

Unveiling the Global Surge: Unraveling the Factors Fueling the Spread of Karoshi Syndrome

Haitham Ahmed Al-Madhagi 

Biochemical Technology Program, Dhamar University, Dhamar, Yemen

Correspondence: Haitham Ahmed Al-Madhagi, Email bio.haitham@gmail.com

Abstract: Karoshi syndrome, also known as “death by overwork”, has been a topic of study and concern in Japan since the 1980s. World Health Organization (WHO) and International Labour Organization (ILO) joint unveiled that in 2021, approximately 750,000 deaths due to Karoshi syndrome globally. The joint defined long working as having > 55 h work/week. Karoshi nowadays is no longer limited to Japan and has become a global issue. Karoshi is primarily attributed to factors such as long working hours, job-related stress, and poor work-life balance. This perspective was sought to provide a short overview of Karoshi syndrome, the underlying mechanisms and the state-of-art preventive measures.

Keywords: Karoshi syndrome, working overload, cardiovascular diseases, stroke

Introduction

Karoshi syndrome, also known as “death by overwork”, has been a topic of study and concern in Japan since the 1980s. World Health Organization (WHO) and International Labour Organization (ILO) joint unveiled that in 2021, approximately 750,000 deaths due to Karoshi syndrome globally. The joint defined Karoshi syndrome as having > 55 h work/week.¹ Karoshi, a term originating from Japan, refers to death resulting from overwork and excessive occupational stress. This phenomenon gained marked attention due to its implications for both public health and workplace policies. The concept emerged in the context of Japan’s rigorous work culture, where long working hours, intense pressure, and limited work-life balance prevail.² It is characterized by extreme levels of stress and overwork, which can lead to serious consequences and even death. Karoshi is a potentially fatal syndrome resulting from long work hours. It is believed to be caused by the stimulation of disorders associated with chronic fatigue after performing high-stress work for a long time, such as cerebrovascular/cardiovascular diseases and mental disorders. Karoshi is not only a clinical disease but also a social issue, and it remains a complex problem for forensic science.³ The Japanese government passed the “Act on Promotion of Preventive Measures against Karoshi and Other Overwork-Related Health Disorders” in 2014 to address the issue of karoshi and promote preventive measures. Karoshi can affect both entrepreneurs and workers in demanding and highly competitive work environments. Karoshi nowadays is no longer limited to Japan and has become a global issue.⁴ It is important to recognize the signs of karoshi and take steps to address the problem and prevent it from affecting one’s health.

Mechanisms of Karoshi Development

Karoshi is primarily attributed to factors such as long working hours, job-related stress, and poor work-life balance. The demanding nature of certain professions and societal expectations can lead to chronic stress and burnout. Factors like job insecurity, inadequate rest, and lack of control over work contribute to the development of physical and mental health issues.⁵ The exact mechanism of death in cases attributed to karoshi is multifaceted and can involve a combination of physiological, psychological, and systemic factors. It’s important to note that karoshi is not recognized as a medical diagnosis in most countries, but rather a social phenomenon associated with death resulting from long working hours and excessive occupational stress.



Figure 1 A collection of implicating mechanisms accounting for the mortality due to Karoshi syndrome.

Nevertheless, several mechanisms have been proposed to explain how overwork and stress can lead to serious health complications and potentially contribute to premature death.⁶ These mechanisms include (also depicted in Figure 1):

1. **Cardiovascular Complications:** Prolonged exposure to chronic stress and overwork can contribute to the development of cardiovascular diseases. The stress response, characterized by elevated levels of stress hormones like cortisol and adrenaline, can lead to increased heart rate, blood pressure, and inflammation. Over time, these physiological changes can damage blood vessels, leading to atherosclerosis (buildup of plaque in arteries) and increasing the risk of heart attacks, strokes, and other cardiovascular events.^{7,8}
2. **Hypertension:** Long working hours and high stress levels can lead to chronic hypertension (high blood pressure). Elevated blood pressure, if left untreated, can strain the heart and blood vessels, increasing the risk of heart disease and stroke.⁹ Plus, an increase of the odds of intracerebral hemorrhage in hypertensive patients.¹⁰
3. **Sleep Deprivation and Exhaustion:** Overwork often leads to inadequate rest and sleep deprivation. Chronic sleep deficits can negatively impact overall health, impair cognitive function, weaken the immune system, and contribute to the development of various health issues.¹¹
4. **Mental Health Implications:** The intense pressure and stress associated with overwork can lead to mental health disorders such as anxiety and depression. These conditions, if not addressed, can further exacerbate physical health issues and increase the risk of self-harm or suicide.^{12,13} This is mostly experienced in information technology workers given that the modern life works are achieved online.¹⁴ A study examined 1990 cases of mental disorders and suicide that received compensation (1371 men and 619 women) from January 2010 to March 2015. The rate of compensation was higher for workers aged 30 to 39 years. For men, the industries with higher rates of compensation were ‘accommodation/eating/drinking services’, ‘information/communication’ and ‘scientific research, professional and technical services’. In these sectors, the rate of compensation was especially high for workers aged 29 or younger.¹⁵ “Long working hours” caused most of the cases of mental disorders and suicide among men (55.7%) and were the main reason for suicide compensation. The frequency of these cases varied by industry and gender.
5. **Metabolic Disruptions:** Chronic stress can disrupt metabolic processes, potentially contributing to conditions like diabetes and obesity. These metabolic disturbances, when coupled with other health risks, can increase the likelihood of cardiovascular complications.⁵

6. Immune System Suppression: Prolonged stress can suppress the immune system, making individuals more susceptible to infections and other illnesses. This weakened immune response can lead to prolonged recovery times and increased vulnerability to health complications.¹⁶
7. Behavioral Factors: Long working hours might lead to unhealthy lifestyle choices, such as poor diet, lack of exercise, and inadequate self-care. These factors can contribute to the development of chronic diseases and further increase the risk of mortality.¹⁷

It is important to point out that while these mechanisms provide insights into how chronic overwork and stress can impact health, individual susceptibility, genetics, and other external factors also play significant roles in determining how these risks manifest. Additionally, societal and cultural factors influence the prevalence and impact of karoshi, particularly in work cultures where extended hours and limited work-life balance are the norm.

Preventive Measures

Firstly, it is worth noting that Karoshi syndrome demonstrated non-success of this integration and is unsuccessful when the lean-based improvements themselves suffer from sustainability issues.¹⁸ This should raise the awareness of both worker citizens and the employing establishments of such old work phenomenon. Efforts to address karoshi syndrome have led to the implementation of various preventive measures. In Japan, reforms aimed at promoting work-life balance, limiting overtime hours, and ensuring adequate rest have been introduced. Additionally, raising awareness about mental health issues and destigmatizing seeking help for stress-related problems are crucial components of preventive strategies.¹⁹ Indeed, utilizing the already applicable remote work and the artificial intelligence arena shall alleviate the incidence of Karoshi syndrome further. Plus, some European countries such as Belgium shortened the working days into 4 instead of 5 a week to simultaneously limit the likelihood of working overload and increase the productivity of the employees.²⁰

Disclosure

The authors report no conflicts of interest in this work.

References

1. Pega F, Náfrádi B, Momen NC, et al. Global, regional, and national burdens of ischemic heart disease and stroke attributable to exposure to long working hours for 194 countries, 2000–2016: a systematic analysis from the WHO/ILO Joint estimates of the work-related burden of disease and injury. *Environ Int*. 2021;154:106595. doi:10.1016/j.envint.2021.106595
2. Cheng Y, Park J, Kim Y, Kawakami N. The recognition of occupational diseases attributed to heavy workloads: experiences in Japan, Korea, and Taiwan. *Int Arch Occup Environ Health*. 2012;85:791–799. doi:10.1007/s00420-011-0722-8
3. Kanai A. “Karoshi (Work to Death)” in Japan. *J Bus Ethics*. 2009;84:209–216. doi:10.1007/s10551-008-9701-8
4. Yamauchi T, Yoshikawa T, Takamoto M, et al. Overwork-related disorders in Japan: recent trends and development of a national policy to promote preventive measures. *Ind Health*. 2017;55:293–302. doi:10.2486/indhealth.2016-0198
5. Wang -C-C, Chen W-L, Chiang S-T, et al. 61 The impact of metabolic syndrome on karoshi from overwork. *Occup Environ Med*. 2018;75:A387–A387. doi:10.1136/oemed-2018-ICOHabstracts.1107
6. Xiao N, Yang B-F, Shi J-Z, et al. Karoshi may be a consequence of overwork-related malignant arrhythmia. *Med Sci Monit*. 2019;25:357–364. doi:10.12659/MSM.911685
7. Kivimäki M, Jokela M, Nyberg ST, et al. Long working hours and risk of coronary heart disease and stroke: a systematic review and meta-analysis of published and unpublished data for 603,838 individuals. *Lancet*. 2015;386:1739–46.
8. Fadel M, Sembajwe G, Gagliardi D, et al. Association between reported long working hours and history of stroke in the CONSTANCES Cohort. *Stroke*. 2019;50:1879–1882. doi:10.1161/STROKEAHA.119.025454
9. Yoo DH, Kang M-Y, Paek D, Min B, Cho S-I. Effect of long working hours on self-reported hypertension among middle-aged and older wage workers. *Ann Occup Environ Med*. 2014;26:25. doi:10.1186/s40557-014-0025-0
10. Morita Y, Yoshikawa T, Takahashi M. Long working hours and risk of hypertensive intracerebral haemorrhage among Japanese workers claiming compensation for overwork-related intracerebral haemorrhage: an unmatched case-control study. *BMJ Open*. 2023;13:e074465. doi:10.1136/bmjopen-2023-074465
11. Arbour M, Tanner T, Hensley J, Beardsley J, Wika J, Garvan C. Factors that contribute to excessive sleepiness in midwives practicing in the United States. *J Midwifery Women's Health*. 2019;64:179–185. doi:10.1111/jmwh.12945
12. Bannai A, Ukawa S, Tamakoshi A. Long working hours and psychological distress among school teachers in Japan. *J Occupat Health*. 2015;57:20–27. doi:10.1539/joh.14-0127-OA
13. Nishimura Y, Yamauchi T, Sasaki T, Yoshikawa T, Takahashi M. Overtime working patterns and adverse events in work-related suicide cases: hierarchical cluster analysis of national compensation data in Japan (fiscal year 2015–2016). *Int Arch Occup Environ Health*. 2022;95:887–95. doi:10.1007/s00420-021-01760-5.

14. Takahashi Y, Yoshikawa T, Yamamoto K, Takahashi M. Characteristics of mental disorders among information technology workers in 238 compensated cases in Japan. *Ind Health*. 2023;2022–2197. doi:10.2486/indhealth.2022-0197
15. Yamauchi T, Sasaki T, Yoshikawa T, Matsumoto S, Takahashi M. Incidence of overwork-related mental disorders and suicide in Japan. *Occup Med*. 2018;68:370–377. doi:10.1093/occmed/kqy080
16. Eguchi H, Wada K, Recognition SDR. Compensation, and Prevention of Karoshi, or Death due to Overwork. *J Occup Environ Med*. 2016;58:e313. doi:10.1097/JOM.0000000000000797
17. Seok H, Won J-U, Lee TI, et al. A dose-response relationship between long working hours and unmet need for access to hospital facilities. *Scand J Work Environ Health*. 2016;42:135–143. doi:10.5271/sjweh.3551
18. Nishiyama K, Johnson JV. Karoshi—death from overwork: occupational health consequences of Japanese production management. *Int J Health Serv*. 1997;27:625–641. doi:10.2190/1JPC-679V-DYNT-HJ6G
19. Sugiura T, Dohi Y, Takagi Y, et al. Impacts of lifestyle behavior and shift work on visceral fat accumulation and the presence of atherosclerosis in middle-aged male workers. *Hypertens Res*. 2020;43:235–245. doi:10.1038/s41440-019-0362-z
20. Spencer DA. A four-day working week: its role in a politics of work. *Political Quarterly*. 2022;93:401–407. doi:10.1111/1467-923X.13173

Risk Management and Healthcare Policy

Dovepress

Publish your work in this journal

Risk Management and Healthcare Policy is an international, peer-reviewed, open access journal focusing on all aspects of public health, policy, and preventative measures to promote good health and improve morbidity and mortality in the population. The journal welcomes submitted papers covering original research, basic science, clinical & epidemiological studies, reviews and evaluations, guidelines, expert opinion and commentary, case reports and extended reports. The manuscript management system is completely online and includes a very quick and fair peer-review system, which is all easy to use. Visit <http://www.dovepress.com/testimonials.php> to read real quotes from published authors.

Submit your manuscript here: <https://www.dovepress.com/risk-management-and-healthcare-policy-journal>