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ORIGINAL ARTICLE

Work and its impact on health: Obesity, over-weight and rise in blood pressure: A Cross-Sectional Study

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ABSTRACT
The working lifestyle has grown to become increasingly desk-bound with the evolution of the computer showing its health effect on the working professionals. Various prospective researches have documented the influence of stress at work on blood pressure and weight. Long working hours in front of the computer screens and often consuming unhealthy food has become a common trend amongst the employees. This in turn poses a risk for development of several chronic disorders due to this sedentary behaviour as a result of the work stress. We carried out a cross-sectional research project for the duration of August 2016 to November 2016. A sample size of 110; n=55 each in the study group and control group, were taken into study. The study group had work professionals who had computer operated work for 8 to 12 hours duration per day with one hour of break. Both groups were assessed based on their weight and blood pressure measurements. The mean ± standard deviation (SD) values for each parameter were calculated for both the study as well as the control groups. These values were subsequently compared utilizing an unpaired 't' test. The study group exhibited a positive association between work lifestyle and its impact seen in their blood pressure measurements and weight. The control group was found to have a lower blood pressure and lower body mass index when compared with the study group.
Keywords*: working professional, blood pressure, obese, overweight*

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INTRODUCTION

The impact of workplace dangers on society remains significant, causing illness, death, and significant financial and social repercussions. This is why protecting the health of workers remains a top national priority. [1]

Various researches have demonstrated a strong connection amidst psychosocial stress and an elevated likelihood of developing heart issues, hypertension and even cancer. While the connection of stress and chronic weight gain is not fully understood, research suggests that stress may influence dietary habits, resulting in changes in weight. [2]

This effect may vary based on factors like components as gender, initial body mass index, and how the body responds to stress through cortisol levels. As a result, some individuals may experience greater weight gain during periods of stress, while others may even lose weight. [3, 4]

In1970s and 1980s, research on work-related stress gained traction thanks to Robert Karasek's Demand-control model. It stated that work-related stress was the result of a combination of demanding psychological job requirements and limited control of job. [5]

Additionally, Goldstein defined stress as a state where our expectations, whether innate, learned, or deduced, do not align with our present or future perceptions of the internal or external world.[6]

The consequences of obesity span a wide range of health and safety concerns. These include a greater possibility of conditions like prediabetes as well as diabetes mellitus, hypertension, heart disorder, increased cholesterol levels and varied other disorders. [7]

In addition, research has shown a strong correlation of stress related to work and the development of heart disorders in both look-back and prospective studies. [8]

There has been a significant increase in global attention towards the issue of overweight and obesity, as they pose considerable public health risks. Research has shown that ongoing stress can lead to the setting off of the hypothalamic-pituitary-adrenal axis in human beings, leading to a higher consumption of "self-rewarding" food. This elevation in intake has been linked to a rise in cases of obesity.[9]

As working adults, we devote a significant portion of our lives to our jobs. It's no surprise that the stress and demands of work can have an impact on our eating and physical activity habits, potentially resulting in weight gain and obesity.

Additionally, the rigors of the workplace, including exposure to harmful substances, physical strain, and psychological stress, can also contribute to occupational injuries and illnesses. Moreover, being overweight or obese can not only limit job opportunities and hinder performance, but it may also influence the connection between workplace exposures and our overall health. [10]

The issue of sedentary behaviour is quickly becoming a pressing matter in public health. IT professionals, in particular, are facing longer hours in front of their computer screens without prioritizing their wellbeing, including their weight. The demands of their work often take precedence over their physical health.

As a result, such working professionals are at an increased risk of weight gain as a result of their predominantly sedentary lifestyles. This not only leads to a slower metabolism and a poorer BMI, but also has detrimental effects on their overall well-being. On top of that, prolonged physical inactivity also contributes to significant psychological stress.[11]

The metabolic syndrome presents a combination of potentially damaging components that greatly increase the likelihood of developing heart disease and diabetes mellitus type 2. These contributory factors increasing risk include higher levels of blood pressure, obesity as well as insulin resistance to name a few of the components likely to cause this syndrome. [12]

The way an individual responds to their surroundings mirrors their stress levels, with organisms utilizing parasympathetic and sympathetic networks to cope. Stress could be broken down into two types, acute and chronic, yet its role in obesity remains a mystery.[13]

Obesity is a pressing and growing concern for the global population. Each year, a staggering 2.8 million individuals lose their lives due to obesity-related health problems. The link between obesity and long-term health conditions has been extensively studied and acknowledged. Moreover, the effects of obesity on one's mental well-being are significant.[14]

The current research was performed to analyse the work-related negative influence seen in IT professionals due to long work hours and its association with BMI, obesity and the consequences which they could turn into in time to come.

MATERIAL AND METHODS

Cross-sectional research was carried out in the department of Physiology at Dr. D. Y. Patil Medical College, Pimpri, Pune from August 2016 to November 2016. 55 male participants, i.e., working professionals ranging from 25 to 40 years of age were included in the study who had computer operated work for 8 to 12 hours duration per day with one hour of break and they were matched with 55 male participants who were non-working professionals having the same age.

According to a study by Reckelhoff et al, it was found that men had a greater level of blood pressure in comparison to the women of the same age due to androgens. As a result, we specifically included males in our study to further investigate this observation.[15]

Both groups were assessed based on their weight and blood pressure measurements. The findings were demonstrated as the mean value, with the standard deviation indicated by a plus or minus symbol. To analyze the results, the student's unpaired t-test was utilized in Microsoft Excel. With an impressively low p-value of less than 0.001, the results were deemed to be highly significant. The Institutional Ethical Committee granted ethical clearance, and participants gave informed consent after being informed of the study's objectives and their blood pressure measurements, pulse rate and weight were recorded at subsequent visits.

Participants who regularly exercised, on medications like statins, glitazones, fibrates, clopidogrel, aspirin and anti-hypertensives, those having any history of major disease and women were excluded from this study. Pre-hypertension is characterized by a systolic blood pressure (SBP) reading between 120-139

mmHg and a diastolic blood pressure (DBP) reading between 80-89 mmHg. On the other hand, hypertension is diagnosed when an individual has a SBP of 140mmHg or greater and/or a DBP of 90mmHg or greater.[16]

RESULTS

This research aimed to examine the influence of work stress on professionals who spend prolonged periods in front of computer screens, and how it affects their blood pressure and weight. Furthermore, a comparison was made with a control group to measure the differences.

Table 1: Comparison of BMI in study and control group

BMI (kg/m^2)	Study Mean ±SD	Control Mean ±SD
Weight (Kg)	79±1.414	64.5±6.720
Height (m)	171.5±6.401	163±6.878
BMI (Kg/m^2)	26.85±0.215	24.35±3.101

****** p<0.00 considered highly significant, SD - Standard deviation

Table 1 demonstrates that BMI in the study group (26.85**±**0.215) was comparatively higher than the control group (24.35±3.101).

Table 2: Comparison of different weight groups in both study and control group

Weight in terms of BMI (Kg/m^2)	Study Mean ±SD	Control Mean ±SD	P value
Normal weight (18.5-24.9)	23.7 ± 0.707	20.4 ± 3.25	**0.001
Over weight (25-29.9)	26.85 ± 0.2121	25.4 ± 0.282	**0.001
Obese(>30)	31.3 ± 1.131	31 ± 1.414	0.3312

p<0.001 was considered to be highly significant.

Upon examining Table 2, it can be noted that the study group exhibited a higher weight as measured by BMI, particularly in the normal as well as overweight classification, upon comparison with the control group. No significant difference was noted when obese weight group was compared amongst both the groups.

Table 3: Correlation of blood pressure and pulse rate in computer users and non-computer users

Parameters	Study Mean ±SD	Control Mean ±SD	P value
SBP (mm Hg)	134.75±5.559	116.7±9.054	**0.001
DBP(mm Hg)	87.7±3.910	72.45±5.113	**0.001
Pulse Rate (bpm)	80.7±3.797	72.80±3.701	**0.001

P< 0.001 considered as highly significant.

According to Table 3, a clear and notable difference was observed in SBP and DBP as well as the pulse rate when compared between the study and the control groups. The findings strongly indicate that the study group had significantly higher values in these measures.

DISCUSSION

Employers must ensure a safe workplace for all employees by eliminating known hazards. In light of the increased health risks for overweight individuals in certain work environments, employers must take measures to effectively safeguard these workers. [10]

The rise of obesity in the Indian population can be attributed to unhealthy eating practices and sedentary lifestyles. This surge may also be linked to work overload, as people struggle to keep up with the rapid pace of globalizing and ever-evolving technology. Unfortunately, the consequences of workplace stress have extended beyond mental strain, leading to a surge in health problems, particularly concerning cardiovascular risk factors.[17]

In the present research, we observed that BMI was greater in the study participants (26.85±0.215) in comparison to the control ones (24.35±3.101). This was alike to the inference of results byKim et al who discovered a positive proportional association of the BMI and the countable daily hours of work.[18]

In the realm of work, there are various factors that can influence the job experience. These factors can range from aspects of company's work like lengthy hours of work to elements of psychosocial strain. Some examples of psychosocial stressors could be psychological demands, work-related exertion,

uncertainty about job stability, limited control over job tasks, job-related incentives, and support from colleagues in the workplace. [19]
Similar study by Brunner et al observed that long standing stress at work was a predictor of obesity: general and central. [20]
According to Greiner et al's research, a strong correlation was discovered between individual-reported stressor and hypertension frequency when the stress level observed by an observer was low. [21]
Continuous high levels of work stress have consistently been linked to a heightened likelihood of developing cardiovascular disease. [22]
This link may stem from the adverse impact that work-related stressors have on levels of blood pressure via continuous triggering of the autonomic nervous system. Ambulatory studies on BP have provided evidence for these work-stress effects, as individuals with high levels of work stress tend to exhibit elevated blood pressure levels.
In our study, it was observed that blood pressure was high in the working professionals as compared to the control group. This was alike the results of Schnall et al where they concluded that strain due to job had an impactful contribution in the emergence of hypertension within the workplace. [23]
Furthermore, various research conducted in different countries has revealed a concerning trend: individuals in high-stress occupations have a higher likelihood of developing coronary heart disease. [24, 25, 26]
The study group had a heart rate towards the greater side in contrast to their control counter parts and this was similar to researches conducted by Kamarck *et al* [27] and Vrijkotte *et al* [22] which a significantly proportional association of heart rate in relation to work stress in the high–work stress groups.

CONCLUSION

Research has shown a concerning prevalence of stress and its detrimental impact on obesity. To combat this, numerous studies have proposed implementing measures such as strengthening social support networks, providing individual and group counselling, and promoting health education with a specific emphasis on work environments. These interventions have been suggested as effective ways to prevent and manage stressors and contributing factors, resulting in significant progress in tackling this issue.
The effects of job stress can impact both the individual and the organization in various ways. Strain due to job often arises due to an amalgamation of excessive job demands and minimal hold over the situation. In this fast-paced industry, IT professionals are often expected to prioritize their work over their health, spending long hours in front of computer screens due to the high demands and urgency of their tasks.
It is common for busy professionals to disregard the importance of regular exercise due to their sedentary office job. However, there are ways to combat the harmful effects of this lifestyle by incorporating different physical activities, such as brisk walking, swimming, sports, or yoga. This study further suggests a correlation between workplace stress and its influence on the health of workers.

REFERENCES

1. Steenland K, Burnett C, Lalich N, Ward E, Hurrell J. (2003). Dying for work: the magnitude of US mortality from selected causes of death associated with occupation. *Am J Ind Med*. 43:461–482.
2. Kuczmarski RJ, Flegal KM. (2000). Criteria for definition of overweight in transition: background and recommendations for the United States. *Am J Clin Nutr*. 72:1074–1081.
3. Kivimäki M, Head J, Ferrie J E, Shipley MJ, Brunner E, Vahtera J, Marmot MG (2006). *Work stress, weight gain and weight loss: evidence for bidirectional effects of job strain on body mass index in the Whitehall II study. International Journal of Obesity, 30(6), 982–987.*
4. Block JP, He Y, Zaslavsky AM, Ding L, Ayanian JZ. (2009). Psychosocial Stress and Change in Weight Among US Adults. ***American Journal of Epidemiology***, Vol 170 (2); 181-192.
5. Hanson M, LL, Westerlund H, Goldberg M *et al.* (2017). Work stress, anthropometry, lung function, blood pressure, and blood-based biomarkers: a cross-sectional study of 43,593 French men and women. *Sci Rep* 7, 9282.
6. Goldstein DS. (2010). Adrenal responses to stress. *Cell Mol Neurobiol*.;30(8):1433–1440.
7. Steele C, Thomas C, Henley S, et al. (2017). Vital signs: trends in incidence of cancers associated with overweight and obesity—United States, 2005–2014. ***MMWR Morb Mortal Wkly Rep***. 66:1052–1058.
8. Rosengren A, Hawken S, Ounpuu S, Sliwa K, Zubaid M, Almahmeed WA, et al. (2004). Association of psychosocial risk factors with risk of acute myocardial infarction in 11 119 cases and 13 648 controls from 52 countries (the INTERHEART study): case-control study. *Lancet* ;364: 953-62.
9. Guo X, Gong S, Chen Y. *et al.* (2023). Lifestyle behaviors and stress are risk factors for overweight and obesity in healthcare workers: a cross-sectional survey. *BMC Public Health* 23, 1791.

10. Schulte PA, Wagner GR, Ostry A, Blanciforti LA, Cutlip RG, Krajnak KM, Luster M, Munson AE, O'Callaghan JP, Parks CG, Simeonova PP, Miller DB. (2007). Work, obesity, and occupational safety and health. Am J Public Health.;97(3):428-36.
11. Nayee KS, Vaghasiya A. (2023). Correlation of BMI with workplace stress and physical activity in IT professionals. Int J Health Sci Res. 13(6):41-45.
12. Expert Panel on Detection. Executive summary of the third report of the National Cholesterol Education Program (NCEP) expert panel on detection, evaluation, and treatment of high blood cholesterol in adults (adult treatment panel III). *JAMA* 2001;285: 2486-97.
13. Koski M, Naukkarinen H. (2017). The Relationship between Stress and Severe Obesity: A Case-Control Study. Biomed Hub. 3;2(1):1-13.
14. Jacobsen AL, DeVries CEE, Poulsen L, Mou D, Klassen AF, Pusic AL, Makarawung DJS, Wiezer MJ, van Veen RN, Sørensen JA. (2022). The impact of body mass index (BMI) on satisfaction with work life: An international BODY-Q study. Clin Obes. ;12(4):e12527.
15. Reckelhoff JF. (2001). Gender differences in the regulation of blood pressure. Hypertension. May;37(5):1199-208.
16. Victorian Health Promotion Foundation. Reducing prolonged sitting in the workplace. An evidence review:Summary report.2012.Accessed on 21/7/22
17. Shinde VV. (2019). Relationship of body mass index to job stress and eating behaviour in health care professionals-an observational study. Obesity Medicine. 1;14:100070.
18. Kim BM, Lee BE, Park HS *et al.* (2016). Long working hours and overweight and obesity in working adults. *Ann of Occup and Environ Med* 28, 36.
19. Myers S, Govindarajulu U, Joseph MA, Landsbergis P. (2021). Work Characteristics, Body Mass Index, and Risk of Obesity: The National Quality of Work Life Survey. Ann Work Expo Health. 22;65(3):291-306.
20. Brunner EJ, Chandola T, Marmot MG. (2007). Prospective effect of job strain on general and central obesity in the Whitehall II Study. Am J Epidemiol. 1;165(7):828-37.
21. Greiner BA, Krause N, Ragland D, Fisher JM. (2004). Occupational stressors and hypertension: a multi-method study using observer-based job analysis and self-reports in urban transit operators. Soc Sci Med. 59(5):1081-94.
22. Vrijkotte TG, van Doornen LJ, de Geus EJ. (2000). Effects of work stress on ambulatory blood pressure, heart rate, and heart rate variability. Hypertension. :35(4):880-6.
23. Schnall PL, Schwartz JE, Landsbergis PA, Warren K, Pickering TG. (1998). A longitudinal study of job strain and ambulatory blood pressure: results from a three-year follow-up. Psychosom Med. ;60(6):697-706.
24. Kuper H, Marmot M. (2003). Job strain, job demands, decision latitude, and risk of coronary heart disease within the Whitehall II study. *J Epidemiol Community Health*.57(2):147–153.
25. Belkic K, Schnall P, Landsbergis P, ***et al.*** (2000). The workplace and cardiovascular health: conclusions and thoughts for a future agenda. *Occup Med.* ;15(1):307–321.
26. Pickering TG. Does psychological stress contribute to the development of hypertension and coronary heart disease? Eur J Clin Pharmacol. 1990;39 Suppl1:S1-7.
27. Kamarck TW, Shiffman SM, Smithline L, Goodie JL, Paty JA, Gnys M, & Jong JYK. (1998). Effects of task strain, social conflict, and emotional activation on ambulatory cardiovascular activity: Daily life consequences of recurring stress in a multiethnic adult sample. ***Health Psychology, 17***(1), 17–29.