



衛生防護中心
Centre for Health Protection

Non-Communicable Diseases Watch

April 2013

Health Tips

Sleep is required on a daily basis for everyone regardless of age, sex and ethnicity. For both adults and children, sufficient and good quality sleep is a key element of a healthy lifestyle, as much as good nutrition and regular exercise are.

In this Issue Page

**Sleep:
A Basic Health
Necessity 1**

**Joyful 'Fruit'
Month 9**

News Bites 10

This publication is produced by the Surveillance and Epidemiology Branch, Centre for Health Protection of the Department of Health

18/F Wu Chung House
213 Queen's Road East
Wan Chai, Hong Kong
<http://www.chp.gov.hk>

All rights reserved



衛生署
Department of Health

Sleep: A Basic Health Necessity

Sleep is a significant but often neglected determinant of physical and mental health. A good quality sleep is vital for resting, recharging, and nourishing the body and the mind. Conversely, inadequate and disturbed sleep can affect daytime functioning and lead to a range of chronic health problems.

In adults, inadequate and/or poor quality sleep may impair daytime cognitive functions, such as working memory, episodic memory and problem solving skills.¹ Healthy young adults subjected to sleep deprivation in laboratory studies also experienced a number of adverse metabolic, endocrine and immune consequences. These adverse changes include increased insulin resistance and decreased glucose tolerance; activation of the sympathetic nervous system, which causes heart rate accelerations, blood vessel constriction and blood pressure elevation; higher levels of stress hormone (cortisol); lower levels of satiety-boosting hormone (leptin) and higher levels of appetite-stimulating hormone (ghrelin); and suppressed immune functions and elevated markers of inflammation.²⁻⁴ Sleep loss may result in obesity through increased calorie intake (by having irregular eating habits, snacking between meals and preference for high-calorie foods), and reduced energy expenditure (owing to decreased motivation for exercise).⁴ These changes contribute to the development and exacerbation of chronic diseases and, ultimately, a shortened lifespan.

For children, sleep is essential for growth, as growth hormone is most intensely secreted during deep sleep.⁵ Lack of quality sleep can also lead to short stature, moodiness, aggression, irritability and hyperactivity⁶. It can also impair cognitive development and learning, which can impact school performance.⁷

Types of Sleep and the Sleep Cycle

Studies of human sleep have demonstrated that sleep is divided into two basic types, namely non-rapid eye movement (non-REM) sleep and rapid eye movement (REM) sleep. Non-REM and REM sleep have *distinct brain wave patterns, eye movements and muscle tones*. Non-REM sleep is further divided into 3 stages (Box 1). Throughout the night, sleep cycles between non-REM and REM sleep about every 90 minutes, with 3 – 5 cycles per night. A cycle typically begins with non-REM sleep, progresses through its three stages, and finally enters REM sleep.

The ability to function and feel well while awake depends not only on the amount of total sleep but also the amount of each type of sleep. To feel well-rested and

energetic during the day, it is necessary to have an adequate amount of deep sleep (stage 3 Non-REM sleep), which is considered 'restorative'.⁸

Box 1: Types and stages of sleep⁸

Non-REM Sleep

- * Stage 1: Light sleep; easily awakened; muscles relax with occasional twitches; eye movements are slow.
- * Stage 2: Eye movements stop; slower brain waves, with occasional bursts or rapid brain waves.
- * Stage 3 "deep sleep": It occurs soon after falling asleep and mostly in the first half of the night. Difficult to awaken; large slow brain waves; heart and respiratory rates are slow and muscles are relaxed.

REM Sleep

- * Usually first occurs about 90 minutes after falling asleep; longer periods occur during second half of the night.
- * Eyes move rapidly behind closed eyelids.
- * Breathing becomes shallower, heart rate and blood pressure increase.
- * Dreaming occurs.
- * Arms and leg muscles are temporarily paralysed.

Amount of Sleep Required for Optimal Health

The amount of sleep someone needs varies from person to person and with his/her age. Despite the variations, studies suggest that the optimal amount of sleep needed to perform properly and not have problem sleepiness during the day is about 7 - 8 hours for adults (including older people) and at least 10 hours for school-aged children and adolescents. Newborns and preschool children need even more hours of sleep a day: newborns need to sleep 16 - 18 hours a day and preschool children need to sleep 11 - 12 hours a day.⁸

For elders, there is no consensus as to whether older people need just as much as or less sleep than younger adults. A study suggested that older people indeed need 1.5 hours less sleep than younger adults⁹ but some sleep experts said it is a myth that elders need less sleep. On the other hand, it is generally accepted that sleep pattern changes in older people. Elders tend to go to sleep earlier at night and wake up earlier in the morning. They are more easily wakened during sleep because there is a larger proportion of 'shallow-sleep'. Also, elders are more likely to have their sleep disrupted because of medical conditions and the medications taken.⁸

Major Health Risks Associated with Short Sleep Duration and Poor Sleep Quality

Epidemiological studies have shown that short sleep duration (with < 7 hours per night in general for adults) and/or suboptimal quality of sleep (such as difficulty in initiating or maintaining sleep) are associated with an increased risk of obesity¹⁰, metabolic syndrome¹¹, type 2 diabetes¹², cardiovascular diseases¹³⁻¹⁵, certain cancers¹⁶⁻¹⁹, mood disorders²⁰, suicide²¹, injuries²²⁻²⁴, as well as all-cause mortality²⁵ (Box 2). On the other hand, some studies have also shown an association between long sleep duration (≥ 9 hours per night) and elevated risks of chronic diseases (such as diabetes¹², metabolic syndrome²⁶, heart disease and stroke¹³) and greater mortality in adults.^{25,27} From a population perspective, however, short sleep duration is a more salient issue and is more likely than long sleep duration to cause substantial impact to public health.^{28,29}

Box 2: Major health risks associated with short sleep duration and / or suboptimal sleep quality

Obesity – In adults, short duration of sleep (< 5 hours per night in general) was associated with a 55% increased risk of obesity (defined as body mass index ≥ 30 kg/m²). In children, short sleep duration (≤ 10 hours per night in general) was associated with a 89% increased risk of obesity (defined as body mass index > 95th percentile according to growth charts).¹⁰

Metabolic syndrome (a group of metabolic disorders related to the occurrence of obesity, characterised by the presence of diabetes, hypertension, and dyslipidaemia, all of which are important risk factors for cardiovascular diseases) – The risk of developing metabolic syndrome increased by more than 45% among short sleepers compared with those sleeping 7 - 8 hours per night.¹¹

Type 2 Diabetes – Short duration of sleep (≤ 6 hours per night) was associated with a 28% increased risk of type 2 diabetes. Difficulty in initiating sleep and difficulty in maintaining sleep were associated with a 57% and an 84% increased risk respectively.¹²

Cardiovascular diseases – In people aged below 65 years, short sleep duration was associated with a 33% increased risk of hypertension.¹⁵ Short sleepers had a 48% and 15% increased risk of developing or dying from coronary heart disease and stroke respectively compared to those sleeping 7 - 8 hours per night.¹³ People who reported suffering from insomnia had a 45% increased risk of developing or dying from cardiovascular diseases compared to those who did not suffer from sleep complaints.¹⁴

Cancers – Sleep duration of < 6 hours per day was associated with a 43% increased risk of cancers.¹⁹ Individuals sleeping < 6 hours per night on average had an almost 50% increase in risk of colorectal adenomas as compared with those sleeping at least 7 hours per night.¹⁸ Women who slept ≤ 6 hours per day had a 62% increased risk of breast cancer compared to those who slept 7 hours per day.¹⁷

Mood disorders – People with insomnia were about 10 times and 17 times as likely to have clinically significant depression and anxiety respectively compared with those not suffering from insomnia.²⁰

Suicide – Insomnia was associated with a 94%, 99% and 115% increased risk of suicidal ideation, suicidal attempt and suicide respectively.²¹

Injuries – Sleep deprivation or sleepiness was associated with as many as 20% of road traffic accidents.^{22,23} Among workers having no pre-existing chronic conditions, insomnia was associated with 80% and 50% increased risk of workplace and non-workplace injuries respectively.²⁴

All-cause mortality – Short sleepers (with < 7 hours of sleep in general) had a 10% increased risk of all-cause mortality than those who slept 7 - 9 hours.²⁵

Sleep Deficiency Across the World

Sleep deficiency is a growing public health issue worldwide, especially in fast-paced, non-stop “24/7” developed countries with increasing work, social, recreational and academic demand.

A global cross-sectional survey in 2002 of about 35 000 people aged 15 and above from ten countries (including China) revealed that the mean sleep duration was 7.6 hours (median 7.5 hours) and the mean sleep latency (the time taken to fall asleep) was 24.8 minutes (median 15 minutes). While 31.6% of participants experienced insomnia and 25.7% of slept < 7 hours a day, 11.6% were found to be “very sleepy” or “dangerously sleepy” during daytime. Overall, 24.0% of participants considered that they did not sleep well.³⁰

Similarly, sleep disturbances prevail in many low-income countries. A survey of over 40 000 older people aged 50 and above from 8 countries across Africa and Asia during 2006 - 2007 found that 16.6% of participants had insomnia and other severe sleep disturbances.³¹

Local Situation

The general population

Sleep disturbance is also a common complaint among the Hong Kong population. A population-based telephone survey in 2007 interviewed about 5 000 Chinese adults aged 18 and above and used the Pittsburgh Sleep Quality Index (PSQI) to evaluate multiple dimensions of the participants' sleep over a 1-month period. Results showed that the average sleep duration was about 6.5 hours with about half (49.6%) of the participants reporting having less than 7-hour sleep per night. The average sleep latency was 21.1 minutes and 9.4% of respondents could not get to sleep within 30 minutes. The prevalence of insomnia (defined by a PSQI

global score of greater than 5) was 39.4% (35.2% for male and 43.2% for female). People aged 60 and above had the highest prevalence of insomnia at 47.1%.³²

A more recent survey that telephone-interviewed over 2 000 community-dwelling people aged 18 - 64 in 2011 found that 35.5% of respondents slept less than 7 hours a day on average. During the 30 days prior to the survey, a substantial proportion (20.6%) of respondents reported that they frequently (three times or more a week) experienced insomnia symptoms, including trouble in falling asleep (11.8%), intermittent awakenings or difficulty in maintaining sleep during the night (12.2%), and early morning awakenings and unable to sleep again (9.4%). Females (23.6%), respondents aged 55-64 (25.2%), divorced/separated/widowed respondents (36.2%), respondents who had not completed secondary education or below (25.1%) and non-working respondents (27.9%) were more likely than their respective counterparts to report having insomnia symptoms three times or more a week. A higher proportion of insomniacs were also found among frequent drinkers (25.9%), people living with a chronic disease (29.6%), those who had severe psychological stress (52.4%), and those who self-rated their general health status as ‘poor’ (55.5%) (Table 1). Overall, 20.1 % of respondents reported that they did not get enough sleep for 20 days or more during the 30 days prior to the survey, and 13.8% considered the quality of their sleep ‘poor’ or ‘very poor’.³³

Table 1: Rate of people aged 18-64 frequently having insomnia symptoms (having ‘difficulty in falling asleep’, ‘intermittent awakenings’, or ‘early morning awakenings’ three or more times a week) during the 30 days prior to the survey by demographic characteristics, lifestyle factors and general health status

Characteristics	Rate*
Sex	
Male	17.1%
Female	23.6%
Age group	
18-24	16.9%
25-34	20.8%
35-44	16.8%
45-54	22.6%
55-64	25.2%
Marital status	
Never married	18.2%
Married with children	20.9%
Married without children	22.2%
Divorced/Separated/Widowed	36.2%
Education level	
Not completed secondary or below	25.1%
Completed secondary/Matriculation	22.5%
Tertiary	15.4%
Occupation	
Managerial/Professional worker	16.2%
Clerk	21.8%
Service worker	19.8%
Blue collar worker	10.0%
Non-working persons (included unemployed persons, home-makers, fulltime students and re-tirees)	27.9%
Alcohol consumption	
Never or seldom drinker (no drinking in the past month)	21.4%
Occasional drinker (drinking in the past month but less than 4 days a week)	18.1%
Frequent drinker (drinking at least 4 days a week)	25.9%
Presence of chronic diseases (doctor-diagnosed and required long term follow-up)	
Yes	29.6%
No	17.2%
Level of psychological distress (according to the Kessler-6 [K6] Scale of Non-specific Psychological Distress)	
Severe (K6 scores ≥ 13)	52.4%
No / Non-significant (K6 score <13)	18.8%
Self-rated general health status	
Good or excellent	11.7%
Fair	25.6%
Poor	55.5%

Base: Excluding respondents with unknown or missing information in the respective group.

Note: * Rate per 100 persons in the respective group.

Source: Behavioural Risk Factor Survey, April 2011.

Adolescents and children

Sleep deprivation and disturbance is also common among local adolescents and children. A study of 1 629 Chinese adolescents aged 12-19 on their sleep-wake patterns and sleep disturbance in the 2003-2004 school year found that on school nights (the night before a day that students must go to school) they slept on average about 7.3 hours, and 32% had a total sleep time less than 7 hours. The prevalence of difficulties in falling asleep, waking up during the night and waking up too early in the morning three days or more per week in the preceding 3 months was 5.6%, 7.2% and 10.4% respectively. Overall, 19.1% reported one or more of the three sleep disturbances, and 41.9% had excessive daytime sleepiness.³⁴

In another longitudinal study about childhood insomnia, 1 611 Hong Kong Chinese children aged 9 - 11 years at baseline were followed up for 5 years until they were 14 - 16 years old. The study reported that at 5-year follow up 5.6% of the participants had difficulty in initiating sleep, 0.8% had difficulty in maintaining sleep, and 1.4% had early morning awaking three times or more a week during the past 12 months. Overall, 6.6% of children suffered from chronic insomnia at 5-year follow up (defined as having any of the above insomnia symptoms three or more times a week over the past 12 months), and the prevalence was higher than that of baseline (4.2%). The incidence of chronic insomnia and persistence rate of insomnia symptoms over the course of the study were 6.2% and 14.9% respectively.³⁵

Prioritise Sleep for Better Health

Sleep is required on a daily basis for everyone regardless of age, sex and ethnicity. Sleep deprivation for an extended period can result in ill-health or even early death. For both adults and children, sufficient and good quality sleep is a key element of a healthy lifestyle, as much as good nutrition and regular exercise are. Box 3 provides some tips for how to form good sleep habits and sleep well.

Of note is that a number of sleep disorders can disrupt sleep quality and make people sleepy during the day, even after they have apparently spent enough time in bed to be well-rested. These sleep disorders include sleep apnoea (symptoms include loud snoring with breathing pauses during sleep), restless leg syndrome (symptoms include unpleasant creeping or crawling feeling in legs, especially in the evening and when trying to fall asleep), and narcolepsy (which may present with excessive daytime sleepiness or falling asleep unexpectedly, sudden muscle weakness, sleep paralysis or vivid dreams while falling asleep).^{8,36} Persons with suspicious symptoms should consult a doctor for proper diagnosis and treatment. Refrain from drinking as alcohol can affect sleep quality and exacerbate sleep problems. Inappropriate use of sleep medications can bring undesirable side-effects, such as daytime drowsiness, dry mouth, drug dependency and tolerance. Sleeping medications may also affect existing medical conditions and interact with other medications. Always consult a doctor before taking any sleeping medications, and take it as directed.

Box 3: Tips on how to form good sleep habits and sleep well**For adults****For children**

- ◇ Develop a good sleep schedule. Go to bed and get up at about the same time every day, even on the weekends. This can reinforce the body's sleep-wake cycle and help promote better sleep at night.
 - ◇ Do not smoke. Nicotine in cigarette is a stimulant, which prevents and disturbs sleep. It causes smokers to sleep only lightly and wake up early in the morning because of nicotine withdrawal.
 - ◇ Get active. Adequate physical activities and exercise can help people fall asleep faster and make the sleep more restful. However, avoid vigorous physical activities before bed.
 - ◇ Avoid large meals and beverages before bedtime, as they can cause indigestion and frequent urination that interfere with sleep.
 - ◇ Avoid food and beverages containing caffeine, such as coffee, tea and soft drinks. Caffeine suppresses the secretion of melatonin (a hormone that helps falling asleep faster and staying asleep longer) and promotes the release of adrenaline (a hormone that keeps people awake).
 - ◇ Avoid excessive alcohol, if drinking at all. Alcohol is known to compromise sleep.
 - ◇ Prohibit the bedroom activities other than sleeping, such as surfing the internet or watching television in bed.
 - ◇ Choose a comfortable mattress and pillow.
 - ◇ Go to toilet before going to bed.
 - ◇ Create a 'sleep conducive' environment. Minimise light and noise and avoid excessive hot and cold temperatures of the room. Keep the room well-ventilated.
- ◇ Set an age-appropriate bedtime and wake up time for children to ensure that they get enough sleep. Draw up an age-appropriate nap schedule as well: avoid too many or very long naps, as too much daytime sleep can make your child sleep less at night.
 - ◇ Encourage children to sleep independently. If necessary, introduce a comforting bedtime buddy, such as a teddy bear, to overcome their worries.
 - ◇ Ensure plenty of physical activities (and exercise) and time spent outdoors during the day.
 - ◇ Maintain a regular daily mealtimes. Make sure children do not go to bed hungry, but avoid giving children big meals close to bedtime.
 - ◇ Avoid food and beverages containing caffeine such as coffee and tea; and limit those with large amounts of sugar, including chocolate and soft drinks.
 - ◇ Do not allow young children to be put to sleep with a nursing bottle of milk or drink of any flavor.
 - ◇ Do not get children involved in vigorous-intensity activities (such as rough play) and limit their use of computers or video games before bedtime. Do not allow children to fall asleep while watching television or videos.
 - ◇ Create a relaxing bedtime routine, such as reading a book and putting favourite pajamas on.
 - ◇ Teach children that sleep is important for their growth and development.
 - ◇ Make sure children are comfortable. Arrange for a comfortable temperature and minimum light and noise in the bedroom.

References

- Fortier-Brochu E, Beaulieu-Bonneau S, Ivers H, et al. Insomnia and daytime cognitive performance: a meta-analysis. *Sleep Med Rev* 2012;16:83-94.
- Aldabal L, Bahammam AS. Metabolic, endocrine, and immune consequences of sleep deprivation. *Open Respir Med J* 2011;5:31-43.
- Blask DE. Melatonin, sleep disturbance and cancer risk. *Sleep Med Rev* 2009;13:257-64.
- Knutson KL, Spiegel K, Penev P, et al. The metabolic consequences of sleep deprivation. *Sleep Med Rev* 2007;11:163-78.
- Verrillo E, Bizzarri C, Cappa M, et al. Sleep characteristics in children with growth hormone deficiency. *Neuroendocrinology* 2011;94:66-74.
- Simola P, Liukkonen K, Pitkaranta A, et al. Psychosocial and somatic outcomes of sleep problems in children: a 4-year follow-up study. *Child Care Health Dev* 2012.
- Dewald JF, Meijer AM, Oort FJ, et al. The influence of sleep quality, sleep duration and sleepiness on school performance in children and adolescents: A meta-analytic review. *Sleep Med Rev* 2010;14:179-89.
- Your guide to healthy sleep. Bethesda National Institutes of Health, U.S. Department of Health and Human Services; 2011.
- Klerman EB, Dijk DJ. Age-related reduction in the maximal capacity for sleep--implications for insomnia. *Curr Biol* 2008;18:1118-23.
- Cappuccio FP, Taggart FM, Kandala NB, et al. Meta-analysis of short sleep duration and obesity in children and adults. *Sleep* 2008;31:619-26.
- Hall MH, Muldoon MF, Jennings JR, et al. Self-reported sleep duration is associated with the metabolic syndrome in midlife adults. *Sleep* 2008;31:635-43.
- Cappuccio FP, D'Elia L, Strazzullo P, et al. Quantity and quality of sleep and incidence of type 2 diabetes: a systematic review and meta-analysis. *Diabetes Care* 2010;33:414-20.
- Cappuccio FP, Cooper D, D'Elia L, et al. Sleep duration predicts cardiovascular outcomes: a systematic review and meta-analysis of prospective studies. *Eur Heart J* 2011;32:1484-92.
- Sofi F, Cesari F, Casini A, et al. Insomnia and risk of cardiovascular disease: a meta-analysis. *Eur J Prev Cardiol* 2012.
- Wang Q, Xi B, Liu M, et al. Short sleep duration is associated with hypertension risk among adults: a systematic review and meta-analysis. *Hypertens Res* 2012;35:1012-8.
- Kakizaki M, Inoue K, Kuriyama S, et al. Sleep duration and the risk of prostate cancer: the Ohsaki Cohort Study. *Br J Cancer* 2008;99:176-8.
- Kakizaki M, Kuriyama S, Sone T, et al. Sleep duration and the risk of breast cancer: the Ohsaki Cohort Study. *Br J Cancer* 2008;99:1502-5.
- Thompson CL, Larkin EK, Patel S, et al. Short duration of sleep increases risk of colorectal adenoma. *Cancer* 2011;117:841-7.
- von Ruesten A, Weikert C, Fietze I, et al. Association of sleep duration with chronic diseases in the European Prospective Investigation into Cancer and Nutrition (EPIC)-Potsdam study. *PLoS One* 2012;7:e30972.
- Taylor DJ, Lichstein KL, Durrence HH, et al. Epidemiology of insomnia, depression, and anxiety. *Sleep* 2005;28:1457-64.
- Pigeon WR, Pinquart M, Conner K. Meta-analysis of sleep disturbance and suicidal thoughts and behaviors. *J Clin Psychiatry* 2012;73:e1160-7.
- Cochrane Injuries Group. Systematic reviews of interventions for preventing sleep-related injuries. *Inj Prev* 2009;15:428.
- Horne J, Reyner L. Vehicle accidents related to sleep: a review. *Occup Environ Med* 1999;56:289-94.
- Kessler RC, Berglund PA, Coulouvrat C, et al. Insomnia, comorbidity, and risk of injury among insured Americans: results from the America Insomnia Survey. *Sleep* 2012;35:825-34.
- Gallicchio L, Kalesan B. Sleep duration and mortality: a systematic review and meta-analysis. *J Sleep Res* 2009;18:148-58.
- Arora T, Jiang CQ, Thomas GN, et al. Self-reported long total sleep duration is associated with metabolic syndrome: the Guangzhou Biobank Cohort Study. *Diabetes Care* 2011;34:2317-9.
- Grandner MA, Drummond SP. Who are the long sleepers? Towards an understanding of the mortality relationship. *Sleep Med Rev* 2007;11:341-60.
- Grandner MA, Hale L, Moore M, et al. Mortality associated with short sleep duration: The evidence, the possible mechanisms, and the future. *Sleep Med Rev* 2010;14:191-203.
- Luyster FS, Strollo PJ, Jr., Zee PC, et al. Sleep: a health imperative. *Sleep* 2012;35:727-34.
- Soldatos CR, Allaert FA, Ohta T, et al. How do individuals sleep around the world? Results from a single-day survey in ten countries. *Sleep Med* 2005;6:5-13.
- Stranges S, Tigbe W, Gomez-Olive FX, et al. Sleep problems: an emerging global epidemic? findings from the INDEPTH WHO-SAGE study among more than 40,000 older adults from 8 countries across Africa and Asia. *Sleep* 2012;35:1173-81.
- Wong WS, Fielding R. Prevalence of insomnia among Chinese adults in Hong Kong: a population-based study. *J Sleep Res* 2010;20:117-26.
- Behavioural Risk Factor Survey April 2011. Hong Kong SAR: Department of Health; 2012.
- Chung KF, Cheung MM. Sleep-wake patterns and sleep disturbance among Hong Kong Chinese adolescents. *Sleep* 2008;31:185-94.
- Zhang J, Lam SP, Li SX, et al. Longitudinal course and outcome of chronic insomnia in Hong Kong Chinese children: a 5-year follow-up study of a community-based cohort. *Sleep* 2011;34:1395-402.
- Ohayon MM. Epidemiological overview of sleep disorders in the general population. *Sleep Med Res* 2011;1-9.

Joyful 'Fruit' Month

The Department of Health (DH) launched the annual “Joyful Fruit Day” in the 2006/07 school year as one of the highlights of the EatSmart@school.hk Campaign to promote daily fruit eating habit among teachers and students.

This year, under the theme “More than Fruit”, the DH further designated April as “Joyful Fruit Month” to encourage extended periods of promotion of fruit eating. Activities of this year are also supported by the Ocean Park as well as restaurants.

For details, please refer to the Joyful Fruit Month webpage of the EatSmart@school.hk Campaign website and Fruity Recipe Competition webpage of the EatSmart@restaurant.hk Campaign website.

The former webpage also contains interesting information about the fruit-eating habits of Ocean Park inhabitants.

Let's support Joyful Fruit Month by eating fruit every day and reminding your family and friends to do so !





News Bites

Just one week of insufficient sleep could be enough to affect the activities of hundreds of human genes, a study warned.

The study analysed whole-blood RNA samples of 26 healthy individuals (12 women and 14 men with an average age of 27.5 years) who were exposed to one week of insufficient sleep (sleep-restriction condition with an average of 5.7 hours sleep per 24 hours) and one week of sufficient sleep (control condition with an average of 8.5 hours sleep per 24 hours) as to understand the effects of insufficient sleep on gene expression. Results showed that the expression of 711 genes was altered by insufficient sleep (i.e. increased or decreased the amount of specific RNA or proteins produced). Those affected included genes associated with circadian rhythms, sleep homeostasis, oxidative stress, and metabolism.

Sleep deficiency can lead to a host of chronic health problems including obesity, type 2 diabetes, cardiovascular diseases and certain cancers, but the mechanisms linking sleep with health remain largely elusive. This study revealed the effects of insufficient sleep on gene expression and provided important clues on the mechanisms of how sleep deprivation may influence human health.

[Source: Moller-Levet CS, Archer SN, Bucca G, et al. Effects of insufficient sleep on circadian rhythmicity and expression amplitude of the human blood transcriptome. PNAS 2013; doi/10.1073/pnas.1217154110]

Editor-in-Chief

Dr Regina Ching

Members

Dr Alex Fu	Dr Eddy Ng
Dr KH Kung	Ms Faith Wan
Dr Winnie Lau	Dr Lilian Wan
Mr YH Lee	Dr Francisco Wong

Non-Communicable Diseases (NCD) WATCH is dedicated to promote public's awareness of and disseminate health information about non-communicable diseases and related issues, and the importance of their prevention and control. It is also an indication of our commitments in responsive risk communication and to address the growing non-communicable disease threats to the health of our community.

The Editorial Board welcomes your views and comments. Please send all comments and/or questions to so_dp3@dh.gov.hk.