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Prospective Evaluation

# Prevalence of Low Back Pain in Greek Public Office Workers

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**Background:** Epidemiological studies have provided information on the prevalence and risk factors of low back pain (LBP) in white collar workers in industrialized countries. Little information has related individual, work ergonomic, and psychosocial factors to the incidence of LBP in low income countries.

**Objectives:** To assess the prevalence of LBP among Greek public office workers. To identify and relate the individual, work ergonomic, and psychosocial factors to the occurrence of LBP.

**Design:** Cross-sectional study of Greek office workers in the public sector.

**Methods:** A self-reported standardized questionnaire was constructed to record risk factors associated with the occurrence of LBP. Personal characteristics, work ergonomics, and psychosocial traits were collected and related to LBP prevalence.

**Results:** Of the 771 office workers, 648 responded (84% return rate). The majority of the participants were women (75.8%). Among all responders, 33%, 37.8%, 41.8%, and 61.6% presented with point, one-year, two-year, and lifetime prevalence respectively. Sleep disturbances due to pain were reported in 37% of the office clerks with chronic low back pain. Multiple logistic regression models have revealed that significant determinants for predicting LBP occurrence are age, gender, body mass index, body distance from computer screen, adjustable back support, clerk body position while sitting, sitting time of greater than 6 hours, job satisfaction, repetitive work, and anger during last 30 days.

**Conclusion:** High proportions of Greek office workers suffer from LBP which might affect the Greek economy. The incidence of LBP status is significantly associated with some anthropometric, ergonomic, and psychosocial factors.

**Key words:** Office workers, risk factors, low back pain, epidemiology

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Low back pain (LBP) is one of the most common causes of musculoskeletal disorders related to work status and conditions (1-4). In Europe, 30% of the general worker population, namely 44 million workers suffer from LBP, whereas in Greece 44% of workers present with work related LBP (5). The loss of 600 million working days annually, lower production rates, the financial compensation of the injured workers, and the cost of hiring and training new personnel are only a few of the consequences of LBP (5-12).

Many epidemiological studies have attempted to identify and relate risk factors to the prevalence of LBP among blue collar workers (13-16). Individual factors such as gender, age, educational level, body mass index (BMI), and psychosocial factors referring to job satisfaction, work stress, and anger have been examined and related to the incidence of LBP (6,17-23). Fewer epidemiological studies have examined the appearance and associated risk factors of LBP among office workers (24-27).

While the incidence of LBP in the general worker population in Greece is quite high it is not known how many Greek office workers suffer from LBP. Therefore, the goals of this study were:

1. To record the prevalence of LBP among Greek public office workers and examine risk factors contributing to the appearance of LBP.
2. To establish the association and prediction of risk factors to the incidence of LBP.

## Methods

The present cross-sectional study has attempted to determine the epidemiology of LBP in Greek public office workers by means of a self-reported questionnaire delivered in 2005. By utilizing the method of cluster sampling, among all 18 government offices with approximately 3,000 office workers in the greater area of Athens, Greece, 4 were randomly selected to be included in this investigation.

The Research Committee of the Greek Ministry of Education, after examining all ethical issues, approved and funded this research project (EPEAEK II "Archimidis" project No. 8, TEI-A). Additional approvals for participation of their employees were obtained from the selected Greek Ministry of Economics, Ministry of Internal Affairs and Public Management, Ministry of Education as well as by the Technological and Educational Institute of Athens. All clerks in these public offices were chosen and asked to voluntarily participate in this study. The purpose of the research was explained to them along with potential future benefits resulting from improvement of their work conditions.

Based on different valid and reliable questionnaires published in the scientific literature (28,29), a self-administered questionnaire was constructed and written in the Greek language in order to record risk factors associated with the prevalence of LBP, such as work ergonomics and psychosocial factors. All 58 items of this survey were examined and considered appropriate regarding construct and content validity. Because the questions on work ergonomics and psychosocial factors recorded responses in different measurement scales and their content was different, they have been examined separately for internal consistency in this present study. Acceptable internal consistency Cronbach alpha coefficients were calculated between 0.729 and 0.755 and are to be presented in a future publication.

Work ergonomics questions included items such as hours of sitting time (quantitative answer) and presence of forward bent body position greater than 2 hours while sitting (yes or no bivariate answer). Additional questions collecting data on computer distance from participants' body (ordinal answer) and characteristics of workers' chair (back support, adjustable back support, adjustable seating surface) attempted to evaluate the quality of work ergonomics in public office clerks.

Concerning job quality and personality characteristics of public office workers, questions recorded job creativity (yes or no bivariate answer), job repetitiveness (yes or no bivariate answer), and job satisfaction (Likert scale: answer among 4 choices). Furthermore, the psychosocial profile of participants was evaluated with questions determining stress and anger during the last month (Likert scale: answer among 5 choices).

Additional information on all participants was explored by recording individual data and symptom characteristics. Details on the individual characteristics of all public office workers included items such as gender, age, weight, height, BMI, smoking status, and physical activity profile. Regarding pain status, different questions assessed duration of pain history, frequency, and duration of episodes. The intensity of LBP was recorded according to the Visual Analogue Scale (VAS) at the moment of answering the survey. The prevalence of LBP among all sufferers was related to the variable of sleep disturbances which was recorded in 4 choices (sleeping well, waking up some times i.e 1 – 2 times per week, waking up many times i.e. > 3 times per week, never sleeping).

In this present study, the following definitions were used regarding LBP and prevalence: A public office clerk was recorded as a LBP case if he/she had experienced pain, ache, or discomfort in his/her low back and/or low back and lower extremities. An orthopaedic physician of our research team examined all responses regarding symptoms as answered by participants in this questionnaire and determined whether or not individuals with symptomatology in their lower extremities were suffering due to lumbar spine dysfunction. A point prevalent case was referred to an individual who was suffering from LBP at the time of the survey. Similarly, a one-year, 2-year, and lifetime prevalent case was referred to a person who was not experiencing pain at the time of the survey but had felt at least one LBP episode during last year, previous 2 years, or in his/her lifetime respectively.

The questionnaire was delivered to a total of 771 public office workers, answered during work hours,

and collected on the same day. To ensure completeness of answered questionnaires, several days were required to deliver and collect all questionnaires in the different public offices.

Utilizing a SPSS 13.0 software package (SPSS, Chicago Illinois) for the statistical analysis, frequency distributions of responses, and cross-tabulations of individual, work ergonomic, and psychosocial factors were studied in association with reported point, one-year, 2-year, and lifetime prevalence of LBP. Group differences were further analyzed by the chi-square test and significant ($P < 0.05$) values were recorded. Furthermore, multiple logistic regression bivariate analysis has examined the effect of several dependent variables on the outcome factors. The relationship between individual, work ergonomic, and psychosocial risk factors and LBP prevalence was expressed by unadjusted and adjusted OR and 95% CI. Only significant determinants were included in the prediction of LBP point, one-year, 2-year, and lifetime prevalence (outcome factors) from individual, ergonomic, and psychosocial risk factors ($P < 0.05$).

## Results

All 771 office workers were provided with a self-report questionnaire. The response rate of the questionnaire was 84% (i.e. 648 responders). The majority of the participants were women (75.8%) working in the public sector. Among all responders, 33% suffered from LBP at the time of the survey, 37.8% and 41.8% presented with LBP within the previous one and 2 years respectively, and 61.6% of all office clerks experienced at least one LBP episode in their lifetime. Their demographic and personal characteristics as well as point, one-year, 2-year and lifetime prevalence of LBP are shown in Table 1. There were significant differenc-

Table I. *Demographic and personal characteristics of Greek office workers and their LBP prevalence, 2005 (n = 648)*

| | Study Sample | | LBP point prevalence | | LBP one year prevalence | | LBP two year prevalence | | LBP lifetime prevalence | |
|---|---|---|---|---|---|---|---|---|---|---|
| | No. | % | %pos | *P* value | %pos | *P* value | %pos | *P* value | %pos | *P* value |
| Gender | | | | | | | | | | |
| Male | 157 | 24.2 | 31.5 | 0.557 | 39.2 | 0.525 | 44.0 | 0.315 | 56.1 | 0.001 |
| Female | 491 | 75.8 | 33.5 | | 37.2 | | 41.2 | | 63.3 | |
| Age group (years) | | | | | | | | | | |
| ≤45 | 381 | 66.6 | 30.5 | 0.072 | 37.4 | 0.763 | 41.8 | 0.482 | 56.4 | 0.102 |
| ≥46 | 191 | 33.4 | 36.0 | | 38.2 | | 35.3 | | 71.2 | |
| BMI | | | | | | | | | | |
| ≤25 | 386 | 61.8 | 32.5 | 0.885 | 76.2 | 0.383 | 41.7 | 0.805 | 56.2 | < 0.001 |
| ≥25 | 239 | 38.2 | 32.9 | | 71.9 | | 42.3 | | 70.3 | |
| Smoking Status | | | | | | | | | | |
| Smoker | 242 | 37.3 | 33.5 | 0.772 | 39.0 | 0.409 | 41.6 | 0.869 | 65.7 | 0.095 |
| Non-Smoker | 406 | 62.7 | 32.7 | | 36.8 | | 42.0 | | 59.1 | |
| Exercising | | | | | | | | | | |
| Less than 4x/month | 184 | 28.4 | 32.5 | 0.66 | 39.7 | 0.137 | 41.9 | 0.190 | 64.1 | 0.108 |
| 1-2x/week | 154 | 23.8 | 34.7 | | 36.9 | | 41.8 | | 63.0 | |
| ≥3x/week | 116 | 17.9 | 30.7 | | 31.9 | | 35.9 | | 52.6 | |
| Sleep Disturbances | | | | | | | | | | |
| None | 218 | 33.6 | 46.3 | | 60.1 | | 69.3 | | 90.8 | |
| Sometimes (1-2x/week) | 107 | 16.5 | 66.3 | < 0.001 | 68.2 | 0.012 | 70.8 | 0.018 | 100.0 | 0.006 |
| Many times (≥3x/week) | 16 | 2.5 | 82.4 | | 79.5 | | 79.5 | | 100.0 | |
| Almost no sleep | 5 | 0.8 | 43.9 | | 21.3 | | 21.3 | | 100.0 | |

es between males (56.1%) and females (63.3%) with respect to their lifetime LBP prevalence (*P*=0.001).

Based on the mean age of the sample (approximately 44.5 years), participants' age was classified in two categories (≤45 and ≥46 years) and their BMI was divided into 2 groups of below normal to normal ( ≤25) and above normal (≥25) levels. Significant differences were also recorded in their lifetime LBP prevalence (*P*<0.001) between individuals with BMI ≤ 25 (56.2%) and those with BMI ≥ 25 (70.3%). The classification of the respondents exercising habits included the less than 4x/month, 1–2x/week, and ≥3x/week categories. No significant differences were calculated among all exercising groups and across all prevalence periods.

Descriptive statistics of sleep disturbances between healthy participants and those suffering from LBP were recorded at all 4 prevalence periods examined in this study and presented in Table I. Significant differences among categories of sleep disturbances were found for all prevalence periods.

The intensity of pain at the time of the survey as well as the duration of each recurrent episode are depicted in Fig. 1. Results showed 11% of respondents rated their pain as severe or unbearable, whereas > 50% rated it as mild to moderate. In addition, the majority (43%) of the recurrent episodes lasted from one day to one week.

Work ergonomic and psychosocial characteristics of office workers as well as point, one-year, 2-year, and lifetime prevalence of LBP are presented in Table 2. Ergonomic and psychosocial exposures such as body position in sitting, distance of computer screen from clerk's body, adjustable back support, job satisfaction, work stress during last month, and anger in the last 30 days displayed significant values for some of the prevalence periods.

Results from bivariate logistic regression analysis as related to all 4 prevalence periods are reported in Table 3. In the analysis, the significant predictors for point prevalence were the clerk's body position while

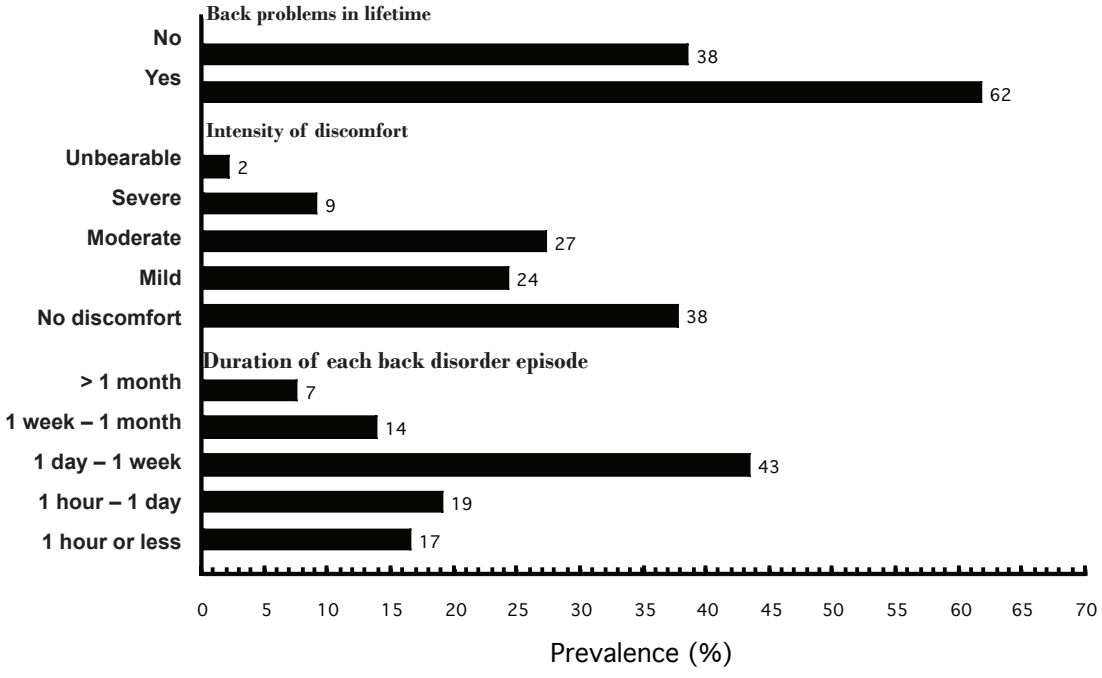


Fig. 1. *Prevalence of self-reported recurrent back disorders by intensity, duration and time of onset*

Table 2. *Work ergonomic and psychosocial characteristics of Greek office workers and their LBP prevalence, 2005 (n = 648)*

| | Study Sample | | LBP point prevalence | | LBP one year prevalence | | LBP two year prevalence | | LBP lifetime prevalence | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **No.** | **%** | **%pos** | ***P* value** | **%pos** | **P value** | **%pos** | ***P* value** | **%pos** | ***P* value** |
| **Sitting Time** | | | | | | | | | | |
| ≧6hrs | 413 | 63.7 | 41.4 | 0.421 | 47.3 | 0.961 | 52.8 | 0.491 | 75.8 | 0.184 |
| ≤6hrs | 52 | 8.0 | 46.2 | | 47.5 | | 50.0 | | 67.3 | |
| **Body Position in sitting** | | | | | | | | | | |
| Forward | 109 | 16.8 | 35.0 | 0.457 | 39.9 | 0.386 | 41.4 | 0.864 | 71.6 | **0.019** |
| Bent>2hrs | 539 | 83.2 | 32.5 | | 37.1 | | 41.9 | | 59.6 | |
| Non forward Bent | | | | | | | | | | |
| **Chair type** | | | | | | | | | | |
| Back Support | 381 | 58.8 | 33.1 | 0.959 | 39.8 | 0.053 | 43.2 | 0.162 | 61.2 | 0.793 |
| No back Support | 267 | 41.2 | 32.9 | | 34.7 | | 39.9 | | 62.2 | |
| **Body distance from computer screen** | | | | | | | | | | |
| ≤ 50 cm | 246 | 38.0 | 36.4 | 0.203 | 36.5 | **0.019** | 41.0 | **0.037** | 56.7 | **0.026** |
| 50-100 cm | 224 | 34.6 | 32.1 | | 43.7 | | 46.7 | | 66.7 | |
| **Adjustable Back Support** | | | | | | | | | | |
| Yes | 374 | 57.7 | 34.0 | 0.385 | 33.2 | **0.002** | 37.7 | **0.002** | 59.6 | 0.234 |
| No | 274 | 42.3 | 31.5 | | 41.1 | | 45.0 | | 64.2 | |
| **Adjustable Seating Surface** | | | | | | | | | | |
| Yes | 468 | 72.2 | 32.8 | 0.780 | 37.9 | 0.756 | 41.7 | 0.876 | 61.3 | 0.833 |
| No | 180 | 27.8 | 33.7 | | 37.0 | | 42.1 | | 62.2 | |
| **Creativity in Job** | | | | | | | | | | |
| Yes | 318 | 49.1 | 31.2 | 0.168 | 37.7 | 0.932 | 41.7 | 0.876 | 62.9 | 0.498 |
| No | 330 | 50.9 | 35.0 | | 37.5 | | 42.1 | | 60.3 | |
| **Job Repetitiveness** | | | | | | | | | | |
| Yes | 433 | 66.8 | 33.2 | 0.839 | 37.4 | 0.818 | 42.4 | 0.615 | 59.6 | 0.139 |
| No | 215 | 33.2 | 32.7 | | 38.1 | | 41.2 | | 65.6 | |
| **Job Satisfaction** | | | | | | | | | | |
| None | 34 | 5.2 | 41.2 | | 46.2 | | 48.5 | | 82.4 | |
| Little | 121 | 18.7 | 38.2 | 0.772 | 41.2 | **0.013** | 45.8 | **0.050** | 59.5 | 0.147 |
| Enough | 338 | 52.2 | 35.8 | | 42.8 | | 47.4 | | 60.7 | |
| Very much | 101 | 15.6 | 33.0 | | 41.2 | | 44.8 | | 59.4 | |
| **Work Stress during last month** | | | | | | | | | | |
| Never | 27 | 4.2 | 34.1 | | 51.1 | | 56.8 | | 51.9 | |
| Almost never | 55 | 8.5 | 39.3 | 0.877 | 43.9 | **0.024** | 51.6 | **0.016** | 49.1 | **0.036** |
| Sometimes | 230 | 35.5 | 34.2 | | 43.6 | | 46.0 | | 58.7 | |
| Frequently | 179 | 27.6 | 35.8 | | 40.3 | | 44.3 | | 64.2 | |
| Very often | 113 | 17.4 | 37.1 | | 37.6 | | 44.5 | | 72.6 | |
| **Anger during last month** | | | | | | | | | | |
| Never | 68 | 10.5 | 28.9 | | 41.8 | | 43.8 | | 52.9 | |
| Almost never | 113 | 17.4 | 37.2 | 0.210 | 41.1 | 0.101 | 46.7 | 0.122 | 49.6 | **0.007** |
| Sometimes | 262 | 40.4 | 34.7 | | 43.0 | | 47.0 | | 63.7 | |
| Frequently | 100 | 15.4 | 40.2 | | 40.5 | | 45.6 | | 68.0 | |
| Very often | 51 | 7.9 | 43.8 | | 44.2 | | 85.3 | | 76.5 | |

Table 3. *Significant risk factors as predictors for LBP prevalence in Greek office workers, 2005 (n = 648)*

| | Point Prevalence LBP | |
|---|---|---|
| | Unadjusted | Multiple Logistic Regression |
| **Determinants** | **OR (95% CI)** | **OR (95% CI)** |
| **Ergonomics** | | |
| Body position in sitting | 1.14 (0.71 – 1.85) | 4.44 (1.11 – 17.81) |
| **Psychosocial Factors** | | |
| Anger last month | 1.22 (1.03 – 1.46) | 1.36 (1.07 – 1.74) |
| | **One Year Prevalence LBP** | |
| | **Unadjusted** | **Multiple Logistic Regression** |
| **Determinants** | **OR (95% CI)** | **OR (95% CI)** |
| **Ergonomics** | | |
| Body distance from computer screen | 2.01 (1.12 – 3.62) | 6.61 (1.21 – 36.04) |
| **Psychosocial Factors** | | |
| Job Satisfaction | 1.25 (1.01 – 1.55) | 1.37 (1.07 – 1.74) |
| Anger last month | 1.19 (1.00 – 1.43) | 1.27 (0.99 – 1.63) |
| | **Two year Prevalence LBP** | |
| | **Unadjusted** | **Multiple Logistic Regression** |
| **Determinants** | **OR (95% CI)** | **OR (95% CI)** |
| **Ergonomics** | | |
| Adjustable back support | 2.27 (1.34 – 3.86) | 5.98 (1.01 – 35.49) |
| **Psychosocial Factors** | | |
| Job satisfaction | 0.56 (0.32 – 1.01) | 0.46 (0.24 – 0.87) |
| Anger last month | 1.24 (1.02 – 1.51) | 1.27 (0.97 – 1.66) |
| | **Lifetime Prevalence LBP** | |
| | **Unadjusted** | **Multiple Logistic Regression** |
| **Determinants** | **OR (95% CI)** | **OR (95% CI)** |
| **Lifestyle Factors** | | |
| Age Group (years) | | |
| ≤45 | 1.226 (1.096 – 1.372) | 0.853 (0.487 – 1.494) |
| ≥46 | 0.642 (0.493 – 0.836) | 1.510 (0.816 – 2.792) |
| Gender | 1.355 (0.941 – 1.951) | 2.106 (1.365 – 3.252) |
| BMI | 1.840 (1.310 – 2.600) | 1.101 (1.048 – 1.157) |
| **Ergonomics** | | |
| Body distance from computer screen | 0.655 (0.450 – 0.952) | 0.251 (0.080 – 0.789) |
| Sitting time ≥ 6 hrs | 1.520 (0.817 – 2.831) | 1.588 (1.064 – 2.368) |
| **Psychosocial Factors** | | |
| Repetitive work | 0.774 (0.550 – 1.088) | 0.667 (0.467 – 0.952) |
| Anger last month | 1.74 (1.25 – 2.41) | 1.244 (1.095 – 1.413) |

sitting and anger during the last 30 days. In addition, significant individual, ergonomic, and psychosocial risk factors for predicting one-year prevalence were the office worker's body distance from the computer screen, job satisfaction, and anger during the last 30 days. Furthermore, the significant determinants for 2-year prevalence were adjustable back support, job satisfaction, and anger during the last month. Finally, significant predictors for lifetime prevalence were age, gender, BMI, body distance from computer screen, sitting time > 6 hours, repetitive work, and anger during last 30 days.

## Discussion

This cross-sectional investigation attempted to examine the prevalence of LBP among Greek public office workers in different time periods in order to describe the acute and chronic occurrence of LBP. The results have shown that the prevalence of LBP increases from 33% to 37.8%, 41.8%, and 61.6% at point, one-year, 2-year, and lifetime respectively. Most epidemiological studies have only examined the 12-month LBP prevalence in office workers and reported comparable results (7,24,26). Although the design in most of these studies is also cross-sectional which establishes causation uncertain, the present investigation might provide more information on the estimate of LBP prevalence than other epidemiological studies since it considers more time periods.

Among the individual risk factors, gender, age, BMI, smoking, and exercising habits were examined (Table I). Significant differences were detected between the groups of gender and BMI and for only the lifetime prevalence of LBP. Females and individuals with greater than normal BMI displayed higher percentages of LBP lifetime prevalence in accordance with other studies (30,31).

Smoking and exercising habits were not significant predictors in this present study. Regarding exercising habits only a small proportion, 17.9%, of our sample participated in regular exercise of equal or greater than 3 times per week which suggests that office clerks were mostly non-exercising individuals. Other studies have reported that both smoking and exercising habits were either weak predictors or non-predictors of LBP prevalence (4,19)

Significant differences were also calculated among some of the ergonomic factors across one-year, 2-year, and lifetime prevalence periods (Table 2). Individuals with forward bent body position for more than 2 hours daily presented with a significantly higher proportion of LBP lifetime prevalence (71.6 vs. 59.6%) and office clerks whose body distance from the computer screen was between 50–100 cm appeared to have a greater percentage of LBP prevalence at one-year (43.7 vs. 36.5%), 2-year (46.7 vs. 41%), and lifetime (66.7 vs. 56.7%) periods. Apparently, the forward bent body position increases spinal loading and contributes to LBP (6). The distance from the computer screen to the operator's body might also be an indirect factor for body adjustment to a non-neutral position which stresses the lumbar region and produces pain. Additionally in this study, the adjustable back support is associated with decreased rates of one-year (33.2 vs. 41.1%) and two-year (37.7 vs. 45%) prevalence of LBP in accordance with other studies (32,33). There were no significant differences between sitting time categories of office clerks, although sitting time >6 hours was a significant predictor for lifetime prevalence of LBP. Other studies have also confirmed that sitting for more than 3 hours daily could be a risk factor for LBP (2,26). Regarding sitting, biomechanical research on risk factors has identified significant ergonomic predictors to be the trunk angle as well as time in this position (32) and twisted trunk posture (34). Our study has neither examined these factors nor has it been a biomechanical investigation. Perhaps questions on twisted trunk posture should be included in future self-reported questionnaires.

The role of different psychosocial risk factors has been examined in this study and significant differences were detected in groups of responses regarding job satisfaction, work stress, and anger during the last 30 days in association with different prevalence periods. However, a clear pattern could not be established. Most researchers have not concluded on the causal effect of psychosocial determinants in the development of LBP (6,23). It is worth mentioning that some researchers suggest that the interaction between psychosocial and ergonomic factors might increase the risk of back disorders and should be taken into consideration (35).

As depicted in Fig. 1, results collected with the VAS showed that the pain intensity at the time of the survey ranged from moderate to unbearable in 38% of the sufferers, whereas the majority (43%) of the recurrent episodes lasted from one day to one week. These results, combined with the fact that in 24.9%, 25.1%, 26%, and 37% of office workers with point, one-year, 2-year, and lifetime prevalence sleep disturbances due

to pain appeared (Table 1), which might suggest that work productivity could be lower because of lumbar spine dysfunction. Because Greece is a country with an abundance of office workers, especially in the public sector, the financial cost of low back injury could be tremendous and might affect the Greek economy seriously.

In summation, certain limitations appear to be present in this research. Generally, although this study is the first to examine risk factors and the prevalence of LBP in public office workers in Greece, its results may not be generalized to include office workers in the private sector. Future research might include private office workers and provide additional information. Furthermore, due to existing bureaucratic factors in Greece, in terms of public office workers' participation in research projects, our investigating team has considered it appropriate to select a representative sample of government clerks by utilizing the method of random cluster sampling. Perhaps in future research, other selection methods may be more suitable to use in other countries which have a different bureucratic processes. Moreover, since the design in this study is cross-sectional the results should be interpreted with great caution because they express only association and not causation between the risk factors and prevalence of LBP. Lastly, in future research on LBP prevalence, data gathered from exercise and smoking habits of participants could also be examined with regards to frequency and type of exercise as well as years of smoking and number of cigarettes per day.

## Conclusion

Based on the results of the study, different individual, ergonomic, and psychosocial factors appear to be associated with the incidence of LBP. Consequently, it is important that prevention programs take into account all these risk factors in order to reduce the frequency of low back injuries in public office workers and improve their work environment. It would also be worthwhile to follow this cohort and recording its low back health status in the future.

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