Cross-national comparison of the relationship between working hours and employment status and sleep duration and quality among Japan, the United Kingdom, Germany, and Australia. A research protocol.

Abstract

This study explores the relationship between employment status, working hours, and sleep quality across Japan, the UK, Germany, and Australia, addressing significant variations in sleep duration observed across these countries. Notably, 56% of the Japanese population sleeps less than seven hours per day, compared to around 30% in the UK, Germany, and Australia. Meanwhile, working hours are generally higher in Japan and Australia. The study uses four representative panel datasets—Understanding Society (UK), the Japan/Keio Longitudinal Panel Survey (Japan), the German Socio-Economic Panel (Germany), and the Household, Income and Labour Dynamics in Australia (HILDA)—and applies fixed and mixed effects models to examine sleep time and quality. The models account for employment status, working hours, and the interaction between employment security and working time, while controlling for socio-demographic and socio-economic factors. Results show consistent patterns across the countries, with longer working hours (48+ hours/week) linked to poorer sleep quality and fewer sleep hours, while shorter working hours (1-20 hours/week) have minimal or positive effects on sleep. The study finds that the type of employment contract (permanent vs. non-permanent) has little effect on sleep outcomes, with overwork having significant negative consequences for sleep, even for those with permanent contracts. The findings underscore the importance of working time in shaping sleep quality, highlighting the need for policies that consider the broader impact of overwork on sleep health across different labor markets.

Keywords

Overemployment, Sleep, Job contract, Cross-country

Background

Average sleep duration significantly varies across countries. For instance, 56 percent of the Japanese population sleeps less than seven hours per day against 35 percent in the United Kingdom , 31 percent in Australia, and 30 percent in Germany [1]. Several country features explain such a gap including demographic composition and employment characteristics.

In Japan, sleep duration has been declining since the 1960s [2]. In 2014, "good sleep" became a policy priority with specific sleep guidelines published for different generations [3] although mainly focusing on individuals' behaviours and not targeting the social mechanisms leading to poor sleep quality and short sleep duration among which work and employment are usually seen as detrimental [4,5] . As a matter of fact, despite regulations passed over the past decades to prevent long working hours, working time remains high in Japan [6] and the labour market is fragmented with many women – particularly among the oldest generations – remaining out of the labour market (as housekeepers) [7] and older workers sometimes downgraded to specific employment statuses (contract work) [8,9]. High working time and a fragmented labour market come together with profound demographic changes. By 2050, it is estimated that the percentage of people aged 65 and over will reach 37.5 percent of the population. It was 4.9 percent in 1950 and 17.8 percent in 2000. By contrast, it will reach 28.9 in Europe in 2050 and was 7.9 and 19.1 in 1950 and 2000 [10]. As ageing explains alteration in normal sleep pattern and comes with lower and less regular sleeping time [11] and sleep disturbance[12], Japan faces multiple challenges to improve population sleep.

The relationship between employment and sleep is different in the United Kingdom. By comparison with Japan, the UK population now sleeps more than they used to in the 1970s as they go to bed earlier and wake up later. This is true also for the employed population for which an increase in sleeping time was observed over the same period [13]. Nevertheless, differences exist when looking a micro data. Whilst working time is lower, employment statuses are less fragmented and the ageing of the population is less pronounced in the UK, employment remains a major driver of sleep discrepancies across the British population. First, the relationship between working hours and sleep duration is also present in the United Kingdom where there is an inverse relationship between working hours and sleep duration that is stronger among the male population [14]. Second, socio-economic differences – that are more pronounced in the UK – although not having a clear impact on sleep quantity [15] are associated with poor sleep quality as people from socio-economically deprived groups are at increased risk of poor sleep [16].

Additionally, studying the relationship between employment and sleep in Germany is crucial for understanding how labor dynamics affect individual well-being in a highly industrialized and economically significant country. According to the 2017 Health Report of the German Statutory Health Insurance (DAK), approximately one-third of employed German adults aged 35 to 65 report experiencing insomnia at least three times per week. Compared to 2010, sleep problems and disorders have increased by approximately 60%[17]. Germany's strong emphasis on work-life balance, robust labor laws, and cultural attitudes towards health and wellness make it an ideal setting for such research[18]. Notably, Germans generally prioritize sleep as an essential component of health, with average sleep durations

typically aligning with recommended guidelines of 7-9 hours per night. However, variations exist across different demographics and employment sectors, with factors such as job stress, shift work, and long working hours often contributing to sleep deprivation or poor sleep quality among certain groups. This investigation provides valuable insights into how employment conditions influence these variations in sleep patterns and overall health. Additionally, as Germany undergoes demographic changes and technological advancements, understanding these interactions becomes essential for developing effective policies to promote both worker productivity and public health.

Studying the relationship between employment and sleep in Australia is important due to its unique socio-economic landscape and labor market characteristics. Australian adults report sleeping, on average, 7–8 hours a day[18], which is within the recommendations outlined in Australia's Sleep Health Foundation guidelines. Despite this, 66% adults report at least 1 sleep problem and almost half of all adults report at least 2 sleep related problems[20].Factors such as long working hours, shift work, and high job demands contribute to sleep deprivation among certain groups. Additionally, the prevalence of digital devices and lifestyle choices also impact sleep quality and duration. Australia has a diverse workforce with significant representation of both urban and remote workers, and the labor market is influenced by these factors. The growing gig economy and flexible work arrangements present new challenges and opportunities for understanding sleep patterns among workers[20]. The impact of these employment conditions on sleep is further compounded by cultural attitudes towards work and health, making it essential to examine how these dynamics affect sleep duration and quality. Insights from this research can inform targeted interventions and policies to enhance worker well-being, productivity, and public health, while also addressing the unique needs of Australia's diverse workforce.

To better understand differences among Japan, the UK, Germany, and Australia, one should account for the interplay between employment and working time. Working time is a complex variable when it comes to cross-national comparison. According to the OECD, average hours actually worked per year per worker were 1,707 in Australia,1607 in Japan, 1532 in the UK, and 1341 in Germany in 2022 [21]. However, average hours worked do not translate sub-population differences. In Japan, long working hours remain the norm among the male working population, contributing to shape employed women's career path and leading to high rates of part-time work within the female population [22]. This long working hours pattern explains sleeping time differences across the Japanese population. Comparing white collar Japanese employees with the rest of the population, a cross-sectional study [23] has shown a higher prevalence of poor sleep quality (based on the Pittsburgh Sleep Quality Index (PSQI)) – between 30 and 45 percent – among the former. Significant factors associated with poor sleep included stress, job dissatisfaction, being unmarried, lower education, younger age and poor sleep quality was associated with absenteeism, poor health, work and relationship problems and workplace accidents. Mafune and Yokoya [24] have shown that workers with over 100 hours of overtime experiencing less than 6 hours of sleep, late dinners, and increased dining out. Night shift workers also reported more frequent awakenings during sleep. The conclusion highlighted that around 30% of the surveyed temporary workers were at risk of overwork-related health issues, including insufficient sleep, late meals, and mental health

symptoms, suggesting a need for regulations to prevent excessive overtime requests. Early start of the working day is associated with lower sleep duration, sleep problems, and fatigue [25]. Working time is also associated with sleep duration, with those working less that 8 hours a day sleeping more than those working more than 8 hours a day [26].-

However, non-employed people are also at risk. It was evidenced that unemployment (i.e., those looking for a job) and non-employment are associated with high insomnia-related symptoms prevalence [27], particularly among the male population and to a lesser extent among the female population [28]. A substantial amount of research was produced on the relationship between transition from work to retirement and sleep quality and duration. It was shown that retirement is not only associated with short-term reductions in sleep difficulties but also increase in sleep duration over 1 to 2 years [29,30]. Results are similar using panel data from France [31]. Using longer follow-up longitudinal data, it was demonstrated that these positive effects last over time for non-restorative sleep, premature awakening and restless sleep [32] with potential greater effects on female as well as greater effects on those retiring from part-time jobs [33]. Both employment and non-employment may affect sleep duration and quality through different mechanisms but the amount of evidence is limited when it comes to addressing short sleep and poor sleep quality across different statuses [34].

The relationship between work and employment and sleep is of interest in such a context as low sleep duration and poor sleep quality both have detrimental effects with sleep disturbances associated with depressive symptoms among the older population [35]and low (<6 h) and high sleeping time (>9h) associated with higher mortality risks [36]. However, national contexts also explain both sleep patterns across populations and the way employment and working time affect sleep. Only a few studies have addressed such a relationship using longitudinal cross-national data. Comparison panel data on the population aged 20 to 69 among the UK, Germany, Australia, and Japan, this study aims to address the following three research questions: (1) *Do sleep duration and quality vary among Japan, the United Kingdom, Germany, and Australia, and do differences occur within population sub-groups including the employed or female populations?* ; (2) *Are some specific employment status associated with lower sleep duration and poorer sleep quality after controlling for individual socio-economic characteristics?* ; (3) *Are the associations between working time and sleep duration and quality similar across countries as well as by gender and type of occupation?*.

Data and methods

The study uses data from four major panel datasets: the Japan Household Panel Survey (JHPS), the UK Household Longitudinal Study (Understanding Society), the German Socio-Economic Panel (SOEP), and the Household, Income and Labour Dynamics (HILDA) survey in Australia.

The JHPS combines two longitudinal datasets: the Keio Household Panel Survey (KHPS) and the JHPS. Both datasets are based on stratified random sampling, and respondents are selected by gender and age group. Data are available from 2004 and 2009 to 2021, with annual follow-up surveys. The UKHLS includes data from over 40,000 respondents across several waves, spanning from 2009 to 2021. SOEP, which started in 1984, surveys around 15,000 households in Germany, while the HILDA survey collects data from

over 13,000 respondents in Australia. All datasets are restricted to the population aged 20 to 69 for consistency.

Outcomes measured in the study include sleep duration, troubles falling asleep, lost sleep over worry, and sleep quality. Sleep duration is the average number of hours respondents report sleeping at night. Troubles falling asleep is defined as difficulty falling asleep within 30 minutes. Lost sleep over worry refers to respondents' reports on losing sleep due to worry, and sleep quality is assessed with questions about the overall quality of sleep over the past month. All variables are coded into binary outcomes for analysis.

The study includes three models that examine employment status and working time as exposure variables. Model 1 uses employment status as the exposure variable, categorizing respondents into permanent employment, temporary employment, self-employment, unemployment, and inactivity. Model 2 uses working time, categorizing respondents by the average number of hours worked per week. Model 3 examines the interaction between working time and whether the job is permanent or contract work, focusing on the employed population.

Stratification in the models is done by gender, age group (20-39, 40-59, 59-69), and occupation (professional vs. non-professional). Additional analyses will be conducted for troubles falling asleep, lost sleep over worry, and sleep quality as sensitivity checks.

Preliminary results

The analysis across UKHLS, HILDA, and SOEP datasets reveals that longer working hours (48+ hours/week) are consistently associated with poorer sleep quality and fewer sleep hours, while shorter working hours (1-20 hours/week) generally show positive or minimal effects on sleep. The type of employment contract (permanent vs. non-permanent) had little impact on sleep outcomes. Having children negatively affected sleep quality and duration, and higher household income was generally linked to better sleep, especially on weekends. Time spent on housework also had a negative effect on sleep quality, highlighting the broader influence of work-life balance factors on sleep health.

The study finds that the type of employment contract (permanent vs. non-permanent) has little effect on sleep outcomes, with overwork having significant negative consequences for sleep, even for those with permanent contracts. The findings underscore the importance of working time in shaping sleep quality, highlighting the need for policies that consider the broader impact of overwork on sleep health across different labor markets.

Tables.

Table1. Fixed effects model examining the interaction between working time and contract on sleep (UKHLS).

	Model 1		Model 2	
	Sleep quality	CI	Sleep hours per day	CI
Working hours per week (Ref.=35-48)				
1-20	0.14	(-0.02 - 0.30)	0.12	(-0.13 - 0.37)
	(0.08)		(0.13)	
21-34	-0.08	(-0.23 - 0.07)	0.08	(-0.16 - 0.31)
	(0.08)		(0.12)	
48+	-0.11	(-0.35 - 0.13)	-0.02	(-0.39 - 0.34)
	(0.12)		(0.19)	
Contract (Ref.=Not permanent)				
Permanent	0.02	(-0.07 - 0.11)	-0.07	(-0.21 - 0.07)
	(0.05)		(0.07)	
Working hours × Contract (Ref.= 35-48 × Not permanent)				
1-20 × Permanent	-0.14	(-0.30 - 0.03)	0.02	(-0.23 - 0.28)
	(0.08)		(0.13)	
21-34 × Permanent	0.06	(-0.10 - 0.21)	0.00	(-0.24 - 0.25)
	(0.08)		(0.12)	
48+ × Permanent	0.00	(-0.24 - 0.24)	-0.11	(-0.48 - 0.26)
	(0.12)		(0.19)	
Constant	1.45	(-0.33 - 3.24)	5.60***	(2.78 - 8.43)
	(0.91)		(1.44)	
Observations	32,356		31,026	
R-squared	0.04		0.01	
Number of ID	24,137		23,574	

Table1. Fixed effects model examining the interaction between working time and contract on sleep (continued).

	Model 3		Model 4	
	Have trouble falling into sleep	CI	Frequence of taking sleep medicine	CI
Working hours per week (Ref.=35-48)				
1-20	-0.04	(-0.32 - 0.23)	-0.13	(-0.29 - 0.03)
	(0.14)		(0.08)	
21-34	0.07	(-0.20 - 0.33)	0.06	(-0.09 - 0.21)
	(0.13)		(0.08)	
48+	-0.12	(-0.53 - 0.29)	-0.02	(-0.26 - 0.21)
	(0.21)		(0.12)	
Contract (Ref.=Not permanent)				
Permanent	-0.00	(-0.16 - 0.15)	-0.08	(-0.17 - 0.01)
	(0.08)		(0.05)	
Working hours × Contract (Ref.= 35-48 × Not permanent)				
1-20 × Permanent	-0.00	(-0.29 - 0.29)	0.09	(-0.07 - 0.26)
	(0.15)		(0.08)	
21-34 × Permanent	-0.07	(-0.34 - 0.20)	-0.06	(-0.22 - 0.09)
	(0.14)		(0.08)	
48+ × Permanent	0.03	(-0.38 - 0.45)	-0.00	(-0.24 - 0.24)
	(0.21)		(0.12)	

Constant	2.16	(-0.93 - 5.24)	1.26	(-0.52 - 3.03)
	(1.57)		(0.91)	
Observations	32,349		32,345	
R-squared	0.01		0.02	
Number of ID	24,139		24,132	

Note. Standard errors in parentheses. * p<0.05, ** p<0.01, *** p<0.001. All models control for a series of covariates.

Table2. Fixed effects model examining the relationship between working time and sleep (HILDA).

	Model 1		Model 2	
	Sleep quality	95% CI	Sleep hours per week	95% CI
Working hours per week (Ref.=35-48)				
1-20	0.00	(-0.03 - 0.04)	1.41***	(1.04 - 1.79)
	(0.02)		(0.19)	
21-34	-0.02	(-0.05 - 0.01)	0.71***	(0.38 - 1.03)
	(0.02)		(0.17)	
48+	-0.06***	(-0.09 - -0.03)	-0.83***	(-1.15 - -0.50)
	(0.02)		(0.16)	
Constant	2.06*	(0.25 - 3.87)	59.51***	(40.35 - 78.66)
	(0.92)		(9.77)	
Observations	27,688		27,694	
R-squared	0.02		0.03	
Number of ID	14,039		14,027	

Note. Standard errors in parentheses. * p<0.05, ** p<0.01, *** p<0.001. All models control for a series of covariates.

Table2. Fixed effects model examining the relationship between working time and sleep (continued).

	Model 3	
	Having trouble sleeping	95% CI
Working hours per week (Ref.=35-48)		
1-20	0.04	(-0.10 - 0.18)
	(0.07)	
21-34	0.05	(-0.07 - 0.18)
	(0.06)	
48+	0.04	(-0.09 - 0.16)
	(0.06)	
Constant	9.95**	(2.58 - 17.33)
	(3.76)	
Observations	27,673	
R-squared	0.01	
Number of ID	14,030	

Note. Standard errors in parentheses. * p<0.05, ** p<0.01, *** p<0.001. All models control for a series of covariates.

Table3. Fixed effects model examining the relationship between working time and sleep (SOEP).

	Model 1		Model 2	
	Satisfaction with sleep	95% CI	Sleep hours during working week	95% CI
Working hours per week (Ref.=35-48)				
1-20	-0.03	(-0.09 - 0.03)	0.13***	(0.10 - 0.16)
	(0.03)		(0.01)	
21-34	-0.03	(-0.08 - 0.03)	0.05***	(0.03 - 0.08)
	(0.03)		(0.01)	
48+	-0.12***	(-0.17 - -0.07)	-0.10***	(-0.12 - -0.08)
	(0.02)		(0.01)	
Constant	8.54***	(8.04 - 9.04)	7.16***	(6.93 - 7.40)
	(0.25)		(0.12)	
Observations	89,081		92,166	
R-squared	0.02		0.01	
Number of ID	30,935		32,424	

Note. Standard errors in parentheses. * p<0.05, ** p<0.01, *** p<0.001. All models control for a series of covariates.

Table3. Fixed effects model examining the relationship between working time and sleep (continued).

	Model 3	
	Sleep hours during weekend	95% CI
Working hours per week (Ref.=35-48)		
1-20	-0.12***	(-0.15 - -0.08)
	(0.02)	
21-34	-0.08***	(-0.11 - -0.05)
	(0.02)	
48+	-0.05**	(-0.08 - -0.02)
	(0.01)	
Constant	8.48***	(8.19 - 8.78)
	(0.15)	
Observations	91,920	
R-squared	0.02	
Number of ID	32,397	

Note. Standard errors in parentheses. * p<0.05, ** p<0.01, *** p<0.001.

Table4. Fixed effects model examining the interaction between working time and contract on sleep (SOEP).

	Model 1	Model 2	Model 3
	Satisfaction with sleep	Sleep hours during working week	Sleep hours during weekend
Working hours per week (Ref.=35-48)			
1-20	-0.02	0.11***	-0.12***
	(0.04)	(0.02)	(0.02)
21-34	-0.00	0.04*	-0.09***
	(0.03)	(0.01)	(0.02)
48+	-0.12***	-0.10***	-0.05**
	(0.03)	(0.01)	(0.02)
Contract (Ref.=Fixed term or casual worker)			
Permanent	0.05	0.03*	0.08***
	(0.03)	(0.02)	(0.02)
Working hours × Contract (Ref.= 35-48 × Not permanent)			
1-20 × Permanent	-0.07	0.00	-0.07
	(0.07)	(0.03)	(0.04)
21-34 × Permanent	-0.07	0.01	-0.03
	(0.06)	(0.03)	(0.04)
48+ × Permanent	-0.06	0.03	0.07
	(0.08)	(0.04)	(0.05)
Constant	8.29***	7.02***	8.43***
	(0.30)	(0.14)	(0.18)
Observations	75,125	77,534	77,326
R-squared	0.02	0.01	0.02
Number of ID	26,513	27,648	27,623

Note. Standard errors in parentheses. * p<0.05, ** p<0.01, *** p<0.001.

References

1. Hafner M, Stepanek M, Taylor J, Troxel WM, van Stolk C. Why Sleep Matters -- the Economic Costs of Insufficient Sleep: A Cross-Country Comparative Analysis. RAND Europe. RAND; 2016. www.rand.org/giving/contribute
2. Bin YS, Marshall NS, Glozier N. Secular trends in adult sleep duration: A systematic review. *Sleep Med Rev*. 2012;16(3):223-230. doi:10.1016/j.smrv.2011.07.003
3. Noda H. The Japanese government's "good sleep" challenge: Sleep guidelines for health promotion 2014. *J Epidemiol*. 2015;25(4):339-340. doi:10.2188/jea.JE20140217
4. Baird MD, Dubowitz T, Cantor J, Troxel WM. Examining the impact of employment status on sleep quality during the COVID-19 pandemic in two low-income neighborhoods in Pittsburgh, PA. *Sleep*. 2022;45(3). doi:10.1093/sleep/zsab303
5. Alcántara C, Gallo LC, Wen J, et al. Employment status and the association of sociocultural stress with sleep in the Hispanic Community Health Study/Study of Latinos (HCHS/SOL). *Sleep*. 2019;42(4). doi:10.1093/sleep/zsz002
6. Takami T. Current State of Working Hours and Overwork in Japan Part I : How Has It Changed Over the Years ? *Japan Labor Issues*. 2019;3(16):18-21.
7. Zhou Y. Career Interruption of Japanese Women: Why Is It So Hard to Balance Work and Childcare? *The Japan Institute for Labour Policy and Training*. Published online 2015:106-123.
8. Wels J, Takami T. The Impact of Transitioning to Non-Standard Employment on Older Workers' Self-Reported and Mental Health in Japan. A Longitudinal Perspective Using the Japanese Study of Aging and Retirement. *Ageing Int*. 2021;46(4). doi:10.1007/s12126-020-09392-9
9. Wels J. Subjective survival probabilities by employment category and job satisfaction among the fifty-plus population in Japan. *medRxiv preprint*. 2023;2023.01.01.23284103:1-26. doi:10.1101/2023.01.01.23284103
10. Nakatani H. Aging and shrinking population: The looming demographic challenges of super-aged and super-low fertility society starting from Asia. *Glob Health Med*. 2023;5(5):257-263. doi:10.35772/ghm.2023.01057
11. Stanley N. *The Physiology of Sleep and the Impact of Ageing*. Vol 3.; 2005.
12. Li J, Vitiello M V., Gooneratne NS. Sleep in Normal Aging. *Sleep Med Clin*. 2018;13(1):1-11. doi:10.1016/j.jsmc.2017.09.001
13. Lamote de Grignon Pérez J, Gershuny J, Foster R, De Vos M. Sleep differences in the UK between 1974 and 2015: Insights from detailed time diaries. *J Sleep Res*. 2019;28(1). doi:10.1111/jsr.12753
14. Chatzitheochari S, Arber S. Lack of sleep, work and the long hours culture: Evidence from the UK time use survey. *Work, Employment and Society*. 2009;23(1):30-48. doi:10.1177/0950017008099776
15. Adams J. Socioeconomic position and sleep quantity in UK adults. *J Epidemiol Community Health (1978)*. 2006;60(3):267-269. doi:10.1136/jech.2005.039552
16 Tibubos, A. N., Zenger, M., Schmalbach, B., Beutel, M. E., & Brähler, E. (2020). Measurement invariance, validation and normative data of the Jenkins Sleep Scale-4 (JSS-4)

in the German general population across the life span. Journal of psychosomatic research, 130, 109933.
17 Schneider, H., & Rinne, U. (2019). The labor market in Germany, 2000-2018. IZA World of Labor.
18 AIHW (Australian Institute of Health and Welfare) 2021. Sleep–related breathing disorders with a focus on obstructive sleep apnoea. Cat. no. PHE 294. Canberra: AIHW.
19 Adams R, Appleton S, Taylor A, McEnvoy D & Antic N 2017. Report to the Sleep Health Foundation 2016 Sleep Health Survey of Australian Adults. Adelaide: The University of Adelaide, The Adelaide Institute for Sleep Health.
20 Skinner, N., & Pocock, B. (2011). Flexibility and work-life interference in Australia. Journal of Industrial Relations, 53(1), 65-82.
21. Fatima Y, Bucks RS, Mamun AA, et al. Sleep trajectories and mediators of poor sleep: findings from the longitudinal analysis of 41,094 participants of the UK Biobank cohort. *Sleep Med*. 2020;76:120-127. doi:10.1016/j.sleep.2020.10.020
22. OECD. Hours worked. *OECD Factbook 2014: Economic, environmental and social statistics*. Published online 2014. doi:10.1787/888933028292
23. Nemoto K. Long working hours and the corporate gender divide in Japan. *Gend Work Organ*. 2013;20(5):512-527. doi:10.1111/j.1468-0432.2012.00599.x
24. Doi Y, Minowa M, Tango T. Impact and correlates of poor sleep quality in Japanese white-collar employees. *Poor Sleep Quality in Japanese Employees-Doi et al SLEEP*. 2003;26(4):467-471. https://academic.oup.com/sleep/article/26/4/467/2707861
25. Mafune K, Yokoya K. Working hours, lifestyle habits, sleep, and mental health of temporary workers (in Japanese). *Sangyo Eiseigaku Zasshi*. 2005;47(Special):332. doi:10.1539/sangyoeisei.KJ00003803966
26. Åkerstedt T, Kecklund G, Selén J. Early morning work - Prevalence and relation to sleepwake problems: A national representative survey. *Chronobiol Int*. 2010;27(5):975-986. doi:10.3109/07420528.2010.489001
27. Basner M, Dinges D. Dubious Bargain: Trading Sleep for Leno and Letterman. *Sleep*. 2009;32(6):747-752. https://academic.oup.com/sleep/article/32/6/747/2454408
28. Kim K, Uchiyama M, Okawa M, Liu X, Ogihara R. An Epidemiological Study of Insomnia Among the Japanese General Population. *Sleep*. 2000;23(1):1-7. doi:10.1093/sleep/23.1.1a
29. Maeda M, Filomeno R, Kawata Y, et al. Association between unemployment and insomnia-related symptoms based on the Comprehensive Survey of Living Conditions: a large cross-sectional Japanese population survey. *Ind Health*. 2019;57(6):701-710. doi:10.2486/indhealth.2018-0031
30. Garefelt J, Gershagen S, Kecklund G, Westerlund H, Platts LG. How does work impact daily sleep quality? A within-individual study using actigraphy and self-reports over the retirement transition. *J Sleep Res*. 2022;31(3). doi:10.1111/jsr.13513
31. Garefelt J, Gershagen S, Kecklund G, Westerlund H, Platts LG. How does cessation of work affect sleep? Prospective analyses of sleep duration, timing and efficiency from the Swedish Retirement Study. *J Sleep Res*. 2021;30(3). doi:10.1111/jsr.13157
32. Vahtera J, Westerlund H, Hall M, et al. *Effect of Retirement on Sleep Disturbances: The GAZEL Prospective Cohort Study*. Vol 32.; 2009. https://academic.oup.com/sleep/article/32/11/1459/2454350

33. Peristera P, Nyberg A, Magnusson Hanson LL, Westerlund H, Platts LG. How consistently does sleep quality improve at retirement? Prospective analyses with group-based trajectory models. *J Sleep Res*. 2022;31(2). doi:10.1111/jsr.13474
34. van de Straat V, Platts LG, Vahtera J, Westerlund H, Bracke P. Reduction in sleep disturbances at retirement: Evidence from the Swedish Longitudinal Occupational Survey of Health. *Ageing Soc*. 2020;40(10):2155-2173. doi:10.1017/S0144686X19000515
35. Sukegawa T, Itoga M, Seno H, et al. Sleep disturbances and depression in the elderly in Japan. *Psychiatry Clin Neurosci*. 2003;57(3):265-270. doi:10.1046/j.1440-1819.2003.01115.x
36. Amagai Y, Ishikawa S, Gotoh T, et al. Sleep Duration and Mortality in Japan: the Jichi Medical School Cohort Study. *J Epidemiol*. 2004;14(4):124-128. doi:10.2188/jea.14.124