

Working Hours and Its Impact on Quality of Sleep and Motivation¹

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Abstract: *Current research indicates that long working hours can have negative impacts on the health of employees. This paper addresses issues how working hours impacts selected factors such as sleep and employee motivation. It also presents basic results obtained in the survey carried out in companies operating in Slovakia in 2014. At the same time, the paper serves as an introduction to a broad examination of the socio-psychological issues relating to matters of changes in the work environment and their impacts on performance of employees.*

Key Words: *Working Hours; Quality of Sleep; Motivation, Survey; Businesses; Slovakia.*

Introduction

Research on the impact of working hours on employees is an up-to-date topic for several reasons. Globalization increases the competitive pressure on companies that are confronted with wider competition, as it was in the past. This results in greater demands and pressures on employees and will be reflected in longer working hours. Other effects come from the impact of the postindustrial era of business, reflected in unstable environment and widespread use of information technology. Analogously to globalization, unstable environment puts pressure on employee performance, which is reflected in longer working hours. Use of information technology in conjunction with high pressure affects the emergence of new forms of work, as flexplace, virtual office or work from home. They then have an impact on working hours, which does not have to end with the departure from office, but can continue at home. Mentioned behaviour, environment, and tools, however, do not remain without consequences. Work-home spillover increases stress. Long working hours im-

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pacts sleep. Lack of sleep is associated with various diseases, such as cardiovascular disease, diabetes, and obesity. All this creates a strong incentive to study the issue of long working hours, factors influencing the long working hours, its link to the quality of sleep and motivation, which leads to long working hours. While in the current literature there are studies of long working hours, a significant share of the current research deals with long working hours in the Asian environment, which means working time of 60 hours per week. In our research, we therefore examined whether there are negative effects of long working hours in working environment of the European Union. While the issue of the impact of long working hours on health engaged primarily scientists in medicine or psychology, management is not covered sufficiently in this area.

The aim of this work is to identify and explain the major factors of influence on the length of working hours, working hours, and its relationship to problems with sleep and motivational factors on the long working hours. In this paper we present a tool that will allow businesses to identify vulnerable groups of employees, implement preventive measures, develop preventive programs, and work with motivation in order to avoid undesirable consequences.

In the literature there are identified physical and psychological consequences as manifestations of long working hours.

Physical consequences of long working hours were studied by following authors. K. Sato et al. wrote that long working hours, over 55 hours per week, are linked to headache prevalence and lack of physical activity.² They identified the relationship of long working hours and health problems, such as high blood pressure, diabetes, heart attack, depression, neck and shoulder pain, lack of sleep, and the impact on cognitive function. The positive impact of reduced working hours on health can be positively influenced by using the leisure time for physical activity. A similar conclusion was reached by A. Spurgeon et al., who found that working hours over 50 hours per week is associated with health consequences.³ Ch.-P. Loh points out that the extended working hours signifi-

² SATO, K., Y. HAYASHINO, S. YAMAZAKI, M. TAKEGAMI, R. ONO, K. OTANI, S. KONNO, S. KIKUCHI and S. FUKUHARA. Headache Prevalence and Long Working Hours: The Role of Physical Inactivity. *Public Health*. 2012, vol. 126, no. 7, pp. 587-593. ISSN 0033-3506.

³ SPURGEON, A., J. M. HARRINGTON and C. L. COOPER. Health and Safety Problems Associated with Long Working Hours: A Review of the Current Position. *Occupational and Environmental Medicine*. 1997, vol. 54, no. 6, pp. 367-375. ISSN 1076-2752.

cantly reduced the time spent on exercise and physical activity.⁴ Y. Cheng et al. found that “long working hours and short sleep duration contribute independently to the risk of cardiovascular diseases in men”.⁵ They identified the relationship between tendency to heart disease and short sleep. Men who slept less than six hours a day were most prone to heart disease; another reason was working hours more than 60 hours a week. A negative effect was also related to smoking and body mass index (BMI) over 27. T. Ohtsu et al. wrote that in order to avoid short sleep it is essential to avoid long working hours.⁶ Among men they associate sleep shorter than 6 hours per day with long working hours between 9 and 11 hours, and especially with working hours longer than 11 hours per day. Studying overtimes, overtimes between 3 and 4 hours were associated with short sleep with comparable impacts of overtimes more than 4 hours a day. Among women they identified the relationship of short sleep and working hours more than nine hours a day. The problem of long working hours also affected short sleep during days off. T. Kobayashi et al. in a study of 933 men found that 11.8 % of them were suffering from metabolic syndrome.⁷ Number of hours worked per day, beyond which the likelihood of metabolic syndrome increases among Japanese workers, was 10 hours. The authors argue that the measures against metabolic syndrome are needed in the fight against cardiovascular disease. I. Jeong et al. found a relation of working hours and increased risk of cardiovascular disease.⁸ An unexpected finding was the relation be-

⁴ LOH, Ch.-P. A. Physical Inactivity and Working Hour Inflexibility: Evidence from a U.S. Sample of Older Men. *Review of Economics of the Household*. 2009, vol. 7, no. 3, pp. 257-281. ISSN 1569-5239.

⁵ CHENG, Y., Ch.-L. DU, J.-J. HWANG, I-S. CHEN, M.-F. CHEN and T.-Ch. SU. Working Hours, Sleep Duration and the Risk of Acute Coronary Heart Disease: A Case-Control Study of Middle Aged Men in Taiwan. *International Journal of Cardiology*. 2014, vol. 171, no. 3, pp. 419-422. ISSN 0167-5273.

⁶ OHTSU, T., Y. KANEITA, S. ARITAKE, K. MISHIMA, M. UCHIYAMA, T. AKASHIBA, N. UCHIMURA, S. NAKAJI, T. MUNEZAWA, A. KOKAZE and T. OHIDA. A Cross-Sectional Study of the Association between Working Hours and Sleep Duration among the Japanese Working Population. *Journal of Occupational Health*. 2013, vol. 55, no. 4, pp. 307-311. ISSN 1341-9145.

⁷ KOBAYASHI, T., E. SUZUKI, S. TAKAO and H. DOI. Long Working Hours and Metabolic Syndrome among Japanese Men: A Cross-Sectional Study. *BCM Public Health*. 2012, vol. 12, no. 5, pp. 1-8 [395]. ISSN 1471-2458.

⁸ JEONG, I., J. RHIE, I. KIM, I. RYU, P. K. JUNG, Y. S. PARK, Y.-S. LIM, H.-R. KIM, S.-G. PARK, H.-J. IM, M.-Y. LEE and J.-U. WON. Working Hours and Cardiovascular Disease in Korean Workers: A Case-Control Study. *Journal of Occupational Health*. 2013, vol. 55, no. 5, pp. 385-391. ISSN 1341-9145.

tween short working hours and cardiovascular disease. The employees who worked more than 52 hours a week were the most prone to cardiovascular disease, followed by employees working for 40 hours or less per week and employees working between 48.1 and 52 hours per week. The least prone to cardiovascular disease were employees working between 40.1 and 48 hours per week.

Psychic manifestations of long working hours were studied by following authors. N. Jansen et al. wrote that longer working hours and overtime will be reflected in an increased need for recovery.⁹ Further, they found that there is a difference between men and women in relations between working hours, schedule, and need for recovery. K. M. De Almondes and J. F. Araújo studied the subjective perception of sleep quality.¹⁰ They found that employees working during the day have a higher quality of sleep than the employees working in shifts. K. Wada et al. wrote: *"Some physicians need some support to maintain their mental health. Physicians who do not take enough days-off, who reduced sleep hours, and who have certain number of days on-calls may develop depressive symptoms."*¹¹ Approximately every tenth study participant was diagnosed with depression. They found that those most likely to suffer from depression were those with no off-duty days, those who were on call more than 8 times a month, those who slept less than five hours a day, and those who had six or more days of overnight work per month.

Our research was conducted on a sample of 166 respondents. We used the methods of descriptive and inductive statistics to analyze the data. The main methods were the methods of location, spread, correlation analysis, and multiple linear regression.

⁹ JANSEN, N., I. KANT, L. van AMELSVOORT, F. NIJHUIS and P. van den BRANDT. Need for Recovery from Work: Evaluating Short-Term Effect of Working Hours, Patterns and Schedules. *Ergonomics*. 2003, vol. 46, no. 7, pp. 664-680. ISSN 0014-0139.

¹⁰ De ALMONDES, K. M. and J. F. ARAÚJO. Sleep Quality and Daily Lifestyle Regularity in Workers with Different Working Hours. *Biological Rhythm Research*. 2011, vol. 42, no. 3, pp. 231-245. ISSN 0929-1016.

¹¹ WADA, K., T. YOSHIKAWA, T. GOTO, A. HIRAI, E. MATSUSHIMA, Y. NAKASHIMA, R. AKAHO, M. KIDO and T. HOSAKA. National Survey of the Association of Depressive Symptoms with the Number of Off Duty and On-Call, and Sleep Hours among Physicians Working in Japanese Hospitals: A Cross Sectional Study. *BMC Public Health*. 2010, vol. 10, no. 3, pp. 1-6 [127]. ISSN 1471-2458.

Findings

In the presented research we found following facts, which are shown in Table 1. Researched factors can be divided into two main groups. The first group is dealing with the working hours and the second group with the quality of sleep.

To study the issues of working hours, we studied working hours per day, working hours per week, and overtime. In the question of working hours per day respondents were asked to choose from five options (4 hours or less, 4.1 to 6, from 6.1 to 7, 7.1 to 8, and more than 8 hours per day). The question related to the number of working hours per week was open and we were interested in the real number of working hours per week, with an accuracy of 0.5 hour. On the issue of overtime we studied how often the respondents stayed in the work after the standard working hours was over. The respondents were asked to select from five options, ranged from regularly to never (regularly, often, sometimes, rarely, and never).

The second group of questions contained questions about the quality of sleep. With questions about the quality of sleep we studied problems with sleep, the number of hours of sleep during the workdays, and the number of hours of sleep over the weekend. To ask about problems with sleep, we asked how often the respondents had problems with sleep, like problems to fall in sleep or frequent waking up during the sleep. Respondents were asked to choose from five options ranging from regular chronic problems to never (regular/chronic problems, often, sometimes, rarely, and never). The second question related to sleep quality was the question about the number of hours of sleep during workdays. The question was open and respondents were asked how many hours of sleep they had during the workday, with an accuracy of 0.5 hour. In the third question we addressed the issue of hours of sleep over the weekend. The question was open and respondents were asked how many hours of sleep they had during the weekend, with an accuracy of 0.5 hour.

In our research we have found that most people are working in the range of 7 – 8 hours (including 8 hours) daily. This result was expected, since the standard working hours are 8 hours. An interesting finding, however, was that a significant portion of respondents (39.76 %) worked more than 8 hours per day.

The respondents worked on average 40.22 hours per week, while the most frequent value was 40 hours. As in the case of working hours per

day, this was expected because of the standard working week. The standard deviation value of 8.98 refers to the relatively high volatility of working hours per week, and thus there are people who work much more, and also people working for significantly less than 40 hours per week. Among the respondents, 39.51 % worked 41 hours or more per week. 13.58 % of respondents worked more than 48 hours per week.

The result of the survey of overtime is that the majority of respondents stayed at least sometimes at work after the official working hours was over. It is interesting that 86.67 % stayed at work after the standard working hours at least sometimes, 27.88 % of respondents stayed often or more than often to work after the end, and 9.70 % of the respondents regularly.

On the question of problems with sleep, the majority of respondents answered that they had rarely sleep problems. 21.08 % of respondents had never problems with sleep and had so a good quality of sleep, while 78.92 % of the people surveyed had at least some problems with sleep. Only 1.20 % of them had chronic problems, 12.05 % had often, and 30.72 % had occasional problems with sleep.

The respondents slept on average 6.88 hours during the workdays. Standard deviation with a value of 0.91 taking into account the average means that the length of the sleep did not significantly deviate from the average. The most common sleep duration was 7 hours. While only 3.61 % of respondents slept 9 hours or more during workdays, about one third (32.53 %) slept less than 7 hours, and 4.82 % of them slept less than 6 hours per day.

Table 1 Data Description

Data Description							
	N	MEAN	SD	MED	MOD	MIN	MAX
Working hours per day	166	4.10	0.98	4	4	1	5
Working hours per week	162	40.22	8.98	40	40	15	75
Overtime	165	3.08	1.14	3	3	1	5
Problem with sleep	166	3.63	0.99	4	4	1	5
Hours of sleep during workdays	166	6.88	0.91	7	7	5	9
Hours of sleep during weekend	166	8.29	1.42	8	8	0	12

Source: Own research.

During the weekend the respondents slept on average 8.29 hours; most often they slept 8 hours. In our study, less than 8 hours slept 20.48 % of respondents, less than 7 hours 6.63 %, and less than 6 hours slept 1.81 % of respondents.

The result of our research is that while the overall level of working hours given the environment of the European Union is standard, there is an interesting share of workers (39.51 to 39.76 %) who deviate towards longer working hours. Since this is not a negligible share, it is interesting to examine the effects of long working hours. Similarly, we can observe the respondents having trouble sleeping, and also having shortened duration of sleep during the week, which, according to some sources, is affected by the length of working hours. A detailed analysis of those factors is presented in the discussion.

Discussion

As we have shown in the results of our research, we found a significant share of employees who work more than the standard working hours. We have also observed a significant share of employees with sleep problems. Due to presented literature, extensive working hours has an impact on the quality of sleep, which is then reflected on a higher occurrence of cardiovascular diseases, diabetes, and obesity. These results are alarming and are the reason for further analysis in the discussion. In the discussion we analyze the factors of influence on long working hours, factors of influence on problems with sleep with a focus on long working hours, and motivational factors on long working hours. Analysis will show whether there are similar effects on health as with extremely long working hours, and what are the motivating factors for workers who work long working hours. The results of the analysis create a business tool that will allow companies to identify the weak and vulnerable places and thus create the possibility of preventing negative effects due to long working hours.

First we analyzed the factors of long working hours, which are shown in Table 2. The result of the analysis is a model of working hours per day, which explains 17 per cent of the variability of working hours per day. According to this model, the working hours is significantly and positively influenced by the workload, income, and negatively by work from home. Under the workload we studied the perceived level of workload during the workweek. The respondents were asked to select from five options, from no load to heavy pressure (none, low, medium, higher, and I'm under heavy pressure). Employees who are under more pressure

Table 2 Regression Analysis of Working Hours and Quality of Sleep

Regression Analysis of Working Hours and Quality of Sleep				
	Working hours per day	Working hours per day	Quality of sleep	Quality of sleep
Gender	-0.18 (0.15)	-0.21 (0.14)	-0.39* (0.16)	-0.39* (0.15)
Age	0.00 (0.08)	-	-0.00 (0.06)	-
Family status	0.06 (0.22)	-	-	-
Company size	0.00 (0.07)	-	-	-
Position	-0.05 (0.06)	-	-	-
Income	0.14 (0.08)	0.21** (0.07)	-	-
Foreign participation	0.04 (0.10)	-	-	-
Portion of mental work	0.00 (0.00)	-	-	-
Flexibility of working time	0.09 (0.06)	0.07 (0.06)	-	-
Portion of work from home	-0.01** (0.00)	-0.01** (0.00)	-0.01 (0.00)	-0.01* (0.00)
Workload	0.34** (0.10)	0.35** (0.10)	-0.07 (0.11)	-
Lighting	-	-	0.12 (0.14)	-
Working hour per day	-	-	-0.13 (0.09)	-0.16* (0.08)
Overtime	-	-	0.04 (0.07)	-
Alcohol	-	-	0.00 (0.08)	-
Smoking	-	-	-0.04 (0.06)	-
Nutrition	-	-	-0.03 (0.07)	-
Sport	-	-	0.10* (0.05)	0.12** (0.04)
Leisure time activity	-	-	-0.06 (0.04)	-0.06 (0.04)
Adjusted R ²	0.17	0.17	0.07	0.10

Source: Own research. Note: Standard error in parenthesis, ** significance level ≤ 0.01 , * significance level ≤ 0.05 .

are working longer. It may be so, for example, because of the difficulty to achieve the objectives or an important task. Studying income, we were interested in the level of income. The respondents could choose from five options reaching from low income to high income, with a set middle level of approximate average wage 800 EUR (low, rather below, the average wage/800 EUR, rather higher, and high). Employees with higher income were working longer. This may be caused either by a motivating effect of income, or the nature of the work. While the character of manual work does not allow in principle non-standard working hours, employees in higher positions, with higher wage, work longer because their work is more creative and mentally demanding, and is not bound to a specific place. By the portion of work from home, we studied the percentage of the total labour that the employees had the opportunity to do from home. The portion of working from home has a minimal negative impact on hours worked per day. Workers who are allowed to work more from home have a better regulation of working time, which may be due to the intervention of a partner and children. Groups most prone to long working hours are therefore employees with high workloads, higher wages, and without the opportunity to work from home.

Next, the factors of influence on the problems with sleep are analyzed and shown in Table 2. Especially we focused on a question whether even in our environment, with relatively shorter working hours, negative effects of long working hours affecting the quality of sleep can be found. The result of the analysis is a quality of sleep model, which explains 10 per cent of the variability in quality of sleep. Quality of sleep is significantly and negatively affected by gender, working hours per day, and minimally by a portion of work from home. Quality of sleep is significantly and positively affected by sport activities. Statistically, the most significant is the positive impact of sport. When addressing sports, respondents were asked how many times a week they practice sports, while under sports we understood at least 30-minutes of sport activity. We found that employees who practice sports more often have a better quality of sleep. In the context of the negative impact, women have worse quality of sleep. For our research of working hours, our finding of a negative impact of working hours on quality of sleep was very meaningful. We found out that with prolonging of the working hours the quality of sleep debilitates. We have identified a weak negative impact of portion of work from home. Employees who are allowed to work a larger portion of work from home have lower quality of sleep. This may be due to the spillover be-

tween workplace and home. Results of our analysis of factors of influence on the quality of sleep are that the risk group for reduced sleep quality and thus the health consequences associated with it are women who have long working hours, who do not practice any sport activities, and have a greater opportunity to work from home.

Table 3 Motivational Factors on Long Working Hours

Motivational Factors on Long Working Hours		
	Working hours per day	Working hours per day
Money	-0.09 (0.05)	-0.09* (0.05)
Ownership	0.01 (0.04)	-
Self-realization	0.05 (0.05)	-
Recognition	-0.03 (0.05)	-
Independence	-0.05 (0.05)	-
Working for himself	-0.09* (0.04)	-0.09* (0.04)
Career	-0.08 (0.05)	-0.07 (0.04)
Time off and holidays	0.00 (0.04)	-
Adjusted R ²	0.03	0.06

Source: Own research. Note: Standard error in parenthesis, ** significance level ≤ 0.01 , * significance level ≤ 0.05 .

Finally, we analyzed the motivational factors on long working hours. These factors are shown in Table 3. By studying the motivational factors, participants were asked what most motivates them. Their task was to assess and classify the relevant motivational factors shown in Table 3, provided that the factor that motivates them the most should have the value 1. Using regression analysis we created a model of motivational factors on working hours per day, which explains 6 per cent of the variability in working hours. According to this model, the length of working hours is significantly and positively influenced by money and working for themselves. The explanation is that workers are motivated to work longer by promise of higher wages for longer working hours. A positive effect on working hours per day had also working for themselves. People who

are motivated when the results of their work have a primary impact on themselves (entrepreneurs) are interested to work longer. With the analysis of motivational factors of long working hours we found out that people motivated by money and work for themselves tend to work longer.

The result of the analysis of factors of influence is that employees who perceive a heavy workload, have higher wages, and do not have the opportunity to work from home, are prone to work long working hours. Women who were working long working hours, without any sport activities, and with a greater possibility of work from home, had lower quality of sleep. People who are motivated by money and work for themselves are more likely to work longer.

Conclusion

In the literature, the effects of extremely long working hours on workers' health are convincingly documented. In this paper, we found out that even less extremely long working hours leads to negative consequences. Among the important factors influencing the long working hours are heavy workload, higher wages, and the opportunity to work from home. Long working hours has a negative effect on the quality of sleep. Wages and work on themselves motivate people to work longer. Being aware of these factors influencing the working hours, working hours and quality of sleep, and motivational factors of long working hours, as well as other negative impacts of long working hours on health will allow businesses to establish preventive measures. They can monitor the perceived workload of employees, set wages so that they will not create an incentive towards longer working hours, and control the setting of work from home. The negative effects of long working hours in the form of a lower quality of sleep can be prevented with an active promotion of sports activities, such as a financial contribution to the gym, swimming, or by creating a running community in the company.

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