University of Groningen

A Literature Review on Sick Leave Determinants (1984-2004)

Beemsterboer, Willibrord; Stewart, Roy; Groothoff, Johan; Nijhuis, Frans

Published in:

International Journal of Occupational Medicine and Environmental Health

DOI:

[10.2478/v10001-009-0013-8](https://doi.org/10.2478/v10001-009-0013-8)

IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.

Document Version

Publisher's PDF, also known as Version of record

Publication date:

2009

[Link to publication in University of Groningen/UMCG research database](#)

Citation for published version (APA):

Beemsterboer, W., Stewart, R., Groothoff, J., & Nijhuis, F. (2009). A Literature Review on Sick Leave Determinants (1984-2004). *International Journal of Occupational Medicine and Environmental Health*, 22(2), 169-179. <https://doi.org/10.2478/v10001-009-0013-8>

Copyright

Other than for strictly personal use, it is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license (like Creative Commons).

The publication may also be distributed here under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license. More information can be found on the University of Groningen website: <https://www.rug.nl/library/open-access/self-archiving-pure/taverne-amendment>.

Take-down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Downloaded from the University of Groningen/UMCG research database (Pure): <http://www.rug.nl/research/portal>. For technical reasons the number of authors shown on this cover page is limited to 10 maximum.

A LITERATURE REVIEW ON SICK LEAVE DETERMINANTS (1984–2004)

WILLIBRORD BEEMSTERBOER¹, ROY STEWART², JOHAN GROOTHOFF², and FRANS NIJHUIS¹

¹ University of Maastricht, the Netherlands

Department of Health Organization

² University of Groningen, the Netherlands

Department of Health Sciences

Abstract

Objectives: A literature review for the years 1984–2004 was performed to identify the determinants of the sick leave frequency and duration over that period and to establish the continuity in the character of those determinants. **Materials and Methods:** The review referred to national and international studies on the determinants of the frequency and duration of sick leave. **Results:** The review presented a highly consistent picture of the factors determining sick leave frequency and duration. **Conclusion:** Over the study period, the frequency and duration of sick leave were determined by a broad range of factors, a substantial number of which had a similar influence on both the study parameters.

Key words:

Literature review, Determinants of sick leave frequency, Determinants of sick leave duration

INTRODUCTION

The sickness absence is associated with numerous factors determining the frequency and duration of sick leave. Over the last several years, extensive research has been performed to precisely define the character of these determinants. The assumption is that, in general, during the period of 1984–2008, the character of sick leave determinants did not change substantially. Therefore, the aim of the present literature review was to identify relevant factors determining the sick leave frequency and duration over that period. The research question was: Which determinants of the sick leave frequency and duration are significant according to literature reports published in 1984–2004?

The sick-leave frequency is a measure of sickness absenteeism which generally shows a fairly strong relationship with the factor of motivation. The sick leave duration, apart from being connected with motivation, is also

strongly related to the factors referring to the seriousness of the illness. In view of the different character of sick leave frequency and duration, we considered them separately. The sick leave frequency indicates the number of sickness spells an employee takes a year, while the sick leave duration indicates the mean number of days a year per a sickness spell.

The literature review we performed was focused on sick leave determinants that were general rather than specific in nature. For instance, the character of air pollution in workplace was not specified in terms of the chemicals that might be responsible. Also, with regard to the level of education, no distinction was made between different types of school of the same level. Apart from this, the review concerned general tendencies in research on the sick leave frequency and duration. In other words, the study is meant as a broad review on sick leave determinants rather than a systematic review. The present review takes into account that the contradictory findings reported in

Received: January 14, 2008. Accepted: May 12, 2009.

Address reprint request to W.G.M. Beemsterboer, Hoogbrugstraat 20-B, 6221 CR Maastricht, the Netherlands (e-mail: willibrordbeemsterboer@uwnet.nl).

literature may be related to the socio-economic and cultural differences between the countries with different social security systems.

MATERIALS AND METHODS

To identify the relevant determinants of sick leave frequency and duration, we searched through (inter)national scientific journals and academic theses as well as the Medline database. In accordance with the research subjects commonly reported in (inter)national literature, we focused on the following categories of determinants of the sick leave frequency and duration: work characteristics (working conditions, work contents, working relations and work circumstances), health characteristics (perceived workload and health complaints), motivation, and individual characteristics and circumstances. Therefore, apart from searching the sources of data by the following keywords: sickness absence, sickness spells, sickness duration, sick leave, sick leave frequency and sick leave duration, we also considered the keywords relating to the work characteristics and those referring to lifestyle, such as smoking and drinking, or to individual characteristics and circumstances, like age, gender, marital status and level of education. The keywords for the health characteristics included medical consumption (more specified: visits to the family doctor and drug use), health complaints and perceived physical and mental health and perceived physical and mental workload. The assumed specific direction of the effect of the determinants of sick leave frequency and duration was also investigated.

RESULTS

The sick leave is associated with numerous determinants, and over the years, extensive research has been performed both nationally [1–7] and internationally [8–9] to establish the precise character of those determinants [10–21].

The studies on sick leave often distinguish between the sick leave frequency and sick leave duration. Therefore, we have considered the determinants that:

- generate sick-leave (frequency),
- contribute to the continuation or termination of sick leave (duration).

Determinants of sick leave frequency

The number of sickness spells an employee takes a year is influenced by the attitude towards absenteeism, by individual characteristics and motivation, and by the relation between health and working conditions or working relations.

Generally, the determinants that play an important role in generating sick leave (frequency) are the determinants of personal well-being [6,22–25], of individual factors [2,4,18,23,26–30] and of the atmosphere at the workplace [2,11–12,15–18,31–35].

Apart from the influence of the psychosocial factors [6,11,19,36], an evident relationship was found between a high frequency of sick leave and education or the level of functioning [37–38]. Further, the sick leave frequency was higher in the case of changes in private life and spending much time on housekeeping [37,39–40]. The determinants of sick leave related to the work characteristics, are categorized as ‘working conditions’, ‘work contents’, ‘working relations’ and ‘work circumstances’. Figure 1 summarizes the results of the literature review of the determinants having influence on the sick leave frequency. The direction of the effect of the determinants is displayed in Table 1.

Determinants of sick leave duration

According to Schröer [26], the differences in sick leave duration are related to gender, age, level of education, marital status, number of children and the strains of private life. The same author also found that the individual’s sickness record, perceived health, mental and psychosomatic complaints, physical limitations and lifestyle are the determinants that increase sick leave duration; the same applies to consulting medical doctors.

Sick leave duration depends on such determinants as the way the employers deal with sick employees and with the reintegration activities [80–84] as well as the motivation to return to work [5,85–87] and the organization

Table 1. Selected determinants of sick leave frequency and duration, and direction of effect

Independent determinants	Effect on: frequency ¹	Effect on: duration ²
Working conditions		
Appreciation of one's work (<i>sum</i>)	high is more → lower	high is more → shorter
Expectations for the future (<i>sum</i>)	high is better → lower	high is better → shorter
Satisfied with one's work (<i>yes = 1/no = 0</i>)	high is more → lower	high is more → shorter
Positive about social-medical support during sick leave (<i>yes = 1/no = 0</i>)	high is more positive: indifferent ³	high is more positive: indifferent
Type of appointment (<i>permanent = 1/temporarily = 0</i>)	indifferent	indifferent
Work contents		
Autonomy (<i>sum</i>)	high is more → lower	high is more → shorter
Workload (more work, same period of time) (<i>yes = 1/no = 0</i>)	high is more → higher	high is more → longer
Mental workload (<i>yes = 1/no = 0</i>)	heavier → higher	heavier → longer
Match between work and level of education (<i>yes = 1/no = 0</i>)	high is better → lower	high is better → shorter
Working relations		
Opinion about supervisors (<i>sum</i>)	high is more positive → lower	high is more positive → shorter
Managers are well informed about the workplace (<i>yes = 1/no = 0</i>)	high is better → lower	high is better → shorter
Good atmosphere at the workplace (<i>yes = 1/no = 0</i>)	high is better → lower	high is better → shorter
Work circumstances		
Pollution at the workplace	more pollution → higher	more pollution → longer
Air climate / pollution	bad air climate / more pollution → higher	bad air climate / more pollution → longer
Health status (perceived workload):		
Perceived physical workload (<i>sum</i>)	high is more → higher	high is more → longer
Perceived mental workload (<i>sum</i>)	high is more → higher	high is more → longer
Health status (health complaints):		
Questions about perceived health (<i>sum</i>)	high is more perception of poor health → higher	high is more perception of poor health → longer
Mental balance (<i>sum</i>)	high is more out of balance → higher	high is more out of balance → longer
Burnout due to work (<i>sum</i>)	high is more severe → higher	high is more severe → longer
Annual number of visits (family doctor)	more is poorer health → higher	more is poorer health → longer
Frequently taking medicines (<i>yes = 1/no = 0</i>)	more is poorer health → higher	more is poorer health → longer
Motivation		
Work-related factors (<i>yes = 1/no = 0</i>)	high is more pleasure in work → lower	high is more pleasure in work → shorter
Home-related factors (<i>sum</i>)	high is less motivated for work → higher	high is less motivated for work → longer
Individual characteristics and circumstances		
Age	older → lower	older → longer
Gender (<i>w = 1/m = 0</i>)	female → higher	female → longer
Marital status (<i>married = 1/not married = 0</i>)	married → lower	married → shorter
Satisfied with private circumstances (<i>yes = 1/no = 0</i>)	more → lower	more → shorter
Level of education (<i>high = 1, low, vocational school level = 0</i>)	high → lower	high → shorter
Alcohol consumption (<i>yes = 1, no = 0</i>)	drinking → higher	drinking → longer
Smoking (<i>yes = 1, no = 0</i>)	smoking → higher	smoking → longer

¹ Based on the literature review performed: the assumed effect on the frequency of sick leave (lower = lower frequency of sick leave; higher = higher frequency of sick leave).

² Based on the literature review performed: the assumed effect on the duration of sick leave (shorter = shorter duration of sick leave; longer = longer duration of sick leave).

³ Indifferent: literature is scarce or ambiguous.

Fig. 1. Results of literature review on determinants of sick leave frequency: 1984–2004.

of health care (waiting periods before effective treatment) [2].

A lower socioeconomic status or a longer history of employment is associated with longer periods of sick leave [5,47,88–89], as is frequently the case during the socioeconomic

transition [90]. Programs to improve workers' health are important [91–92]. The determinants of the employment conditions are the prominent factors that affect the sick leave duration [4–5,26,31]. As shown by the results of this literature review (Fig. 2), a substantial number of determinants

Fig. 2. Results of literature review on determinants of sick leave duration: 1984–2004.

have influence on the duration of sick leave. For the direction of the effect of these determinants see Table 1. Figures 1 and 2 present a global insight into how a certain number of determinants apparently play a role not only in the frequency but also in the duration of sick leave.

The finding that similar determinants can influence both the sick leave frequency and duration derives from earlier Dutch studies, like those of Nijhuis & Soeters [3], Smulders [4], and Grosfeld [5]; however, the direction of this influence has not always been consistent.

DISCUSSION

To get insight into the various determinants of the sick leave frequency and duration over the period of 1984–2004, a literature review was performed. The aim was to identify relevant sick leave-related determinants and not to evaluate the magnitude of the effect of those determinants. In future studies, the relative effect of the determinants should also be taken into consideration.

As shown by the results of the literature review, the determinants that had influence on the sick leave frequency (Fig. 1) were found to be related to the atmosphere at the workplace, personal well-being and individual factors. This explains the difference in comparison with the data regarding the determinants of sick leave duration (Fig. 2) where the results were classified as work, health and individual characteristics.

CONCLUSION

After reviewing the literature, we concluded that in the period of 1984–2004, the sick leave frequency and duration were influenced by a broad range of similar determinants. The determinants related to both the study parameters were mentioned in a highly consistent pattern. This conclusion was based on the finding that during the years 1984–2004, the studies on sick leave frequency and duration were apparently focused on similar determinants. Furthermore, we concluded that in the research on sick leave, a substantial number of comparable determinants were found to have a similar influence on the frequency of sick leave as they had on the duration.

REFERENCES

1. Draaisma D, Smulders P. *Absenteeism and the company*. Leiden: NIPG/TNO; 1978 [in Dutch].
2. Soeters J. *Absenteeism due to illness in the reform area South-Limburg*. Maastricht: Rijksuniversiteit Limburg; 1980 [in Dutch].
3. Nijhuis F, Soeters J. *Work and illness: a study of absenteeism because of illness and incapacity to work in 51 companies in South-Limburg*. Maastricht: Rijksuniversiteit Limburg; 1982 [in Dutch].
4. Smulders P. *Balance of 30 years sickness absence review; the results of 318 summarized studies*. Leiden: NIPG/TNO; 1984 [in Dutch].
5. Grosfeld J. *The predictability of individual duration of sick leave (dissertation)*. Amsterdam: Swets & Zeitlinger; 1988 [in Dutch].
6. Schalk M. *Determinants of frequent sick leave (dissertation)*. The Hague: Delwel; 1989 [in Dutch].
7. Klein Hesselink D, Kruidenier H, Veerman T, Buijs P. *Absenteeism explained. A literature review on determinants of sick leave and incapacity for work*. Amsterdam: NIA; 1993 [in Dutch].
8. Johns G. *Contemporary research on absence from work: Correlates, causes and consequences*. *Int Rev Ind Organ Psychol* 1997;12:115–74.
9. Harrison D, Martocchio J. *Time for absenteeism: A 20-year review of origins, offshoots, and outcomes*. *JOM* 1998;24:305–50.
10. Marmot M, North F, Feeney A, Head J. *Alcohol consumption and sickness absence: from the Whitehall II study*. *Addiction* 1993;88:369–82.
11. North F, Syme S, Feeney A, Head J, Shipley M, Marmot M. *Explaining socioeconomic differences in sickness absence: the Whitehall II Study*. *BMJ* 1993;306:361–6.
12. Geurts S, Buunk B, Schaufeli W. *Health complaints, social comparisons, and absenteeism*. *Work & Stress* 1994;8:220–34.
13. Stansfield S, Feeney A, Head J, Canner R, North F, Marmot M. *Sickness absence for psychiatric illness: the Whitehall II Study*. *Soc Sci Med* 1995;40:189–97.
14. Marmot M, Feeney A, Shipley M, North F, Syme S. *Sickness absence as a measure of health status and functioning: from the UK Whitehall II Study*. *J Epidemiol Community Health* 1995;49:124–30.
15. Rael E, Stansfield S, Shipley M, Head J, Feeney A, Marmot M. *Sickness absence in the Whitehall II study, London: the role of social support and material problems*. *J Epidemiol Community Health* 1995;49:474–81.
16. North F, Syme S, Feeney A, Shipley M, Marmot M. *Psychosocial work environment and sickness absence among British civil servants: the Whitehall II study*. *Am J Public Health* 1996;86:332–40.
17. Stansfield S, Fuhrer R, Head J, Ferrie J, Shipley M. *Work and psychiatric disorder in the Whitehall II study*. *J Psychosom Res* 1997;43:73–81.

18. Feeney A, North F, Head J, Canner R, Marmot M. *Socioeconomic and sex differentials in reason for sickness absence from the Whitehall II Study*. *Occup Environ Med* 1998;55:91–8.
19. Niedhammer I, Bugel I, Goldberg M, Leclerc A, Gueguen A. *Psychosocial factors at work and sickness absence in the Gazel cohort: a prospective study*. *Occup Environ Med* 1998;55:735–41.
20. Melchior M, Niedhammer I, Berkman L, Goldberg M. *Do psychosocial work factors and social relations exert independent effects on sickness absence? A six-year prospective study of the Gazel cohort*. *J Epidemiol Community Health* 2003;57:285–293.
21. Moreau M, Valente F, Mak R, Pelfrene E, De Smet P, De Backer G, et al. *Occupational stress and incidence of sick leave in the Belgian workforce: the Belstress study*. *J Epidemiol Community Health* 2004;58:507–16.
22. Hoverstad T, Kjolstad S. *Use of focus groups to study absenteeism due to illness*. *J Occup Med* 1991;33:1046–50.
23. Kentner M. *Frequency of absenteeism — value and modification by work disability data*. *Gesundheitsw* 1991;61:26–31.
24. Hornquist J, Zar M, Hansson B. *Precursors of repeated short-term sick leave: an empiric review of some background, job and well-being characteristics*. *Scand J Soc Med* 1993;21:164–70.
25. Reynolds S. *Psychological well-being at work: is preventing better than cure?* *J Psychosom Res* 1997;43(1):93–102.
26. Schröer C. *Absenteeism due to stress. A study of the character of stress, support and absenteeism (dissertation)*. Maastricht: University of Maastricht; 1993 [in Dutch].
27. Muller C, Monrad T, Biering-Sorensen F, Darre E, Deis A, Kryger. *The influence of previous low back trouble, general health and working conditions on future sick-listing because of back trouble. A 15-year follow-up study of risk indicators for self-reported sick-listing caused by low back trouble*. *Spine* 1999;24:1562–70.
28. Virtanen M, Kivimäki M, Elovainio M, Vahtera J, Cooper C. *Contingent employment, health and sickness absence*. *Scand J Work Environ Health* 2001;27:365–72.
29. Boedeker W. *Associations between workload and diseases rarely occurring in sickness absence data*. *J Occup Environ Med* 2001;43:1081–8.
30. IJzelenberg W, Molenaar D, Burdorf A. *Different risk factors for musculoskeletal complaints and musculoskeletal sickness absence*. *Scand J Work Environ Health* 2004;30:56–63.
31. Kaiser C. *Insurance medicine and the duration of sick leave (dissertation)*. Maastricht: University of Maastricht; 1992 [in Dutch].
32. Vahtera J, Kivimäki M, Koskenvuo M, Pentti J. *Hostility and registered sickness absences: a prospective study of municipal employees*. *Psychol Med* 1997;27:693–701.
33. Kivimäki M, Elovainio M, Vahtera J. *Workplace bullying and sickness absence in hospital staff*. *Occup Environ Med* 2000;57:656–60.
34. Kivimäki M, Elovainio M, Vahtera J, Ferrie J. *Organisational justice and health of employees: prospect cohort study*. *Occup Environ Med* 2003;60:27–33.
35. Eriksen W, Bruusgaard D, Knardahl S. *Work factors as predictors of sickness absence: a three month prospective study of nurse's aides*. *Occup Environ Med* 2004;61:398–404.
36. Vaananen A, Toppinen-Tanner S, Kalimo R, Mutanen P, Vahtera J, Peiro J. *Job characteristics, physical and psychological symptoms and social support as antecedents of sickness absence among men and women in the private industrial sector*. *Soc Sci Med* 2003;57:807–24.
37. Leigh J. *Employee and job attributes as predictors of absenteeism in a national sample of workers: the importance of health and dangerous working conditions*. *Soc Sci Med* 1991;33:127–37.
38. Bloemhoff A, Smulders P, van Dijk F, van Wely P. *Quality of work and health. The future in six scenarios*. *Tijdschr Soc Gezondheidsz* 1993;71:1–20 [in Dutch].
39. Deursen C van, Houtman I, Bongers P. (1999). *Work, private circumstances, dangerous habits and absenteeism: differences between men and women*. *Tijdschr Gezondheidsz* 1999;77:105–15 [in Dutch].
40. Vahtera J, Pentti J, Uutela A. *The effect of objective job demands on registered sickness absence spells; do personal, social and job-related resources act as moderators?* *Work & Stress* 1996;10:286–308.
41. Leijon M, Mikaelsson B. *Repeated short-term sick-leave as a possible symptom of psycho-social problems*. *Scand J Soc Med* 1984;12:165–9.
42. Melamed S, Ben-Avi I, Luz J, Green M. *Objective and subjective work monotony: effects on job satisfaction, psychosocial distress, and absenteeism in blue-collar workers*. *J Appl Psychol* 1995;80:29–42.

43. Zboril-Benson L. *Why nurses are calling in sick: the impact of health care restructuring*. Can J Nurs Res 2002;33:89–107.
44. Virtanen M, Kivimaki M, Elovainio M, Vahtera J, Ferrie J. *From insecure to secure employment: changes in work, health, health related behaviours, and sickness absence*. Occup Environ Med 2003;60:948–53.
45. Virtanen P, Vahtera J, Nakari R, Pennti J, Kivimaki M. *Economy and job contract as contexts of sickness absence practices: revisiting locality and habitus*. Soc Sci Med 2004;58:1219–29.
46. Ala-Mursala L, Vahtera J, Kivimaki M, Kevin M, Pennti J. *Employee control over working times: associations with subjective health and sickness absence*. J Epidemiol Community Health 2002;56:244–5.
47. Heaney C, Clemans J. *Occupational stress, physician-excused absences, and absences not excused by a physician*. Am J Health Prom 1995;10:117–24.
48. Geurts S. *Absenteeism from a social psychological perspective (dissertation)*. Nijmegen: Katholieke Universiteit Nijmegen; 1994.
49. Greiner B, Krause N, Ragland D, Fisher. *Objective stress factors, accidents, and absenteeism in transit operators: a theoretical framework and empirical evidence*. J Occup Health Psychol 1998;10:130–46.
50. Bourbonnais R, Mondor M. *Job strain and sickness absence among nurses in the province of Quebec*. Am J Ind Med 2001;39:134–202.
51. Otten F. *Work stress and healthiness*. The Hague: Statistics Netherlands (CBS); 2001 [in Dutch].
52. Buunk A, Janssen P. *Social support at home and psychosocial stress at work*. Gedrag & Gezondh 1987;15:147–54 [in Dutch].
53. Buunk A, Doosje B, Jans L, Hopstaken L. *Perceived Reciprocity, Social Support, and Stress at Work: The Role of Exchange and Communal Orientation*. J Pers Soc Psychol 1993;65: 801–11.
54. Janssen P, Buunk B, Nijhuis F. *The influence of social support regarding relative deprivation and stress in higher educated men. A comparison of three age-groups*. Gedrag en Organisatie 1994;7:71–89 [in Dutch].
55. Geurts S, Schaufeli W, Rutte C. *Absenteeism, turnover intention and inequity in the employment relationship*. Work & Stress 1999;13:253–67.
56. Kivimaki M, Sutinen R, Elovainio M, Vahtera J, Rasanen K, Toyry S, et al. *Sickness absence in hospital physicians: 2 year follow up study on determinants*. Occup Environ Med 2001;58:61–6.
57. Szubert Z, Makowiec-Dabrowska T, Sobala W. *Health-related absenteeism among workers employed in various work environments*. Med Pr 1990;50:89–118 [in Polish].
58. Ekberg K, Wildhagen I. *Long-term sickness absence due to musculoskeletal disorders: the necessary intervention of 'work conditions'*. Scand J Rehabil Med 1996;28(1):39–47.
59. Milton D, Glencross P, Walters M. *Risk of sick leave associated with outdoor air supply frequency humidification, and occupant complaints*. Indoor Air 2000;10:212–21.
60. Wargocki P, Sundell J, Bischof W, Brundett G, Fanger P, Gyntell F, et al. *Ventilation and health in non-industrial indoor environments: report from a European multidisciplinary scientific consensus meeting (EUROVEN)*. Indoor Air 2002;12:113–28.
61. Hopstaken L. *Deliberately. Absenteeism as reasoned behaviour (dissertation)*. Groningen: Rijksuniversiteit Groningen; 1994 [in Dutch].
62. Jacobson B, Aldane S, Goetzel R, Vardell K, Adams T, Pietras R. *The relationship between perceived stress and self-reported illness-related absenteeism*. Am J Health Prom 1996;11: 54–61.
63. Schechter J, Green L, Olsen L, Kruse K, Cargo M. *Application of Karasek's demand/control model in a Canadian occupational setting including shift workers during a period of reorganization and downsizing*. Am J Health Prom 1997;11: 394–9.
64. Feuerstein M, Berkowitz S, Haufler A, Lopez M, Huang G. *Working with low back pain: workplace and individual determinants or limited duty and lost time*. Am J Ind Med 2001;40: 627–38.
65. Voss M, Floderus B, Diderichsen F. *Changes in sickness absenteeism following the introduction of a qualifying day for sickness benefit — findings from Sweden Post*. Scand J Public Health 2001;29:166–74.
66. Houtman I, Bongers P, Smulders P, Kompier M. *Psychosocial stressors at work and musculoskeletal problems*. Scand J Work Environ Health 1994;20:139–45.
67. Dewa C, Lin E. *Chronic physical illness, psychiatric disorder and disability at the workplace*. Soc Sci Med 2000;51:41–50.

68. Moncrieff J, Pomerleau J. *Trends in sickness benefits in Great Britain and the contribution of mental disorders*. J Public Health Med 2000;22:59–67.
69. Savikko A, Alexanderson K, Hensing G. *Do mental health problems increase sickness absence due to other diseases?* Soc Psychiatry Psychiatric Epidemiol 2001;36:310–6.
70. Bass A, Bharucha-Reid R, Delaplane-Harris K, Schork M, Kaufmann R, McCann D, et al. *Employee drug use, demographic characteristics, work reactions, and absenteeism*. J Occup Health Psychol 1996;1:92–9.
71. Arola H, Pitkanen M, Nygard C, Huhtala H, Manka M. *The connection between age, job control and sickness absences among Finnish workers*. Occup Med (Lond) 2003;53:229–30.
72. Alexanderson K, Leijon M, Akerlind I, Rydh H, Bjurulf P. *Epidemiology of sickness absence in a Swedish county in 1985, 1986 and 1987. A three year longitudinal study with focus on gender, age and occupation*. Scand J Soc Med 1994;22:27–34.
73. Mastekaasa A. *Parenthood, gender and sickness absence*. Soc Sci Med 2000;50:1827–42.
74. Hensing G, Alexanderson K. *The association between sex segregation, working conditions and sickness absence among employed women*. Occup Environ Med 2004;61(2):e7.
75. Isacson A, Hanson B, Janzon L, Kugelberg G. *The epidemiology of sick leave in an urban population in Malmoe, Sweden*. Scand J Soc Med 1992;20:234–9.
76. Jenkins R, Harvey S, Butler T, Thomas R. *A six year longitudinal study of the occupational consequences of drinking over 'safe limits' of alcohol*. Br J Ind Med 1992;49:369–74.
77. Ryan J, Zwerling C, Orav E. *Occupational risks associated with cigarette smoking: a prospective study*. Am J Public Health 1992;82:29–32.
78. Bush R, Wooden M. *Smoking and absence from work: Australian evidence*. Soc Sci Med 1995;41:437–46.
79. Halpern M, Shikier R, Rentz A, Khan Z. *Impact of smoking status on workplace absenteeism and productivity*. Tob Control 2001;10:233–8.
80. Dijk F van, Prins R. *Occupational health care and work incapacity: recent developments in The Netherlands*. Occup Med (Lond) 1995;45(3):159–66.
81. Marnetoft S, Selander J, Bergroth A, Ekholm J. *Vocational rehabilitation — early versus delayed. The effects of early vocational rehabilitation compared to delayed vocational rehabilitation among employed and unemployed, long-term sick-listed people*. Int J Rehab Res 1999;22(3):161–70.
82. Aronsson G, Gustafsson K, Dallner M. *Sick but yet at work. An empirical study of sickness presenteeism*. J Epidemiol Community Health 2000;54(7):502–9.
83. Hogelund J. *Reintegration: public or private responsibility? Consequences of Dutch and Danish policies toward work-disabled persons*. Int J Health Serv 2002;32(3):467–87.
84. Nordqvist C, Holmqvist C, Alexanderson K. *Views of laypersons on the role employers play in return to work when sick-listed*. J Occup Rehab 2003;13(1):11–20.
85. Bonsall J, Squier J, Baron C, Parker G. *Effect of physiotherapy on sickness absence in industry: a comparative study*. J Soc Occup Med 1991;41(4):176–80.
86. Olbrich D, Cicholas B, Klenke-Bossek H. *Psychosomatic-psychotherapeutic rehabilitation of social medicine problem patients — an exploratory study of findings, follow-up and treatment outcome*. Rehabilitation (Stuttg) 1998;37(1):7–13.
87. Berglund H, Gerner U. *Motivation and return to work among the long-term sicklisted: an action theory perspective*. Disabil Rehabil 2002;24(14):719–26.
88. Knutsson A, Goine H. *Occupation and unemployment rates as predictors of long-term sickness absence in two Swedish counties*. Soc Sci Med 1998;47:25–31.
89. Sharp C, Watt S. *A study of absence rates in male and female employees working in occupations of equal status*. Occup Med (Lond) 1995;45(3):131–6.
90. Indulski J, Szubert Z. *Medical causes of female sickness absence during economic transition in Poland*. Int J Occup Med Environ Health 1999;12(4):295–303.
91. Donaldson S, Sussman S, Dent C, Severson H, Stoddard J. *Health behavior, quality of work life, and organizational effectiveness in the lumber industry*. Health Educ Behav 1999; 26(4):579–91.
92. Aldane S, Pronk N. *Health promotion programs, modifiable health risks, and employee absenteeism*. J Occup Environ Med 2001;43(1):36–46.
93. Petterson H, Arnetz B, Arnetz J. *Predictors of job satisfaction and job influence — results from a national sample of Swedish nurses*. Psychother Psychosom 1995;64:9–19.
94. Arts S, Kerkstra A, Zee J van der, Huyer Abu-Saad H. *Workload, capacity for coping and psychological and physical*

- outcomes amongst home helps in the Netherlands. *Health Soc Care Community* 1999;7(2):79–90.
95. Allgood C, O'Rourke K, VanDerslice J, Hardy M. *Job satisfaction among nursing staff in a military health care facility.* *Mil Med* 2000;165(10):757–61.
 96. Wright D, Beard M, Edington D. *Association of health risks with the cost of time away from work.* *J Occup Environ Med* 2002;44(12):1126–34.
 97. Andrea H, Beurskens A, Metsemakers J, van Amelsfoort L, van den Brandt P, Van Schayck C. *Health problems and psychosocial work and environment as predictors of long-term sickness absence in employees who visited the occupational physician and/or family doctor in relation to work: a prospective study.* *Occup Environ Med* 2003;60(4):295–300.
 98. Winnubst J, Marcelissen F, Kleber R. *Effects of social support in the stressor-strain-relationship: a Dutch sample.* *Soc Sci Med* 1982;16(4):475–82.
 99. Marcelissen F, Winnubst J, Buunk B, Wolff C. *Social support and occupational stress: a causal analysis.* *Soc Sci Med* 1988;26(3):365–73.
 100. Unden A-L. *Social support at work and its relationship to absenteeism.* *Work & Stress* 1996;10(1):46–61.
 101. Peter R, Siegrist J. *Chronic work stress, sickness absence, and hypertension of middle managers: general or specific sociological explanations?* *Soc Sci Med* 1997;45(7):1111–20.
 102. Karasek R. *Lower health risk with increased job control among white collar workers.* *J Organ Behav* 1990;11:171–85.
 103. Shain M. *The role of the workplace in the production and containment of health costs: the case of stress-related disorders.* *Int J Health Care Qual Assur Inc Leadersh Health Serv* 1999;12(2–3):i–vii.
 104. Boedeker W. *Effect of occupationally related stress on diagnosis-specific work incapacity.* *Soz Praeventiv-med* 2000;45(1):25–34.
 105. Eshoj P, Jepsen J, Nielsen C. *Long-term sickness absence-risk indicators among occupationally active residents of a Danish county.* *Occup Med (Lond)* 2001;51(5):347–53.
 106. Vasse R, Nijhuis F, Kok G. *Associations between work stress, alcohol consumption and sickness absence.* *Addiction* 1998;93(2):231–41.
 107. Lund T, Iversen L, Poulsen K. *Work environment factors, health, lifestyle and marital status as predictors of job change and early retirement in physically heavy occupations.* *Am J Ind Med* 2001;40(2):161–9.
 108. Astrand N, Isacson S. *Back pain, back abnormalities, and competing medical, psychological, and social factors as predictors of sick leave, early retirement, unemployment, labour turnover and mortality: a 22 year follow up of male employees in a Swedish pulp and paper company.* *Br J Ind Med* 1988;45(6):387–95.
 109. Grunfeld B, Noreik K. *Long-term sick-leave patients in Oslo. A follow-up study.* *Tidsskr Nor Lægeforen* 1992;12(2):215–8.
 110. Grossi G, Soares J, Angesleva J, Perski A. *Psychosocial correlates of long-term sick-leave among patients with musculoskeletal pain.* *Pain* 1999;80(3):607–19.
 111. Atroshi I, Andersson I, Gummesson C, Leden I, Odenbring S, Ornstein E. *Primary care patients with musculoskeletal pain. Value of health-status and sense-of-coherence measures in predicting long-term work disability.* *Scand J Rheumatol* 2002;31(4):239–44.
 112. Tsai S, Gilstrap E, Colangelo T, Menard A, Ross C. *Illness absence at an oil refinery and petrochemical plant.* *J Occup Environ Med* 1997;39(5):455–62.
 113. Gjesdal S, Bratberg E. *The role of gender in long-term sickness absence and transition to permanent disability benefits. Results from a multiregister based, prospective study in Norway 1990–1995.* *Eur J Public Health* 2002;12(3):180–6.
 114. Brage S, Nygard J, Tellnes G. *The gender gap in musculoskeletal-related long-term sickness absence in Norway.* *Scand J Soc Med* 1998;26(1):34–43.
 115. Leijon M, Hensing G, Alexanderson K. *Gender trends in sick-listing with musculoskeletal symptoms in a Swedish county during a period of rapid increase in sickness absence.* *Scand J Soc Med* 1998;26(3):204–13.
 116. Sandanger I, Nygard J, Brage S, Tellnes G. *Relation between health problems and sickness absence: gender and age differences — a comparison of low-back pain, psychiatric disorders, and injuries.* *Scand J Public Health* 2000;28:244–52.
 117. Upmark M, Moller J, Romelsjo A. *Longitudinal, population-based study of self reported alcohol habits, high levels of sickness-absence, and disability pensions.* *J Epidemiol Community Health* 1999;53:223–9.
 118. Upmark M, Thundal K. *An explorative, population-based study of female disability pensioners: the role of childhood*

- conditions and alcohol abuse/dependence.* Scand J Public Health 2002;30(3):191–9.
119. Smith G, Athanasou J, Reid C, Ng T, Ferguson D. *Sickness absence, respiratory impairment and smoking in industry: an Australian study.* Med J Aust 1981;1(5):235–7.
120. Eriksen W, Natvig B, Rutle O, Bruusgaard D. *Smoking as a predictor of long-term work disability in physically active and inactive people.* Occup Med (Lond) 1998;48(5):315–20.
121. Natvig B, Eriksen W, Bruusgaard D. *Low back pain as a predictor of long-term work disability.* Scand J Public Health 2002;30:288–92.

Copyright of International Journal of Occupational Medicine & Environmental Health is the property of Instytut Medycyny Pracy im. Jerzego Nofera and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.