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Work-related biomechanical exposure and job strain in midlife separately and jointly predict disability after 28 years: a Finnish longitudinal study ¹

by Prakash KC, MSc (Public Health),² Subas Neupane, PhD, Päivi Leino-Arjas, PhD, Mikaela B von Bonsdorff, PhD, Taina Rantanen, PhD, Monika E von Bonsdorff, PhD, Jorma Seitsamo, PhD, Juhani Ilmarinen, PhD, Clas-Håkan Nygård, PhD

1 *Supplementary tables*

2 *Correspondence to: Prakash KC, School of Health Sciences, University of Tampere, FI-33014, Tampere, Finland. [E-mail: Prakash.kc@uta.fi or prakashkc10@gmail.com]*

Supplement Table A: Classification of Activities of Daily Living (ADL) and Instrumental ADL (IADL) items used to create Disability (0-12)

Activities	Questionnaire: Any difficulties in.....	Level of difficulty	Recoded level
ADL tasks	<i>Eating?</i>	Manage without difficulties	Coded as '0'
	<i>Going to bed?</i>	Manage with little difficulties	Coded as '1'
	<i>Dressing?</i>	Manage with lots of difficulties	
	<i>Bathing?</i>	Cannot manage without help from others	
	<i>Toileting?</i>	Cannot manage with help as well	
IADL tasks	<i>Preparing meals?</i>	Manage without difficulties,	Coded as '0'
	<i>Doing laundry?</i>	Manage with little difficulties	Coded as '1'
	<i>Doing light domestic work?</i>	Manage with lots of difficulties	
	<i>Dosing/taking medicine?</i>	Cannot manage without help from others	
	<i>Shopping?</i>	Cannot manage with help as well	
	<i>Using phone?</i>		
	<i>Management of personal finances?</i>		

Source: (Prakash KC et al. 2016)

Prakash KC, Neupane S, Leino-Arjas P, von Bonsdorff MB, Rantanen T, von Bonsdorff ME, et al. Midlife job profiles and disabilities in later life: a 28-year follow-up of municipal employees in Finland. *Int Arch Occup Environ Health*. 2016;89(6):997–1007.

Supplement Table B: Baseline characteristics of non-respondent women according to job strain and work-related biomechanical exposures, Finnish Longitudinal study on Aging Municipal Employees (FLAME), 1981-2009

Baseline Characteristics	N=1542		Biomechanical					Job strain								
			Low		High		<i>p</i> -value	Low		Passive	Active		High		<i>p</i> -value	
	No.	%	(n=696)	%	(n=846)	%		(n=522)	%	(n=398)	%	(n=247)	%	(n=375)		%
Age (years) ^a	51.2	3.6	51.5	3.6	51.1	3.7	0.087 ^b	51.3	3.6	51.5	3.7	51.2	3.6	51.0	3.7	0.280 ^b
BMI ^a	25.5	3.7	25.2	3.5	25.7	3.7	0.011 ^b	25.4	3.6	25.6	4.0	25.4	3.3	25.6	3.7	0.724 ^b
Tenure period ^a	7.6	3.7	8.2	3.7	7.2	3.6	<0.001 ^b	7.7	3.7	7.7	3.7	7.4	3.6	7.7	3.8	0.814 ^b
Occupational class																
White collar	886	57		77		41	<0.001		69		42		73		48	<0.001
Blue collar	656	43		23		59			31		58		27		52	
Chronic diseases																
No	436	28		36		22	<0.001		33		32		20		23	<0.001
Yes	1105	72		64		78			67		68		80		77	
Physical activity																
Active	716	48		48		48	0.492		51		42		53		48	0.001
Moderately active	621	42		43		41			41		42		40		44	
Inactive	150	10		9		11			8		16		7		8	
Smoking status																
Never	1127	73		71		74	0.009		74		69		70		78	0.028
Former	198	13		16		11			14		15		15		8	
Current	217	14		13		15			12		16		15		14	
Alcohol intake																
None	1342	88		87		89	0.347		87		90		86		88	0.853
≤2 drinks/month	143	9		10		9			10		8		10		9	
≥1drink/week	43	3		3		2			3		2		4		3	

BMI, Body Mass Index (“weight (kg)/height (m²)”); ^aExpressed as mean and Standard Deviation (SD); ^bAnalysis of variance (ANOVA);

Supplement Table C: Baseline characteristics of non-respondent men according to job strain and work-related biomechanical exposures, Finnish Longitudinal study on Aging Municipal Employees (FLAME), 1981-2009

Baseline Characteristics	N=1630		Biomechanical					Job strain								
			Low		High			Low		Passive	Active		High			
	No.	%	(n=947)	%	(n=683)	%	p-value	(n=417)	%	(n=488)	%	(n=234)	%	(n=491)	%	p-value
Age (years) ^a	51.0	3.7	50.1	3.8	51.1	3.6	0.517 ^b	51.1	3.6	51.2	3.7	50.9	3.7	50.9	3.6	0.458 ^b
BMI ^a	26.3	3.3	26.4	3.3	26.3	3.4	0.352 ^b	26.1	3.1	26.4	3.2	26.4	3.4	26.5	3.3	0.361 ^b
Tenure period ^a	7.6	3.8	7.8	3.8	7.3	3.9	0.016 ^b	8.0	4.0	7.5	3.7	7.9	3.9	7.2	3.8	0.013 ^b
Occupational class																
White collar	383	23		37		4	<0.001		37		12		41		16	<0.001
Blue collar	1247	77		63		96			63		88		59		84	
Chronic diseases																
No	426	26		32		19	<0.001		30		28		24		23	0.092
Yes	1204	74		68		81			70		72		76		77	
Physical activity																
Active	665	42		44		39	0.029		44		39		50		38	0.006
Moderately active	741	46		46		47			45		47		44		48	
Inactive	187	12		10		14			11		14		6		14	
Smoking status																
Never	685	42		25		20	0.011		26		19		25		22	0.159
Former	553	34		40		39			40		39		42		40	
Current	383	24		35		41			24		42		33		38	
Alcohol intake																
None	368	23		42		42	0.104		44		43		35		43	0.235
≤2 drinks/month	649	40		36		32			34		35		38		32	
≥1drink/week	613	37		22		26			22		22		27		25	

BMI, Body Mass Index (“weight (kg)/height (m²)”); ^aExpressed as mean and Standard Deviation (SD); ^bAnalysis of variance (ANOVA);

Supplemental Table D: Fit-indices for Pairwise Comparison (Bonferroni adjusted) of job strain

Models	BIC	AIC	df	ChiSq(df)	Pr> ChiSq
Overall respondents					
Model I	10585.20	10543.37	7	54.50(3)	<0.001
Model II	10548.18	10500.37	8	32.75(3)	<0.001
Model III	10077.02	9999.758	13	22.38(3)	<0.001
Women					
Model I	6129.67	6091.05	7	22.24(3)	<0.001
Model II	6117.47	6073.34	8	14.64(3)	0.002
Model III	5812.21	5740.94	13	6.53(3)	0.088
Men					
Model I	4424.75	4389.89	7	38.91(3)	<0.001
Model II	4421.55	4381.72	8	29.54(3)	<0.001
Model III	4292.69	4228.37	13	28.86(3)	<0.001

BIC, Bayesian Information Criteria; AIC, Akaike Information Criteria; df, degree of freedom; Model I: Adjusted for age, tenure period; Model II: Adjusted for age, tenure period and occupational groups; Model III: Adjusted for age, tenure period, occupational groups, and other covariates (chronic diseases, physical activity, alcohol intake, BMI and smoking status)

Supplemental Table E: Fit-indices for Relative Excessive Risk due to Interaction (RERI) estimates

Job strain/Biomechanical exposure	BIC	AIC	df	R ² (McFadden)	Pr> ChiSq
Overall respondents					
Passive/High biomechanical					
Model I	17397.66	17367.78	5	0.0961	<0.001
Model II ^a	15750.42	15679.10	12	0.1554	<0.001
Active/High biomechanical					
Model I	17392.85	17362.97	5	0.0964	<0.001
Model II ^a	15741.05	15669.73	12	0.1559	<0.001
High/High biomechanical					
Model I	17246.04	17216.16	5	0.1040	<0.001
Model II ^a	15701.81	15630.49	12	0.1580	<0.001
Women					
Passive/High biomechanical					
Model I	10330.32	10302.74	5	0.1198	<0.001
Model II	9203.74	9143.44	11	0.1900	<0.001
Active/High biomechanical					
Model I	10263.40	10235.82	5	0.1255	<0.001
Model II	9098.43	9158.73	11	0.1940	<0.001
High/High biomechanical					
Model I	10225.15	10197.58	5	0.1288	<0.001
Model II	9171.25	9110.94	11	0.1928	<0.001
Men					
Passive/High biomechanical					
Model I	6895.83	6920.72	5	0.0696	<0.001
Model II	6479.95	6425.53	11	0.1055	<0.001
Active/High biomechanical					
Model I	6936.52	6911.63	5	0.0675	<0.001
Model II	6477.37	6422.94	11	0.1059	<0.001
High/High biomechanical					
Model I	6868.26	6843.37	5	0.0767	<0.001
Model II	6468.66	6414.23	11	0.1071	<0.001

BIC, Bayesian Information Criteria; AIC, Akaike Information Criteria; df, degree of freedom; Model I: Adjusted for age and tenure period; Model II: Adjusted for age, tenure period, occupational groups and other covariates (chronic diseases, physical activity, alcohol intake, BMI and smoking status); ^a adjusted for items in model II including gender

Supplement Table F: Prevalence proportion ratios (PR) and 95% CI for association between work-related exposures (biomechanical and job strain) and later life disability (mortality added as highest disability), Finnish Longitudinal study on Aging Municipal Employees (FLAME), 1981-2009

Work-related exposures	All		Women		Men	
	PR	95 % CI	PR	95 % CI	PR	95 % CI
Biomechanical ^a						
High vs Low	1.24	1.12–1.37	1.43	1.22–1.67	1.41	1.24–1.60
Job strain ^{a, b}						
Passive vs Low	1.35	1.12–1.62	1.16	0.87–1.54	1.44	1.14–1.82
Active vs Low	1.14	0.94–1.38	1.00	0.76–1.31	1.33	1.02–1.73
High vs Low	1.65	1.37–2.00	1.50	1.12–2.00	1.69	1.32–2.16
Active vs Passive	0.84	0.69–1.04	0.86	0.62–1.18	0.92	0.71–1.19
High vs Passive	1.22	1.00–1.50	1.29	0.92–1.81	1.17	0.92–1.48
High vs Active	1.45	1.17–1.80	1.50	1.09–2.07	1.27	0.97–1.65
Biomechanical ^c						
High vs Low	1.01	0.91–1.13	1.27	1.08–1.50	1.15	1.01–1.32
Job strain ^{b, c}						
Passive vs Low	1.11	0.93–1.33	1.04	0.80–1.37	1.24	0.98–1.56
Active vs Low	1.15	0.95–1.40	1.00	0.76–1.33	1.36	1.05–1.77
High vs Low	1.37	1.13–1.67	1.35	1.00–1.83	1.48	1.16–1.89
Active vs Passive	1.04	0.85–1.28	0.96	0.71–1.30	1.10	0.85–1.43
High vs Passive	1.24	1.02–1.51	1.29	0.93–1.80	1.20	0.95–1.51
High vs Active	1.19	0.96–1.48	1.35	0.96–1.89	1.08	0.83–1.41
Biomechanical ^d						
High vs Low	1.04 ^e	0.94–1.16	1.19	1.01–1.40	1.05	0.92–1.19
Job strain ^{b, d}						
Passive vs Low	1.12 ^e	0.94–1.35	1.04	0.79–1.38	1.27	1.00–1.61
Active vs Low	1.09 ^e	0.90–1.34	0.96	0.72–1.29	1.31	1.01–1.70
High vs Low	1.29 ^e	1.07–1.56	1.28	0.95–1.72	1.40	1.10–1.77
Active vs Passive	0.97 ^e	0.79–1.20	0.92	0.67–1.27	1.03	0.80–1.34
High vs Passive	1.14 ^e	0.95–1.38	1.22	0.89–1.68	1.08	0.88–1.37
High vs Active	1.18 ^e	0.95–1.46	1.33	0.95–1.85	1.06	0.82–1.38

BMI, Body Mass Index; CI, Confidence Interval; ^aModel I: Adjusted for age, tenure period; ^bBonferroni adjusted pairwise comparisons; ^cModel II: Adjusted for age, tenure period, and occupational groups; ^dModel III: Adjusted for age, tenure period, occupational groups, and other covariates (chronic diseases, physical activity, alcohol intake, BMI and smoking status), ^eadjusted for items in model III including gender