

Burnout and work environments of public health nurses involved in mental health care

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Aims: (1) To examine whether prevalence of burnout is higher among community psychiatric nurses working under recently introduced job specific work systems than among public health nurses (PHNs) engaged in other public health services. (2) To identify work environment factors potentially contributing to burnout.

Methods: Two groups were examined. The psychiatric group comprised 525 PHNs primarily engaged in public mental health services at public health centres (PHCs) that had adopted the job specific work system. The control group comprised 525 PHNs primarily engaged in other health services. Pines' Burnout Scale was used to measure burnout. Respondents were classified by burnout score into three groups: A (mentally stable, no burnout); B (positive signs, risk of burnout); and C (burnout present, action required). Groups B and C were considered representative of 'burnout'. A questionnaire was also prepared to investigate systems for supporting PHNs working at PHCs and to define emergency mental health service factors contributing to burnout.

Results: Final respondents comprised 785 PHNs. Prevalence of burnout was significantly higher in the psychiatric group (59.2%) than in the control group (51.5%). Responses indicating lack of job control and increased annual frequency of emergency overtime services were significantly correlated with prevalence of burnout in the psychiatric group, but not in the control group.

Conclusions: Prevalence of burnout is significantly higher for community psychiatric nurses than for PHNs engaged in other services. Overwork in emergency services and lack of job control appear to represent work environment factors contributing to burnout.

Stress related diseases such as burnout have recently begun to attract attention among medical professionals.^{1–4} Burnout is a syndrome characterised by extreme physical and mental fatigue and emotional exhaustion.⁵ A wide range of professions experience burnout, including physicians, nurses, and educators. The common factor is that all share an intense involvement with people or provide assistance to people.^{6–7} Burnout represents a problem in the working environment, rather than an internal human problem. Factors identified as contributing to burnout include malignant stressors associated with job and working environment.⁸

In developed countries like the UK and Canada, newly implemented work climates or systems following health reforms and restructuring place considerable stress on district nurses and home care workers.^{9–10} For instance, one study reported that many district nurses felt that ongoing changes to the National Health Service represented the largest stressor in the UK.¹⁰ The environments in which medical professionals work are undergoing profound changes, due to increasing demands in medical care, mounting pressure to keep medical costs down, and reforms to medical care systems.^{11–14} Changes in medical care systems and working environments can act as stressors on medical professionals, resulting in physical and mental burdens.^{15–16} In Japan, the work system for public health nurses (PHNs) in public health centres (PHCs) across the country was fundamentally modified in April 1997, when the Community Health Act came into effect.^{17–19} This Act replaced the previous region-specific work system with a job-specific work system. The resulting changes to the work environment of PHNs working in PHCs seem to be contributing to various types of mental stress.

Under the region specific work system, PHNs were involved with all public health activities in a given region.

Under the new job specific work system, PHNs working in a PHC are involved in one of five major areas of services: (1) health services for adults and the aged; (2) services for mothers and children; (3) services related to infectious diseases; (4) services related to intractable diseases; and (5) mental health services.¹⁸ We focused on PHNs engaged in mental health services (community psychiatric nurses) when conducting this survey. Community psychiatric nurses are said to experience greater physical and mental fatigue due to problems with working conditions (inadequate support systems) and unsatisfactory regional emergency mental health care systems. However, no studies have systematically examined evidence supporting this view. The aim of the present study was therefore to investigate whether prevalence of burnout is higher among community psychiatric nurses working under the recently introduced job specific work system than among PHNs engaged in other public health services. In addition, factors contributing to burnout were identified, and three major categories related to the work environment (support systems, PHN relationship with physicians, and emergency service systems at PHCs) were examined.

METHODS

In Japan, 448 PHCs are operated by prefectures, which are similar to counties in the UK.¹⁹ Of these, 356 have adopted the job specific work system, although the number of community psychiatric nurses was unknown at 27 of the 356 PHCs. Community psychiatric nurses working at 329 PHCs were therefore requested to participate in this survey.

A total of 133 PHCs had only one PHN engaged in public mental health services. For these institutions, that PHC

Abbreviations: PHC, public health centre; PHN, public health nurse; RR, relative risk

Main messages

- Prevalence of burnout was significantly higher for community psychiatric nurses (prevalence 59.2%) than for PHNs engaged in other public health services in this nationwide survey.
- Excessive work demands, particularly for emergency overtime work, and low job control for community psychiatric nurses are work environment factors that appear to contribute to burnout.
- The work characteristics of community psychiatric nurses may be categorised as displaying "high job strain".

selected to participate in the present study. The remaining 196 PHCs had two or more PHNs engaged in public mental health services. Under these circumstances, two PHNs were randomly selected as participants. A total of 525 PHNs primarily engaged in public mental health services were therefore selected, forming the psychiatric group. The control group comprised 525 PHNs (one or two nurses selected at random from each of the 327 stations) from the same PHCs and primarily engaged in adult/aged services ($n = 132$), mother/child services ($n = 132$), infectious disease services ($n = 131$), or intractable disease services ($n = 130$). This sample size was sufficient to detect an increased prevalence of burnout in the psychiatric group of $\geq 10\%$, assuming burnout prevalence in the control group of about 50% as seen in the preliminary survey, with 80% power at the 5% level of significance (two tailed test). The required sample size was 408 in each group, for a total of 816. On 5 November 2002, a questionnaire was mailed to all 1050 potential subjects. To avoid any potential disadvantage to respondents associated with responses, the questionnaire was anonymous in design and each respondent sealed and mailed the return envelope by themselves. After the initial deadline for responses had passed, all nurses to whom questionnaires had been sent were mailed a request for participation in the survey, to increase response rate. The questionnaire included a column for obtaining from each respondent informed consent for use of the extracted data in this study.

Instruments for evaluating burnout have been developed by Pines and colleagues,²⁰ Maslach and Jackson,²¹ and Jones.²² Each of these instruments displays unique characteristics, and selection depends on the specific survey objectives or preferences of the investigator. The Burnout Scale developed by Pines *et al* has been translated into Japanese and has been used to study burnout among Japanese nurses and PHNs.^{23, 24} The present study utilised Pines' Burnout Scale to measure burnout. The scale is a self diagnosis instrument that includes 21 questions evaluating three factors of burnout: (1) physical exhaustion; (2) emotional exhaustion; and (3) mental exhaustion. Of the 21 items, 17 are negative and four are positive.²⁰ Responses to all items utilise a seven point scale. Composite burnout score represents the mean response for all items, with scores for positive items reversed. This scale was previously validated based on a sample of more than 5000 individuals, comprising Americans, Canadians, Japanese, Australians, and Israelis. Construct validity was established using discriminant validity methods, which utilise correlational-type analysis of the target test, with several other relevant measures. The Burnout Scale has also shown high test-retest reliability and internal consistency.²⁵

Respondents were classified by burnout score into three groups: group A (score ≤ 2.9 ; mentally stable, healthy, no

Policy implications

- To implement the de-institutionalisation that the national government has devised, a system must be established that can both accept discharged patients, and also cope with the emergency care needs of discharged patients.
- Community psychiatric nurses will play a central role in any such system. Countermeasures to improve work environments and prevent burnout among nurses should therefore be implemented.

burnout); group B ($3 \leq \text{score} \leq 3.9$; positive signs, risk of burnout); and group C (score ≥ 4 ; burnout present, action required).^{20, 23} Groups B and C were considered to represent a state of "burnout" for the purposes of this study. A separate questionnaire was also prepared to investigate factors providing support for PHNs working in PHCs and the adequacy of emergency mental health service systems. This questionnaire included items pertaining to individual characteristics (age of nurses, population of region covered by each PHC, length of nursing career, etc) and the work environment (actual data on work, work systems, support systems, etc). Prior to the main survey, a preliminary survey of 104 PHNs at 52 PHCs was conducted. Results of the preliminary survey were utilised to improve the validity and reliability of this separate questionnaire.

Relative risk (RR) of burnout for the psychiatric group compared to the control group was determined with 95% confidence intervals (CI). Gross differences in burnout prevalence between psychiatric and control groups were compared using the Mantel-Haenszel method to adjust for possible confounding effects. Stratified comparisons were performed to adjust for characteristics that differed significantly ($p \leq 0.10$) between psychiatric and control groups. Adjusted RRs, associated 95% CIs, and p values were calculated using the Mantel-Haenszel test. The Mantel extension test for trends was used to evaluate correlations between burnout and working conditions. These analyses were performed for both groups. Values of $p \leq 0.05$ were considered statistically significant. All statistical analyses were based on two tailed probabilities. SPSS for Windows software (version 10.0.5J, SPSS Japan, Tokyo, Japan) was used for statistical analyses.

RESULTS

Of the 1050 questionnaires sent out, 858 were returned. Responses were received from 423 community psychiatric nurses and 435 nurses engaged in other services (adult/aged services, $n = 112$; mother/child services, $n = 102$; infectious disease services, $n = 109$; intractable disease services, $n = 112$). Overall response rate was 81.7%. Of the 858 responses, 625 were collected by the original deadline (primary responses), and 233 were collected after the reminder letter was sent (secondary responses). No significant differences were observed between primary and secondary responses in terms of response tendencies for any questions in the questionnaire. Some respondents answered that they were involved in two or more of the five service categories mentioned above, rather than specialising in one particular service category. These respondents were excluded from analysis. As a result, 785 respondents were included in the final analysis, including 396 community psychiatric nurses and 389 PHNs not engaged in mental health services. The estimate of internal consistency (Cronbach's α) for the Burnout Scale was 0.94 in the 785 respondents.

Table 1 Characteristics of PHNs

Characteristics	Service area		p*
	Psychiatric health care, n = 396	Others, n = 389	
Age			
≤30	35 (9)	49 (13)	
31–35	68 (17)	69 (18)	
36–40	66 (17)	81 (21)	
41–45	106 (27)	80 (21)	
46–50	57 (14)	53 (14)	
≥51	64 (16)	57 (15)	0.064
Population covered by health centre (×1000)			
<100	124 (32)	126 (33)	
100–150	90 (23)	89 (23)	
150–200	53 (14)	56 (15)	
200–250	38 (10)	31 (8)	
250–300	29 (7)	26 (7)	
>300	58 (15)	56 (15)	0.968
Time taken to workshop (min)	40 [20, 60]	45 [20, 60]	0.339
Career as PHN (y)	19 [12, 24]	17 [11, 23]	0.125
Number of years in current service			
<1	144 (36)	181 (47)	
1	57 (14)	45 (12)	
2+	195 (49)	163 (42)	0.009

Results expressed as no. (%), or median [25th, 75th centile].

*Wilcoxon rank-sum test.

Table 1 compares characteristics between psychiatric and control groups. Psychiatric and control groups displayed significant differences in number of years in current service ($p = 0.009$).

Table 2 shows overall prevalence of burnout for the two groups. Relative risk of burnout was significantly increased for the psychiatric group compared with the control group. Two factors that differed significantly ($p \leq 0.10$) between psychiatric and control groups, age strata and number of years in current service, were examined to adjust for possible confounding effects. Relative risks for overall, age strata, and number of years in current service were significantly increased.

Table 3 shows the association between prevalence of burnout in each group and answers to questions on PHN relationships with physicians, support systems, and emergency

service systems at PHCs. Affirmative responses to “Is success or failure of service largely determined by the physician?” were significantly associated with prevalence of burnout in the psychiatric group ($p = 0.008$), but not in the control group ($p = 0.868$). For the question, “How often are emergency overtime services needed per year?”, increased annual frequency of emergency overtime services correlated with prevalence of burnout in the psychiatric group ($p = 0.014$), but not in the control group ($p = 0.426$).

DISCUSSION

The key finding of this study was that prevalence of burnout is significantly higher for community psychiatric nurses than for PHNs engaged in other public health services. Prevalence of burnout reached 59.2% for community psychiatric nurses. This is higher than the prevalence reported in a previous survey of physicians engaged in emergency paediatric care (50%), using the same Pines' Burnout Scale.²⁶ Past studies of burnout among medical professionals have focused on hospital based staff, and have revealed unresolved problems pertaining to hospital staff.^{27–29} The present study, however, reveals that more than half of PHNs engaged in community health services at PHCs display some level of burnout, irrespective of the type of public health services provided. This study also shows that the situation is more serious for community psychiatric nurses, who represented the primary focus of this study. We believe the results of this study display external validity, since the study was carefully and adequately designed, and involved PHNs across the country. Furthermore, no previous study of PHNs has been conducted on such a large scale.

The distribution of burnout among community psychiatric nurses displayed two slow peaks: one for the 30s age group; the other for the 50s age group. Differences in burnout prevalence between psychiatric and control groups were particularly noticeable for nurses in their 30s. Community psychiatric nurses in this age bracket have often been pursuing a nursing career for at least a decade, and are in the prime of their life as community psychiatric nurses, possessing large amounts of knowledge and experience. For this reason, high expectations and heavy work demands may be heaped on these nurses by both superiors and subordinates. Levels of expectation and work demands may prove excessive, causing extreme mental and physical exhaustion

Table 2 Prevalence of burnout according to service area, age, and number of years in current service, and relative risks (RRs) of burnout for psychiatric group compared with control group

	Service area		Comparison between psychiatric health care and others			
	Psychiatric health care, n = 387	Others, n = 377	RR	(95% CI)	p	
All	Burnout, % (95% CI)	Burnout, % (95% CI)				
	59.2 (54.3 to 64.1)	51.5 (46.4 to 56.5)	1.15*	(1.01 to 1.31)*	0.032†	
Age						
≤30	58.8	61.2				
31–35	65.7	50.7				
36–40	64.1	51.9				
41–45	53.3	41.0				
46–50	57.9	54.0				
≥51	58.3	55.8	1.17‡	(1.03 to 1.33)‡	0.022§	
Years in current service						
<1	62.3	50.3				
1	64.8	46.5				
2+	55.4	54.1	1.15‡	(1.01 to 1.31)‡	0.037§	

*Crude relative risk and 95% confidence interval. † χ^2 test. ‡Adjusted relative risks and 95% confidence intervals using the Mantel-Haenszel method. §Mantel-Haenszel test.

Table 3 Prevalence of burnout among PHNs, stratified by service area and working conditions

Working conditions	Service area					
	Psychiatric health care, n = 387			Others, n = 377		
	Total	Burnout (%)	p*	Total	Burnout (%)	p*
Support status						
PHNs in service						
3+	171	57.9		61	52.5	
2	134	57.5		115	48.7	
1	69	63.8	0.531	172	54.7	0.619
Staff members other than PHNs						
2+	107	50.5		75	48.0	
0/1	176	61.9	0.064	136	53.7	0.473
Help by PHNs in other service areas						
Sufficient	85	41.2		99	41.4	
Moderate	221	63.3		199	50.3	
Seldom	62	67.7		67	65.7	
Not at all	15	60.0	0.004	12	75.0	0.001
Emergency services after usual business hours						
Night/holiday duty rotation system						
Present	262	56.9		178	49.4	
Planned/unknown	19	52.6		70	52.9	
Absent	92	67.4	0.099	76	55.3	0.384
Frequency of emergency overtime work						
None	39	41.0		215	48.4	
Less than 5 times/year	167	58.1		107	56.1	
More than 6 times/year	172	64.0	0.014	49	51.0	0.426
Service schedule disturbed by emergency services						
Never	10	40.0		100	44.0	
Rarely	54	48.1		144	50.7	
Sometimes	180	56.1		83	55.4	
Often	141	68.8	0.002	38	68.4	0.011
Relations to physicians						
Physician needed						
Never	46	47.8		284	51.8	
Rarely	86	58.1		50	52.0	
Sometimes	109	66.1		16	56.3	
Often	135	60.7	0.169	5	60.0	0.730
Physician difficult to secure when needed†						
Never	18	38.9		17	35.3	
Rarely	58	62.1		26	61.5	
Sometimes	108	58.3		20	60.0	
Often	146	67.1	0.051	7	42.9	0.450
Success/failure is dependent on physician						
Never	17	35.3		72	55.6	
Rarely	79	57.0		66	47.0	
Sometimes	214	57.5		151	49.0	
Always	72	72.2	0.008	48	60.4	0.868

*Wilcoxon rank-sum test (for trends). †Asked only to those affirming need for physician (that is, excluding the 46 responding "never" to physician needed).

and contributing to burnout. The apex of the second burnout peak was for nurses in their 50s, and may well reflect the influences of reduced physiological functioning and the increasing development of illness that occurs in the 50s.

With regard to nurse relationships with physicians, the most striking difference observed between the psychiatric and control groups was the correlation between prevalence of burnout and percentage of responses, indicating that success or failure of services is perceived as largely dependent on the physicians involved. In the psychiatric group, prevalence of burnout rose significantly with increasing perception of dependence on physicians. No such correlation was noted in the control group. Of the nurses who stated that the success or failure of service was "always" dependent on the physicians involved, 72.2% experienced burnout. This percentage was higher than that for any other question, meaning that burnout in community psychiatric nurses is closely related to whether the physician needed for a given community psychiatric service satisfies the requests or expectations of nurses. Furthermore, in the psychiatric group, increased frequency of services requiring emergency overtime work elevated the prevalence of burnout. No such correlation was observed in the control group. The implication here is that mental health services differ from other public health services in terms of the nature of cases requiring emergency

overtime work, and that mental health services more frequently involve difficult cases that are more likely to cause burnout in PHNs.

The prevalence of burnout recorded by this study may slightly overestimate the real situation, since cases with relatively mild symptoms were also included as cases of burnout according to our criteria. That is, group B (positive signs and risk of burnout) and group C (burnout present and action required) were both deemed representative of burnout. Although the prevalence of burnout needs to be evaluated more carefully, the present study undoubtedly indicates that the prevalence of burnout is higher among PHNs involved in mental health care than among PHNs in charge of other services. Furthermore, considering a British report that one in every two community psychiatric nurses was seriously emotionally drained by their work,³⁰ the prevalence of burnout revealed in the present study may not be excessively high. It is plausible to imagine from these studies that as work environments for PHNs in developed countries have undergone rapid changes in recent years, more than a few PHNs have been burdened by great physical and mental stress, possibly causing varying degrees of burnout.

The present study focused only on the work environment, whereas burnout can be caused by factors related to both the workplace and personal and social factors. The significant

factors identified in the present study cannot completely explain the level of burnout observed in all cases. Relationships between burnout among community psychiatric nurses and personal or social factors must also be examined. Further investigation of the issues surrounding work environment and job stress will add to our understanding of burnout, work environment, and potential preventive measures among community psychiatric nurses. Theories on job stress, particularly the demand-control model described by Karasek, have contributed to the study of job stress by supplying theoretical frameworks with which to explain associations between psychosocial characteristics of the work environment and health outcomes.^{31, 32} The demand-control model suggests that a high demand-low control combination at work can contribute to mental and physical pathology.^{33, 34} In our study, the work environment factor "increased frequency of emergency overtime work" would presumably represent high job demands, and the factors "difficulty securing a physician" and "success/failure is determined by physician" may both represent low job control. The work characteristics of community psychiatric nurses may thus be categorised as displaying "high job strain", and some studies have reported that "high job strain" is associated with mental illness.³⁵ In future, associations between work environment, stress levels, and mental illness among community psychiatric nurses should be analysed utilising approaches including not only burnout theories, but also job stress theories, such as the demand-control model.

The present study displays several limitations. First, the reliability and validity of the Japanese version of Pines' Burnout Scale, employed in the present study, have yet to be strictly verified. However, a previous study using this version of Pines' Burnout Scale did show the internal validity of the scale.²⁶ In the present study, Cronbach's α coefficient was 0.94, indicating a high level of internal consistency for the scale. Second, we performed nine tests for each group in table 3. To adjust for multiple testing we calculated adjusted p values of those tests that had displayed significance before adjusting using the Holm method.³⁶ In analyses of the psychiatric group, the resulting p values were 0.032, 0.084, 0.018, and 0.056 for the working conditions "help by PHNs in other service areas", "frequency of emergency overtime work", "service schedule disturbed by emergency services", and "success/failure is dependent on the physician", respectively. The possibility cannot be excluded that multiple testing might have contributed to spurious significant results for "frequency of emergency overtime work" and "success/failure is dependent on the physician".

In conclusion, our study shows that prevalence of burnout is significantly higher for community psychiatric nurses than for PHNs engaged in other services. Excessive work demands, particularly for emergency overtime work, and low job control for community psychiatric nurses appear to represent work environment factors contributing to burnout. Countermeasures to improve the work environment and thus prevent burnout among nurses need to be implemented.

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REFERENCES

- 1 Visser MR, Smets EM, Oort FJ, et al. Stress, satisfaction and burnout among Dutch medical specialists. *CMAJ* 2003;**168**:271-5.
- 2 Lee I, Wang HH. Perceived occupational stress and related factors in public health nurses. *J Nurs Res* 2002;**10**:253-60.
- 3 Linzer M, Visser MR, Oort FJ, et al. Society of General Internal Medicine (SGIM) Career Satisfaction Study Group (CSSG). Predicting and preventing physician burnout: results from the United States and the Netherlands. *Am J Med* 2001;**111**:170-5.
- 4 Palsson MB, Hallberg IR, Norberg A, et al. Burnout, empathy and sense of coherence among Swedish district nurses before and after systematic clinical supervision. *Scand J Caring Sci* 1996;**10**:19-26.
- 5 Pines A, Maslach C. Characteristics of staff burnout in mental health settings. *Hosp Community Psychiatry* 1978;**29**:233-7.
- 6 Gundersen L. Physician burnout. *Ann Intern Med* 2001;**135**:145-8.
- 7 Cherniss C. *Beyond burnout: helping teachers, nurses, therapists, and lawyers recover from stress and disillusionment*. New York: Routledge, 1995.
- 8 Maslach C, Schaufeli WB, Leiter MP. Job burnout. *Annu Rev Psychol* 2001;**52**:397-422.
- 9 Denton M, Zeytinoglu I, Davies S, et al. Job stress and job dissatisfaction of home care workers in the context of health care restructuring. *Int J Health Serv* 2002;**32**:327-57.
- 10 Evans L. An exploration of district nurses' perception of occupational stress. *Br J Nurs* 2002;**11**:576-85.
- 11 Matsuda S. The health and social system for the aged in Japan. *Aging Clin Exp Res* 2002;**14**:265-70.
- 12 Lai OK. Long-term care policy reform in Japan. *J Aging Soc Policy* 2001;**13**(2-3):5-20.
- 13 Waits J. Japan starts on health-spending slowdown. *Lancet* 2001;**358**:647.
- 14 Ikegami N, Campbell JC. Health care reform in Japan: the virtues of muddling through. *Health Aff (Millwood)* 1999;**18**(3):56-75.
- 15 Blair A, Littlewood M. Sources of stress. *J Community Nurs* 1995;**9**:38-40.
- 16 Traynor M. The views and values of community nurses and their managers: research in progress—one person's pain, another person's vision. *J Adv Nurs* 1994;**20**(1):101-9.
- 17 Health and Welfare Statistics Association. Community Health Act. *Journal of Health and Welfare Statistics* 2000;**47**(9):20-1.
- 18 Ohno A, Yajima M, Mori Y, et al. The role of public health nurses at public health centers after community health act implementation. *Kitakanto Med J* 2000;**50**:127-37.
- 19 Health and Welfare Statistics Association. Activity of public health stations. *Journal of Health and Welfare Statistics* 2002;**49**(9):18-19.
- 20 Pines A, Aronson E. *Burnout. From tedium to personal growth*. New York: The Free Press, 1981.
- 21 Maslach C, Jackson SE. Burnout in health professions: a social psychological analysis. In: Sanders GS, Suls J, eds. *Social psychology of health and illness*. Hillsdale, NJ: Lawrence Erlbaum Associates, 1982:227-51.
- 22 Jones WJ. *The staff burnout scale for health professionals (SBS-HP)*. Park Ridge, IL: London House, 1980.
- 23 Inaoka F, Matsuno K, Miyasato K. A study of burnout in nurses and its etiology. *Nursing* 1984;**36**:81-103.
- 24 Matsuno K. Study of "burn out syndrome" among public health nurses and its causative factors. *Japan Journal of Public Health* 1983;**30**:503-10.
- 25 Pines AM. The burnout measure. Paper presented at the National Conference on Burnout in the Human Service, Philadelphia, November 1981.
- 26 Fields AI, Cuerdon TT, Brasseux CO, et al. Physician burnout in pediatric critical care medicine. *Crit Care Med* 1995;**23**:1425-9.
- 27 Shanafelt TD, Bradley KA, Wipf JE, et al. Burnout and self-reported patient care in an internal medicine residency program. *Ann Intern Med* 2002;**136**:358-67.
- 28 Whippen DA, Canellos GP. Burnout syndrome in the practice of oncology: results of a random survey of 1,000 oncologists. *J Clin Oncol* 1991;**9**:1916-20.
- 29 Aiken LH, Clarke SP, Sloane DM. International Hospital Outcomes Research Consortium. Hospital staffing, organization, and quality of care: cross-national findings. *Int J Qual Health Care* 2002;**14**(1):5-13.
- 30 Fagin L, Brown D, Bartlett H, et al. The Claybury community psychiatric nurse stress study: is it more stressful to work in hospital or the community? *J Adv Nurs* 1995;**22**:347-58.
- 31 Karasek RA. Job demands, job decision latitude and mental strain: implications for job redesign. *Adm Sci Q* 1979;**24**:285-307.
- 32 Karasek RA, Theorell T. *Healthy work: stress, productivity and the reconstruction of working life*. New York, NY: Basic Books, 1990.
- 33 Karasek RA, Theorell T, Schwartz JE, et al. Job characteristics in relation to the prevalence of myocardial infarction in the US health examination survey (HES) and the health and nutrition examination survey (HANES). *Am J Public Health* 1988;**78**:910-18.
- 34 Karasek RA, Baker D, Marxer F, et al. Job decision latitude, job demands, and cardiovascular disease: a prospective study of Swedish men. *Am J Public Health* 1981;**71**:694-705.
- 35 Mausner-Dorsch H, Eaton WW. Psychosocial work environment and depression: epidemiologic assessment of the demand-control model. *Am J Public Health* 2000;**90**:1765-70.
- 36 Holm S. A simple sequentially rejective multiple test procedure. *Scand J Statistics* 1979;**6**:65-70.