

Lifestyle, harassment at work and self-assessed health of female flight attendants, nurses and teachers¹

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Abstract. Health-related lifestyle, harassment at work, and self-assessed health of female flight attendants in comparison to that of female nurses and female primary school teachers were surveyed. A higher proportion of flight attendants than nurses or teachers were smokers, 26% vs. 15% and 17% respectively; and consumed alcohol at least once a week, 40% vs. 21% and 16%. Repeated sexual harassment at work was more common among the flight attendants, 31% vs. 8% and 4%; whereas bullying, physical violence and threats were less prevalent among the flight attendants (12%) than among nurses (19%). Flight attendants were on average somewhat taller, but weighed on average less, 63.8 kg vs. 72.4 kg and 72.7 kg respectively. Repeated exposure to sexual harassment, bullying, violence and threats was related to less physical and psychological well-being in all the groups. Teachers scored on average significantly lower than did the flight attendants on general health and physical well-being, while nurses did not.

Keywords: Occupational health, work-environment, life-style, women's health, flight attendants, teachers, nurses

1. Introduction

The health and well-being of female flight attendants has generated considerable concern, the focus being mainly on the rate of cancer incidence and reproductive outcomes and their possible link to exposure to physical, chemical and psychological factors, e.g. circadian rhythm disruption and potential cosmic ionising radiation. Breast cancer [24,27,36] and, in some studies, skin melanoma [26] have been somewhat rela-

tively elevated, but the question remains as to whether these results are due to occupational exposures or non-occupational factors [35]. Fat intake and alcohol consumption have been suggested as risk factors for breast cancer [24]. There have been some indications of an increased risk of spontaneous abortion among female flight attendants [1]. One survey on flight attendants found that most of the respondents considered that they had experienced work-related physical symptoms, and more women than men considered their job to be psychologically strenuous [22]. A study on job stress among female flight attendants found moderately high levels of fatigue, but moderate-to-low levels of distress and dissatisfaction in the group [20]. However, these studies have possibly lacked a proper control group as it has been argued that the lifestyle of female flight atten-

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dants is hardly comparable with the general population with respect to nutrition, stress, etc. [18].

Working in health care has been linked to various hazards. The most important exposures include infectious agents, formaldehyde, anesthetic agents, neoplastic drugs and ethylene oxide [34]. Studies on mortality and cancer incidence among Icelandic nurses have shown a moderate excess of suicides and brain tumours among those with less than twenty years of employment, and a relatively elevated incidence of breast cancer that increased with increasing lag-time before start of follow-up [11,12]. Nursing is seen as a stressful, physically strenuous occupation. Factors in the work situation that lead to stress on nurses include: close contact with suffering and death, role ambiguity, understaffing, shift work and harassment [17]. According to one study, 90% of nurses and nursing students reported experiencing at least one type of sexual harassment and 30% listed at least four types [7]. A survey on work-conditions and well-being at work among Icelandic nurses has shown that they work long hours and find their job physically and psychologically straining [6]. A study among women in geriatric care has shown that mental exhaustion and harassment are connected to symptoms from various parts of the body [13].

Most studies on the health and well-being of teachers seem to be related to stress [8,14,33] and burn-out [15]. Studies on cancer risk among teachers have shown an excess of breast cancer [4]; however, when social status is taken into account this excess tends to diminish [23].

Nurses, primary school teachers, and flight attendants have many things in common; the majority of these groups are women, their work includes interaction with people whose safety and well-being they are responsible for, in addition to their role of serving and teaching, respectively.

The aim of our study was to investigate health-related lifestyle and harassment at work among female flight attendants in comparison to female nurses and female primary school teachers with the hypothesis that these factors could have an impact on their self-assessed health.

1.1. Material and methods

The population of this study was comprised of all female members of the Icelandic Flight Attendants Association (ICCA) having at least two years working experience; all working female nurses listed with the Icelandic Nurses Association (INA); and all female elementary school teachers listed with the Association

of Teachers in Primary and Lower Secondary Schools (ATPLSS).

A questionnaire was sent to all those who fulfilled the criteria of the study, with the exception of those sitting on the board of the ICCA, as they had been involved in the preparation of the study and had scrutinized the questionnaire beforehand. In total, 371 flight attendants met the given criteria. According to personal information from the ICCA, it is nowadays a prerequisite for seeking a job as a flight attendant to be at least 23 years of age and formal education should be the matriculation examination or a comparable qualification. According to the same source, the requirements of the airlines have changed, i.e. in former times female flight attendants used to be younger when hired and the educational requirements were not as high. They also had to resign from their job when they married or had children. Those who are now middle-aged are the first generation to have this job as a life-long career.

Approximately 94% of the nursing workforce in Iceland are members of the Icelandic Nurses Association (INA). A random sample of 600 nurses was taken from the registry of the INA, a total of 2312 nurses met the criteria. Nearly two-thirds of working registered nurses in Iceland today have completed a B.Sc. in nursing. After 1986, all Icelandic nurses have at least 4 years of study and practical experience before their graduation from university (B.Sc.); prior to 1986 it took three to four years in nursing school to attain a diploma in nursing.

A random sample of 600 teachers was taken from the registry of the ATPLSS, a total of 3368 teachers met the criteria. The education of teachers has changed as in the case of nurses, i.e. after 1971 teachers had on average three years of university education and practical training before their final examination (B. Ed.). For all these three groups education has thus changed considerably during the last decades, being now longer and more formal.

A questionnaire was mailed to all participants in April 2002. In June, all those who had not answered the questionnaire and could be reached received a reminding phone call, and in August the questionnaire was re-mailed to those not yet responding.

All got the same questionnaire with a few additional questions about the special work-environment for each group. The questionnaire included 91 (flight attendants), 87 (nurses), 89 (teachers) questions and was based on a number of questionnaires, e.g. one that has been used at the Department of Research & Occupational Health at the Institute of Occupational Safety

& Health in Iceland. That particular questionnaire is based on Nordic questionnaires [16,19]. Some questions were taken from American questionnaires that had been used before by one of the authors [30] while some questions had been used in a study on work conditions and well-being at work among Icelandic nurses [5].

All the questionnaires opened with questions on social-demographic background, e.g. age, residence, marital status, education, employment years, and percentage of full-time work. Then there were questions on the interaction of work and family life, on health and life-style, gynaecological and menstrual factors, sick-leave, treatments and symptoms, work-related factors, harassment at work, and working conditions. The dependent variables in this study were measured as follows: Daily smoking, yes/no. Do you drink alcohol, yes/no? If yes, then a seven-faceted question followed: (1–5 times a year; 6–10 times a year; monthly; 1–3 times a month; weekly; 2–4 times a week; almost daily). Eating concerns were measured by summation of four five-faceted questions. Respondents were asked how often they thought too much about food and overeating, how often they went on a diet, and the degree to which they considered themselves to have a weight problem. The answer scores were standardised by converting them into z-values prior to summation (Cronbach's Alpha = 0.77). Sleeping was measured by asking respondents about their average hours of sleep. Physical exercise ranged from never (lowest value) to daily (highest value). The question on sexual harassment was four-faceted: "Have you ever been exposed to sexual harassment at your work?" (Never; once; 2–3 times; more often). Violence was measured with a dichotomous variable coded "1" if the subject had been exposed to bullying, physical violence or threats (otherwise coded "0").

Self-assessed general health, physical well-being and psychological well-being ranged from bad (lowest value) to very good (highest value).

Regression models were used to estimate the mean differences among the occupational groups on life-style indicators, harassment, and self-assessed health, while statistically controlling for social-demographics. Furthermore, regression models were used to estimate the effects of life-style indicators, harassment and social-demographics on health indicators within the three occupational groups. All statistical effects reported below are partial effects, which means that all independent variables present in a model are controlled for. Ordinary least squares regression was used for scaled dependent variables (unstandardised coefficients are report-

ed) while logistic regression was used for dichotomous dependent variables (odds ratios are reported). The analysis was performed using the Statistical Package for the Social Sciences 10.0 software [29]. Throughout the analysis, independent variables were included into the equations using the "enter method" [10,31].

The National Bioethics Committee approved the study (VSN 01-26) and the Data Protection Commission was informed as required by law.

2. Results

Table 1 reports socio-demographic characteristics among the three different occupational groups. In all, 394 (66%) nurses, 415 (69%) teachers and 255 flight attendants (69%) answered the respective questionnaires. A higher proportion of flight attendants than nurses or teachers were smokers, i.e. smoked daily or more seldom, 26% vs. 15% and 17% respectively; and consumed alcohol at least once a week, 40% vs. 21% and 16%. Repeated sexual harassment at work was more common among the flight attendants, 31% vs. 8% and 4%; whereas bullying, physical violence and threats were less prevalent among the flight attendants (12%) than among nurses (19%). Flight attendants were on average somewhat taller, but weighed on average less, 63.8 kg vs. 72.4 kg and 72.7 kg, respectively.

Table 2 reports descriptive statistics for the variables used in the regression equations in Tables 3 and 4.

In Table 3 the indicators of lifestyle and harassment at work were regressed on occupation, controlling for age, employment time, residence and marital status. Flight attendants constituted the reference group. On average flight attendants consumed more often alcohol than the other groups. Alcohol consumption increased with longer employment time. Flight attendants exhibited less eating and weight concerns than nurses, while the difference between flight attendants and teachers was not significant. Flight attendants reported sleeping longer hours on average compared to teachers and nurses and exercised more on a regular basis than the other occupational groups. Flight attendants had a higher rate of exposure to repeated sexual harassment than the other groups, but they were less likely to be exposed to bullying, violence or threats. To be single was a risk factor for sexual harassment, to be divorced was associated with daily smoking and exposure to violence (Table 3). When flight attendants were asked if they found that the sexual harassment had had an adverse effect on their physical or psychological health, the majority of

Table 1
Socio-demographic characteristics among female nurses, teachers and flight attendants (FAs)

Socio-demographic characteristics	Nurses		Teachers		FAs		Significant mean differences*
Total no. of respondents (Answering rate)	394 (66%)		415 (69%)		255 (69%)		
	%		%		%		
Smoking, daily or more seldom	15		17		26		15 ≠ 26; 17 ≠ 26
Alcohol use once a week or more often	21		16		40		21 ≠ 40; 16 ≠ 40
Exercise at least once a week	76		71		80		71 ≠ 80
Sexual harassment (once)	10		4		8		10 ≠ 4
Sexual harassment (twice or more often)	8		4		31		8 ≠ 4; 31 ≠ 8; 31 ≠ 4
Bullying, physical violence, threats	19		16		12		19 ≠ 12
Urban living	72		55		96		72 ≠ 55; 72 ≠ 96; 55 ≠ 96
Married or co-habitant	84		80		83		
Divorced	8		7		8		
Single	7		11		7		
Widowed	1		2		2		
	Mean	SD	Mean	SD	Mean	SD	
Height in cm	168.1	5.4	168.3	5.4	169.3	4.7	168.1 ≠ 169.3; 168.3 ≠ 169.3
Weight in kilos	72.4	14.8	72.7	15.1	63.8	7.4	72.4 ≠ 63.8; 72.7 ≠ 63.8

*The column reports significantly unequal group means; $\alpha = 0.05$ (Two-tailed test, Bonferroni correction using a critical T-value of 2.39).

Table 2
Descriptive statistics for variables used in the regression analysis, ranges, means, standard deviations

	Range		Mean	Standard Deviation
	Min	Max		
Age in years	21	70	42.85	10.10
Years of employment	0.67	46.58	16.12	10.81
Alcohol use (never – almost daily)	0	7	2.94	1.79
Smoking (daily smoking = 1)	0	1	0.10	0.30
Summary scale for eating concerns (alpha = 0.77)	-7.70	7.78	-0.01	3.09
Exercise (daily – almost never)	1	5	3.23	1.14
Average hours of sleep	3.50	11	7.42	0.91
Self-assessed general health	1	4	3.29	0.72
Self-assessed physical well-being	1	4	3.05	0.76
Self-assessed psychological well-being	1	4	3.14	0.70

Note: Descriptive statistics are calculated prior to listwise deletion.

them said it had not had any such effect (not shown in a table).

In Table 4, the indicators of self-assessed general health and physical and psychological well-being were regressed on occupation and controls. The results show that flight attendants report significantly better general health and physical well-being than teachers, while the difference between flight attendants and nurses is not significant on any of these measures. General health and physical well-being tend to decline with age and those who were divorced assessed their psychological well-being significantly lower than others.

Finally, we regressed self-assessed health and well-being on life-style, harassment, and socio-demographic characteristics within each occupational group (Table 5). The main outcome was that daily smokers among flight attendants and nurses assessed their psychological well-being worse than others; con-

cern about eating and weight was related to worse general health and physical well-being among nurses and teachers. Also, repeated exposure to sexual harassment, bullying, violence or threats was related to less physical and psychological well-being in all the groups.

3. Discussion

Repeated exposure to sexual harassment, bullying, violence or threats at work was related to less physical and psychological well-being in all the occupational groups. Flight attendants were significantly the most likely to be exposed to repeated sexual harassment at work, they were also more likely than teachers or nurses to smoke and drink alcohol at least once a week; however, they exercised and slept more. Alcohol consumption increased with longer employment

Table 3

Indicators of life-style and harassment regressed on occupation while controlling for background characteristics. Unstandardized regression coefficients are reported for ordinary least squares regression models; odds ratios (OR) are reported for binary logistic regression models. Flight attendants used as the reference group

Independent variables	Dependent Variables						
	Ordinary least squares regression					Binary logistic regression	
	Alcohol use	Eating and weight concerns	Sleeping regular basis	Exercise on harassment	Sexual	Daily smoking	Violence
Occupation						OR	OR
Flight attendants	–	–	–	–	–	1.00	1.00
Teachers	–1.08**	0.21	–0.32**	–0.35**	–0.68**	0.86	3.00**
Nurses	–0.93**	0.63*	–0.27**	–0.20*	–0.57**	0.60	2.48**
Employment time	0.03**	0.01	0.003	0.00	0.00	1.02	1.00
Social-Demographic characteristics							
Age	–0.01	–0.02	–0.01	0.00	–0.00	1.00	0.99
Rural	–0.34**	0.43	0.16*	0.06	–0.06	0.67	0.61
Single	0.19	0.38	–0.16	0.22	0.20*	1.54	1.05
Widowed	–0.32	1.65*	–0.20	–0.19	–0.37	1.88	0.89
Divorced	–0.05	0.30	–0.12	0.04	0.14	3.03**	4.34**
Deviance statistic	–	–	–	–	–	594.67	592.25
Degrees of freedom	–	–	–	–	–	8	8
N	985	986	970	982	983	982	921

* $p < 0.05$; ** $p < 0.01$ (two-tailed test).

Table 4

Self-assessed health indicators regressed on occupation while controlling for social-demographic characteristics. Unstandardized regression coefficients are reported for ordinary least squares regression models. Flight attendants used as the reference group

Independent Variables	Dependent Variables		
	General health	Physical well-being	Psychological well-being
Occupation			
Flight attendants	–	–	–
Teachers	–0.18**	–0.17*	–0.06
Nurses	–0.08	–0.09	0.00
Employment time	0.00	0.01	0.00
Social-Demographic characteristics			
Age	–0.01*	–0.01*	–0.00
Rural	0.01	0.04	0.00
Single	–0.04	–0.01	–0.08
Widowed	0.14	0.01	–0.24
Divorced	–0.12	–0.13	–0.26**
N	984	985	988

* $p < 0.05$; ** $p < 0.01$ (two-tailed test).

time. Daily smokers among flight attendants and nurses assessed their psychological well-being worse than others. Teachers scored on average significantly lower than flight attendants on general health and physical well-being while nurses did not.

A noteworthy difference between the flight attendants and the other two groups was that flight attendants were more often exposed to sexual harassment. A qualitative study, aimed at identifying possible work-related sources of psychosocial stress among Italian flight attendants [2], was initiated as a follow-up to a mortality study that showed an unexpected increase in

suicide [3]. The participants in the qualitative study indicated that mental health was a major concern and several work-related risk factors, such as depression and anxiety, were highlighted [2]. As to the issue of sexual harassment, it was originally planned to be included in the Italian questionnaire, however, although many of the Italian flight attendants had been subjected to “advances”, there was no indication that they found these episodes particularly bothersome [2]. In the present study, the majority of the flight attendants that had been exposed to sexual harassment also confirmed it had not had any harmful effect on their health. However, ex-

Table 5

Self-assessed indicators of health and well-being regressed on life-style, harassment, and social-demographic characteristics within the three occupational groups. The table reports unstandardized regression coefficients from ordinary least squares regression

Independent variables	Dependent Variables								
	General health			Physical well-being			Psychological well-being		
	Nurses	Teachers	FAs	Nurses	Teachers	FAs	Nurses	Teachers	FAs
Employment time	-0.00	0.00	-0.01	0.01	0.01	0.01	0.00	0.01	0.02
Life-style									
Alcohol use	0.05*	-0.01	0.00	0.04	0.01	0.01	-0.00	0.02	0.02
Daily smoking	-0.04	-0.03	-0.02	-0.05	-0.05	-0.02	-0.07*	-0.05	-0.07*
Eating concerns	-0.03*	-0.03**	-0.02	-0.04**	-0.05**	-0.02	-0.02	-0.03*	0.01
Sleep	0.05	-0.01	0.13**	0.11*	0.01	0.13**	0.03	0.01	0.02
Exercise (daily – almost never)	0.11**	0.19**	0.14**	0.12**	0.17**	0.17**	0.06	0.08*	0.04
Harassment									
Sexual harassment (once)	-0.07	-0.25	0.11	-0.03	0.06	0.05	0.11	-0.40*	-0.02
Sexual harassment (more than once)	-0.04	-0.27	-0.18*	-0.00	-0.26	-0.12	-0.03	-0.35	-0.23*
Violence	-0.21	-0.15	-0.00	-0.33*	-0.11	-0.36	-0.26*	-0.06	-0.43*
Social-Demographic characteristics									
Age	-0.01	-0.01	0.01	-0.00	-0.01	-0.01	0.01	-0.00	-0.01
Rural	-0.00	0.03	-0.06	0.09	0.06	0.09	-0.04	0.07	-0.39
Single	-0.01	0.02	-0.05	-0.03	0.10	0.06	-0.12	0.07	-0.17
Widowed	0.18	-0.02	0.81*	-0.02	0.26	0.30	0.01	-0.49	-0.48
Divorced	0.18	-0.32*	-0.06	0.14	-0.10	-0.20	-0.06	-0.40*	-0.07
Adjusted R ²	0.06	0.12	0.13	0.10	0.11	0.16	0.04	0.07	0.04
Constant	2.76**	3.23**	2.01**	1.89**	2.91**	2.12**	2.71**	2.71**	3.27**
N	311	351	212	311	351	212	311	353	212

* $P < 0.05$; ** $p < 0.01$ (two-tailed).

posure to repeated sexual harassment had a negative statistical relationship with self-assessed general health and psychological well-being among them.

O'Hare and O'Donohue, who studied risk factors for sexual harassment experienced by the female faculty staff and students at a large Midwestern university in the USA, found that the risk factors most strongly associated with sexual harassment in the workplace were an unprofessional environment in the workplace, a sexist atmosphere, and a lack of knowledge about the organization's formal grievance procedures [21].

Nursing is said to have dealt with sexual harassment long before the term was coined during the 1970s and there are several publications on this [7]. It has been postulated that sexual harassment is a major workplace problem affecting 30–76% of nurses and nursing students [7]. In the light of this, the low percentage of Icelandic nurses that have experienced this nuisance is noteworthy. A possible explanation is a difference between groups and cultures as to how they define harassment. Some do not regard sexual jokes or teasing remarks as harassment while others do.

According to Icelandic legislation on safety and health in the workplace, managers are obliged to carry out risk assessment of the workplace as people have the right to a safe workplace environment that does not endanger their health. Since our results indicate that there is an interrelationship between having been harassed

twice or more often and less self-assessed general health and psychological well-being, managers should take sexual harassment into account when conducting workplace risk assessment. The European Union (EU) has called on its member states to take action to prevent sexual harassment at work, as well as dealing with its consequences. For this purpose the EU put forward a recommendation in 1991 on the protection of the dignity of women and men at work (92/131/EEC), followed by a code of practice on measures to combat sexual harassment in the workplace [9].

Hitherto, when the health and well-being of female flight attendants has been the subject of research, the focus has mainly been on exposure, i.e. circadian rhythm disruption and cosmic ionising radiation. The excess of breast cancer found among Icelandic flight attendants [27], though not convincingly confirmed in a collaborative study in eight European countries [36], might possibly have some explanation in their occupational related life-style, including alcohol consumption, which in some studies has been found to be related to breast cancer [28]. The smoking habits of the flight attendants is a risk for lung cancer; however, only an insignificant excess was found among those with twenty or more years of employment in the collaborative European study [36]. No case of lung cancer was found in the Icelandic study on cancer incidence among flight attendants [25]. In this connection it should be kept in

mind that the group has a mean age of 41 years and that lung cancer might have a long latency time.

That flight attendants exercise more, sleep more, are on average with a lower body mass index and are less worried about their weight possibly counteracts the negative influence of some other lifestyle factors.

The main weakness of this study is the well-known limitations of questionnaires with possible bias from rating behaviour and the possibility of recall bias [32].

4. Conclusion and recommendations

The study highlights different lifestyle patterns and harassment at work among three groups of working women that seem to influence their self-assessed health. Repeated exposure to sexual harassment, bullying, violence or threats at work was related to less physical and psychological well-being in all the occupational groups. Employers should take exposure to sexual harassment, bullying, violence and threats into account when they conduct workplace risk assessment. Teachers scored on average significantly lower than flight attendants on general health and physical well-being while nurses did not. Thus teachers deserve special attention in further studies.

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References

- [1] R. Aspholm, M.-L. Lindbohm, H. Paakkulainen, H. Taskinen, T. Nurminen and A. Tiitinen, Spontaneous abortions among Finnish flight attendants, *J Occup Environ Med* **41** (1999), 486–491.
- [2] T.J. Ballard, L. Corradi, L. Lauria, C. Mazzanti, G. Scaravelli, F. Sgorbissa, P. Romito and A. Verdecchia, Integrating qualitative methods into occupational health research: a study of women flight attendants, *Occup Environ Med* **61** (2004), 163–166.
- [3] T.J. Ballard, S. Lagorio, M. De Santis, G. De Angelis, M. Santaquilani, M. Caldora and A. Verdecchia, A retrospective cohort mortality study of Italian commercial airline cockpit crew and cabin attendants, 1965–1996, *Int J Occup Environ Health* **8** (2002), 87–96.
- [4] L. Bernstein, M. Allen, H. Anton-Culver, D. Deapen, P.L. Horn-Ross, D. Peel, R. Pinder, P. Reynolds, J. Sullivan-Halley, D. West, W. Wright, A. Ziogas and R.K. Ross, High breast cancer incidence rates among California teachers: results from the California Teachers Study (United States), *Cancer Causes Control* **13** (2002), 625–635.
- [5] P. Biering and H. Sveinsdóttir, Könnun á vinnuálagi og starfsánægju íslenskra hjúkrunarfræðinga, 3. hluti: Streita og álag (Working conditions and well-being at work among Icelandic nurses, Part 3. Stress and strain (in Icelandic)), Tímarit hjúkrunarfræðinga, *The Nurses' Journal* **77** (2001), 321–327.
- [6] P. Biering, Könnun á vinnuálagi og starfsánægju íslenskra hjúkrunarfræðinga, (Study on work strain and well being at work among Iceland nurses), (Report in Icelandic), Háskóli Íslands, Reykjavík, 2000.
- [7] G. Bronner, C. Peretz and M. Ehrenfeld, Sexual harassment of nurses and nursing students. Experience before and throughout the nursing career, *J Adv Nurs* **42** (2003), 637–644.
- [8] K.B. Chan, G. Lai, Y.C. Ko and K.W. Boey, Work stress among six professional groups: the Singapore experience, *Soc Sci Med* **50** (2000), 1415–1432.
- [9] European Union (home page on the Internet), Charter of Fundamental Rights of the European Union, Article 23, Equality between man and women, Available from: http://www.europarl.eu.int/comparl/libe/elsj/charter/art23/default_en.htm.
- [10] D.N. Gujarati, *Basic Econometrics*, McGraw-Hill, Inc, New York, 2000.
- [11] H. Gunnarsdottir and V. Rafnsson, Cancer incidence among Icelandic nurses, *J Occup Environ Med* **37** (1995), 307–312.
- [12] H. Gunnarsdottir and V. Rafnsson, Mortality among Icelandic nurses, *Scand J Work Environ Health* **21** (1995), 24–29.
- [13] H.K. Gunnarsdottir, G.L. Rafnsdóttir, B. Helgadóttir and K. Tomasson, Psychosocial risk factors for musculoskeletal symptoms among women working in geriatric care, *Am J Ind Med* **44** (2003), 679–684.
- [14] H. Hannerz, K. Albertsen and F. Tüchsen, Hospitalizations among teachers in Denmark, 1981–1997, *Int J Occup Environ Health* **15** (2002), 257–266.
- [15] A. Koustelios, Organizational factors as predictors of teachers' burnout, *Psychol Rep* **88** (2001), 627–634.
- [16] I. Kuorinka, B. Jonsson, A. Kilbom, H. Vinterberg, F. Biering-Sørensen, G. Andersson and K. Jørgensen, Standardised Nordic questionnaires for the analysis of musculoskeletal symptoms, *Appl Ergon* **18** (1987), 233–237.
- [17] M. Lagerström, T. Hansson and M. Hagberg, Work-related low-back problems in nursing, *Scand J Work Environ Health* **24** (1998), 449–464.
- [18] A. Lerchl, Flight attendants, breast cancer, and melatonin (letter), *The Lancet* **352** (1998), 1388–1389.
- [19] K. Lindström, A.-L. Elo, A. Skogstad, M. Dallner, F. Gamberale, V. Hottinen, S. Knardahl and E. Ørvede, General Nordic Questionnaire for Psychological and Social Factors at Work, TemaNord 2000:603. Nordic Council of Ministers, Copenhagen, 2000.
- [20] L.A. MacDonald, J.A. Deddens, B.A. Grajewski, E.A. Whelan and J.J. Hurrell, Job stress among female flight attendants, *J Occup Environ Med* **45** (2003), 703–714.
- [21] E.A. O'Hare and W. O'Donohue, Sexual harassment: identifying risk factors, *Arch Sex Behav* **27** (1998), 561–580.
- [22] B. Pingel and H. Robertsson, Hur mår vi? Analys av en enkät till kabinpersonalen på SAS (How are we? Analysis of a questionnaire for flight attendants at SAS (in Swedish)), Ar-

- betslvsrapport Nr. 2000:8, Arbetslivsinstitutet, (Stockholm), 2000.
- [23] M. Pollán and P. Gustavsson, High-risk occupations for breast cancer in the Swedish female working population, *Am J Public Health* **89** (1999), 875–881.
- [24] E. Pukkala, A. Auvinen and G. Wahlberg, Incidence of cancer among Finnish airline cabin attendants, 1967–1992, *BMJ* **311** (1995), 649–652.
- [25] V. Rafnsson, H. Tulinius, J.G. Jonasson and J. Hrafnkelsson, Risk of breast cancer in female flight attendants: a population-based study (Iceland), *Cancer Causes Control* **12** (2001), 95–101.
- [26] V. Rafnsson, J. Hrafnkelsson, H. Tulinius, B. Sigurgeirsson and J.H. Olafsson, Risk factors for cutaneous malignant melanoma among aircrews and a random sample of the population, *Occup Environ Med* **60** (2003), 815–820.
- [27] V. Rafnsson, P. Sulem, H. Tulinius and J. Hrafnkelsson, Breast cancer risk in airline cabin attendants: a nested case-control study in Iceland, *Occup Environ Med* **60** (2003), 807–809.
- [28] S.A. Smith-Warner, D. Spiegelman, S.-S. Yaun, P.A. van den Brandt, A.R. Folsom, A. Goldbohm, S. Graham, L. Holmberg, G.R. Howe, J.R. Marshall, A.B. Miller, J.D. Potter, F.E. Speizer, W.C. Willett, A. Wolk and D.J. Hunter, Alcohol and breast cancer in women: a pooled analysis of cohort studies, *JAMA* **279** (1998), 535–540.
- [29] SPSS, SPSS for Windows, User's Guide, In: 10.0 ed. Chicago, SPSS Inc, 1999.
- [30] H. Sveinsdottir, Premenstrual syndrome: A myth or reality in women's lives? A community study on premenstrual experiences in Icelandic women, Umeå University Medical Dissertations, New Series No 657, Umeå University, Umeå, 2000.
- [31] B.G. Tabachnick and L.S. Fidell, *Using Multivariate Statistics*, Allyn & Bacon, Boston, 2001.
- [32] A. Toomingas, L. Alfredsson and A. Kilbom, Possible bias from rating behavior when subjects rate both exposure and outcome, *Scand J Work Environ Health* **23** (1997), 370–377.
- [33] R. van Dick and U. Wagner, Stress and strain in teaching: a structural equation approach, *Br J Educ Psychol* **71** (2001), 243–259.
- [34] D. Vecchio, A.J. Sasco and C.I. Cann, Occupational risk in health care and research, *Am J Ind Med* **43** (2003), 369–397.
- [35] E.A. Whelan, Cancer incidence in airline cabin crew (editorial), *Occup Environ Med* **60** (2003), 805–806.
- [36] H. Zeeb, M. Blettner, I. Langner, G.P. Hammer, T.J. Ballard, M. Santaquilani, M. Gundestrup, H. Storm, T. Haldorsen, U. Tveten, N. Hammar, A. Linnarsjö, E. Velonakis, A. Tzonou, A. Auvinen, E. Pukkala, V. Rafnsson and J. Hrafnkelsson, Mortality from cancer and other causes among airline cabin attendants in Europe: a collaborative cohort study in eight countries, *Am J Epidemiol* **158** (2003), 35–46.