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THE IMPACT OF LONG WORKING HOURS AND LIFESTYLE RELATED HEALTH PROBLEMS- A STATISTICAL REVIEW

Life Science

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ABSTRACT

Long working hours is a serious and economically devastating illness that has been reached epidemic proportion in both industrialized and developing countries. Studies reviewed the effects of overtime work on blood pressure and body mass index. Prevalence of RSI (Repetitive strain injury) and musculoskeletal problems of neck that is SSS (straight spine syndrome) especially among IT professionals has been discussed. The sex specific relative risk of affective and stress related disorder was calculated as a function of potential exposure to threats and violence, using conditional cardiovascular disease, diabetes, depression, fatigue etc. Studies revealed that insufficient sleep may be related to increased risk of acute myocardial infarction. Poor life style habits may act as a mechanism linking long hours with cardiovascular disorders. Studies revealed that changing from standard to long hours was associated with increased smoking, higher alcohol consumptions, decreases in physical activity levels and unhealthy weight gain. Proper time management, lifestyle, exercise programmers, proper sleep are the various strategies for prevention and treatment of health problems associated with long working hours. In conclusion long working hours appears to be a risk factor on individual health and the current statistical review says that there is an increasing trend in long working hours.

KEYWORDS

INTRODUCTION

Long working hours is a common phenomenon Worldwide. It is generally taken to be more than 48 hours a week. 1 in 20 workers in Europe work long hours. It is thought that individuals are working longer hours because of increasing workloads and job demands, job insecurity and performance standards and pressures[1]. Evidence from previously published studies in peer-reviewed journals and internet sources were examined to explore health disorders and psycho-social problems among personnel employed in IT-based services and those employed in non-IT sectors such as mining, manufacturing and construction etc, experienced health problems regarding physical strain rather than mental strain.

Objectives

1) To study the trend of long working hours which is increasing worldwide over the years.
2) To understand the risk factors and various statistical issues surrounding working hours (IT and non IT sectors).
3) To analyze clinical issues statistically.
4) To focus on the intervention strategies of long working hours.

Statistical implications

Various statistical tools and techniques are applied in estimation and clinical evaluation of effect of long working hours. Statistics enables to represent the relationship b/w two variables by simple algebraic expressions like polynomials, exponential or logarithmic functions, correlation coefficients (hours worked and likelihood of having hypertension). It is used to estimate the values of one variable which would correspond to the specified values of the other variable using regression analysis. Cox proportional Hazard analyses were used to calculate adjusted hazard ratios (Comparing the risk of job related injury among workers). Statistics provides a sampling technique: large and small sample test (Z test, t test) in testing the hypothesis F test can be applied to test the population variance. Another important statistical tool is the theory of estimation used to estimate the unknown parameters (constants) through point or interval estimation.

RESULTS AND DISCUSSIONS

Issues surrounding long working hours

1. Age: Most epidemiological studies show that prevalence increases with age but may plateau or even decline in old age groups.
2. Gender: There are equal prevalence rates for males and females and hence long working hours carries no gender bias.
3. Job: Long working hours and related health problems involves the type of job they perform.

Prevalence of Long Working Hours

Statistics suggest that the UK workforce work some of the longest hours in Europe[2]. Previews have stated that employees in the UK average a total of 44.7 working hours a week as opposed to 39.9 in Germany, 39 in Denmark and the Netherlands, 36-39 in Italy and 38 in Belgium[3]. A report by the ILO stated that the US has the longest hours, with employees working nearly 2000 hrs per capita in 1997, similarly the Japanese work much longer hours than Europeans (nearly 1900 hrs per capita in 1997 compared to approximately 1730 hrs per capita for the UK).

2.1 Long working Hours: Health problems faced by IT workers

Workers in IT-enabled services face various health and psycho social disorders, due to long working hours.

2.2 Working styles of IT

- Better communication b/w colleagues
- Better time management
- Stronger teams
- Promotion
- Successful training
- Effective management and leadership
- Mental strain
- Adopted to junk foods
- Deadlines for completion of the work.

To clarify the extent to which working hrs affect the risk of acute myocardial infarction, independent of established risk factors and

occupational conditions, a case control study was done. There seemed to be a trend for the risk of infarction to increase with greater increase in mean working hrs.The relation b/w working hours, hours of sleep, the risk of AMI and joint effect of these two factors was studied. For this purpose they took 260 men aged 40-79 who are admitted to hospital with AMI. Odds ratio of AMI relative to mean weekly working hrs and daily working hrs of sleep in the past year or in the recent past were calculated. They concluded overtime work and insufficient sleep may be related to increased risk of AMI[4].

A study based on work-related risk factor for hypertension was carried out. Their findings present an analysis of work hrs and self-reported hypertension among the working population in the state of California. The logistic regression analysis shows a positive association between hours worked per week and likelihood of having self-reported hypertension. Hypertension was reported more in the increasing order of the working hours as follows: 14% (40hrs), 17 % (41-51hrs), 29%(≥ 51hrs) as compared to 11-39hrs per week[5].

Investigation of the association between duration of overtime and the development of impaired fasting glucose (IFG) or type 2 diabetes mellitus (DM) was done. The multivariate adjusted relative risks of IFG tended to decreases with an increase in hours of overtime work a day, but did not reach significance (p for trend=0.202). on the other hand, the multivariate adjusted relative risks of type 2 DM significantly decreased with an increase in hours of overtime work a day (p for trend=0.014). Thus, they concluded that longer over time is a negative risk factor for the development of IFG or type 2 DM in Japanese male office workers[6].

The effects of overtime work on the BP and BMI for male workers in Japan was determined. The Kaplan-Meier method was used to estimate the cumulative incidence rates of developing definite hypertension and increasing BMI, and the Cox proportional hazard model was used to determine the adjusted relative hazard of overtime work. The results of this study indicate that workers whose mean overtime was ≥50hr have lower risks of developing definite hypertension and increasing their BMI[7].

The findings on long working hours and related health problems faced by software professionals are as follows. Total of hundred subjects (90 males, 10 females) were included in the study between the age group of 22-36 years working for more than 1½ years. Finally they came to the conclusion that software developers continue to have lot of problems including RSI, obesity, poor fitness and stress, one year multi-disciplinary intervention of corrective measures of office Ergonomics, posture correction, planning of right diet and preventive exercise programmes could reduce the symptoms in small number of professionals[8]. The impact of extended working hours on the risk of occupational injuries and illnesses among a nationally representative sample of working adults from the US was analysed. Multivariate analytical techniques were used to estimate the relative risk of long working hours per day, extended hours per week, long commute times, and overtime schedules on reporting a work related injury or illness, after adjusting for age, gender, occupation, industry, and region. After adjusting for those factors, working in jobs with overtime schedules was associated with a 61% higher injury hazard rate compared to jobs without overtime[9]. The prevalence of sleep debt, insomnia and long working hours among 2334 IT professionals. Hierarchical regression analyses were applied to investigate relationships of sleep debt and insomnia. The most important factors associated with both sleep debt and insomnia were work-related demands requiring long hours, mental stamina and problem solving and positive perceptions of work, such as job control and importance of the respondents' own work in their life[10].

2.3 Effects of Long Working on Call Centres

A study conducted by Giri (2005) on a case study of call centres, found that women (between 20-30 years age) constituted about 38% of the work force sampled. Shah et al reported the mean age of 25.4 years among computer professionals in the study, while Suparna et al (2005) had subjects with mean age of 29.86 years and [7] had subjects with mean age of 29 years. The males outnumbered females in the ratio of 7:3, in the studies conducted in India[11]. A study was conducted on continued stress and strain at work. It lead to circumstances, where women find it difficult to carry on, especially during pregnancy and in situations of double burden of family and work. Sleeping disorders were observed among 83% and voice-loss among 8.5% Other health problems are ear problems (8.5%), digestive disorders (14.9%) and eye-sight problems (10.6%)[8]. The burn out stress syndrome is commonly observed among young people working in call centers[12].

The authors conducted a pilot study based on a postal questionnaire survey during 2005, on thirty computer professional workers working in different Information Technology-enabled services (ITES) for more than 2 years, with more than 4 hrs computer use in different operations. They concluded that due to long working hours, IT professionals suffered from Musculo-Skeletal disorders, ocular disorders and psycho-social problems as key health problems[13].

2.4 Long working hours: Health problems faced by Non IT Workers

Long working hours are controversial issues because of conflicts between health, safety, work – life balance and productivity. A higher incidence of coronary heart disease was seen in men who worked over 48 hrs per week[14]. Work overload, resulting in longer hours of work, has been linked with stress indefinite complaints and fatigue. This, together with the prolonged exposure to any workplace stressors can obviously affect one's health[15].

A investigation was done on the effects of shift work on health. They found shift workers working on average 48 hours or more a week suffered greater mental and physical health problems for example anxiety, cardiovascular problems, digestive problems and neuroticism)[16].

A five year prospective survey was carried to determine the relationship between occupation, education and CHD among 270000 men employed by the Bell Telephone company in the US[17]. A investigation on the working hours, activities, stress levels and views of house doctors was done[18]. Uehata (1991) interviewed the families of 203 'karoshi' (fatal attacks due to heavy workload) victims who suffered cardiovascular attacks in Japan. It was found that two-thirds of the victims were working 60 or more hours a week, with more than 50 hours overtime per month before the attack. Thus the results of the meta-analysis show a small but significant positive trend of increased health symptoms with increasing hours of work[19].

Research indicates that bus driving is a stressful occupation associated with increased health risks. For example, epidemiological studies have found that, compared to other occupations, bus drivers are at higher risk of cardiovascular, gastrointestinal and musculoskeletal problems. There is also evidence of relatively high blood pressure levels and elevated levels of stress-related hormones (e.g, adrenaline, cortisol) among bus drivers during work. Furthermore, found that, compared to normative samples, bus drivers had lower levels of job satisfaction and unfavorable scores on mental health indices due to their work-related stressors[20].

A study was conducted to examine the risk of depression and stress related disorders as a function of occupational exposure to violence and threats. The Sex specific relative risk of affective and stress related disorder was calculated as a function of potential exposure to threats and violence, using conditional logistic regression for nested case-control data (Phreg procedure, the SAS version 8 statistical program package). They came to the conclusion that Employment in occupation involving potential exposure to work related threats and violence is a risk factor for psychiatrically diagnosed affective and stress related disorders in both sexes[21].

2.5 Meta-analysis

A meta-analytic review was performed on 21 study samples. The study samples used in the meta-analysis were obtained by a literature review of all studies looking at hours of work and health measures. Electronic searches of SOCIOFILE, MEDLINE, PSYCLIT, ASSIA – inform and BIDS databases (1965-1996) were carried out to find all published research on the health effects of long work hours. Two studies reported both individual and group analysis.Correlations from the individual analyses only were included in the meta-analysis. The 19 studies used in the meta-analysis covered a broad range of health measures (e.g. myocardial infarction, exhaustion, mental stress, anxiety, poor sleep). The first step in the meta-analytic method was the calculation of the weighted average observed correlation (mean r). Here, if more than one correlation was reported in a study from the same sample these were averaged. In non-correlational studies, the statistics given were transformed into correlations. When results were reported as not significant and no other information was supplied, correlations were

estimated as zero[22].This occurred in only two studies and the zero correlations were only used for calculating the average correlation value for each study. After the above process, 21 correlation values were finally used in the meta-analysis to produce the mean r. The next step involved the calculation of the observed variation in effect size across studies and the variation due to sampling error. From this, the percentage of variance due to sampling error was estimated, the 95% confidence interval was then calculated to evaluate whether the mean working hours-health correlation was significantly different from zero, due to the small number of studies used in the meta-analysis, further corrections for unreliability and range restriction were not conducted[22,23,24]

A small number of studies also raises the possibility of second order sampling error (Hunter and Schmidt, 1990). However, with the present study it could be argued that any relationship between working hours and health may be marked by the broad range of health measures used in the 19 meta-analyzed studies, long hours of work may affect only certain aspects of health and some more strongly than others. Hence, while acknowledging the above caveats, it was decided to carry out two further meta-analyses looking at physiological and psychological health measures separately. Measures used in the physiological health meta-analysis included somatisation, headaches, work accidents, myocardial infarction, coronary heart disease and general physical health symptoms. Psychological health measures included hostility, depression, poor sleep, irritability/ tension, problems with relationships, lack of concentration, tiredness, role strain, anxiety, frustration, exhaustion, insomnia, social dissatisfaction and general mental stress[25].

Overall Meta-Analysis Results

The Mean correlation between health (both physiological and psychological) measures and working hour is 0.1302. The 95% confidence interval does not contain Zero, indicating a significant although small value for r.

Physiological and Psychological Meta-Analyses

The mean correlation between physiological health measures and working hours is 0.0636 and for psychological health measures 0.1465. In both cases the 95% C.I do not include zero, again indicating the significance of the small correlation values.

3.1 A statistical Analysis of therapies and clinical issues.

A study in Japan gave results that there are problems of health hazards with which work overload is associated. The association of working hours with biological indices related to the cardiovascular system (heart rate variability, blood pressure and serum levels of magnesium, dehydroepiandrosterone sulfate <DHEA-S> and cholesterol). Average working hours (defined as "hours at workplace+ half a commuting time") and sleeping hours in this study were 60.2± 6.3 hr/week and 6.6± 0.8 hr/day respectively[26].

3.2 Correlation between biological indices, age and BMI

The correlations between biological indices, age and BMI (Body Mass Index) were examined in Pearson's correlation coefficient. The relations between all parameters (biological indices, fatigue complaint rates, etc) and working/sleeping hours were examined by two-way analysis of variance (ANOVA) with age and working/sleeping hours as factors. In the ANOVA, the subjects were categorized. The difference in the mean values of the parameters for each working/sleeping hour subgroup was found by Fisher's least significance difference (LSD) method. Statistical significant was set at $p<0.05$.

3.3 Analysis of Heart rate variability (HRV)

Analysis of the frequency with Memcalc (Suma Trust co., Japan) was conducted to obtain HF (power in the high frequency, range, 0.15-0.30 HZ) and LF (power in the low frequency range, 0.04-0.15 HZ). The coefficient of variation of HRV in the high frequency range ($C\text{-}CV_{HF}$) was calculated by the following equation:

$C\text{-}CV_{HF} = {}^{100x(HF)1/2}$

Where RR was the mean R-R interval. The LF/HF ratio was logarithmically converted to get normal distribution in statistical analysis.

Classification of working or sleeping hour subgroups.

The subjects were divided into 3 subgroups according to the 33rd and 66th percentile of working hours (57.1 and 63.3 hr/week); short (SWH, <57.1 hr/week), medium (MWH, 57.1 ≤,, < 63.3 hr/week), long (LWH, 63.3 hr/week ≤) working hour subgroups. And the subjects were divided into 3 subgroups according to the 33rd and 66th percentile of sleeping hours (6-7 hr/day); short (SSH< 6hr/day), medium (MSH, 6≤, < 7hr/day) and long (LSH 7hr/day ≤) sleeping hour subgroups. There was no significant relationships between working hours and biological indices related to the cardiovascular system, but sleeping hours was closely related to working hours negatively, furthermore, the serum DHEA-S level was significantly related to sleeping hours positively combining these two results, it appeared that long working hours might lower the serum DHEA-S level due to the reduction of sleeping hours.

3.4 Repetitive Strain Injuries (RSI) and Straight Spine Syndrome (SSS)

Prevalence of RSI and musculoskeletal problems of neck i.e., SSS is not new in computer professionals. Occupationally caused RSI rank first among the health problems in the frequency with which they affect the quality of life. They finally came to conclusion that software developers continue to have lot of problems including RSI, obesity, poor fitness and stress. One year multi-disciplinary intervention of corrective measures of office Ergonomics, posture correction, planning of right diet and preventive exercise programmes could reduce the symptoms in small number of professionals[27].

3.5 Sleep debt and insomnia in IT professionals

Self-reported sleep debt and insomnia were the dependent factors used in hierarchical regression analyses. The independent factors were perceptions of work and work demands adjustment was made for age, gender and early/late-riser type. Sleep debt was commoner in younger people. Insomnia was commoner in the older age group. Sleep debt and insomnia were commoner in women. After adjustment for age, gender and early/late-riser type, the following perceptions of work were found to be significantly associated with both sleep debt and insomnia: importance of work in the person's life, poor job control, poor opportunities to develop and poor support from the person's immediate superior. When work demands were entered into the models regarding sleep debt, long hours at work and demands for mental stamina were found to be significantly associated with sleep debt.

Urban Migrant Survey

The data used is drawn from the Urban Migrant Survey, which is from the Rural-Urban Migration in China and Indonesia (RUMICI) project. The effect of working hours on mental health was considered, using a sample of around 3000 Chinese migrants who on average work over 60 hours, using the fact that these migrants reasonably expect to be in the city only temporarily because of restrictions on their family staying in the city, they found that the OLS estimate of working 60 hours or more is to score 0.7 higher on a 0 to 36 GHQ12 mental health score or one-sixth of a standard deviation. Using the variation in the economic conditions of the sending villages as instruments that are assumed to affect the relative pay-off of working longer hours without directly affecting mental health, the estimate of the effect of working 60 hours or more increases to 4.1 units more mental health problem or one standard deviation. This effect is larger than that found in previous studies based on smaller or more selective samples. There was a strong correlation found between the importance placed on work and long working hours and shortened sleep. This could reflect IT professional's strong commitment to work, which can be very stressful[28].

3.6 Mental Health and Hours Worked:

Mental health problems are some of the most prevalent and burdensome diseases and the costs of treatment and the indirect costs of lost productivity represent a substantial economic liability. Past research suggests that the relationship between hours worked mental health is nonlinear, with poor health clustered at the extremes of the hours worked distribution[29].

Death March Defined: Your don established " Death March" as the criteria when the schedule, staff, or budget is half of what it should be or when the project requirements are twice what they would normally be. Here the stakeholders are motivated to work insane hours on existing new projects.

Analysis of Variances

A one-way non-parametric ANOVA revealed significant differences between the business, other and technical background groups. Significant mean differences of 1.589 and 1.495 were observed

between the business group and the technical/ other groups respectively with regard to "My supervisor is a pointy-Haired Boss (PHB)" sentiment . A significant mean difference of 1.117 ($p<0.01$) was observed between the business and technical background groups with regard to the "short-term goals vs. long term productivity" item. A significant difference of 1.024 ($p<0.01$) was observed between the business and technical groups with regard to a preference for longer hours over changes to methodology.

A statistical study of clinical issues, complications and intervention strategies

4.1 Clinical Issues:

The association between long working hours and cognitive function in middle age with the confounding factors including age, sex, marital status, education, occupation, income, physical diseases, psychosocial factors, sleep disturbances and health risk behaviours was examined, (Whitehall II study). The Whitehall 11 study sample recruitment (phase 1) took place between 1985 and early 1988 among all office staff, aged 35-55 years, since phase 1, there have been 7 further data collection phases.

4.2 Statistical Analysis

All analyses were carried out by using SAS, version 9.1, statistical software, except missing-data analysis which was done using STATA, version 9.0, statistical software. First, they compared baseline characteristics of the participants by working hours and compared the longer-hours group (>55 hours per week) with the employees with normal working hours (35-40 hours per week) using chi-square test. They used multiple analysis of covariance to examine whether work hours had an overall association with cognitive function, as checking for each measure of cognitive function separately increases the chance of Type 1 error. Age was entered into the models as a continuous variable, and all other covariates were entered as categorical variables. In order to examine linear trend in the association between working hours and cognitive function, they repeated the analysis using working hours as a continuous variable.

Multiple analysis of covariance revealed an overall association of working hours with cognitive function at baseline (P= 0.002) and follow-up (P= 0.037), as well as change in cognitive function scores between baseline and follow-up (P=0.044). Table 4.1 shows the associations between working hours at baseline and each cognitive function measure at baseline and at follow-up after adjustment for all the covariates measured at baseline. Compared with employees working 40 hours or less per week, employees working more than 55 hours had lower vocabulary scores at baseline and at follow-up. Table 4.2 examines the mean difference in the change in reasoning score between those working normal hours and those working long hours. Successive models show the effects of step-by-step adjustments. To further examine whether the findings are robust, sensitivity analysis in a subgroup of participants still employed at follow-up(n=1672, n=1677). Consistent with the main analyses, working more than 55 hours versus 40 hours or less was associated with a greater decline in the reasoning score (difference -1.47; P=0.002) and lower scores on the vocabulary test at baseline (difference -0.77; P=0.009) and at follow-up(difference -0.60; P=0.046). Corresponding P values for the continuous working hours were P=0.009, P=0.004 and P= 0.023. As mild cognitive impairment predicts dementia and mortality, the identification of risk factors for mild cognitive impairment in middle age is important. The results of this study show that long working hours may be one of the risk factors that have a negative effect on cognitive performance in middle age.

CONCLUSIONS

There is a worldwide concern over the potential impact of prolonged work hours on workplace health and safety. It is a serious and economically devastating illness that has been reached epidemic proportion in both industrialized and developing countries. A study on meta analysis reviewed that a small but significant positive trend of increased health symptoms with increasing hours of work. Some studies reviewed the association between duration of overtime and the development of impaired fasting glucose or type 2 diabetes mellitus, conclusion was that longer overtime is a negative risk factor for the development of IFG or type 2 DM. Studies reviewed the effects of overtime work on blood pressure and body mass index. Prevalence of RSI and musculoskeletal problems of neck that is SSS specially among IT professionals has been discussed. The sex specific relative risk of affective and stress related disorder was calculated as a function of potential exposure to threats and violence, using conditional cardiovascular disease, diabetes, depression, fatigue etc. Studies revealed that insufficient sleep may be related to increased risk of acute myocardial infarction. Longer work hours are risk factors for hypertension after controlling for biological and behavioral related risk factors, occupation etc. Poor life style habits may act as a mechanism linking long hours with cardiovascular disorders. Studies revealed that changing from standard to long hours was associated with increased smoking, higher alcohol consumptions, decreases in physical activity levels and unhealthy weight gain. Proper time management, lifestyle, exercise programmers, proper sleep are the various strategies for prevention and treatment of health problems associated with long working hours. In conclusion long working hours appears to be a risk factor on individual health and the current statistical review says that there is an increasing trend in long working hours.

REFERENCES

1. Harrington, J. M. Health effects of shift work and extended hours of work. Occupational and Environmental medicine. 2001;58(1):68-72.
2. Kodz, J., Davis, S., Lain, D., Strebler, M., Rick, J., Bates, P., Trinczek, R. Working long hours: a review of the evidence. Volume 1–Main report. Employment Relations Research Series, 16.
3. Spurgeon, A., Harrington, J. M., & Cooper, C. L. Health and safety problems associated with long working hours: a review of the current position. Occupational and environmental medicine. 1997;54(6): 367-375.
4. Sokejima, S., & Kagamimori, S. Working hours as a risk factor for acute myocardial infarction in Japan: case-control study. Bmj. 1998;317(7161):775-780.
5. Yang, H., Schnall, P. L., Jauregui, M., Su, T. C., & Baker, D. Work hours and self-reported hypertension among working people in California. Hypertension. 2006;48(4):744-750.
6. Liu, Y., & Tanaka, H. Overtime work, insufficient sleep, and risk of non-fatal acute myocardial infarction in Japanese men. Occupational and Environmental Medicine. 2002; 59(7):447-451.
7. Wada, K., Katoh, N., Aratake, Y., Furukawa, Y., Hayashi, T., Satoh, E., ... & Aizawa, Y. Effects of overtime work on blood pressure and body mass index in Japanese male workers. Occupational Medicine. 2006;56(8):578-580.
8. Jeremy Leipzig, work issues in software engineering (2002).
9. Dembe, A. E., Erickson, J. B., Delbos, R. G., & Banks, S. M. The impact of overtime and long work hours on occupational injuries and illnesses: new evidence from the United States. Occupational and environmental medicine. 2005;62(9):588-597.
10. Kivistö, M., Härmä, M., Sallinen, M., & Kalimo, R. Work-related factors, sleep debt and insomnia in IT professionals. Occupational Medicine. 2008;58(2):138-140.
11. Kesavachandran, C., Rastogi, S. K., Das, M., & Khan, A. M. Working conditions and health among employees at information technology-enabled services: A review of current evidence. Indian Journal of Medical Sciences. 2006;60(7):300.
12. Sudhashree, V. P., Rohith, K., & Shrinivas, K. Issues and concerns of health among call center employees. Indian Journal of Occupational and Environmental Medicine. 2005;9(3):129.
13. Cooper, C. L., & Marshall, J. Occupational sources of stress: A review of the literature relating to coronary heart disease and mental ill health. Journal of occupational psychology. 1976;49(1):11-28.
14. Breslow, L., & Buell, P. Mortality from coronary heart disease and physical activity of work in California. Journal of chronic diseases. 1960;11(3-4): 421-444.
15. Cooper, C. L. Identifying stressors at work: Recent research developments. Journal of psychosomatic research. 1983;27(5):369-376.
16. Barton, J., Smith, L., Totterdell, P., Spelten, E., & Folkard, S. Does individual choice determine shift system acceptability?. Ergonomics. 1993;36(1-3):93-99.
17. Hinkle, L. E., Whitney, L. H., Lehman, E. W., Dunn, J., Benjamin, B., King, R., ... & Flehinger, B. Occupation, education, and coronary heart disease. Science. 1968;161(3838):238-246.
18. Moss, P., Reid, N., Jackson, S., Lam, E., & Morris, D. The working hours, work patterns, stress levels and views of house officers–A study of a general surgical department. Part one of a Report to the West Midlands Regional Task Force (Doctors in Training), Coventry University. 1996.
19. Uehata, T. Long working hours and occupational stress-related cardiovascular attacks among middle-aged workers in Japan. Journal of human ergology. 1991;20(2):147-153.
20. Duffy, C. A., & McGoldrick, A. E. Stress and the bus driver in the UK transport industry. Work & Stress. 1990:4(1):17-27.
21. Wieclaw, J., Agerbo, E., Mortensen, P. B., Burr, H., Tüchsen, F., & Bonde, J. P. Work related violence and threats and the risk of depression and stress disorders. Journal of Epidemiology & Community Health. 2006;60(9):771-775.
22. Sparks, K., Cooper, C., Fried, Y., & Shirom, A. The effects of hours of work on health: a meta‐analytic review. Journal of occupational and organizational psychology. 1997;70(4):391-408.
23. Glass, G. V., McGaw, B., & Smith, M. L. Meta-analysis in social research.* Newbury Park. 1981.
24. Hall, J. A., & Rosenthal, R. Testing for moderator variables in meta‐analysis: Issues and methods. Communications Monographs. 1991;58(4):437-448.
25. Hunter, J. E., & Schmidt, F. L. Dichotomization of continuous variables: The implications for meta-analysis. Journal of Applied Psychology. 1990;75(3):334.
26. Sasaki, T., Iwasaki, K., Oka, T., HISANAGA, N., UEDA, T., TAKADA, Y., & FUJIKI, Y. Effect of working hours on cardiovascular-autonomic nervous functions in engineers in an electronics manufacturing company. Industrial health. 1999;37(1):55-61.
27. Choudhary, S. B., Sapur, S., & Deb, P. S. Awkward posture and development of RSI (Repetitive strain injury) in computer professionals. Indian J Occup Environ Med. 2002;6:10-2.
28. Fritjers, P., Johnston, D. W., & Meng, X. The mental health cost of long working hours: the case of rural Chinese migrants. Unpublished Manuscript, Department of Economics, University of Queensland. 2009.
29. Sparks, K., Cooper, C., Fried, Y., & Shirom, A. The effects of hours of work on health: a meta‐analytic review. Journal of occupational and organizational psychology. 1997;70(4):391-408.