

Supplementary material

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Work environment questions and distribution of answers

Table a: Work environment questions, response categories, scoring, and distribution of answers from N=27 678 employees

Physical work environment						
Back twisted or bend	How much of your time at work do you work with your back twisted or doubled over without supporting yourself with your hands or arms?					
Response categories and score	Almost all the time; score =1	Approx. 3/4 of the time; score =1	Approx. 1/2 of the time; score =1	Approx. 1/4 of the time; score =1	Rarely; score =0	Never; score =0
Response distribution in %	3	3.6	5.6	11.9	36.3	39.7
Lifting or carrying	How much of your time at work do you carry or lift objects?					
Response categories and score	Almost all the time; score =1	Approx. 3/4 of the time; score =1	Approx. 1/2 of the time; score =1	Approx. 1/4 of the time; score =1	Rarely; score =0	Never; score =0
Response distribution in %	2.5	2.7	4.8	14.2	34.9	40.9
Wet hands	How much of your time at work do you have wet or moist hands?					
Response categories and score	Almost all the time; score =1	Approx. 3/4 of the time; score =1	Approx. 1/2 of the time; score =1	Approx. 1/4 of the time; score =1	Rarely; score =0	Never; score =0
Response distribution in %	3.1	3	4.5	9.7	23.2	56.6
Psychosocial work environment						
Influence	a: How often do you have a say in how you complete your work tasks? b: How often do you have a say in when you complete your work tasks?					
Response categories and score	Always; score =0	Often; score =0.25	Sometimes; score =0.5	Rarely; score =0.75	Never; score =1.0	
a: Response distribution in %	45.3	42.7	9.6	1.9	0.5	
b: Response distribution in %	28.1	45.8	17.6	6.6	1.9	
Role conflicts	How often are you exposed to conflicting demands at work?					
Response categories and score	Always; score =1.0	Often; score =0.75	Sometimes; score =0.5	Rarely; score =0.25	Never; score =0	
Response distribution in %	3.9	17.5	37.2	33.8	7.6	
Bullying	In the last 12 months have you been subjected to bullying at your work place?					
Response categories and score	Yes. daily; score =1	Yes. weekly; score =1	Yes. monthly; score =1	Yes. more seldom; score =1	No. never; score =0	
Response distribution in %	0.6	1.4	1.7	7.8	88.6	

Hazard ratios from a sensitivity analysis on a weighted population that simulate a representative population of Danish employees

Table b: Weighted population: Hazard ratio's for physical and psychosocial work environment factors and SA episodes ≥ 1 day, ≥ 6 days, and episodes ≥ 21 days.

Physical work environment	SA episodes ≥ 1 day			SA episodes ≥ 6 days			SA episodes ≥ 21 days		
	HR	CI	p-value	HR	CI	p-value	HR	CI	p-value
Physical work environment									
Model 1 partly adjusted *									
Women N=16350									
Back bend or twisted	1.09	[1.01-1.17]	0.02	1.47	[1.24-1.75]	0.00001	1.22	[1.02-1.45]	0.03
Lifting or carrying	1.03	[0.96-1.11]	0.37	1.39	[1.16-1.67]	0.0004	1.31	[1.09-1.56]	0.004
Wet hands	1.06	[0.99-1.14]	0.11	1.49	[1.22-1.81]	0.00007	1.18	[1.02-1.37]	0.03
Men N=11322									
Back bend or twisted	1.19	[1.07-1.32]	0.001	1.69	[1.38-2.08]	<0.00001	1.77	[1.17-2.69]	0.007
Lifting or carrying	1.13	[1.03-1.25]	0.01	1.84	[1.54-2.20]	<0.00001	2.05	[1.50-2.79]	0.00001
Wet hands	1.19	[1.07-1.33]	0.001	1.59	[1.28-1.98]	0.00003	1.59	[1.04-2.42]	0.03
Model 2 fully adjusted **									
Women N=13571									
Back bend or twisted	1.01	[0.94-1.08]	0.84	1.28	[1.09-1.50]	0.002	1.03	[0.85-1.24]	0.80
Lifting or carrying	1.01	[0.93-1.08]	0.89	1.31	[1.10-1.57]	0.003	1.20	[0.99-1.47]	0.07
Wet hands	1.01	[0.94-1.09]	0.82	1.33	[1.10-1.61]	0.003	0.98	[0.83-1.16]	0.82
Men N=9340									
Back bend or twisted	1.01	[0.91-1.13]	0.85	1.47	[1.14-1.89]	0.003	1.42	[0.83-2.43]	0.20
Lifting or carrying	1.01	[0.91-1.12]	0.90	1.66	[1.35-2.03]	<0.00001	1.92	[1.37-2.69]	0.0002
Wet hands	1.05	[0.94-1.17]	0.36	1.31	[1.02-1.69]	0.04	1.49	[0.92-2.39]	0.10
Psychosocial work environment									
Model 1 partly adjusted *									
Women N=16350									
Poor influence	1.63	[1.35-1.96]	<0.00001	2.65	[1.66-4.23]	0.00004	2.29	[1.48-3.52]	0.0002
Role conflicts	1.29	[1.14-1.47]	0.00005	1.98	[1.39-2.84]	0.0002	2.05	[1.51-2.76]	<0.00001
Bullying ***	1.28	[1.17-1.41]	<0.00001	1.52	[1.27-1.82]	0.00001	-		
Men N=11322									
Poor influence	1.80	[1.45-2.22]	<0.00001	2.02	[1.35-3.02]	0.0006	1.34	[0.60-2.99]	0.47
Role conflicts	1.22	[1.04-1.44]	0.02	1.26	[0.88-1.80]	0.21	1.10	[0.55-2.21]	0.79
Bullying ***	1.34	[1.20-1.49]	<0.00001	1.73	[1.39-2.16]	<0.00001	-		
Model 2 fully adjusted **									
Women N=13571									
Poor influence	1.43	[1.18-1.74]	0.0004	2.03	[1.27-3.26]	0.003	1.79	[1.09-2.91]	0.02
Role conflicts	1.19	[1.05-1.36]	0.008	1.65	[1.13-2.41]	0.009	1.67	[1.17-2.38]	0.005
Bullying ***	1.16	[1.05-1.28]	0.005	1.30	[1.04-1.62]	0.02	-		
Men N=9340									
Poor influence	1.41	[1.13-1.75]	0.002	1.69	[1.10-2.62]	0.02	1.21	[0.54-2.74]	0.64
Role conflicts	1.15	[0.97-1.36]	0.11	1.26	[0.85-1.87]	0.24	1.33	[0.65-2.71]	0.44
Bullying ***	1.10	[0.99-1.22]	0.09	1.19	[0.93-1.53]	0.18	-		

* adjusted for age, education, private/public sector, and survey-round.

** additionally adjusted as previous model plus depression, eczema, back disease, other chronic illness, SA in 2 months up to baseline, smoking, exercise, plus physical work environment factors are adjusted for psychosocial work environment, and psychosocial work environment factors are adjusted for physical work environment.

*** 'Bullying' did not fulfill the proportional hazard assumption in analyses with SA episodes ≥ 21 days and is therefore not shown.

How we performed the weighted analyses

The analyses are performed as in the main paper except in the above analysis we included weights. Both the WEHD and the RoWA provided model-assisted weights for their data. The weights adjust for un-even sampling and non-response in population. Both the WEHD survey and the RoWA weights are generalized regression estimated (GREG) weights¹ calculated by the CLAN software². For our analyses, we multiplied the WEHD weights with the RoWA weights to get combined weights. To avoid excessive variance (due to the multiplication), we trimmed the resulting weights. Several methods of trimming exist³, for this study a mild trimming was applied. Weights higher than the 98.5% percentile were marked. We divided data into groups depending on sex, age, sector, and education. In each group, we 'trimmed' weights by taking marked weights and equally many of the lowest weights, calculating their average value, and then assigning this average value as their new weight. We performed regression-analyses with SAS 9.4 'proc surveyPHreg'.

- 1 Cassel CMS, CE; Wretman, J.H. *Foundations of Inference in Survey Sampling*. New York: Wiley, 1977.
- 2 Andersson C, Nordberg L. *A user's guide to CLAN 97. A SAS-program for computation of point- and standard error estimates in sample surveys*: Statistics Sweden (Statistiska centralbyrån), 1998.
- 3 Elliott MR. Model Averaging Methods for Weight Trimming. *J Off Stat* 2008;24:517-540.

Hazard ratios from a sensitivity analysis only on public employees

Table c: Public employees: Hazard ratio's for physical and psychosocial work environment factors and SA episodes ≥ 1 day, ≥ 6 days, and episodes ≥ 21 days.

Physical work environment	SA episodes ≥ 1 day			SA episodes ≥ 6 days			SA episodes ≥ 21 days		
	HR	CI	p-value	HR	CI	p-value	HR	CI	p-value
Physical work environment									
Model 1 partly adjusted *									
Women N=11827									
Back bend or twisted	1.11	[1.08-1.13]	<0.00001	1.33	[1.25-1.42]	<0.00001	1.25	[1.12-1.40]	0.00004
Lifting or carrying	1.08	[1.05-1.10]	<0.00001	1.29	[1.21-1.37]	<0.00001	1.36	[1.21-1.52]	<0.00001
Wet hands	1.08	[1.06-1.11]	<0.00001	1.34	[1.26-1.43]	<0.00001	1.24	[1.12-1.38]	0.00008
Men N=4506									
Back bend or twisted	1.15	[1.09-1.22]	<0.00001	1.73	[1.50-2.00]	<0.00001	1.50	[1.13-2.00]	0.005
Lifting or carrying	1.08	[1.02-1.14]	0.007	1.60	[1.38-1.85]	<0.00001	1.59	[1.20-2.12]	0.001
Wet hands	1.23	[1.16-1.31]	<0.00001	1.45	[1.23-1.72]	0.00001	1.22	[0.86-1.72]	0.26
Model 2 fully adjusted **									
Women N=9876									
Back bend or twisted	1.01	[0.99-1.04]	0.31	1.18	[1.10-1.27]	<0.00001	1.14	[1.01-1.28]	0.04
Lifting or carrying	1.04	[1.01-1.07]	0.007	1.23	[1.15-1.33]	<0.00001	1.29	[1.14-1.46]	0.00006
Wet hands	1.00	[0.98-1.03]	0.81	1.21	[1.13-1.30]	<0.00001	1.08	[0.96-1.22]	0.20
Men N=3832									
Back bend or twisted	1.00	[0.94-1.07]	0.88	1.43	[1.21-1.68]	0.00003	1.24	[0.89-1.73]	0.21
Lifting or carrying	0.96	[0.90-1.02]	0.18	1.36	[1.15-1.61]	0.0003	1.39	[1.00-1.92]	0.05
Wet hands	1.04	[0.98-1.12]	0.21	1.05	[0.87-1.28]	0.60	0.81	[0.53-1.23]	0.33
Psychosocial work environment									
Model 1 partly adjusted *									
Women N=11827									
Poor influence	1.67	[1.58-1.77]	<0.00001	1.79	[1.54-2.09]	<0.00001	1.85	[1.43-2.40]	<0.00001
Role conflicts	1.37	[1.31-1.43]	<0.00001	1.65	[1.46-1.86]	<0.00001	2.04	[1.66-2.51]	<0.00001
Bullying ***	1.36	[1.32-1.40]	<0.00001	1.54	[1.43-1.66]	<0.00001	-		
Men N=4506									
Poor influence	2.32	[2.08-2.58]	<0.00001	2.6	[1.89-3.56]	<0.00001	1.57	[0.83-2.98]	0.17
Role conflicts	1.22	[1.12-1.32]	<0.00001	1.41	[1.10-1.81]	0.007	1.02	[0.63-1.66]	0.93
Bullying ***	1.45	[1.37-1.53]	<0.00001	1.68	[1.43-1.96]	<0.00001	-		
Model 2 fully adjusted **									
Women N=9876									
Poor influence	1.46	[1.37-1.55]	<0.00001	1.29	[1.09-1.54]	0.004	1.28	[0.95-1.71]	0.10
Role conflicts	1.22	[1.16-1.28]	<0.00001	1.32	[1.15-1.51]	0.0001	1.64	[1.30-2.08]	0.00003
Bullying ***	1.21	[1.17-1.25]	<0.00001	1.33	[1.22-1.44]	<0.00001	-		
Men N=3832									
Poor influence	1.84	[1.64-2.08]	<0.00001	1.81	[1.27-2.58]	0.001	1.07	[0.52-2.21]	0.85
Role conflicts	1.13	[1.03-1.24]	0.01	1.32	[1.00-1.74]	0.05	1.05	[0.61-1.80]	0.87
Bullying ***	1.33	[1.25-1.42]	<0.00001	1.40	[1.17-1.67]	0.0003	-		

* adjusted for age, education, private/public sector, and survey-round.

** additionally adjusted as previous model plus depression, eczema, back disease, other chronic illness. SA in 2 months up to baseline, smoking, exercise, plus physical work environment factors are adjusted for psychosocial work environment, and psychosocial work environment factors are adjusted for physical work environment.

*** 'Bullying' did not fulfill the proportional hazard assumption in analyses with SA episodes ≥ 21 days and is therefore not shown.

Hazard ratios from a sensitivity analysis only on private employees

Table d: Private employees: Hazard ratios for physical and psychosocial work environment factors and SA episodes ≥ 1 day, ≥ 6 days, and episodes ≥ 21 days.

Physical work environment	SA episodes ≥ 1 day			SA episodes ≥ 6 days			SA episodes ≥ 21 days		
	HR	CI	p-value	HR	CI	p-value	HR	CI	p-value
Physical work environment									
Model 1 partly adjusted *									
Women N=4945									
Back bend or twisted	1.12	[1.07-1.17]	<0.00001	1.73	[1.53-1.96]	<0.00001	1.62	[1.29-2.04]	0.00003
Lifting or carrying	1.06	[1.01-1.11]	0.02	1.42	[1.25-1.62]	<0.00001	1.44	[1.14-1.82]	0.002
Wet hands	1.08	[1.02-1.14]	0.007	1.69	[1.47-1.95]	<0.00001	1.18	[0.89-1.57]	0.24
Men N=7089									
Back bend or twisted	1.26	[1.21-1.32]	<0.00001	1.62	[1.43-1.83]	<0.00001	1.90	[1.51-2.38]	<0.00001
Lifting or carrying	1.23	[1.18-1.28]	<0.00001	1.72	[1.53-1.94]	<0.00001	1.85	[1.48-2.33]	<0.00001
Wet hands	1.23	[1.17-1.29]	<0.00001	1.51	[1.31-1.75]	<0.00001	1.36	[1.03-1.80]	0.03
Model 2 fully adjusted **									
Women N=4055									
Back bend or twisted	1.04	[0.99-1.10]	0.11	1.52	[1.32-1.75]	<0.00001	1.28	[0.98-1.67]	0.07
Lifting or carrying	1.02	[0.96-1.07]	0.52	1.29	[1.11-1.50]	0.0008	1.33	[1.02-1.75]	0.04
Wet hands	1.08	[1.01-1.15]	0.02	1.66	[1.42-1.95]	<0.00001	1.08	[0.78-1.49]	0.64
Men N=5734									
Back bend or twisted	1.10	[1.05-1.16]	0.0001	1.29	[1.11-1.50]	0.0007	1.33	[1.00-1.76]	0.05
Lifting or carrying	1.11	[1.06-1.16]	0.00003	1.56	[1.35-1.79]	<0.00001	1.72	[1.31-2.25]	0.00008
Wet hands	1.05	[0.99-1.11]	0.10	1.18	[0.99-1.40]	0.06	1.23	[0.89-1.70]	0.21
Psychosocial work environment									
Model 1 partly adjusted *									
Women N=4945									
Poor influence	1.80	[1.64-1.97]	<0.00001	2.51	[1.94-3.25]	<0.00001	2.57	[1.62-4.08]	0.00006
Role conflicts	1.11	[1.02-1.19]	0.01	1.72	[1.38-2.15]	<0.00001	1.77	[1.19-2.62]	0.005
Bullying ***	1.22	[1.16-1.30]	<0.00001	1.61	[1.38-1.87]	<0.00001	-		
Men N=7089									
Poor influence	1.99	[1.83-2.17]	<0.00001	2.36	[1.83-3.04]	<0.00001	1.63	[0.99-2.69]	0.05
Role conflicts	1.12	[1.04-1.20]	0.003	1.21	[0.97-1.51]	0.09	1.23	[0.80-1.88]	0.34
Bullying ***	1.28	[1.21-1.36]	<0.00001	1.60	[1.37-1.87]	<0.00001	-		
Model 2 fully adjusted **									
Women N=4055									
Poor influence	1.60	[1.44-1.77]	<0.00001	1.73	[1.29-2.32]	0.0002	2.45	[1.46-4.11]	0.0007
Role conflicts	1.11	[1.02-1.21]	0.02	1.7	[1.32-2.18]	0.00003	1.89	[1.21-2.96]	0.005
Bullying ***	1.10	[1.04-1.18]	0.002	1.23	[1.04-1.47]	0.02	-		
Men N=5734									
Poor influence	1.62	[1.47-1.79]	<0.00001	2.01	[1.49-2.72]	0.00001	1.51	[0.84-2.70]	0.17
Role conflicts	1.06	[0.98-1.15]	0.16	1.23	[0.95-1.59]	0.12	1.60	[0.98-2.62]	0.06
Bullying ***	1.04	[0.97-1.11]	0.23	1.22	[1.01-1.48]	0.04	-		

* adjusted for age, education, private/public sector, and survey-round.

** additionally adjusted as previous model plus depression, eczema, back disease, other chronic illness, SA in 2 months up to baseline, smoking, exercise, plus physical work environment factors are adjusted for psychosocial work environment, and psychosocial work environment factors are adjusted for physical work environment.

*** 'Bullying' did not fulfill the proportional hazard assumption in analyses with SA episodes ≥ 21 days and is therefore not shown.