

Job strain and cardiovascular mortality over long-term follow-up: a harmonized multicohort individual participant data meta-analysis¹

by Emanuele Maria Giusti, PhD, Xiang Li, MPH, Giovanni Veronesi, PhD, Birgit Linkohr, PhD, Annette Peters, PhD, Melanie Waldenberger, PhD, Rossana Borchini, MD, Giancarlo Cesana, MD, Jian Li, PhD, Ina-Maria Rückert-Eheberg, PhD, Marco Mario Ferrario, MD²

1. SUPPLEMENTARY MATERIAL
2. Correspondence to: Prof. Marco Mario Ferrario, EPIMED Research Center, Department of Medicine and Surgery, University of Insubria, 21100 Varese, Italy. [E-mail: marco.ferrario@uninsubria.it]

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Details of the literature search

Inclusion criteria were cohort studies on subjects free of CVD at baseline, with follow-up duration ≥ 20 years, that measured job strain as an exposure (either at baseline or as a time-varying covariate), and reported CVD mortality as the outcome. We excluded studies for which results for job strain alone were not reported or in which job strain was not analyzed separately (e.g., only examining job demands or job control independently).

The PubMed search string used for the 2019-2026 update was: (("occupational stress"[MeSH Terms] OR ("occupational"[All Fields] AND "stress"[All Fields]) OR "occupational stress"[All Fields] OR ("job"[All Fields] AND "strain"[All Fields]) OR "job strain"[All Fields]) AND ("cardiovascular system"[MeSH Terms] OR ("cardiovascular"[All Fields] AND "system"[All Fields]) OR "cardiovascular system"[All Fields] OR "cardiovascular"[All Fields] OR "cardiovasculars"[All Fields]) AND ("mortality"[MeSH Terms] OR "mortality"[All Fields] OR "mortalities"[All Fields] OR "mortality"[MeSH Subheading])) AND (2019:2026[pdat]). The literature search was performed on 9th April 2026.

Title and abstract screening and data extraction was performed by one author using a standardized form. A methodological quality assessment was not performed.

Supplementary Tables

Table S1. Participation rates and median follow-up by cohort

Cohort	Participation rate	Median follow-up (years)
MONICA Brianza	68%	27.9
SEMM	75%	23.1
MONICA/KORA S1	79%	25.6
MONICA/KORA S2	77%	25.6
MONICA/KORA S3	75%	25.6
MIDUS	77%	28.5

Table S2. Job strain questionnaire versions, item format, and subscale scoring across the four study cohorts

	MONICA Brianza	SEMM	MONICA/ KORA	MIDUS
Questionnaire	JCQ -MONICA MOPSY version ^a	JCQ - original version (4 departments), MONICA MOPSY version ^a (2 departments)	JCQ - MONICA MOPSY version ^{a,b}	Items based on Karasek's Job Demand-Control model
Number of items	13	34 (4 departments), 14 (2 departments)	11	14
Item format	4-point Likert (from “strongly disagree” to “strongly agree”)	4-point Likert (from “strongly disagree” to “strongly agree”)	4-point Likert (from “completely applicable” to “completely unapplicable”)	5-point Likert (from “never” to “all of the time”)
Scoring system	Based on prior factor analysis ^c : 8 items used, 5 for job control, 3 for job demands	Based on prior factor analysis ^c : 8 items used, 5 for job control, 3 for job demands	6 for job control, 5 for job demands	9 items for job control, 5 items for job demands
Job demands subscale item labels	No conflicting demands ^d No excessive amount of work required ^d Enough time to get the job done ^d	No conflicting demands ^d No excessive amount of work required ^d Enough time to get the job done ^d	Conflicting demands ^d Excessive amount of work required ^d Enough time to get the job done Work fast ^d Work hard ^d	Conflicting demands Work very intensively Have enough time to get everything done ^d Too many demands A lot of interruption
Job control subscale item labels	Learn new things High level of skill Requires creativity Decide how much work Decide what to do	Learn new things High level of skill Requires creativity Decide how much work Decide what to do	Learn new things ^d High level of skill ^d Requires creativity ^d Decide how much work ^d Decide what to do ^d Repetitive work	Learn new things High level of skill Variety of things that interest Choice in deciding how Choice in deciding what Have a say in decisions about work Have a say in planning work environment Control time on task Initiate things

Note. Abbreviations: JCQ = Job Content Questionnaire; MOPSY = MONICA Psychosocial Optional Study.

^a World Health Organization, 1989

^b Huth et al., 2014

^c Ferrario et al., 2017

^d Reversed item

References

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Huth C, Thorand B, Baumert J, Kruse J, Emeny RT, Schneider A, et al. Job strain as a risk factor for the onset of type 2 diabetes mellitus: findings from the MONICA/KORA Augsburg cohort study. *Psychosom Med*. 2014;76(7):562-8.

World Health Organization. MONICA Psychosocial Optional Study Manual: suggested measurement instruments. Copenhagen: WHO Regional Office for Europe, 1989

Table S3. Original coding and harmonized classification of occupational class across the four study cohorts

MONICA Brianza and SEMM	MONICA/KORA	MIDUS	Harmonized occupational class
Higher managerial (EGP I)	Employee, incl. Management tasks Self-employed with at least 10 employees	Executive, administrative, and managerial	Managers, professionals and self-employed
Lower managerial (EGP II)	Civil servant, senior civil service / highly qualified employee employment / self. Academic / self- employed with max. 9 employees	Professional specialty	
Self-employed (EGP IVa, IVb, IVc)	Self-employed, max. 1 employee		
Non-manual workers (EGP IIIa, IIIb, V)	Civil servant, intermediate service, skilled/foreman	Technician and related support	Non-manual workers
	Civil servant, senior civil service, employee with qualified activity	Administrative support including clerical Sales occupation	
Skilled manual workers (EGP VI)	White-collar worker, elementary service, blue-collar worker	Service occupation	Manual workers
Unskilled manual workers (EGP VIIa, VIIb)	Civil servant, elementary service, semi-skilled worker Unskilled worker	Farming, forestry, and fishing Precision production, crafts, and repair	
	Master craftsman/foreman	Operator, laborer, and military	

Note. Abbreviations: EGP = Erikson-Goldthorpe-Portocarero occupational class scheme

Table S4. Original coding and harmonized classification of educational attainment across the four study cohorts

MONICA Brianza and SEMM	MONICA/KORA	MIDUS	Harmonized educational attainment class
Primary or middle school	No qualifications	No school/some grade school	Low
	Secondary school / elementary school	Eighth grade/junior high school	
	Vocational school / apprenticeship	Some high school	
High school	Intermediate school leaving certificate	General Educational Development diploma	Intermediate
	Technical school/ technical college/ master school high school diploma / technical diploma	Graduated from high school	
		1 to 2 years of college, no degree yet 3 or more years of college, no degree yet Graduated from a 2-year college or vocational school, or associate's degree	
University or higher	University	Graduated from a 4- or 5-year college, or bachelor's degree	High
		Some graduate school	
		Master's degree Doctoral or other professional degree	

Table S5. Original coding and harmonized classification of cardiovascular risk factors across the four study cohorts

Variable	MONICA Brianza and SEMM	MONICA/KORA	MIDUS	Harmonized variable
Cigarette smoking	Self-reported smoking status (regular, irregular, ex-smoker, never smoker)	Self-reported smoking status (regular, irregular, ex-smoker, never smoker)	Self-reported smoking status (current smoker, former smoker, never smoker)	Current smoker vs. never or former smoker
Hypertension	Current hypertension (systolic blood pressure ≥ 140 , diastolic blood pressure ≥ 90) or known hypertension	Current hypertension (systolic blood pressure ≥ 140 , diastolic blood pressure ≥ 90) or known hypertension	Self-reported diagnosis or use of anti-hypertensive medication	Hypertension yes vs. no
Type 2 diabetes	Self-reported diagnosis, information on insulin and oral hypoglycemic treatments, or (only MONICA Brianza) fasting blood glucose ≥ 126 mg/dL	Self-reported diagnosis or use of antidiabetic medications, with validation by medical staff	Self-reported diagnosis or use of antidiabetic medication	Type 2 diabetes yes vs. no
BMI	Weight and height measured by trained medical staff	Weight and height measured by trained medical staff	Self-reported weight and height	BMI <25 , ≥ 25 and <30 , ≥ 30

Note. Abbreviations: BMI = Body Mass Index

Table S6. Socio-demographic, occupational and cardiovascular risk factors and job strain characteristics across the four study cohorts by sex

Variable	Value	MONICA Brianza			SEMM			MONICA/KORA			MIDUS		
		Men (n=1482)	Women (n=781)	p	Men (n=2254)	Women (n=4195)	p	Men (n=3921)	Women (n=2449)	p	Men (n=1749)	Women (n=1632)	p
Age	Mean $\pm$ SD	43.8 $\pm$ 8.2	40.9 $\pm$ 7.3	<.01	41.5 $\pm$ 7.9	39.9 $\pm$ 6.8	<.01	44.8 $\pm$ 8.6	44.2 $\pm$ 8.2	<.01	43.7 $\pm$ 8.2	44.0 $\pm$ 8.4	.29
Educational attainment	Low, n %	943 (63.7)	504 (64.5)	.86	1139 (51.5)	2102 (50.3)	.06	2052 (52.3)	1399 (57.2)	<.01	97 (5.6)	82 (5.0)	<.01
	Intermediate, n %	427 (28.8)	223 (28.6)		982 (44.4)	1848 (44.2)		1200 (30.6)	809 (33.1)		928 (53.1)	1031 (63.3)	
	High, n %	111 (7.5)	54 (6.9)		92 (4.2)	230 (5.5)		668 (17.0)	239 (9.8)		722 (41.3)	516 (31.7)	
	Missing, n	1	0		41	15		1	2		2	3	
Occupation	Managers, professionals and self-employed, n %	589 (40.0)	226 (29.4)	<.01	680 (30.2)	1176 (28.0)	.13	1261 (32.9)	315 (13.4)	<.01	921 (52.9)	764 (47.0)	<.01
	Non-manual workers, n %	545 (37.0)	342 (44.4)		774 (34.3)	1529 (36.4)		1104 (28.8)	983 (41.9)		282 (16.2)	585 (36.1)	
	Manual workers, n %	340 (23.1)	202 (26.2)		800 (35.5)	1490 (35.5)		1466 (38.3)	1048 (44.7)		538 (30.9)	275 (16.9)	
	Missing, n	8	11		0	0		90	103		8	8	
Body Mass Index	<25, n %	632 (43.1)	521 (67.1)	<.01	800 (36.6)	2407 (59.7)	<.01	1078 (27.6)	1295 (53.5)	<.01	530 (31.2)	785 (50.7)	<.01
	$\geq$ 25 and <30, n %	686 (46.8)	178 (22.9)		1052 (48.1)	1085 (26.9)		2112 (54.1)	774 (32.0)		809 (47.6)	422 (27.3)	
	$\geq$ 30, n %	149 (10.2)	77 (9.9)		336 (15.4)	537 (13.3)		712 (18.2)	352 (14.5)		360 (21.2)	340 (22.0)	
	Missing, n	15	5		66	166		19	28		50	85	
Cigarette smoking	Never or former smoker, n %	910 (61.4)	555 (71.1)	<.01	1337 (60.3)	2705 (66.3)	<.01	2567 (65.5)	1782 (72.8)	<.01	992 (70.7)	820 (69.7)	.77
	Current smoker, n %	571 (38.6)	226 (28.9)		879 (39.7)	1375 (33.7)		1354 (34.5)	667 (27.2)		412 (29.3)	356 (30.3)	
	Missing, n	1	0		38	115		0	0		345	456	
Hypertension	No, n %	1075 (72.6)	634 (81.2)	<.01	1772 (79.8)	3339 (81.7)	.08	2358 (60.1)	1885 (77.0)	<.01	1543 (88.0)	1403 (86.1)	.12
	Yes, n %	406 (27.4)	147 (18.8)		448 (20.2)	750 (18.3)		1563 (39.9)	564 (23.0)		211 (12.0)	226 (13.9)	
	Missing, n	1	0		34	106		0	0		4	3	
Type 2 diabetes	No, n %	1412 (95.3)	774 (99.1)	<.01	2217 (98.4)	4167 (99.3)	<.01	3845 (98.1)	2426 (99.1)	<.01	1647 (95.9)	1590 (97.7)	<.01
	Yes, n %	69 (4.7)	7 (0.9)		37 (1.6)	28 (0.7)		76 (1.9)	22 (0.9)		71 (4.1)	38 (2.3)	
	Missing, n	1	0		0	0		0	1		4	4	
Total cholesterol	Mean $\pm$ SD	216.0 $\pm$ 42.8	204.4 $\pm$ 40.0	<.01	211.4 $\pm$ 40.3	201.7 $\pm$ 37.5	<.01	237.7 $\pm$ 46.8	225.9 $\pm$ 43.0	<.01	n/a	n/a	
	Missing, n	12	3		26	37		45	71				
HDL cholesterol	Mean $\pm$ SD	50.2 $\pm$ 12.6	61.9 $\pm$ 14.3	<.01	48.8 $\pm$ 13.2	59.3 $\pm$ 15.1	<.01	50.1 $\pm$ 15.0	64.3 $\pm$ 16.4	<.01	n/a	n/a	
	Missing, n	10	3		32	74		57	73				
Job strain	Non-high job strain	879 (70.7)	341 (60.2)	<.01	1399 (74.7)	2377 (72.4)	.09	2915 (83.6)	1563 (76.1)	<.01	1308 (75.3)	1139 (70.4)	<.01
	High job strain	365 (29.3)	225 (39.8)		475 (25.3)	905 (27.6)		572 (16.4)	490 (23.9)		429 (24.7)	478 (29.6)	
	Missing, n	238	215		380	913		434	396		12	15	

Note. Abbreviations: SD = Standard Deviation.

Table S7. Socio-demographic, occupational and cardiovascular risk factors and job strain characteristics across the four study cohorts by job strain status.

Variable	Value	MONICA Brianza ^a			SEMM ^b			MONICA/KORA ^c			MIDUS ^d		
		High job strain (n=590)	Non-high job strain (n=1220)	p ^e	High job strain (n=1380)	Non-high job strain (n=3776)	p ^e	High job strain (n=1062)	Non-high job strain (n=4478)	p ^e	High job strain (n=907)	Non-high job strain (n=2447)	p ^e
Sex	Man, n %	365 (61.9)	879 (72.0)	<.01	475 (34.4)	1399 (37.0)	.10	572 (53.9)	2915 (65.1)	<.01	429 (47.3)	1308 (53.5)	<.01
	Woman, n %	225 (38.1)	341 (28.0)		905 (65.6)	2377 (63.0)		490 (46.1)	1563 (34.9)		478 (52.7)	1139 (46.6)	
Age	Mean ± SD	41.5 ± 7.8	42.7 ± 8.0	.03	40.2 ± 7.2	40.5 ± 7.2	.25	45.4 ± 8.3	43.9 ± 8.5	<.01	43.5 ± 8.0	43.9 ± 8.4	.20
Education attainment	Low, n %	357 (60.5)	720 (59.0)	<.01	886 (64.4)	1771 (47.0)	<.01	729 (68.6)	2167 (48.4)	<.01	44 (4.9)	132 (5.4)	<.01
	Intermediate, n %	201 (34.1)	382 (31.3)		445 (32.3)	1814 (48.2)		280 (26.4)	1537 (34.3)		579 (63.9)	1362 (55.7)	
	High, n %	32 (5.4)	118 (9.7)		45 (3.3)	180 (4.8)		53 (5.0)	774 (17.3)		283 (31.2)	949 (38.8)	
	Missing, n	0	0		4	11		0	0		1	4	
Occupation	Managers, professionals and self-employed, n %	144 (24.6)	510 (41.9)	<.01	154 (11.2)	1197 (31.7)	<.01	93 (8.9)	1271 (29.3)	<.01	333 (36.7)	1337 (54.6)	<.01
	Non-manual workers, n %	274 (46.8)	469 (38.6)		492 (35.7)	1445 (38.3)		339 (32.5)	1578 (36.3)		309 (34.1)	552 (22.6)	
	Manual workers, n %	167 (28.5)	237 (19.5)		734 (53.2)	1134 (30.0)		611 (58.6)	1494 (34.4)		263 (29.0)	544 (22.2)	
	Missing, n	5	4		0	0		19	135		2	14	
Body Mass Index	<25, n %	342 (58.2)	580 (48.0)	.01	669 (49.0)	1906 (51.7)	.04	410 (38.8)	1706 (38.3)	.05	344 (37.9)	961 (39.3)	.38
	≥25 and <30, n %	204 (34.7)	500 (41.4)		494 (36.2)	1266 (34.3)		451 (42.6)	2068 (46.4)		331 (36.5)	888 (36.3)	
	≥30, n %	42 (7.1)	128 (10.6)		203 (14.9)	517 (14.0)		197 (18.6)	683 (15.3)		188 (20.7)	509 (20.8)	
	Missing, n	2	12		14	87		4	21		44	89	
Cigarette smoking	Never or former smoker, n %	382 (64.7)	781 (64.0)	.96	833 (60.5)	2419 (64.6)	<.01	701 (66.0)	3101 (69.2)	<.01	470 (51.8)	1325 (54.2)	.06
	Current smoker, n %	208 (35.3)	439 (36.0)		543 (39.5)	1323 (35.4)		361 (34.0)	1377 (30.8)		236 (26.0)	525 (21.5)	
	Missing, n	0	0		4	34		0	0		201	597	
Hypertension	No, n %	467 (79.2)	922 (75.6)	.41	1094 (79.4)	3039 (81.1)	.09	705 (66.4)	2986 (66.7)	.86	776 (85.6)	2138 (87.6)	.09
	Yes, n %	123 (20.8)	298 (24.4)		283 (20.6)	709 (18.9)		357 (33.6)	1492 (33.3)		130 (14.3)	303 (12.4)	
	Missing, n	0	0		3	28		0	0		1	6	
Type 2 diabetes	No, n %	574 (97.5)	1176 (96.4)	.69	1368 (99.1)	3739 (99.0)	.86	1036 (97.6)	4424 (98.8)	.01	874 (96.4)	2365 (96.7)	.36
	Yes, n %	15 (2.5)	44 (3.6)		12 (0.9)	37 (1.0)		26 (2.4)	54 (1.2)		32 (3.5)	76 (3.1)	
	Missing, n	1	0		0	0		0	0		1	6	
Total cholesterol	Mean ± SD	213.4±41.8	209.0± 42.3	.04	206.6± 38.7	205.4± 39.1	.35	236.4± 43.4	232.3± 46.7	.01	n/a	n/a	
	Missing, n	8	6		13	36		18	59				

HDL	Mean ± SD	53.4 ± 14.2	55.4 ± 15.1	.01	55.2 ± 15.3	55.1 ± 15.2	.70	56.8 ± 17.2	55.0 ± 16.9	<.01	n\^a	n\^a
cholesterol	Missing, n	7	5		19	64		22	68			

Note. Abbreviations: SD = Standard Deviation.

^a N=453 had missing data on job strain

^b N=1,293 had missing data on job strain

^c N=830 had missing data on job strain

^d N=27 had missing data on job strain

^e p-values from logistic regression models adjusted for sex and age.

Table S8. Sex-specific cardiovascular disease mortality by cohort

Cohort	Men		Women	
	Number of CVD deaths	Age-adjusted CVD mortality rate (95% CI) ^a	Number of CVD deaths	Age-adjusted CVD mortality rate (95% CI) ^a
MONICA Brianza	84	1.80 (1.42-2.28)	15	0.81 (0.49-1.35)
SEMM	39	0.80 (0.58-1.11)	47	0.64 (0.48-0.86)
MONICA/KORA	366	2.89 (2.54-3.29)	108	1.39 (1.14-1.70)
MIDUS	111	2.06 (1.69-2.55)	72	1.34 (1.05-1.73)

Note. ^a Age-adjusted cardiovascular disease mortality rate per 1000 person-years, estimated at age 45 from Poisson regression models with age as a covariate

Table S9. Heterogeneity tests and I^2 statistics from meta-analyses of job strain and cardiovascular disease mortality

Predictor	Model 1 ^a			Model 2 ^b			Model 3 ^c		
	Heterogeneity test		I^2	Heterogeneity test		I^2	Heterogeneity test		I^2
	Q^d	P-value		Q^d	P-value		Q^d	P-value	
High job strain									
High vs non-high	1.34	.72	0.00	0.55	.91	0.00	0.97	.81	0.00
Job strain categories									
Active vs low job strain	0.61	.89	0.00	0.75	.86	0.00	0.48	.92	0.00
Passive vs low job strain	5.27	.15	44.28	4.26	.24	32.69	2.08	.56	0.00
High job strain vs low job strain	2.35	.50	0.00	1.25	.74	0.00	6.05	.11	51.03
Job demands									
High vs low	2.41	.49	5.55	3.65	.30	28.62	4.59	.20	38.67
Job control									
High vs low	7.69	.05	58.91	5.40	.14	45.95	6.96	.07	57.54
High job strain, attained age <65 years									
High vs non-high	0.43	.93	0.00	1.33	.72	0.00	1.79	.62	0.00
High job strain, attained age ≥65 years									
High job vs non-high	3.86	.28	13.93	2.62	.45	0.00	3.02	.39	0.00

^a Adjusted for sex and age.

^b Adjusted for sex, age, educational attainment and occupational class.

^c Adjusted for sex, age, educational attainment, occupational class, cigarette smoking, hypertension, type 2 diabetes, body mass index.

^d Degrees of freedom = 3.

Table S10. Hazard ratios (95% CI) for coronary heart disease mortality resulting from the meta-analyses, with progressive adjustment for sex, educational attainment, occupational class and CVD risk factors

Predictor	Model 1 ^a		Model 2 ^b		Model 3 ^c	
	HR	95% CI	HR	95% CI	HR	95% CI
High job strain						
Non-high	Ref		Ref		Ref	
High	1.15	0.69 - 1.92	1.05	0.67 - 1.64	0.99	0.61 - 1.61
Job strain categories						
Low job strain	Ref		Ref		Ref	
Active	0.97	0.65 - 1.45	0.99	0.65 - 1.50	0.92	0.42 - 2.00
Passive	0.91	0.55 - 1.52	0.77	0.48 - 1.22	0.83	0.59 - 1.16
High job strain	1.05	0.52 - 2.14	1.01	0.59 - 1.75	0.99	0.54 - 1.71
Job demands						
Low	Ref		Ref		Ref	
High	0.97	0.94 - 1.00	1.08	0.75 - 1.57	1.08	0.74 - 1.58
Job control						
Low	Ref		Ref		Ref	
High	1.03	0.68 - 1.56	0.98	0.63 - 1.51	1.00	0.58 - 1.71
High job strain, attained age <65 years						
Non-high	Ref		Ref		Ref	
High	1.21	0.73 - 1.98	1.15	0.76 - 1.72	1.06	0.65 - 1.73
High job strain, attained age ≥65 years						
Non-high	Ref		Ref		Ref	
High	1.07	0.78 - 1.47	0.97	0.65 - 1.45	0.91	0.56 - 1.50

^a Adjusted for sex and age.

^b Adjusted for sex, age, educational attainment and occupational class.

^c Adjusted for sex, age, educational attainment, occupational class, cigarette smoking, hypertension, type 2 diabetes, body mass index.

Table S11. Heterogeneity tests and I^2 statistics from meta-analyses of job strain and coronary heart disease mortality

	Model 1 ^a			Model 2 ^b			Model 3 ^c		
	Heterogeneity test		I^2	Heterogeneity test		I^2	Heterogeneity test		I^2
	Q^d	P-value		Q^d	p-value		Q^d	P-value	
High job strain									
High vs non-high	4.21	.24	0.00	3.09	.38	0.00	3.46	.33	6.31
Job strain categories									
Active vs low job strain	2.27	.52	0.00	2.39	.5	0.00	5.16	.16	22.91
Passive vs low job strain	2.77	.43	0.00	2.27	.52	0.00	4.01	.26	0.00
High job strain vs low job strain	5.14	.16	0.00	3.61	.31	0.00	1.27	.74	0.00
Job demands									
High vs low	0.04	.99	0.00	3.06	.38	0.00	3.25	.36	0.00
Job control									
High vs low	3.41	.33	0.00	3.12	.37	14.49	4.58	.21	37.11
High job strain, attained age <65 years									
High vs non-high	2.17	.54	0.00	1.31	.73	0.00	1.9	.59	0.00
High job strain, attained age ≥65 years									
High job vs non-high	1.07	.78	0.00	1.52	.68	0.00	2.37	.50	0.00

^a Adjusted for sex and age.

^b Adjusted for sex, age, educational attainment and occupational class.

^c Adjusted for sex, age, educational attainment, occupational class, cigarette smoking, hypertension, type 2 diabetes, body mass index.

^d Degrees of freedom = 3.

Table S12. Hazard ratios (95% CI) for all-cause mortality resulting from the meta-analyses, with progressive adjustment for sex, educational attainment, occupational class and CVD risk factors

	Model 1 ^a		Model 2 ^b		Model 3 ^c	
	HR	95% CI	HR	95% CI	HR	95% CI
High job strain						
Non-high	Ref		Ref		Ref	
High	1.12	0.94 - 1.34	1.05	0.95 - 1.16	1.03	0.93 - 1.14
Job strain categories						
Low job strain	Ref		Ref		Ref	
Active	1.03	0.94 - 1.14	1.04	0.94 - 1.16	1.05	0.92 - 1.19
Passive	1.09	0.90 - 1.32	0.97	0.77 - 1.22	0.96	0.72 - 1.28
High job strain	1.17	0.92 - 1.48	1.05	0.92 - 1.20	1.03	0.87 - 1.21
Job demands						
Low	Ref		Ref		Ref	
High	1.04	0.93 - 1.16	1.07	0.96 - 1.19	1.07	0.95 - 1.20
Job control						
Low	Ref		Ref		Ref	
High	0.92	0.80 - 1.05	1.04	0.90 - 1.19	1.06	0.90 - 1.26
High job strain, attained age <65 years						
Non-high	Ref		Ref		Ref	
High	1.11	0.85 - 1.45	1.08	0.93 - 1.25	1.05	0.93 - 1.19
High job strain, attained age ≥65 years						
Non-high	Ref		Ref		Ref	
High	1.06	0.88 - 1.28	0.99	0.86 - 1.13	0.97	0.84 - 1.12

^a Adjusted for sex and age.

^b Adjusted for sex, age, educational attainment and occupational class.

^c Adjusted for sex, age, educational attainment, occupational class, cigarette smoking, hypertension, type 2 diabetes, body mass index.

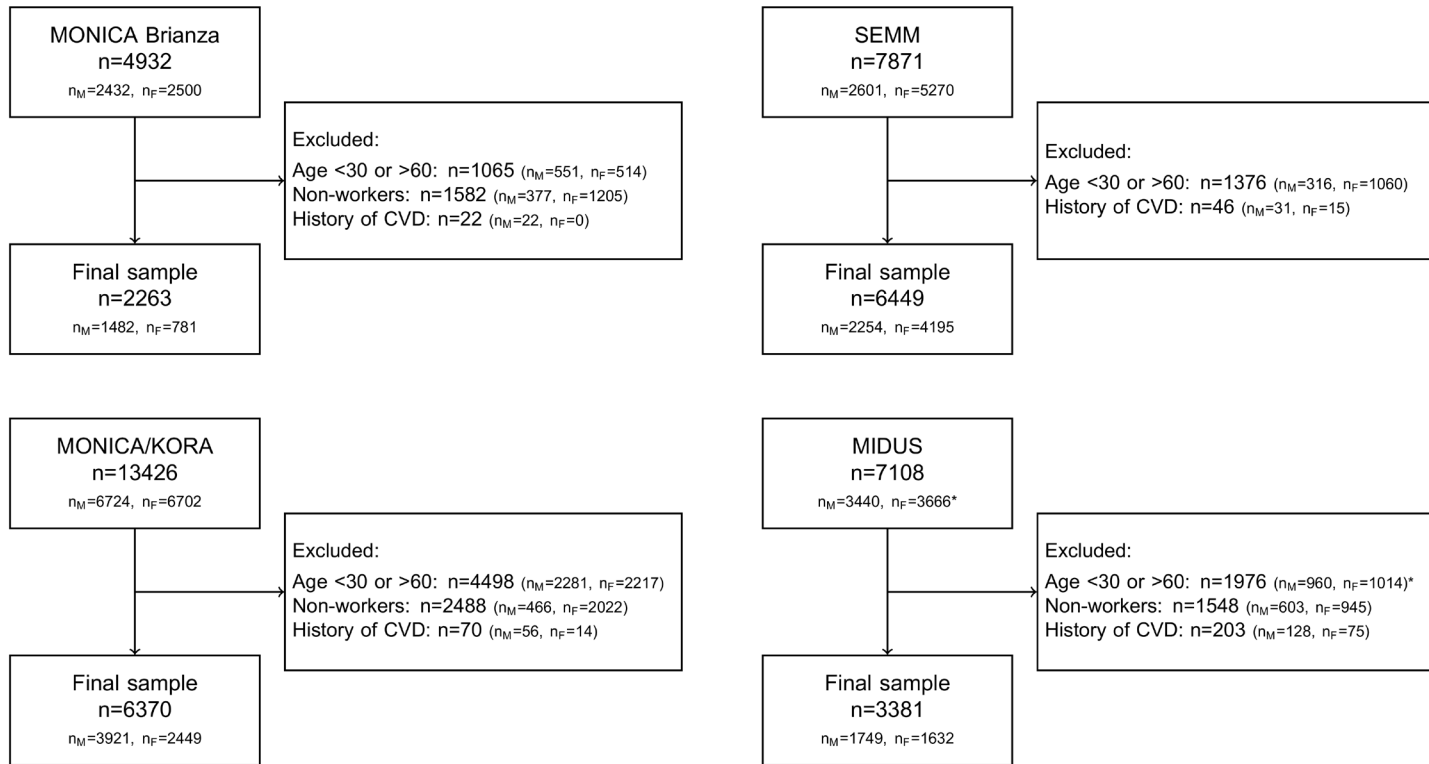
Table S13. Heterogeneity tests and I^2 statistics from meta-analyses of job strain and all-cause mortality

Predictor	Model 1 ^a		I ²	Model 2 ^b		I ²	Model 3 ^c		I ²
	Heterogeneity test			Heterogeneity test			Heterogeneity test		
	Q ^d	p-value		Q ^d	p-value		Q ^d	p-value	
High job strain									
High vs non-high	4.20	.24	20.42	1.45	.69	0.00	1.37	.71	0.00
Job strain categories									
Active vs low job strain	0.83	.84	0.00	1.00	.80	0.00	1.39	.71	0.00
Passive vs low job strain	2.98	.39	2.14	3.89	.27	12.49	5.50	.14	45.85
High job strain vs low job strain	4.51	.21	31.48	1.40	.70	0.00	2.07	.56	0.00
Job demands									
High vs low	2.52	.47	0.00	2.34	.51	0.00	2.54	.47	0.02
Job control									
High vs low	3.58	.31	27.13	3.11	.37	0.09	4.20	.24	22.92
High job strain, attained age <65 years									
High vs non-high	7.68	.05	60.12	2.38	.50	0.00	1.71	.64	0.00
High job strain, attained age ≥65 years									
High job vs non-high	2.79	.43	0.00	1.35	.72	0.00	1.53	.67	0.00

^a Adjusted for sex and age.^b Adjusted for sex, age, educational attainment and occupational class.^c Adjusted for sex, age, educational attainment, occupational class, cigarette smoking, hypertension, type 2 diabetes, body mass index.^d Degrees of freedom = 3.

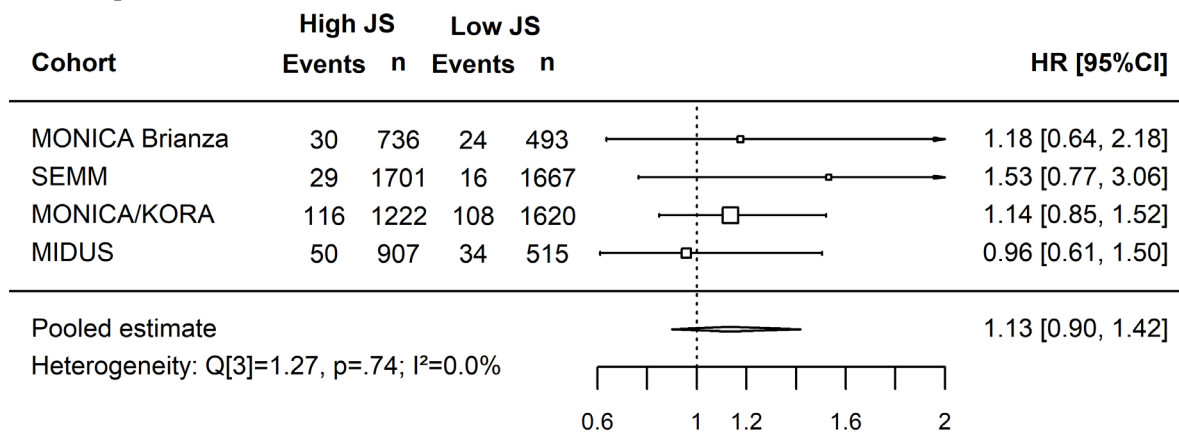
Supplementary figures

Figure S1. Participant flow and sample sizes for initial recruitment, exclusions, and final samples by cohort, overall and stratified by sex



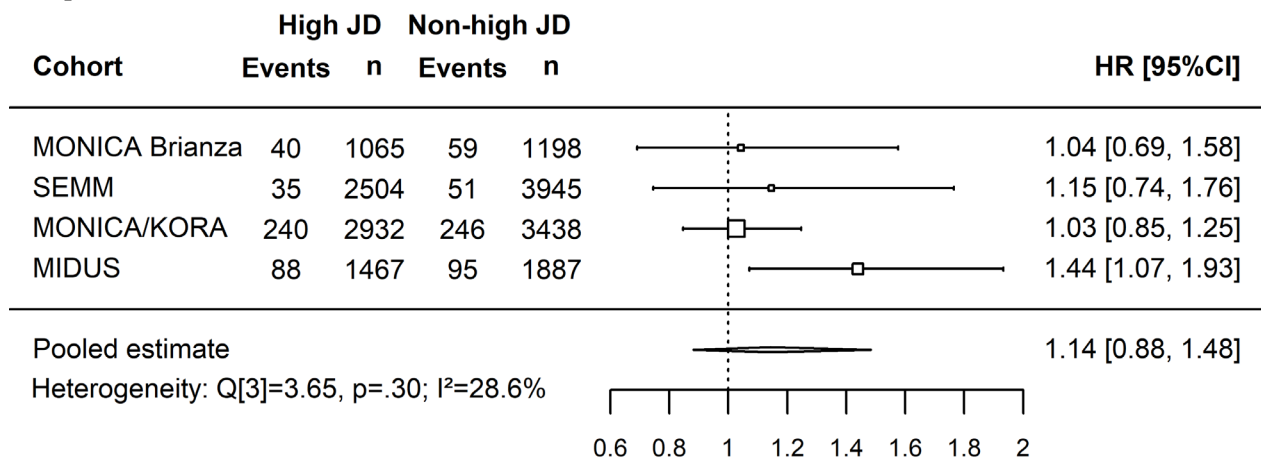
Note. * Two MIDUS participants had missing information on sex and are included in the overall count but not in the sex-stratified counts.

Figure S2. Forest plot of the meta-analytical results for the association between high job strain and cardiovascular disease mortality, using low job strain as reference, adjusted for sex, educational attainment, and occupational class.



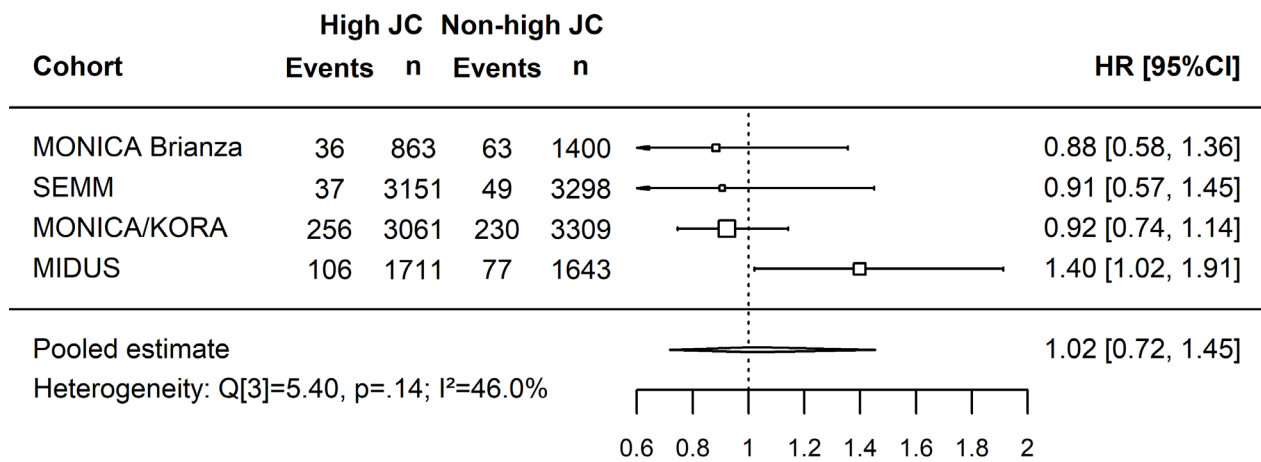
Note. Sample sizes and number of events for each cohort represent means across multiply imputed datasets. For MONICA/KORA, n=32 subjects had unknown cause of death; these missing data were handled through multiple imputation, which may affect reported event counts. Abbreviations: HR=Hazard Ratio, JS = Job Strain.

Figure S3. Forest plot of the meta-analytical results for the association between job demands (dichotomized at the median) and cardiovascular disease mortality, adjusted for sex, educational attainment, and occupational class



Note. Sample sizes and number of events for each cohort represent means across multiply imputed datasets. For MONICA/KORA, n=32 subjects had unknown cause of death; these missing data were handled through multiple imputation, which may affect reported event counts. Abbreviations: HR=Hazard Ratio, JD = Job Demands.

Figure S4. Forest plot of the meta-analytical results for the association between job control (dichotomized at the median) and cardiovascular disease mortality, adjusted for sex, educational attainment, and occupational class



Note. Sample sizes and number of events for each cohort represent means across multiply imputed datasets. For MONICA/KORA, $n=32$ subjects had unknown cause of death; these missing data were handled through multiple imputation, which may affect reported event counts. Abbreviations: HR=Hazard Ratio, JC = Job Control.

Figure S5. Forest plot of the meta-analytical results for the association between high job strain (reference: non-high job strain) and coronary heart disease mortality, adjusted for sex, educational attainment, and occupational class.

