

Greek financial crisis: From loss of money to loss of sleep?

Nena E^{1,2}, Steiropoulos P³, Papanas N⁴, Kougkas D², Zarogoulidis P², Constantinidis TC^{1,2}

¹ Laboratory of Hygiene and Environmental Protection, Medical School, Democritus University of Thrace, Alexandroupolis

² Master (MSc) Program in Occupational Health and Safety, organized by Medical School, Democritus University of Thrace, Alexandroupolis in cooperation with Technological Educational Institute of Athens

³ Department of Pneumonology, Medical School, Democritus University of Thrace, Alexandroupolis

⁴ Second Department of Internal Medicine, Medical School, Democritus University of Thrace, Alexandroupolis Greece

Abstract

Background: A negative effect on public health of the Greek population as a result of the financial crisis is reported. The aim of this study was to examine the effect of the financial crisis on sleep and health outcomes of employees of the National Railway Organisation who had to face mandatory job transfers, significant reductions in salaries and anticipation of job loss.

Methods: Data were analysed retrospectively. A questionnaire of sleep characteristics and habits and the Epworth Sleepiness Scale (ESS) had been answered in 2005 by 226 male employees working at 7 different railway stations in Greece. Comparisons were made with the answers to the same questions given in 2010 by 224 employees working at the same railway stations.

Results: A significant reduction in reported night-time sleep duration was observed ($p < 0.001$), accompanied by an increase in the prevalence of nightmares ($p < 0.001$), sweating at sleep ($p < 0.001$), feeling of suffocation ($p < 0.001$), and daytime sleepiness ($p < 0.001$), accompanied by an increase in ESS score ($p < 0.001$). An increase in consumption of anti-acid medication was also observed which was associated with the number of years at work (OR = 1.152, $p = 0.038$).

Conclusions: Within the Greek financial crisis, sleep duration decreased, while sleep disturbances increased among public employees, facing job insecurity. Hippokratia 2014; 18 (2):135-138.

Key words: Financial crisis, job insecurity, nightmares, sleep loss, sleep disturbance, daytime sleepiness, Epworth Sleepiness Scale, sleep duration

Corresponding author: Paschalis Steiropoulos, MD PhD, FCCP, Department of Pneumonology, Medical School, Democritus University of Thrace Dragana 68100, Alexandroupolis Greece, tel: +302551075333, fax: +302551075096, e-mail: pstirop@med.duth.gr, steiropoulos@yahoo.com

Introduction

The financial crisis that began in 2007 has affected Greece more than any other European country. To finance debt, Greece had to borrow money from the International Monetary Fund and its Eurozone partners under conditions that included reduction of governmental spending, privatisation of public utilities, significant cutback in salaries, and mandatory retirement of public employees. Early reports have demonstrated a negative effect on public health of the Greek population, with a significant increase of those reporting that their health was “bad” or “very bad”¹, as well as an increase in suicidal ideation^{2,3}.

It is already known that economic recession in a country affects psychological well-being of the population⁴ due to generalised stress, changes in personal life and anticipation of job loss⁵. Self-reported job insecurity is associated with poor self-rated health and minor psychiatric morbidity⁵. Sleep disturbances, like poor sleep, insomnia and excessive daytime sleepiness, might be

signs of such conditions^{6,7}. A recent meta-analysis, which included 4 published and 13 unpublished studies with 174,438 participants followed up for 9.7 years, has reported that perceived job insecurity seems to be a modest risk factor for coronary heart disease⁸. The authors concluded that the possibility of harm in coronary health in vulnerable individuals cannot be ruled out.

In this context, it was investigated whether the financial crisis and its psychological consequences had any effect on sleep health. Therefore, this study aimed to retrospectively examine the effect of the financial crisis on sleep and health outcomes of employees of the Greek National Railway Service between 2005 (period of alleged economic growth and prosperity) and 2010 (third year of the financial crisis), which has led to modifications in the company’s structure, with mandatory job transfers, significant reductions in salaries and anticipation of job loss.

Materials and methods

We retrospectively analysed data of two previously conducted works that aimed to examine the prevalence of sleep-related breathing disorders and other sleep characteristics. Phase I comprised data related to a questionnaire of sleep characteristics and habits, as well as the Greek version of the Epworth Sleepiness Scale (ESS)⁹, which had been anonymously answered in 2005 by 226 male employees of the National Railway Organisation, who had been working at seven different railway stations in Greece¹⁰. ESS is a validated questionnaire, widely used to assess subjective daytime sleepiness. It comprises 8 different questions, where the participant rates the probability of falling asleep on a scale from 0 to 3 for eight different situations that most people engage in during their daily lives. A total score >10, is indicative of excessive daytime sleepiness and requires further medical investigation.

Additionally, participants answered conditions about their health status and intake of medication for different conditions. In phase II, the same questionnaires were answered in 2010 by 411 employees, 224 of whom worked at the same railway stations: the latter were included in the study. During this 5-year period, the state did not hire any new employees, so all participants in Phase II were employees of the Organisation in 2005 (Phase I). Both studies had previously received approval by the Ethics Committee of Democritus University of Thrace.

Statistical analysis

Normality was assessed with the Kolmogorov-Smirnov test. For normally distributed values, descriptive results were expressed as mean \pm standard deviation (SD), and Student's t-test was used to assess differences in means of sleep characteristics between phases I and II of the study. Mann-Whitney test was applied in order to compare means of non-normally distributed parameters. Differences between categorical variables were compared with the use of chi-square test. Linear or logistic regression analysis was applied, depending on the examined variables, (i.e. continuous or categorical), in order to explore the effect of age progression on sleep characteristics and incidence of adverse health conditions. Reported p-values are two-tailed. Significance was defined at the 5% level ($p < 0.05$).

Results

In Phase II, as expected, the study population had

grown older, but BMI remained stable. Anthropometric characteristics are presented in Table 1. A significant reduction in the reported night-time sleep duration during this 5-year period was reported. Sleep characteristics of the participating employees, as well as ESS scores, are presented in Table 2. Internal consistency of the ESS, as measured by Cronbach's alpha, was good, exceeding the cut-off point of 0.7 in both phases of the study. More specifically, in questionnaires of phase I Cronbach's alpha was 0.704 and in phase II, this was 0.759). As seen in Table 2, total ESS score and scores of 5 out of 8 questions increased significantly, while mean values in 3 questions (lying down in the afternoon; sitting and talking to someone; driving a car and being stopped in traffic) did not change.

Linear regression analysis demonstrated that age and sleep duration of the employees were not associated ($r^2=0.008$, beta -0.089 , $p=0.058$). Likewise, logistic regression models showed that age did not affect the incidence of nightmares ($p=0.372$), sweating ($p=0.833$), feeling of suffocation ($p=0.158$), and daytime sleepiness ($p=0.556$).

Regarding changes in health conditions, there was an increase in the prevalence of arterial hypertension which was accordingly accompanied by the intake of anti-hypertension medication. Additionally, an increase in the use of medication for gastrointestinal disorders (mainly antacids) was observed. Interestingly, the prevalence of diagnosed gastro-intestinal disorders (i.e. peptic ulcer, colitis etc.) not only did not increase, but it exhibited an insignificant reduction (Table 3). Logistic regression analysis revealed though, that age progression was significantly associated with arterial hypertension (OR: 1.156, 95% CI: 1.005-1.330, $p=0.042$), while increase in antacid medication intake was independent of age, but it was associated with increased number of years at work (OR: 1.152, 95% CI: 1.008-1.317, $p=0.038$).

Discussion

An increase in sleep disturbances among public employees facing job insecurity three years after the beginning of the financial crisis in Greece was observed. This increase was expressed as reduced sleep duration and more frequent indices of poor sleep quality, notably nightmares, sweating at sleep, self-reported apnoeas and feeling of suffocation. Importantly, there was also an increase

Table 1. Characteristics of the employees of the Greek National Railway Organisation who participated in the study in Phase I (2005) and in Phase II (2010). For comparisons, the Student's t-test was applied for continuous variables and chi-square test for categorical variables.

Characteristic	Phase I (N=226)	Phase II (N=224)	p value
Male sex (% participants)	100%	100%	
Age (years)	46.9 \pm 3.9	51.0 \pm 4.0	<0.001
Work years (years)	21.9 \pm 4.3	24.9 \pm 5.4	<0.001
BMI (Kg/m ²)	28.7 \pm 3.7	28.3 \pm 3.7	0.258
Current smokers (%)	59.7%	51.4%	0.087

BMI: body mass index.

Table 2. Reported sleep characteristics by the employees of the Greek National Railway Organisation who participated in the study in Phase I (2005) and in Phase II (2010). For comparisons, the Student's t-test and Mann-Whitney test (for comparison of the 8 questions of the ESS) were applied for continuous variables and chi-square test for categorical variables.

Characteristic	Phase I (N=226)	Phase II (N=224)	p value
Night time sleep duration (hours)	7.1 ± 1.4	5.7 ± 1.6	<0.001
Epworth Sleepiness Scale (total score)	5.4±3.2	6.7 ± 4.2	<0.001
Question 1 of ESS (How likely will you fall asleep while sitting and reading?) (Range 0-3)	0.39 ± 0.64	0.70 ± 0.93	0.002
Question 2 of ESS (How likely will you fall asleep while watching TV?) (Range 0-3)	1.18 ± 0.93	1.60 ± 1.12	<0.001
Question 3 of ESS (How likely will you fall asleep while sitting inactive in a public place?) (Range 0-3)	0.19 ± 0.51	0.37 ± 0.72	0.002
Question 4 of ESS (How likely will you fall asleep as a passenger for 1 hour?) (Range 0-3)	0.17 ± 0.46	0.32 ± 0.69	0.026
Question 5 of ESS (How likely will you fall asleep while lying down to rest in the afternoon?) (Range 0-3)	2.14 ± 0.95	1.97 ± 1.01	0.081
Question 6 of ESS (How likely will you fall asleep sitting and talking to someone?) (Range 0-3)	0.06 ± 0.23	0.10 ± 0.412	0.638
Question 7 of ESS (How likely will you fall asleep sitting quiet after lunch, without alcohol?) (Range 0-3)	1.17 ± 1.1	1.5 ± 1.14	0.002
Question 8 of ESS (How likely will you fall asleep in a car, stopped for a few minutes in the traffic?) (Range 0-3)	0.06 ± 0.25	0.14 ± 0.5	0.120
Self-perceived sleepiness (% participants)	7.1	18.3	<0.001
Self-perceived feeling of suffocation (% participants)	11.5	26.4	<0.001
Nightmares (% participants)	13.3	27.1	<0.001
Night-time sweating (% participants)	16.8	50.7	<0.001

ESS: Epworth Sleepiness Scale.

Table 3. Health conditions and medication intake of employees who participated in the study in Phase I (2005) and in Phase II (2010). For comparisons, the chi-square test for categorical variables was applied.

Characteristic	Phase I (N=226)	Phase II (N=224)	p value
Arterial Hypertension (% participants)	16.8	32.6	<0.001
Medication for arterial hypertension (% participants)	12	26.3	<0.001
Gastro-intestinal disorders (% participants)	25.3	24.4	0.778
Medication for gastro-intestinal disorders (% participants)	22.1	35.8	0.012

in daytime sleepiness. This is in contrast to a previous publication from Finland⁴ reporting little change in sleep behaviour over an 8-year period before and after the economic crisis. Surprisingly, a recent work from Iceland¹¹ demonstrated that the 2008 economic crisis led to an increase of the number of persons who reported getting the recommended amount of sleep, which was accompanied by reductions in health-compromising behaviours, such as smoking or heavy drinking.

However, our findings agree with a recent work from Thessaloniki, Greece¹², which also retrospectively compared sleep characteristics among patients referred for polysomnography between 2008 (first year of the financial crisis) and 2011 (fourth year of continuous recession). This work also demonstrated a significant increase in reported nightmares ($p<0.001$) and headaches ($p<0.001$). Still, these colleagues reported no alterations in daytime sleepiness, among their line of apnoeic and overweight patients, who, as expected, had ESS scores exceeding normal ranges⁹. Taken together, both studies suggest that the economic crisis is already beginning to

exert a negative impact on sleep quality in the workforce. The severity of these perturbations has not yet been fully appreciated and more data is needed. Besides, Barclay et al¹³ have already shown that negative life events are associated with sleep disturbances, and this effect is attributed to both environmental and genetic factors.

A further finding was an increase in the incidence of arterial hypertension, but this emerged as an effect of advancing age. It would have been very interesting to reveal a correlation between this condition and adverse changes in professional status (mainly, unemployment or risk of job loss), given that job insecurity has already been recognised as a contributor to poor coronary health¹⁴.

Furthermore, there was an increase in the consumption of medication against gastrointestinal disorders (mainly antacids), which was independent of age, but associated with increased number of years at work. Arguably, this may be taken to suggest that the increase of gastrointestinal symptoms is associated with greater job insecurity, since the higher number of years at work could easily lead to mandatory retirement or unfavour-

able transfer. This argument is enhanced by the fact that the frequency of gastrointestinal disorders (i.e. peptic ulcer, colitis etc.) not only did not increase, but it exhibited an insignificant reduction.

The strengths and limitations of this work may be outlined as follows. A major strength was the objective assessment of sleep characteristics. A further strength is the absence of bias in selecting representative participants, since the primary aim of both previous studies was to evaluate sleep-related breathing disorders. Of note, no question pertaining to the financial crisis or to job status was included, which could influence their answers. This held true for both study phases.

The limitations of this study can be summarized as follows. First of all, the use of retrospective data generally limit the validity of the evidence provided, and a prospective enquiry into the incipient effects of the economic crisis would be highly desirable. Additionally, the anonymity of the data has led to the inability to conduct a paired analysis of the examined outcomes to each individual, in order to focus on the occurred changes. Nevertheless, all data derive from the employees of the same organization located in the same stations, and facing the same conditions during corporate changes, due to the financial crisis. An additional limitation is the inclusion of males only. However, as shown by Laszlo et al¹⁵ in their meta-analysis, the interaction between gender and job insecurity is not significant. Finally, one could say that age progression could have affected the sleep characteristics of the individuals included. Still, as statistical analysis has showed, age did not affect either sleep duration, or the incidence of the reported sleep disorders.

The practical implication of our findings is that the Greek financial crisis is beginning to exert yet another unfavourable effect on the population's health. The magnitude of this effect has not yet been fully appreciated. Sleep is essential to promote and maintain physical and mental health: "our little life is rounded with a sleep"¹⁶. Hence, the observed changes in sleep health may be anticipated to further compromise general health and quality of life of Greek citizens.

In conclusion, Greek railway workers have recently been found to exhibit increased sleep disturbances (reduced sleep duration and poor sleep quality), as well as more frequent daily somnolence, in comparison to the earlier pre-crisis years. These perturbations are emerging as an additional consequence of the economic crisis and merit further examination. Certainly, more recent data from other professional groups also, could help in better assessing the effect of job insecurity on Greek employees' sleep quality and quantity after six years in financial crisis.

Conflicts of interest

None declared by authors.

References

1. Kentikelenis A, Karanikolos M, Papanicolas I, Basu S, McKee M, Stuckler D. Health effects of financial crisis: omens of a Greek tragedy. *Lancet* 2011; 378: 1457-1458.
2. Economou M, Madianos M, Theleritis C, Peppou LE, Stefanis CN. Increased suicidality amid economic crisis in Greece. *Lancet*. 2011; 378: 1459.
3. Economou M, Madianos M, Peppou LE, Theleritis C, Patelakis A, Stefanis C. Suicidal ideation and reported suicide attempts in Greece during economic crisis. *World Psychiatry*. 2013; 12: 53-59.
4. Hyypää MT, Kronholm E, Alanen E. Quality of sleep during economic recession in Finland. A longitudinal cohort study. *Soc Sci Med*. 1997; 45: 731-738.
5. Ferrie JE, Shipley MJ, Stansfeld SA, Marmot MG. Effects of chronic job insecurity and change in job security on self reported health, minor psychiatric morbidity, physiological measures and health related behaviours in British civil servants: the Whitehall II study. *J Epidemiol Commun Health*. 2002; 56: 450-454.
6. Stores G. Clinical diagnosis and misdiagnosis of sleep disorders. *J Neurol Neurosurg Psychiatry*. 2007; 78: 1293-1297.
7. Bencá RM, Peterson MJ. Insomnia and depression. *Sleep Med*. 2008; 9: 53-59.
8. Virtanen M, Nyberg ST, Batty GD, Jokela M, Heikkilä K, Fransson EI, et al; IPD-Work Consortium. Perceived job insecurity as a risk factor for incident coronary heart disease: a systematic review and meta-analysis. *BMJ*. 2013; 347: f4746.
9. Tsara V, Serasli E, Amphilochoiu A, Constantinidis T, Christaki P. Greek version of the Epworth Sleepiness Scale. *Sleep Breath*. 2004; 8: 91-95.
10. Nena E, Tsara V, Steiropoulos P, Constantinidis T, Katsarou Z, Christaki P, et al. Sleep disordered breathing and quality of life of railway drivers in Greece. *Chest*. 2008; 134: 79-86.
11. Ásgeirsdóttir TL, Cormán H, Noonan K, Ólafsdóttir Þ, Reichman NE. Was the economic crisis of 2008 good for Icelanders? Impact on health behaviors. *Econ Hum Biol*. 2013; 13: 1-19.
12. Pataka A, Chavouzis N, Fekete Passa K, Pitsiou G, Argyropoulou P. The financial crisis has an impact in sleep medicine: experience of a sleep clinic in Greece. *Sleep Breath*. 2013; 17: 1329-1332.
13. Barclay NL, Eley TC, Rijdsdijk FV, Gregory AM. Dependent negative life events and sleep quality: an examination of gene-environment interplay. *Sleep Med*. 2011; 12: 403-409.
14. Ferrie JE, Kivimäki M, Shipley MJ, Davey Smith G, Virtanen M. Job insecurity and incident coronary heart disease: the Whitehall II prospective cohort study. *Atherosclerosis*. 2013; 227: 178-181.
15. László KD, Pikhart H, Kopp MS, Bobak M, Pajak A, Malyutina S, et al. Job insecurity and health: a study of 16 European countries. *Soc Sci Med*. 2010; 70: 867-874.
16. Shakespeare W, *The Tempest*. Wells S, Taylor G (Eds), *The complete works of William Shakespeare, 1st Edition*, Oxford University Press, Oxford, 1988, 1167-1189.