J Occup Health 2009; 51: 223–231

Journal of Occupational Health

Self-reported Health among Employees in Relation to Sex Segregation at Work Sites

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Abstract: Self-reported Health among Employees in Relation to Sex Segregation at Work Sites: Pia SVEDBERG, *et al*. Section of Personal Injury Prevention, Department of Clinical Neuroscience, Karolinska Institutet, Sweden—Objectives: Despite the high level of sex segregation of the labour market in Sweden and other countries, there is little knowledge on the association between sex segregation and ill-health. The aim of this study was to study associations between self-reported ill-health among women and men and the level of numerical sex segregation at their work sites and psychosocial work conditions. **Methods:** A cross-sectional questionnaire study was conducted among 10,000 employed persons in the County of Östergötland, Sweden. The questionnaire covered the level of numerical sex segregation at the work site, work organisation and conditions, ill-health, and demography. The proportions of individuals at sex-integrated and sex-segregated work sites reporting frequent ill-health symptoms were calculated and compared using Chi-square test statistics. Prevalence's of physical and psychosocial work aspects were calculated. Logistic regression models were used to assess the associations between sex segregation and other aspects of the work situation and health. **Results:** Among the men, 69% worked at male-dominated work sites, 16% at female-dominated, and 15% at sex-integrated work sites. Among the women, the equivalent rates were 8%, 75%, and 17%, respectively. Sex segregation was associated with all self-reported ill-health symptoms among the men, also when controlling for possible confounders. Other variables that were associated with self-reported ill-health symptoms were demands at work, negative expectations, and sickness presence. **Conclusions:** The present study generates sufficient findings to suggest that the link between sex segregation at work sites and ill-health is an important area that merits further attention.
(J Occup Health 2009; 51: 223–231)

Key words: Gender, Self-reported health, Sex-segregated work sites

The labour market in Sweden, as well as in other countries, is highly segregated with regard to different aspects such as social stratification[1, 2]. This segregation has been of interest both for political and scientific reasons, partly due to its demonstrated strong relationship with health[1, 3–6]. Another aspect of the labour-market segregation that has received little but now increasing attention during the last few years is that of sex[2, 4, 7–9]. It is well established that most occupations and organisations are partly, or to a great extent numerically dominated by one of the two sexes[2, 4, 7–9]. Consequently, the vast majority of employees work in sex-segregated jobs and/or work sites. However, we have a limited understanding of the extent to which sex segregation at work is associated with health. Previous studies have mainly focused on sex segregation of occupations, while the importance of sex segregation at work-sites has so far been overlooked.

To date, there have been few studies that have investigated health aspects for women and men in relation to the sex segregation of the labour-market[10–12]. These few studies indicate that there is an association between sex-segregated occupations and ill-health for both women and men. Both sexes in occupations that are sex-segregated seem to have higher levels of ill-health; conversely, better health is reported for those in the few occupations that are sex-integrated. Especially women in extremely male-dominated occupations have been shown to have higher levels of ill-health than others[10–13]. Still, the association between sex segregation of occupations and ill-health has been demonstrated when

Received Mar 8, 2008; Accepted Feb 7, 2009
Published online in J-STAGE Apr 1, 2009
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indicators of ill-health are based on self-reports[14], diagnosed by a physician[15], or reflected in the rates of sick leave[10, 11, 16, 17]. It has also been shown in relation to several diagnoses such as myocardial infarction[15], and sick leave due to musculoskeletal diagnoses[10], psychiatric diagnoses[18], pregnancy-related diagnoses[19], and cardiovascular disease[20].

Physical work demands of sex-segregated occupations might exceed those of sex-integrated occupations and could possibly cause adverse health outcomes for those individuals involved. Nonetheless, there is a great variation in physical demands of sex-segregated occupations; both female and male dominated, rather than a consistent trend[17]. For example, physical demands vary greatly between extremely male-dominated occupations such as carpenters, taxi drivers, police officers, construction workers, and engineers. Studies have also shown that sex-integrated occupations require at least high-school qualifications, which opens up the possibility of an effect of educational level, a factor long known as being positively correlated with health[21, 22], as an alternative explanatory variable. However, many sex-segregated occupations, such as engineers, also require higher education.

Moreover, the association between sex-segregated occupations and ill-health can be mediated by different work conditions in sex-segregated as opposed to sex-integrated occupations. It has also been suggested that there are variations in psychosocial aspects of the occupations[23]. One such aspect of psychosocial work conditions is social support. Previous studies have shown social support to be of importance for health[24]. It is possible that it is easier for both women and men to gain social support at sex-integrated jobs. If anything, it may be more difficult for women to gain social support in extremely male-dominated occupations and work sites[23]. A secretary works in an extremely female-dominated occupation (>90% women) but might be employed at an extremely male-dominated work site, for example, at a metal industry (<10% women). Hensing and colleagues found that women employed in production in the extremely male-dominated metal industry had very high sickness absence[25]. However, at a more detailed level, the women working in departments where women were in numerical majority had higher sickness absence than those in the male-dominated departments. Thus, it seems to be of importance to also study sex segregation at the work-site level. While previous studies have mainly focused on sex segregation of occupations, the present study focuses on sex segregation at work sites, and not on the sex segregation of occupations.

The aim of the present study was to investigate associations between self-reported ill-health among women and men, and the level of numerical sex segregation at their work sites, and psychosocial work conditions.

Materials and Methods

Study participants and questionnaire

A cross-sectional study of a random sample of 10,000 employed persons in three municipalities in the County of Östergötland, Sweden in May 2001, was performed using questionnaire data from the survey "Work and Health among Women and Men"[26]. The comprehensive questionnaire included established and validated instruments on e.g. health, symptoms, demographics, and level of sex segregation at the work site. The questionnaire was first tested in two pilot studies in other municipalities within the same county. The questionnaire was mailed to the eligible study participants and non-responders were reminded on five occasions, both through mail and by a telephone call. In total, 4,965 individuals responded, whereof 55% were women (n=2,746). Age ranged between 18 to 62 yr (mean age=42 yr) and the characteristics of the sample are presented in Table 1. The study was approved of by the Regional Ethical Committee of Linköping.

Measures

The indicators of ill-health and symptoms during the last three months were based on self-reports and are presented in Table 2. All health-related variables were dichotomised to contrast the most negative category, that is, the individuals who reported frequent symptoms, with those who reported less frequent or no symptoms. A series of items reflecting the nature of the work environment at the work site were included: *physical demands at work*; if the subject had been *at work many times in spite of illness*, e.g. sickness presence; if there were *bullying at work*; if the subject had *negative expectations* in the sense of expecting matters to worsen rather than improve; if *social support by superiors* was considered poor; and if there were *sexual harassment* or *threats of violence* at the workplace. Responses to the items were dichotomised.

The measure of sex segregation was based on self-report. The participants were asked about the ratio of women and men at their current work site: 1) more than 60% women, 2) sex-integrated, or 3) more than 60% men.

Statistical analysis

The proportions of individuals in sex-integrated, male- or female-dominated work sites, respectively, who rated themselves as having frequent symptoms of the various kinds were calculated and compared using Chi-square tests for significance for women and men separately.

Prevalences of physical and psychosocial aspects at work, including physical demands, sickness presence, bullying at the workplace, and an index of negative expectations on the future work situation, poor social

Table 1. Characteristics including sample distribution (%) and questionnaire response (%) of the study population, 10,000 persons aged 18–62 yr from the County of Östergötland, Sweden

Variables	N	% Sample	% Responders
All	10,000		
Gender			
Male	5,102	51.0	44.7
Female	4,898	49.0	55.3
Age groups			
18–25 yr old	1,481	14.8	12.2
25–34 yr old	2,242	22.4	19.5
35–44 yr old	2,266	22.7	23.3
45–54 yr old	2,367	23.7	25.9
55–62 yr old	1,600	16.0	18.9
Individual missing in register file[a]	44	0.4	0.2
Number of days in unemployment			
0–7 days	8,118	81.2	83.3
More than 7 days	1,815	18.2	16.2
Individual missing in register file[a]	67	0.7	0.4
Number of sources of income			
0 sources of income	1,780	17.8	13.3
At least 1 source of income	8,153	81.5	86.2
Individual missing in register file[a]	67	0.7	0.4
Civil status			
Unmarried	4,287	42.9	36.9
Married	4,412	44.1	49.5
Divorced or widow/widower	1,234	12.3	13.1
Individual missing in register file[a]	67	0.7	0.4
Disposal income (individualized from the family)			
Less than 73,999 SEK	1,998	20.0	15.9
74,000 to 91,999 SEK	1,941	19.4	19.3
92,000 to 112,999 SEK	2,018	20.2	20.7
113,000 to 141,999 SEK	1,997	20.0	22.1
142,000 SEK or more	1,979	19.8	21.6
Individual missing in register file[a]	67	0.7	0.4
Family type			
Living alone	3,987	39.9	36.0
Living together (children not included)	5,946	59.5	63.6
Individual missing in register file[a]	67	0.7	0.4
Highest educational level			
Compulsory school	2,654	26.5	22.6
High school	5,563	55.6	56.6
University	1,607	16.1	19.8
Individual missing in register file[a]	176	1.8	1.0
Country of birth			
The Nordic countries	8,940	89.4	93.0
Other countries	1,016	10.2	6.8
Individual missing in register file[a]	44	0.4	0.2

[a]Data from Statistics Sweden.

Table 2. Percent (%) of men (n=1,392) reporting ill-health symptoms for different levels of numerical sex segregation at work sites

Symptom	Type of sex segregation/integration at work site			
	Male-dominated	Sex-integrated	Female-dominated	*p*
Tired	24.4	29.6	34.7	0.005
Heavy headed	7.4	7.8	13.1	0.02
Headaches	6.1	4.9	7.0	ns
Concentration difficulties	1.0	1.5	3.3	0.001
Dizzy spells	1.9	0	1.4	ns
Shortness of breath	4.0	5.4	3.8	ns
Sleeping problems	9.7	10.7	19.6	0.001
Palpitations	1.8	2.4	3.8	ns
Gastric symptoms	4.5	8.8	11.3	0.001
Colds	1.8	2.4	3.2	ns
Coughs	3.2	2.9	3.7	ns
As healthy as others	8.6	9.4	9.5	ns
Expect health to get worse	2.5	3.4	3.7	ns
Health is excellent	8.0	9.3	12.3	ns

support by superiors, sexual harassment, and threats of violence in the work situation were calculated. The proportions were compared between the three types of work sites using Chi-square analysis for men and women separately. Logistic regression models were used to assess the associations between ill-health symptoms, other aspects of the work situation that might affect health, and numerical sex segregation at the work site. Crude odds ratios (OR) and 95% confidence intervals (CI) were first calculated for sex segregation and all variables representing aspects of the psychosocial work environment for each health outcome that had been shown to be related to sex segregation. Only those variables that showed a significant association were included in the logistic regression models. In order to examine if the non-response influenced the results, the logistic regression models were analysed both with the unweighted data as well as with inclusion of a weight constructed to account for non-response. Dropout analysis showed that the non-response was not randomly distributed; consequently weights for sub-groups were created in order to compensate for the uneven response rate. The weighted analyses can be considered to be a reflection of the "true" situation, if a full response rate had been achieved.

Results

Among the 1,392 men responding to the question, 69.3% worked at a male-dominated work site, 15.7% at female-dominated work sites, and 15% worked at sex-integrated work sites. Among the 1,881 women responding to the question, 8.5% worked at male-dominated, 74.7% at female-dominated, and 16.7% at sex-integrated work sites. Few older men (≥55 yr) were found at female-dominated work sites as compared to sex-integrated or male-dominated work sites (18% compared to 15.6% and 66.5%, respectively). For women above 55 yr of age, the opposite pattern was observed, i.e. 73.8% worked at female-dominated, 18.6% at sex-integrated, and 7.5% at male-dominated work sites.

Statistically significant prevalence differences of self-reported symptoms for men at male-dominated, sex-integrated, and female-dominated work sites were found. Among men (47) there were indications that those at female-dominated work sites reported more health problems than those at sex-integrated or male-dominated work sites (Table 2). There were statistically significant differences for feeling tired, feeling heavy headed, having difficulties concentrating, sleeping problems, and gastric symptoms. Twice as many men working at female-dominated work sites reported feeling heavy headed, having sleeping problem, gastric symptoms, and four times as many reported concentration difficulties.

For women, there were no statistically significant differences in rate reporting symptoms (Table 3). Overall, a higher proportion of the women than of the men reported symptoms, both in general and at the work sites where they were in a minority, with the large exception of sleeping problems. One fifth of the men at female-dominated work sites reported this symptom. Also, there were large differences among both women and men in how frequent different types of symptoms were. For instance, feeling tired was very common, while concentration difficulties were less frequent.

Both women and men at male- and female-dominated

Table 3. Percent (%) women (n=1,881) reporting ill-health symptoms for different levels of numerical sex segregation at work sites

Symptom	Type of sex segregation/integration at work site			
	Male-dominated	Sex-integrated	Female-dominated	*p*
Tired	42.6	44.2	40.6	ns
Heavy headed	20.1	16.1	16.6	ns
Headaches	16.9	17.1	15.7	ns
Concentration difficulties	3.0	4.5	3.2	ns
Dizzy spells	3.9	6.2	3.9	ns
Shortness of breath	5.2	4.3	4.9	ns
Sleeping problems	11.0	15.9	15.0	ns
Palpitations	2.6	5.6	6.2	ns
Gastric symptoms	8.6	6.2	8.9	ns
Colds	5.2	4.2	3.0	ns
Coughs	5.8	4.9	4.3	ns
As healthy as the next person	9.3	7.8	12.9	ns
Expect health to get worse	2.6	1.9	2.0	ns
Health is excellent	14.5	7.6	12.5	ns

Table 4. Prevalences of aspects of the work situation in different levels of numerical sex segregation at work sites, reported by men and women, respectively (frequency of yes responses in parenthesis)

Aspect of work situation	Type of sex segregation/integration at work site			
Men	Male-dominated	Sex-integrated	Female-dominated	*p*
Physical demands at work	68.8 (634)	68.5 (135)	61.4 (132)	ns
Sickness presence	9.4 (90)	6.8 (14)	10.1 (22)	ns
Bullying at work	9.7 (91)	10.8 (22)	12.3 (26)	ns
Negative expectations[a]	22.4 (213)	15.0 (31)	20.7 (45)	0.06
Poor social support by superiors	53.9 (493)	56.9 (111)	60.3 (123)	ns
Sexual harassments	0.6 (6)	0.5 (1)	5.2 (11)	0.001
Threats of violence	9.2 (87)	15.7 (32)	32.7 (69)	0.001
Women	Male-dominated	Sex-integrated	Female-dominated	*p*
Physical demands at work	67.5 (104)	62.0 (183)	64.7 (859)	ns
Sickness presence	10.7 (17)	12.5 (39)	10.5 (145)	ns
Bullying at work	16.6 (26)	16.7 (51)	11.1 (152)	0.01
Negative expectations[a]	35.7 (56)	25.6 (79)	28.0 (385)	0.06
Poor social support by superiors	57.5 (88)	55.2 (165)	57.8 (779)	ns
Sexual harassments	4.4 (7)	2.9 (9)	2.5 (35)	ns
Threats of violence	9.5 (15)	13.5 (42)	28.3 (389)	0.001

[a]Having negative expectations in the sense of expecting matters at work to worsen rather than to improve.

work sites reported negative expectations and experienced threats of violence to a greater extent than the women and men at sex-integrated work sites (Table 4). A higher proportion of the men at female-dominated work sites also reported sexual harassments and threats of violence compared to those at sex-integrated or male-dominated work sites.

A considerably higher proportion of women experienced threats of violence at the female-dominated workplaces as compared to the other two categories (Table 4). Hardly any men experienced sexual harassments in the male-dominated work sites, while a higher proportion of the women at male-dominated, compared to the female-dominated work sites, reported this. Overall, women

Table 5. Unweighted and weighed odds ratios (OR) and 95% confidence intervals (CI) for the associations between health outcomes and work related factors including sex segregation at work site for men

		Unweighted		Weighted	
Outcomes	Factors / Reference	OR	95% CI	OR	95% CI
Tired	Sex segregation / *Sex integrated work sites*	1.35	1.14–1.60	1.35	1.31–1.40
	Physical demands at work / *No*	2.58	1.97–3.36	2.60	2.45–2.76
	Bullying at work / *No*	1.65	1.11–2.44	1.64	1.50–1.79
	Negative expectations / *No*	2.17	1.60–2.94	2.04	1.90–2.18
Heavy head	Sex segregation / *Sex integrated work sites*	1.40	1.09–1.79	1.44	1.37–1.52
	Physical demands at work / *No*	2.58	1.68–3.98	2.69	2.45–2.96
	Sickness presence / *No*	2.05	1.19–3.56	2.27	2.02–2.56
	Negative expectations / *No*	2.67	1.73–4.14	2.28	2.07–2.51
Difficulties concentrating	Sex segregation / *Sex integrated work sites*	1.96	1.16–3.29	2.11	1.89–2.36
	Physical demands at work / *No*	3.25	1.24–8.48	2.83	2.30–3.48
Gastric symptoms	Sex segregation / *Sex integrated work sites*	1.64	1.26–2.12	1.77	1.67–1.87
	Sickness presence /*No*	2.32	1.27–4.26	2.55	2.24–2.90
	Bullying at work / *No*	2.09	1.16–3.77	1.77	1.55–2.04
Sleeping problems	Sex segregation / *Sex integrated work sites*	1.52	1.22–1.88	1.53	1.46–1.60
	Physical demands at work / *No*	2.17	1.50–3.15	2.06	1.90–2.23
	Sickness presence / *No*	2.34	1.44–3.80	2.28	2.06–2.54
	Negative expectations / *No*	2.71	1.85–3.98	2.81	2.59–3.05

experienced more negative exposures than men at their work sites.

There were no significant differences among the women with regard to symptoms. Also, the logistic regression analysis yielded no statistically significant associations for women; therefore, results from the logistic regression analysis are presented for men only. All the included types of health indicators were associated with sex segregation at work sites as compared to sex-integrated work sites for the men, and also after inclusion of the other work-situation variables that were entered into the final logistic regression models (Table 5). The other variables that were associated with self-reported symptoms were demands at work, negative expectations, and sickness presence. Although there were differences in the magnitude of effects between the unweighted and weighted analyses, the overall results were similar and all effects remained statistically significant when repeated using the weighted data, i.e., accounting for missing data.

Discussion

In this study we found an association between numerical sex segregation at work sites and self-reported ill-health symptoms for men. These associations were unaffected when adjusted for potentially confounding aspects of the work situation. Other aspects of importance for self-reported ill-health symptoms were: demands at work, negative expectations of the work, bullying at work, and sickness presence.

The present study sample followed expectations regarding the relative sex-integration at subjects' immediate work site, with males predominantly found at male-dominated work sites and women at female-dominated work sites[28]. Our results are also in line with some previous observations in the literature. There have been indications that women and men within occupations that are sex-integrated seem to have better health than those in occupations that are sex-segregated, an effect that seems to be accentuated when the occupation is extremely segregated[10, 11, 27, 28]. Until now, few studies on association between sex segregation at work sites and ill-health have been conducted—most studies have focused on sex segregation of occupations. We found very few consistent results that women at female- or male-dominated work sites report more ill-health symptoms than women at sex-integrated workplaces. So far there are lacks of studies on this, with one exception, reporting high sickness absence among women employed in the

male-dominated metal industry[25]. However, among the men in the present study several ill-health symptoms were significantly more frequent among men at female-dominated work sites. In fact, twice as many men at female-dominated work sites, compared to men at other types at work sites, reported feelings of being heavy headed, having sleeping problems, gastric symptoms, and four times as many reported concentration problems. For the women, patterns were far less consistent with smaller differences between groups and none that were statistically significant.

There could be at least two different explanations for these higher levels of health symptoms among the men at female-dominated work sites as compared to men at male-dominated or sex-integrated work sites. First, working at a female-dominated work site may be associated with stressors in its own right. For instance, men might systematically be “forced” to do the heaviest work tasks or in several ways be expected to have other competences than women. One could speculate that men who work at a female-dominated work site such as a day care centre experience expectations of being very technical, even if they are not. They might find that it is hard for them to fulfil these expectations. This might be related to the fact that more men than women report physical work demands; in turn this might be negatively associated with health. Second, there may be confounding variables, such as known physical and psychosocial risk factors, that are more prevalent at female-dominated work sites.

One could also speculate that men at female-dominated work sites experience similar levels of symptoms as other men, but that they are more inclined to report them, alternatively that men with poorer health are selected into female-dominated work environments, something rarely studied but found in one prospective study[15]. Östlin and co-authors found a negative health selection of men in the extremely female-dominated secretarial occupation[15]. Due to the cross-sectional design of the present study such aspects could not be elucidated.

Yet another potential explanation is that the present study did not exhaust the source of confounders. Perhaps the most relevant candidate here is the social status attached to different occupations and work sites, where female-dominated occupations and work sites typically have lower status than male-dominated and sex-integrated ones[30–32]. The social status associated with an occupation might affect self esteem and sense of ones own value in ways that have implications for health. On the other hand, men in female-dominated jobs often experience the phenomenon of “glass elevator”, i.e., that they are pushed upwards in the organisational hierarchy, which might reduce at least some of the influence of low social status of the occupation[26, 32]. However, exploring this hypothesis, and accounting for the way in which it impinges on health at work-sites, lied beyond the scope of the present study.

It is equally difficult to resolve why we did not find parallel observations for women as for men. There are, of course, many different explanations to the discrepancies between the present and other studies. One of potential relevance appears to be the question of the definition, or conceptualisation, of sex segregation. Thus, it could be that the previously observed relationship holds, but is linked to sex segregation in terms of occupations and not to the work site. This in turn may be linked to the fact that female-dominated occupations have considerably lower average salaries than male-dominated or sex-integrated occupations[33, 34]. There is no doubt that an insufficient income limits the choices available in life and therefore it may have an important effect on various health aspects. These mechanisms are generally, but not exclusively, tied to occupations rather than work site. It is possible that there are different mechanisms operating for workplaces and occupations.

Limitations and strengths

The major limitation of the present study was the relatively low response rate. A strength is that we, through Statistics Sweden which did the random selection of the study population, provided data that made good non-response analysis possible. The data shows that more elderly than young, more women than men, more high than low educated, and more persons born in the Nordic countries than in other countries, responded. However, since the dropout analysis showed that the non-response was non-randomly distributed, weights for sub-groups were created in order to compensate for the uneven response rate. The weights were based on register information from Statistics Sweden, from the Swedish longitudinal data base of education, income, and occupation (LOUISE), which is a longitudinal register of the entire Swedish population. The weighted analyses can be considered to be a reflection of the “true” situation, if a full response rate had been achieved. Although there were differences in the magnitude of effects between the unweighted and weighted analyses, the overall results were similar and all effects remained statistically significant when repeated using the weighted data, i.e., accounting for missing data. The cross-sectional study design means that no interpretation of causal relations can be drawn. Another concern with this type of study is that we rely on self-reports. Self-rated health is by its nature such that self-report is the only valid and possible way to obtain information[35]. For health symptoms though, it would have been better to have been able to verify symptoms and diseases with physical examinations. The multiple comparisons can also imply a risk that some of our findings are caused by chance, because of the high number of variables analyzed.

However, all variables in the questionnaire were motivated by the hypotheses at the start.

The strengths of this study are the large number of participants, the good quality of register data which also enabled the drop-out analyses to be performed, and the broad number and types of variables included.

Conclusion

In spite of the non-significant findings for the women, the present study generates sufficient findings for men to suggest that the association between sex segregation at work site and ill-health symptoms is an important area that merits further attention.

Acknowledgments: This study was financially supported by The National Institute for Working Life and by the Swedish Council for Working Life and Social research.

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