

# Sleep in Relation to Sickness Absence, Unemployment and Place of Residence

R. Asplund, M.D., Ph.D., S.U. Marnetoft, Ph.D., J. Selander, Ph.D.,  
and B. Åkerström, Ph.D.

This study, a questionnaire survey, was undertaken to assess the influence of sickness absence and unemployment on sleep in a randomly selected group of men and women in five Swedish municipalities with very different demographic conditions, living conditions and health profiles. The survey comprised 1,948 randomly selected persons (47.7% men) of ages 20–64 years. Poor sleep was reported by 17.0% of the men and 18.5% of the women (NS). Poor sleep was 5.5 (3.5–8.6) times more common in sick listed men and 6.8 (4.7–9.9) times more common in such women than in men and women, respectively, who were not sick-listed. The proportion reporting poor sleep increased in parallel with increasing numbers of days on sickness benefit during the last year. In a multiple logistic regression analysis significant independent correlates of poor sleep in men were: being on sickness benefit (OR 2.1; 95%CI 1.1–3.8), poor somatic health (3.6; 2.0–6.3) and poor mental health (7.0; 4.0–12.3). The corresponding correlates in women were: being on sickness benefit (2.5; 1.4–4.3), poor somatic health (3.2; 1.8–5.8) and poor mental health (5.5; 3.3–9.2). Age, marital status, employment status and the place of residence were deleted by the logistic model for both sexes. It is concluded that poor sleep increased in men and women on sickness benefit but not those who were unemployed after adjustment for age, health, marital status and place of residence. **(Sleep and Hypnosis 2005;7(1):22-28)**

**Key words:** age, employment status, mental health, sick-leave, sleep, somatic health

## INTRODUCTION

**S**leep complaints are common in association with poor somatic health and poor mental

From Centre for Public Health, Karolinska Institute, SE - 141 83 Huddinge (Dr. Asplund), The Research and Development Unit, Jämtland County Council, SE - 181 25 Östersund (Dr. Asplund), The department of Public health, Division of Rehabilitation Medicine, Karolinska Institute, SE - 171 76, Stockholm (Dr. Marnetoft), Centre for studies on National Social Insurance, Mid Sweden University, SE - 831 25 Östersund (Drs. Marnetoft and Selander), and Department of Nursing and Health Sciences, SE - 831 25 Östersund, Sweden (Dr. Åkerström).

Address reprint requests to: Dr. Ragnar Asplund  
Tallvägen 3, S-833 34 STRÖMSUND, Sweden  
Phone: Int +46-670-100 07 Fax: Int +46-63-16 56 26  
e-mail: r.asplund@telia.com or ragnar.asplund@jll.se

Accepted February 16, 2005

health in adults of both sexes (1–4). Poor sleep is increased in association with many somatic diseases and symptoms, such as cerebrovascular diseases, heart diseases, stroke, cancer, diabetes, the sleep-apnoea syndrome, painful conditions in the musculo-skeletal system and, in women, the menopausal transition (5–8). Mental disorders also are often accompanied by poor sleep. Stress is associated with profound influence on sleep (9,10) and sleep impairment is one of the main diagnostic criteria of major depression (11). In addition, constitutional factors such as obesity, life-style factors and habits, such as smoking, and coffee-

and alcohol consumption are associated with sleep complaints (12–14).

Sick-leave and unemployment are more likely to occur in persons with sleep impairment (15). In Sweden, sickness benefit can be allowed if the person is unable to work due to a medical cause. Conceptually therefore, as sick-leave (in contrast to unemployment) is likely to occur as a consequence of medical impairment, examining the relationships between sleep, sickness absence and employment status may reveal whether sleep impairment can be attributed to absence from work for any reason or whether there are health-related prerequisites for the development of sleep impairment in association with absence from work.

This study, therefore, aimed to investigate sleep in a random sample of adult men and women in an attempt to establish whether sleep is changed in association with absence from work due to sick leave or unemployment, independently of well-known causes, such as age, sex, somatic health, mental health and the place of residence.

## MATERIALS AND METHODS

In September 2003, a postal questionnaire with an explanatory letter was sent to the following groups of randomly selected men and women aged 20–64 years:

- 500 in each of three small, sparsely populated municipalities in northern Sweden, namely Härjedalen, Strömsund and Åre with 11,059, 13,293 and 9,635 inhabitants respectively on the 1st of November 2003;
- 500 in the city of Östersund (58,324 inhabitants)
- 1000 in Stockholm, the capital of Sweden (one of the municipalities of the county of Stockholm, with 761,949 inhabitants).

Those who had not replied within two weeks were sent a reminder; those who had not

replied after a further two weeks received a second reminder with another copy of the questionnaire; those who had not replied two weeks after this reminder received a final reminder after another two weeks.

## QUESTIONNAIRE

The questionnaire consisted of questions on age and sex, somatic and mental health, sleep, bodily pain, employment status and sick-leave. Somatic health was considered as “Good” if the statement “My somatic health is ...:” was answered “Very good” or “Rather good”, among the response alternatives (which were, “Very good”, “Rather good”, “Rather poor”, and “Very poor”); and “Poor” if it was answered “Rather poor”, or “Very poor”. The statements “My mental health is ...” and “My sleep is ...” were handled accordingly. Questions on the occurrence of good sleep, frequent awakenings difficulty in falling asleep after nocturnal awakenings, being on sickness benefit and being unemployed were all answered “Yes” or “No”. The number of days off from work due to sickness was also asked for.

## Statistical analyses

Group comparisons of non-numerical data were made with the chi-square test. For comparing frequencies, odds ratios (OR) with a 95% confidence intervals (CI) were calculated. For simultaneous evaluation of the influence of more than one independent variable on a dependent variable, logistic regression analysis (StatView 5.0 for the Macintosh) was performed.

## RESULTS

The questionnaire was initially sent to 3,000 individuals of whom 1,425 persons responded. (Seventeen questionnaires were returned without having been filled in.) After reminders, a further 523 answers were received. Thus there

were 1,948 evaluable questionnaires (men 47.7%). Of the recipients who could be expected to answer (2,983 individuals) the response rate was 65.2%. Of the men, 51.9% and 50.6% of the women were younger than 45 years. The proportion of persons younger than 30 years was larger in Åre, Östersund and Stockholm, while the proportion aged 60 years or older was greater in Härjedalen and Strömsund (Table 1).

**Table 1. Age distribution (%) in the different municipalities.**

| Municipality | <30  | 30–44 | 45–59 | 60–64 |
|--------------|------|-------|-------|-------|
| Härjedalen   | 11.7 | 31.8  | 44.1  | 12.3  |
| Strömsund    | 9.8  | 31.3  | 45.3  | 13.7  |
| Åre          | 16.5 | 37.4  | 35.6  | 10.6  |
| Östersund    | 19.3 | 31.3  | 39.7  | 9.8   |
| Stockholm    | 19.8 | 42.2  | 30.0  | 8.0   |

Sixty-five percent of the men and 71.5% of the women were married or cohabitating. The figures were lower in men of ages under 30 years (Table 2). Fifteen percent of the men and 14.3% of the women were unemployed with relatively higher figures in the youngest and oldest age groups, while being on sickness benefit was most common in men and women of aged 60 years or older (Table 2).

**Table 2. The percentage distribution of marital status, being on sickness benefit and being unemployed in the men and women in the study group.**

|                        | Age (years) |       |       |       |
|------------------------|-------------|-------|-------|-------|
|                        | 20–29       | 30–44 | 45–59 | 60–64 |
| Married - cohabitating |             |       |       |       |
| Men                    | 48.5        | 69.5  | 69.6  | 69.3  |
| Women                  | 58.5        | 76.9  | 73.8  | 68.0  |
| Sick-listed            |             |       |       |       |
| Men                    | 0.8         | 4.7   | 13.6  | 40.6  |
| Women                  | 7.7         | 11.1  | 20.6  | 49.5  |
| Unemployed             |             |       |       |       |
| Men                    | 23.6        | 11.4  | 10.5  | 22.8  |
| Women                  | 24.6        | 10.4  | 13.4  | 28.1  |

The municipalities of Härjedalen, Strömsund and Åre were very sparsely populated in relation to their areas, while the population density was higher in Östersund

and, particularly, in Stockholm (Table 3). The rate of sick-listing was twice as high in Strömsund as in Stockholm, while the unemployment rates were at a lower level in Stockholm than in the other four municipalities, that showed small differences in unemployment rates (Table 3).

**Table 3. The number of inhabitants (inh.), inh. per square kilometre (inh/km<sup>2</sup>), inh. being on sickness benefit (S) and being unemployed (U) in the five municipalities in the study.**

| Municipality | inh.   | inh/km <sup>2</sup> | S    | U    |
|--------------|--------|---------------------|------|------|
| Härjedalen   | 11059  | 1.0                 | 14.2 | 15.2 |
| Strömsund    | 13293  | 1.3                 | 19.0 | 15.5 |
| Åre          | 9635   | 1.3                 | 15.5 | 17.5 |
| Östersund    | 58324  | 26.3                | 16.8 | 15.7 |
| Stockholm    | 761947 | 4074.6              | 10.8 | 11.7 |

## SLEEP COMPLAINTS IN RELATION TO SICK-LISTING

Poor sleep was reported by 17.0% of the men and 18.5% of the women (NS). Poor sleep was 5.5 (3.5–8.6) times more common in sick listed men and 6.8 (4.7–9.9) times more common in such women than in men and women, respectively, who were not sick-listed.

Frequent awakenings were reported by 28.9% of men and 39.0% of women ( $p < 0.0001$ ). Frequent awakenings were 6.1 (4.1–10.2) times more common in men and 5.5 (3.8–7.9) times more common in women among those who were sick-listed than among those who were not.

Difficulty in falling asleep after nocturnal awakening was reported by 20.2% of the men and 26.0% of the women ( $p < 0.01$ ). Difficulty in falling asleep was 5.5 (3.5–8.6) times more common in men and 4.0 (2.8–5.7) times more common in women among those who were sick-listed than among those who were not. Reports on poor sleep, frequent awakenings and difficulty in falling asleep after nocturnal awakenings were all increased in parallel with increased number of days on sickness benefit during the last twelve months (Figures 1–3).

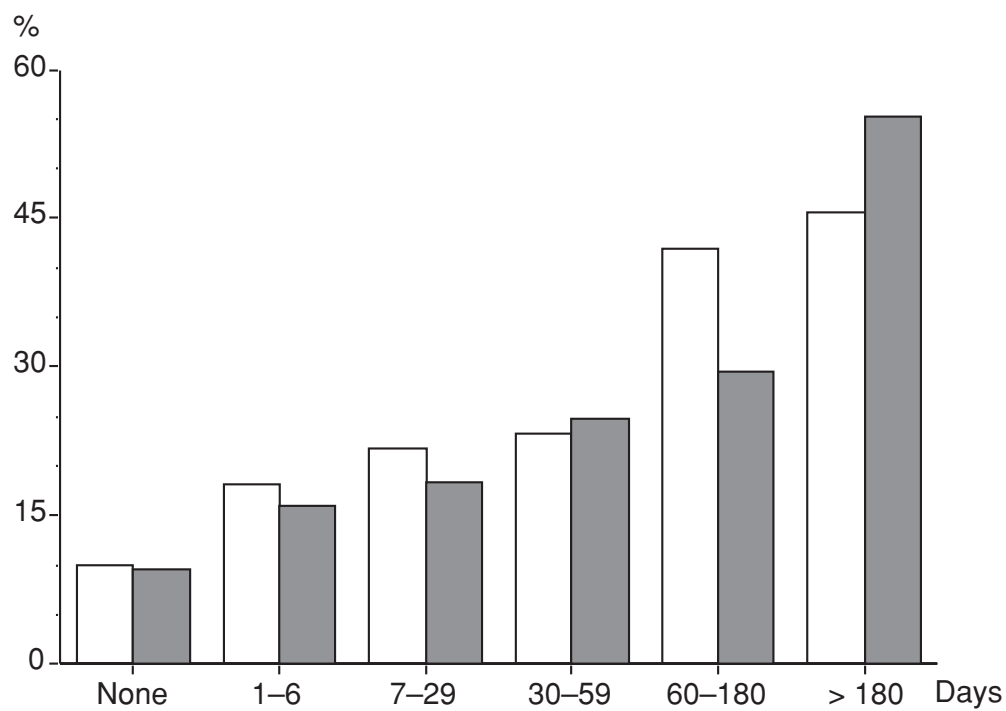


Figure 1. The distribution of reports on poor sleep in relation the number of days on sickness benefit during the last 12 months in men (white bars;  $p < 0.0001$ ) and women (grey bars;  $p < 0.0001$ ).

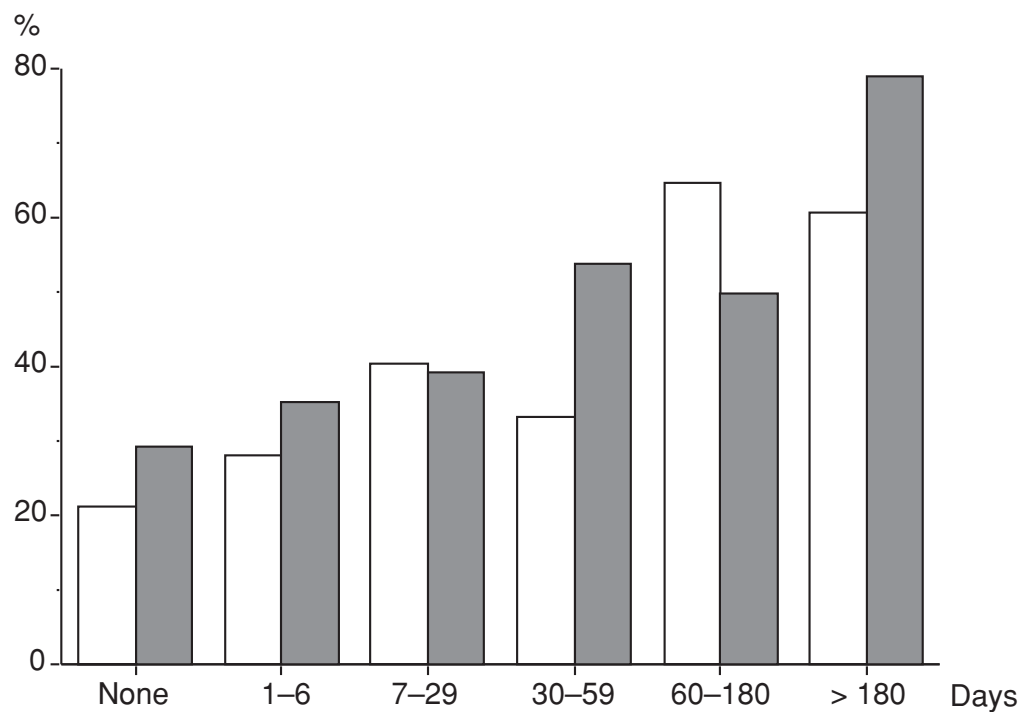
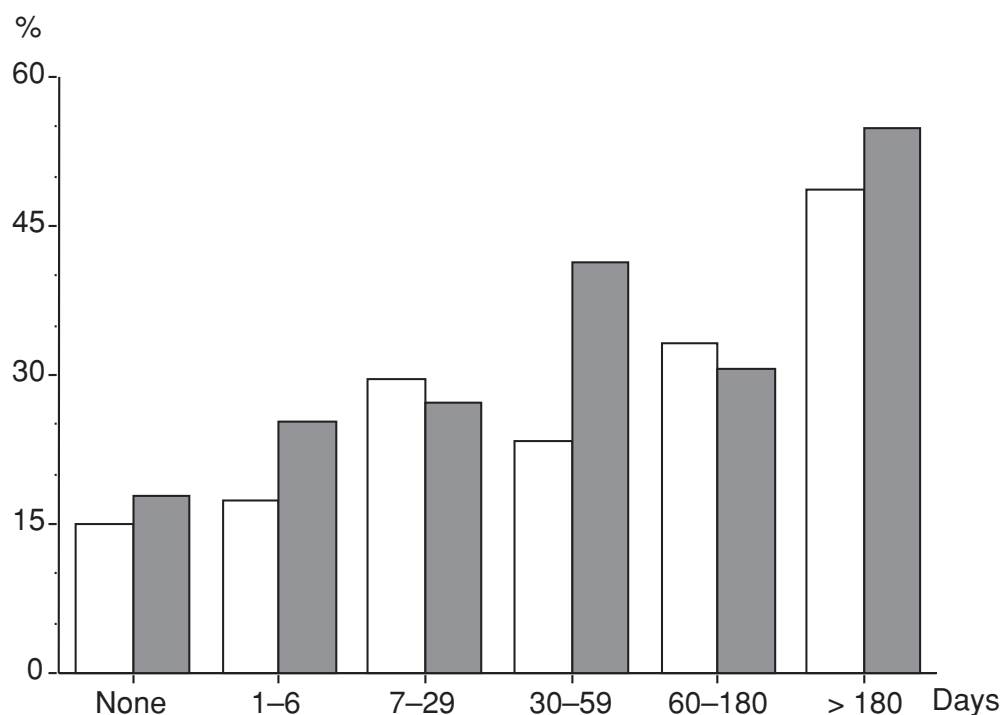


Figure 2. The distribution of reports on frequent awakenings in relation the number of days on sickness benefit during the last 12 months in men (white bars;  $p < 0.0001$ ) and women (grey bars;  $p < 0.0001$ ).



**Figure 3.** The distribution of reports on difficulty in falling asleep after nocturnal awakenings in relation to the number of days on sickness benefit during the last 12 months in men (white bars;  $p<0.0001$ ) and women (grey bars;  $p<0.0001$ ).

The number of respondents reporting all three symptoms (poor sleep, frequent awakenings and difficulty in falling asleep after nocturnal awakenings) was 5.1 (3.1–8.2) times greater in men and 4.8 (3.2–7.2) times greater in women on sickness benefit.

### SLEEP AND HEALTH IN RELATION TO EMPLOYMENT STATUS AND PLACE OF RESIDENCE

Poor sleep was 1.7 (1.0–3.0) times more common in unemployed men and 1.8 (1.0–3.3) times more common in unemployed women than in employed men and women. Poor somatic health was reported by 7.7% of gainfully employed men and by 30.5% of the unemployed men ( $p<0.0001$ ) and, in women by 10.4% and 28.7%, respectively ( $p<0.0001$ ). The corresponding figures for poor mental health were 5.0% and 26.2% in men ( $p<0.0001$ ) and 8.4% and 17.7% in women, respectively ( $p<0.01$ ).

With one exception there were no significant

differences in reports on poor sleep, poor somatic health or poor mental health in relation to the place of residence for either men or women. The exception was the proportions of women with poor somatic health, which were 14.2% in Härjedalen, 22.3% in Strömsund, 13.2% in Åre, 17.1% in Östersund, and 11.6% in Stockholm ( $p<0.05$ ).

### LOGISTIC REGRESSION ANALYSES

In a multiple logistic regression analysis, significant independent correlates of poor sleep in men were: being on sickness benefit (OR 2.1; 95%CI 1.1–3.8), poor somatic health (3.6; 2.0–6.3) and poor mental health (7.0; 4.0–12.3). The corresponding correlates in women were: being on sickness benefit (2.5; 1.4–4.3), poor somatic health (3.2; 1.8–5.8) and poor mental health (5.5; 3.3–9.2). Age, marital status, employment status and the place of residence were not found to be significant correlates for either sex.

## DISCUSSION

This questionnaire study showed that poor sleep was associated with increased propensity for sick leave in both men and women. This is in accordance with previous findings. A study of 5,924 telecommunications company workers in the Tokyo metropolitan area found that poor sleepers were more likely to take sick leave but also that they suffered more often from poor physical and psychological health (16).

It is already known that the propensity for sick-leave on at least one day during a eight week period is increased in insomniacs who do not report daytime symptoms and further increased in insomniacs with daytime symptoms (15). The present study also revealed that not only poor sleep but also frequent nocturnal awakenings and difficulty in falling asleep after such awakenings were increased in a stepwise manner in parallel with increasing numbers of day on sickness benefit during the last year (Figures 1–3).

As sick leave by definition implies absence from work in association with some health complaint, and as both poor somatic and mental health are associated with poor sleep (1,2) it was expected that reports on poor sleep would be more common in persons who were absent from work due to sickness than in those who were not. The logistic regression analysis showed that reports on poor sleep were still increased in both men and women on sickness benefit after the influence of somatic and mental health had been taken into account.

There were large differences in the age distribution between the different municipalities. The proportion of persons aged up to 29 years were twice as large in Stockholm as in Strömsund while the proportion of persons aged 45 years and older showed the reverse pattern (Table 1).

Poor somatic health and bodily pain are both associated with sleep impairment (2). In a previous study it was found that reports on poor somatic health and on bodily pain were

increased in parallel with increasing age (2). Although sick leave showed significant differences between the different municipalities' reports on poor sleep showed no such difference.

Sickness absence showed considerable differences between the different study areas, from 10.8% in Stockholm to 19.0% in Strömsund (Table 3). It could, therefore, be expected that the three sparsely populated municipalities in northern Sweden, Härjedalen, Åre and Östersund would show higher proportions of persons with poor sleep than did Stockholm, especially as the inhabitants of these three municipalities were not only older on average, but had lower income and a lower educational level compared with Östersund and, Stockholm – factors with a well-known detrimental effect on sleep impairment (2,17,18). It would seem attractive to assume that life in a small village on the countryside might be less stressful than in a large city and so favour good sleep.

There are studies supporting the view that stress is one of the most important factors in the development of poor sleep (16). If this is the case, calm and peaceful living conditions might counteract the expected negative influence of unfavourable conditions of age, income and education in persons in the three northern municipalities. However, our study was not designed to determine whether there was a real difference in stress in the different areas of residence.

In a univariate analysis, unemployment was associated with increased occurrence of poor sleep in both sexes. Such an increase is also found in other studies (15,19). The logistic regression analysis showed that unemployment was not independently associated with sleep impairment after adjustment for age, health, marital status and place of residence. This may indicate that health-related factors (which are more likely to be present when individuals are absent from work due to sickness than due to unemployment), rather than social, environmental or life-style factors explain the

major part of the difference in sleep between the two groups.

In summary, sleep impairment was increased in men and women on sickness benefit, but not

in those who are unemployed, after the influence of age, somatic and mental health, marital status the place of residence had been taken into account.

## REFERENCES

1. Asplund R. Sleep and hypnotic use in relation to perceived somatic and mental health among the elderly. *Arch Gerontol Geriatr* 2000;31:199–205.
2. Asplund R, Marnetoft SU, Selander J, Åkerström B. Sleep in relation to somatic and mental health and pain in adult men and women. *Sleep and Hypnosis* 2004;6:148–54.
3. Ohayon M. Epidemiological study on insomnia in the general population. *Sleep* 1996;19(3 Suppl):S7–15.
4. Ohayon MM. Interactions between sleep normative data and sociocultural characteristics in the elderly. *J Psychosom Res* 2004;56:479–86.
5. Asplund R. Sleep disorders in the elderly. *Drugs Ageing* 1999;14:91–103.
6. Asplund R, Åberg H. Sleep and cardiac symptoms among women aged 40–64 years. *J Int Med* 1998; 243:209–13.
7. Asplund R. Nightmares in relation to health, sleep and somatic symptoms in the elderly. *Sleep and Hypnosis* 2003;5:175–181.
8. Polo-Kantola P, Erkkola R, Irjala K, Helenius H, Pullinen S, Polo O. Climacteric symptoms and sleep quality. *Obstet Gynecol* 1999;94:219–24.
9. Hall M, Vasko R, Buysse D, Ombao H, Chen Q, Cashmere JD, Kupfer D, Thayer JF. Acute stress affects heart rate variability during sleep. *Psychosom Med* 2004;66:56–62.
10. Bonnet MH, Arand DL. Situational insomnia: consistency, predictors, and outcomes. *Sleep* 2003;26:1029–36.
11. Bech P, Rasmussen NA, Olsen LR, Noerholm V, Abildgaard W. The sensitivity and specificity of the Major Depression Inventory, using the Present State Examination as the index of diagnostic validity. *J Affect Disord* 2001;66:159–64.
12. Asplund R. Body mass index and sleep in women aged 40 to 64 years. *Maturitas* 1995;22:1–8.
13. Shilo L, Sabbah H, Hadari R, Kovatz S, Weinberg U, Dolev S, Dagan Y, Shenkman L. The effects of coffee consumption on sleep and melatonin secretion. *Sleep Med* 2002;3:271–273.
14. Brower KJ. Insomnia, alcoholism and relapse. *Sleep Med Rev* 2003;7:523–39.
15. Terzano MG, Parrino L, Cirignotta F, Ferini-Strambi L, Gigli G, Rudelli G, Sommacal S; Studio Morfeo Committee. Studio Morfeo: insomnia in primary care, a survey conducted on the Italian population. *Sleep Med* 2004;5:67–75.
16. Doi Y, Minowa M, Tango T. Impact and correlates of poor sleep quality in Japanese white-collar employees. *Sleep* 2003;26:467–71.
17. Sutton DA, Moldofsky H, Badley EM. Insomnia and health problems in Canadians. *Sleep*. 2001;24:665–70.
18. Shochat T, Umphress J, Israel AG, Ancoli-Israel S. Insomnia in primary care patients. *Sleep* 1999;22 Suppl 2:S359–65.
19. Li RH, Wing YK, Ho SC, Fong SY. Gender differences in insomnia – a study in the Hong Kong Chinese population. *J Psychosom Res* 2002;53:601–9.