their maximum amount of pain) and pain at its 'best' (what is the minimal amount of pain they have), reported sciatica, frequency, etc. LBP was reported if the participant suffered during the past 7 days (including the day of the survey) [35] and pain was located in the lumbar (low back) region.

In addition, three reliable, validate and extensively used self-administered questionnaires were added in the Greek survey form: i) The Roland-Morris Disability Questionnaire, which is one of the most popular questionnaires (entailing 24 questions), assessing mild to moderate physical disability caused by LBP, ii) Tthe Hospital Anxiety and Depression (HAD) scale, which is a 14-item scale detecting anxiety (7 items) and depression (7 items) in people with physical health problems, and finally iii), the SF-12 Health Survey, often reported as a QoL measure. It is a shorter version of the SF-36 Health Survey (version 2), entailing 12 questions for measuring physical health and well-being (mental health). All three questionnaires have previously been cross-culturally validated within the Greek setting and have been utilised across similar populations [34,36–38].

Prior to being administered, the survey form was piloted in a LBP sample of 30 people, for clarity and comprehensiveness. Following this, some minor corrections based on the pilot sample feedback were undertaken.

2.3. Procedure undertaken

For each of the 25 testing sites in total, the 'starting point zero', corresponded to the biggest (and most popular) square of the town, city or village; which usually constitutes the buzziest location in the Greek settings. From this zero point, each tester was directed towards an eastern and northern direction and included in the study every third household/building situated on the right side of the central road (number 3 was a randomly selected number). Testers were instructed to ask each subject a standardised question in order to identify if they suffered LBP. Age and sex of people who did not suffer from LBP were reported whereas, people who suffered LBP were provided a full informed consent prior to their participation in the study. In cases where there was no answer from a given household (i.e. people were absent), interviewers would visit for a second time (evening time). When each tester would reach the end of road or the border of the given city, town or village, he was instructed to return to the central square again following a parallel road or avenue and start again surveying by using a 5-point star-type clockwise route. The study was carried out between October and November 2012.

2.4. Data analysis

Prevalence was estimated descriptively by frequencies and percentages, whereas, LBP factors (sociodemographic, physical and lifestyle data) were also estimated descriptively (means and standard deviations for interval/ratio data and percentages and frequencies for nominal/ordinal type data). The association of LBP features with several sociodemographic, physical and lifestyle parameters was tested using χ^2, independent sample t tests and Pearson's correlation coefficient. Regression analysis was carried out using two linear regression analysis models with two dependent variables for predicting associations; i) pain intensity (based on the worst pain intensity on the VAS) and ii) disability (based on the Roland-Morris Disability Questionnaire). Analysis was performed utilising SPSS (Version 20.0).

Table 1
Sample overview across central and western Greece

Urban area	Reported inhabitants*	People being asked (number)	People with LBP number (percentage)	Men number (percentage)
Athens (central)	3089698	1167	74 (6,34%)	33 (44,6%)
Patras (west)	213984	837	129 (15,4%)	74 (57,3%)
Ioannina (north west)	89061	389	99 (25,45%)	42 (42,4%)
Trikala (centre-north)	61653	407	83 (20,34%)	29 (34,9%)
Korinthos (central-west)	58192	325	86 (24,46%)	32 (37,2%)
Total	**3512588**	**3125**	**(15,07%)**	**210 (44,6%)**

*Based on 2011 National census of the Hellenic Statistical Authority (ELSTAT).

Table 2
Sociodemographic, physical and lifestyle data of the sample ($n = 471$)

		Percent (nu)
Sociodemographic		
Residence	Rural	17% (81)
	Urban	44% (206)
	Semi-urban	40% (184)
Education	Primary	22% (102)
	High school	48% (224)
	Higher education	31% (145)
Smoking	Non-smokers	61% (285)
	Heavy smokers (> 2 p/day)	21% (99)
Marriage	Not married	25% (119)
	Married	64% (300)
	Divorsed/widowed	11% (51)
Income (annual)	< 7200€	30% (140)
	7200–24000€	60% (281)
	> 24000€	7% (32)
Physical		
Pain location	LBP during last month	98% (460)
	Sciatica during last month	60% (281)
	Pain below the knee	40% (188)
Frequency	Every day	180% (85)
	Most days	54% (254)
Recurrence	LBP recurrent episodes	76% (356)
Activity limitation	LBP – limiting activities	61% (289)
	Sciatica – limiting activities	36% (11)
Investigations	Xray	34% (158)
	MRI	12% (56)
Bed rest	Bed rest (2–3 days)	17% (80)
	Bed rest (< 1 week)	11% (52)
	Bed rest (2 weeks)	7% (31)
	> 1 month bed rest	8% (38)
Recovery status	Improvement	48% (224)
	No improvement	33% (157)
	Exacerbation	15% (69)
Other problems	Other musculoskeletal problems	35% (163)
Sick leave		31% (147)
Specialist visit		70% (330)
Treatment		70% (329)
	Mean (SD)	**95% confidence intervals**
VAS-average pain intensity	5,26 (1,857)	5,10–5,43
VAS-pain at worst	7,99 (1,87)	7,82–8,16
Disability (Roland-Morris)	10,01 (6,14)	9,46–10,57
Lifestyle		
HAD (anxiety subscale)	11,24 (6,22)	10,68–11,81
HAD (depression subscale)	9,16 (6,44)	8,57–9,74
SF-12 Physical subscore	41,06 (9,67)	40,19–41,94
SF-12 Mental subscore	46,02 (10,86)	45,04–47

3. Results

Out of 3125 people being questioned, a total of 471 (15%) reported LBP (210 males, 261 females, mean age: 47,04 ± 15,03) at the time of the survey. Table 1 summarises the sample's distribution according to geographical area. Amongst them, nearly 76% were suffering from recurrent LBP, 60% reported associated leg pain (sciatica), and 70% received specialist care and were already under some form of conservative treatment. Their average and worst pain intensity on a VAS score was 5.26 ± 1.8 and 7.99 ± 1.8, respectively. 61% reported that their LBP was limiting their activities and function. Table 2 summarises the sample's sociodemographic, physical & lifestyle characteristics.

Table 3 presents the results of linear regression analysis using two different dependent variables; pain intensity (VAS at worst) and disability (Roland-Morris), keeping as independent variables the samples's sociodemographic, physical and lifestyle characteristics. Significant regression equations were found for pain intensity[1] and disability.[2] *Pain intensity* was associated with age from the sociodemographic factors, bed rest, activity limitation due to LBP and specialist visit from the physical factors, and anxiety and mental health from the lifestyle factors. *Disability* was associated with sex and age (sociodemographic), activity limitation due to sciatica, bed rest, pain intensity and frequency from the physical factors, and physical wellness (lifestyle factor).

Table 4 presents associations (correlations) with sociodemographic, physical and lifestyle factors across the sample. Sociodemographic characteristics (income, smoking, marital status etc.) did not yield significant associations, apart from age which correlated with disability (physical factor) and physical wellness (lifestyle factor), (r being 0.446 and −0.405, respectively, with $p < 0.001$). Significant associations were yielded between pain intensity with disability (as physical factors) and QoL (SF-12 physical subscale as a lifestyle factor), (r being 0.543 and −0.453, respectively with $p < 0.001$). Below knee pain was associated only with activity limitation ($r = 0.453$). The other lifestyle factors (anxiety, depression and mental wellness) had only weak associations with age, education and pain intensity; r ranging between 0.301 and 0.342 ($p < 0.001$). Whereas, visit to specialist had weak associations with high disability and QoL (r between 0.327 and 0.379, $p < 0.001$).

[1] [$F_{(22,448)} = 41.245$, $p < 0.001$, with an R^2 of 0.669].
[2] [$F_{(4,466)} = 19.441$, $p < 0.001$, with an R^2 of 0.143].

In terms of gender, although men and women had comparable ages (men-mean age 45.29 ± 14.9, women-mean age: 48.45 ± 15.0), significant differences amongst them were reported on several sociodemographic (education, marital status, smoking, annul income), physical (sciatica and its functionality, pain intensity, specialist visit, other musculoskeletal problems) and lifestyle factors (anxiety and depression and metal health). LBP recurrence, disability, bed rest, treatment, LBP functionality and physical health did not reveal statistically significant gender differences. Table 5 summarises gender-adjusted prevalence distributions of sociodemographic, physical and lifestyle parameters.

4. Discussion

The present study aimed to explore the association of sociodemographic, physical and lifestyle factors on LBP in a general population sample of central and western Greece. It was within the scope of the study to attempt to use a representative sample of the general population, encompassing a combination of rural and urban representations. The combination of the 5 cities with variable sizes across central and western mainland and the selection of two towns and villages surrounding each city was thought to be an objective way of capturing a general population sample.

4.1. Prevalence

The prevalence of LBP (15%) found in the present study is in agreement with an older systematic review by Walker [6] on LBP point prevalence (ranging between 12–33%), as well as a more recent systematic review by Hoy et al. [7] on the global prevalence of LBP, which showed the point prevalence of activity-limiting LBP was estimated to be 12 ± 2%, and the 1-month prevalence was estimated to be 23 ± 2.9%. However, a number of epidemiological studies have yielded higher prevalence rates in developing (56% in Qatar [39], 32% in Africa [18], 34% in Tibet [40]) and developed countries (19% [41] and 15–22% [11] in UK with a trend of an increased prevalence over time [42], 26% in Australia [2], 26,9% in the Netherlands [14], 29% in Canada [43], and between 32% and 48% in Germany [11,35]).

Similar to international studies, previous Greek studies have yielded considerable variability in prevalence rates. Point prevalence range between 11% in a

Table 3
Linear regression analysis between sociodempgraphic, physical and lifestyle factors as independent variables and pain intensity & physical disability as dependent ones

Factors		Worst pain intensity†	Disability‡
Sociodemographic	Sex	0.914	0.006*
	Age	0.000**	0.013*
	area	0.744	0.354
	education	0.278	0.545
	maritalstatus	0.353	0.083
	Annual income	0.074	0.492
	Smoking	0.709	0.660
Physical	VAS-average pain intensity	0.000**	0.095
	VAS-pain at best	0.952	0.003*
	LBP during last month	0.000**	0.711
	LBP which is limiting activities	0.017*	0.079
	Sciatica during last month	0.122	0.876
	Sciatica which is limiting activities	0.137	0.026*
	Pain below the knee	0.270	0.658
	LBP recurrent episodes	0.358	0.057
	Other musculoskeletal problems	0.122	0,466
	Specialist visit	0.000**	0.521
	Pain frequency	0.504	0.000**
	Pain status	0.838	0.028*
	Bed rest	0.021*	0.014*
Lifestyle	HAD-Anxiety subscale	0.031*	0.684
	HAD-Depession subscale	0.375	0.424
	SF-12 Physical subscore	0.234	0.000**
	SF-12 Mental subscore	0.007*	0.652

†Measured with a visual analogue scale (VAS); ‡Measured with the Roland=Morris Disability Quesitonnaire; $^{*}p < 0.05$; $^{**}p < 0.001$.

Table 4
Associations between sociodemographic, physical & lifestyle factors

Factors	Physical factors			Lifestyle factors			
	LBP – limiting activities	Sciatica – limiting activities	Roland-Morris	HAD (Anxiety)	HAD (Depression)	SF-12 physical subscore	SF-12 mental subscore
Sociodemographic							
Sex	−0.040	−0.018	0.078	0.094*	0.064	−0.206**	−0.176**
Age	−0.128**	−0.168**	0.446**	0.261**	0.342**	−0.405**	−0.199**
Area	0.001	−0.191**	−0.082	0.055	0.033	0.107*	0.076
Education	0.098*	0.105*	−0.339**	−0.308**	−0.332**	0.350**	0.202**
Marital status	−0.073	−0.086	0.304**	0.163**	0.216**	−0.254**	−0.237**
Annual income	0.029	0.007	−0.030	−0.099*	−0.059	0.075	0.174**
Smoking	−0.025	−0.035	−0.033	0.071	0.005	0.058	−0.003
Physical							
LBP (last month)	−0.140**	0.021	−0.098*	−0.057	−0.071	0.082	−0.030
Sciatica (last month)	0.230**	−0.066	−0.395**	−0.003	−0.039	0.361**	0.201**
Pain below the knee	−0.072	0.453**	−0.077	−0.210**	−0.196**	−0.020	0.055
Pain frequency	−0.174**	0.012	0.363**	0.075	0.113*	−0.334**	−0.184**
VAS – average pain	−0.226**	−0.048	0.456**	0.315**	0.301**	−0.396**	−,161**
VAS – pain at best	−0.176**	−0.028	0.294**	0.117*	0.144**	−0.370**	−0.221**
VAS – pain at worst	−0.273**	−0.071	0.543**	0.302**	0.302**	−0.453**	−0.121**
Recurrent episodes	0.081	0.043	−0.226**	0.140**	0.095*	0.182**	0.166**
Other musculoskeletal	0.012	0.003	−0.119**	0.043	0.052	0.208**	0.094*
Specialist visit	0.192**	−0.027	−0.363**	−0.046	−0.039	0.327**	0.086
Days of bed rest	−0.135**	−0.021	0.394**	0.082	0.117*	−0.286**	−0.086
Investigations	0.073	0.102*	0.000	0.171**	0.181**	−0.024	−0.055

*Pearson's correlation is significant at the 0.05 level (2-tailed); **Pearson's correlation is significant at the 0.01 level (2-tailed).

Table 5
Sex-adjusted prevalence of sociodemographic, physical and lifestyle factors

Factors		Male	Female	p values
Sociodemographic		Numbers (Percentages)		
	Education			0.002**
	Primary	33 (16%)	66 (25%)	
	High school	92 (44%)	132 (51%)	
	Higher	82 (39%)	63 (24%)	
	Marital status			< 0.001**
	Unmarried	66 (31%)	53 (20%)	
	Married	134 (64%)	166 (64%)	
	Divorsed/widowed	9 (4%)	42 (16%)	
	Annual Income			0.004**
	$<$ 7200 euro	50 (24%)	90 (35%)	
	7200–14400 euro	80 (38%)	94 (36%)	
	14400–24000 euro	53 (25%)	54 (21%)	
	$>$ 24000 euro	22 (11%)	10 (4%)	
	Smoking			0.01**
	Non-smoker	114 (54%)	171 (66%)	
	Light smoker (1–2 p/week)	38 (18%)	49 (19%)	
	Heavy smoker ($>$ 1–2 p/day)	58 (28%)	41 (16%)	
Physical	LBP limiting activities	126 (60%)	163 (63%)	0.63**
	Sciatica (last month)	105 (50%)	176 (67%)	< 0.001**
	Sciatica limiting activities	58 (28%)	113 (43%)	0.002**
	Pain below the knee	64 (31%)	124 (48%)	0.001**
	Pain frequency			0.083**
	Most days	49 (23%)	81 (31%)	
	Every day	33 (16%)	52 (20%)	
	Specialist visit	133 (63%)	197 (76%)	0.024**
	Under treatment	137 (67%)	192 (74%)	0.147**
	Bed rest	83 (40%)	114 (44%)	0.331**
	LBP recurrence	152 (72%)	204 (78%)	0.317**
	Other musculoskeletal problems	48 (23%)	115 (44%)	< 0.001**
		Mean (SD)		
	Average pain intensity	5.05 (1.9)	5.44 (1.7)	0.03*
	Worst pain intensity	7.75 (2.1)	8.19 (1.7)	0.002*
	Roland-Morris	9.48 (6.4)	10.44 (5.9)	0.32*
Lifestyle	HAD (anxiety)	10.60 (6.6)	11.77 (5.8)	0.003*
	HAD (depression)	8.70 (6.9)	9.52 (5.9)	0.04*
	SF-12 Physical	39.28 (9.5)	43.28 (9.4)	0.85*
	SF-12 Mental	48.15 (9.7)	44.31 (11.4)	0.01*

*For independent sample's t test, **For χ^2 *test*.

large scale study encompassing rural and urban representation from 8547 people [25] to 57% from a smaller scale study in primary care conducted in a rural part of Greece [26]. Two urban based studies reported 1-month and 6-month prevalence rates of 31% [15] and 40% [27], respectively. Whereas, occupational LBP prevalence rates are somewhat higher, too, ranging from 37–38% in public office workers [31] and shipyards [30] to 46% in dentists [29] and 75% in Greek nursing personnel [28]. What is interesting in the presenting study is the variability in prevalence rates across the 5 urban testing sites (ranging from 7% to 25%). The reason for this low prevalence in the area of Athens is not known, although within-country fluctuations have been reported in previous studies [11,20]. Future studies should further explore LBP point prevalence around Athens.

This variability across the present study and previous ones apart from differences in the methodological design, such as differences in the sample size, application of randomization as opposed to convenience sampling methods in a number of other studies, utilization of rural versus urban versus mixed populations etc. could also be attributed to differences in the definition of LBP. Whereas, a number of studies have either not clearly defined how they were reporting LBP in their study [13,25] or used the one day limit for LBP and utilized a location of pain between the last ribs and the gluteal folds [2,7,44], the presenting study utilized a 7-day limit for LBP and location of pain was restricted to the lumbar (low back) region only. Defining duration for point prevalence and location of pain in LBP epidemiological studies has been a subject of great debate in the past [44–46]. In this study, the presenting pain location was selected in order to distinguish true back pain from other referred pain (i.e. back-associated leg pain, gluteal pain etc.). Anatomical referral pain patterns were already recorded in the survey. The 7-day duration has been used in previous epidemiological studies [35,47] and was also thought to be more 'realistic' in terms of true 'bothersomeness'; it was felt that a longer day duration would better distinguish LBP from any incidental ache experienced. Thus, this definition of duration and location in the present study could partly explain the differences in the lower point prevalence rates between this and other epidemiological reports. However, further work should take place in this area in order to confirm this.

4.2. *Physical factors*

Regarding self-reported leg-associated back pain, 60% of the LBP sample reported sciatica and 40% reported having below knee pain. Although these numbers are comparable with previous studies, both internationally [41–48] and in Greece [15], there is large variability in self-reported sciatica [27,49]. Again, this could be attributed to the lack of a gold and reporting sciatica [50]. Pain below the knee in this study has also been associated with activity limitation, indicating restricted functionality with below knee pain (Table 4), thus, justifying Hider et al.'s [48] recent distinction between below and above knee sciatica.

Over two thirds of the sample (76%) were suffering from recurrent LBP episodes and over half of the sample (54%) had LBP most of the days. 70% received specialist care and were already under some form of conservative treatment whereas, nearly a third of them (27%) underwent bed rest for up to a week. Although most of these rates are comparable with several other studies regarding pain frequency, recurrence and bed rest [15,51], it is interesting to note the high percentage of the sample receiving specialist care (secondary care). This number is much higher than most studies investigating healthcare seeking (primary or secondary) patterns [48,51–53]. This percentage is however comparable with a Greek study by Korovessis et al. [27] and is in agreement with previous report regarding healthcare utilisation within Greece [54–56]. It could therefore be suggested that within Greece there is an overwhelming percentage of healthcare utilisation amongst LBP patients. It would be interesting to follow through this sample and perhaps further explore their natural course and the medical options offered to them.

Despite the high percentage of people seeking medical care, the sample presented with mild to moderate disability, as indicated by the Roland-Morris. Significant associations were yielded between below knee pain with disability and QoL (SF-12 physical subscale only), indicating more severe disability deficits with radiating pain. However, their 'worst' pain intensity was high and 61% reported that their LBP was limiting their activities and function. This moderate intensity-low disability amongst the LBP sample is quite common in several studies [2,11,41,43]. Furthermore, disability has yielded moderate to strong associations with pain intensity and age (the older the people the higher the reported disability). Such associations are also familiar in other studies [57]. Disability was also found on the regression model to be suggestive of age (from the sociodemographic factors), bed rest, pain intensity, sciatica limited activity, pain status and frequency (from the other physical factors) and physical health (on SF-12 physical subscale) from the lifestyle factors.

More severe functional limitations with sciatica and more extensive pain were noted amongst women, especially for those with reported sciatica and its functionality. Amongst other physical factors, women reported higher pain frequency & intensity, more visits to specialists and other musculoskeletal problems (i.e. neck pain). Women also reported higher ratings on lifestyle factors, more anxiety and depression and poorer self-reported mental wellness (than men). Such findings are in line with previous research indicating a more 'severe' physical and lifestyle impact of LBP amongst women, for which causal relationship is unclear [3,4,27,35]. However, in view of the differences in methodologies across studies, conclusions or generalisations cannot be made. Interestingly, a number of factors, LBP recurrence, self-reported disability, bed rest, treatment, and self-reported physical health did not reveal statistically significant gender differences.

4.3. *Sociodemographic factors*

As regards to the sociodemographic factors, the regression analysis model did not reveal any associations of inhabitancy area, marital status, education, income or smoking history with either disability or pain intensity. Sex has been associated with physical disability and age has been the only factor associated with both, pain intensity and disability on the linear regression models. Age was also correlated with self-reported disability (as a physical factor) and QoL (as a lifestyle factor), which has been found to be the case in most LBP epidemiological studies [4]. Correlations of the remaining sociodemographic factors with other physical (disability, physical limitations, pain location) and lifestyle factors (mental wellness, anxiety, depression) were also weak,. Interestingly, this contrasts previous research findings, which support stronger associations with similar sociodemographic parameters [3,20,58,59]. Further research on a more extensive list of sociodemographic features would be of interest to explore.

4.4. *Lifestyle factors*

Anxiety and depression were low to moderate, with a statistical significance difference amongst men and women (women scoring higher in both scales). Weak associations were yielded for both, anxiety and depression with sociodemographic and physical parameters. Anxiety was found predictive of pain intensity on the regression model. Although anxiety and depression have been suggested as risk factors for LBP in several studies [64–67], strong associations were not found in this study. It could be argued that the low disability-low severity profile of the sample could explain such findings.

QoL as measured by the SF-12 Health Survey also demonstrated a mildly affected profile with a more significant overlay amongst women in self-reported mental wellness. Stronger associations were yielded between SF-12 physical subscale with one sociodemographic and one physical factor; age and pain intensity, respectively. Physical and mental wellness were predictive of disability and pain intensity, respectively. This relatively good QoL picture of the sample has also been reported amongst musculoskeletal conditions (including LBP) [26,38,68] and across general population samples [69]. This could partly be explained by our low severity sample profile. It could also partly be the result of a culturally-driven issue as indicated in Antonopoulou et al.'s study [26]; they believe that, LBP is perceived as a low severity symptom (especially amongst rural samples), and thus do not feel that lifestyle is strongly affected by it.

It appears that *pain intensity* was one of the factors which, in the present study was found to be associated with gender, age, bed rest, activity limitation due to LBP, specialist visit, anxiety and self-reported mental wellness. Significant correlations were also yielded between pain intensity with disability and QoL, indicating strong associations between them. In this study and, as opposed to previous studies, three levels of pain intensity were measured; average pain, pain at its worst and pain at its best. This three-level pain measure was chosen in order to better 'capture' the impact of pain in demographic, physical and lifestyle factors. Indeed, it was noted that pain at its worst and to a lesser extent average pain intensity was the most indicative pain factor. Pain intensity is probably one of the most useful and commonly utilised LBP outcome measures [60–62] without always consistent findings [63]. Perhaps distinction and utilisation of a multi-level pain intensity measure (as ours) could lead to more accurate and consistent predictive findings. It is therefore, suggested that future studies should encompass, along with current pain, worst pain intensity as an independent self-reported measure.

One of the major strengths of the current study is the sampling method; which was of a random nature, addressing a general population sample with both urban and rural representation in the Greek mainland, thus enhancing the study's external validity. We also tried to report a variety of sociodemographic, physical and lifestyle factors, which in previous LBP literature were deemed important. Unfortunately, the cross-sectional nature of the study limited further exploration of causal relationships between the factors investigated. This must be implemented in future studies as there is a scarcity of longitudinal ones within Greece. Also, the lack of exploring similar factors (sociodemographic, physical and lifestyle) in the asymptomatic population approached for recruitment, could have precluded further interpretation of the study's findings.

5. Conclusion

LBP point prevalence was found 15% in a general population sample across western and central Greece. Functional limitations, moderately high intensity pain, associated leg pain and recurrence were amongst the highly prevalent physical symptoms in the sample. Despite the sample's mild disability level, perceived physical disability and quality of life were correlated with age (as a sociodemographic factor) and two physical factors, pain intensity and below knee pain (sciatica). Especially the three-level pain intensity (average, 'best' and 'worst' pain intensity) utilised in the study appeared to be one of the most predictive and associative factors for age, as well as several physical and lifestyle parameters. Thus, LBP management and clinical research could benefit from the utilisation of a multi-level pain intensity measure. Unlike previous literature, most sociodemographic characteristics (annual income, education, smoking, marital status etc.) were not correlated with any LBP physical or lifestyle factors, thus possibly indicating a different socioeconomic background and aetiology domain to that of the usual non-specific LBP spectrum. Further investigation into this is required. In line with previous reports, significant gender differences were reported across the sample amongst several sociodemographic (education, marital status, smoking, annul income), physical (sciatica and its functionality, pain frequency & intensity, specialist visit, other musculoskeletal problems) and lifestyle factors (anxiety, depression and mental wellness). Finally, the fact that physical parameters were amongst the most prevalent characteristics of the Greek sample could provide recommendations on what the 'rehabilitation focus' should entail (i.e. biomedically-functionally orientated rehabilitation rather than psychosocially managed).

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Conflict of interest

The authors report no declarations of interest.

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