

Supplementary Materials

Associations of cardiovascular-kidney-metabolic syndrome stage with trabecular bone score and bone mineral density

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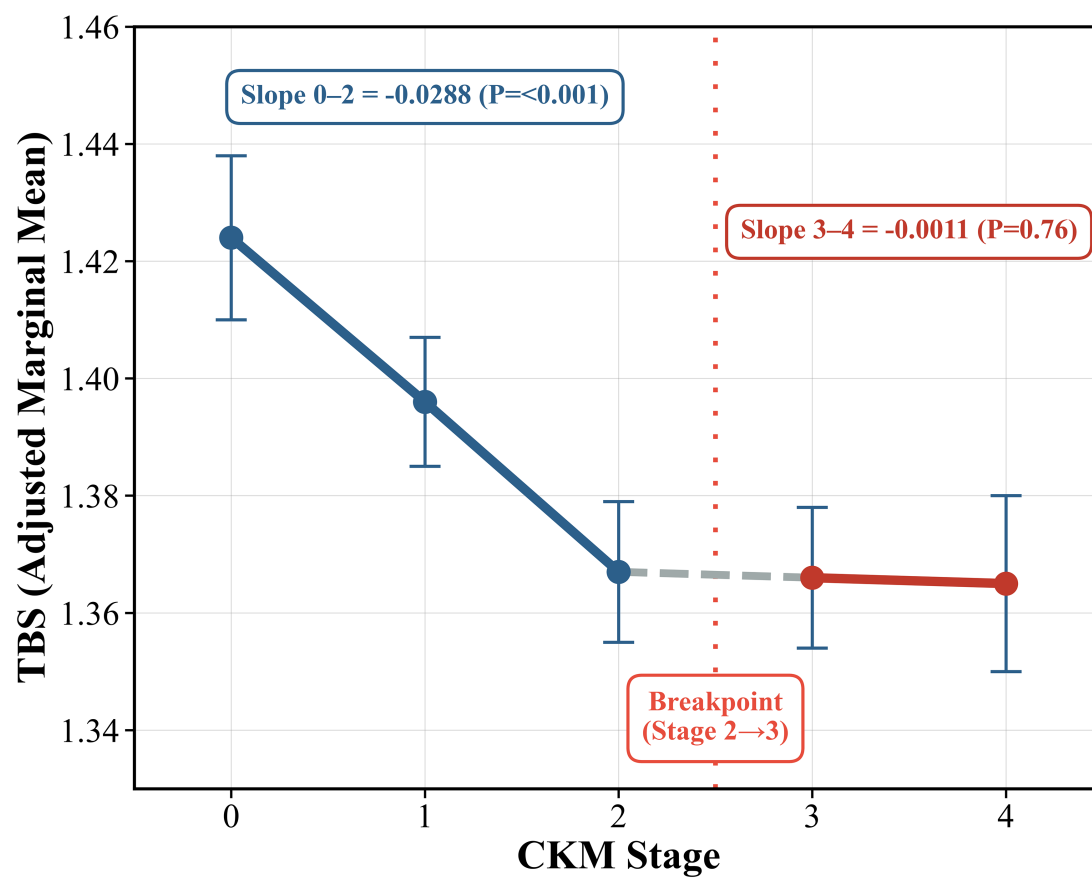
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Supplementary Figure 1. Segmented regression of TBS across CKM stages.

Supplementary Table 1. The basic PREVENT 10-year risk estimation model equations

10-year CVD risk assessment equation	
Men	log-Odds = $-3.031168 + 0.7688528 \times (\text{age} - 55) / 10 + 0.0736174 \times ((\text{TC} - \text{HDL-C}) \times 0.02586 - 3.5) - 0.0954431 \times (\text{HDL-C} \times 0.02586 - 1.3) / 0.3 - 0.4347345 \times (\min(\text{SBP}, 110) - 110) / 20 + 0.3362658 \times (\max(\text{SBP}, 110) - 130) / 20 + 0.7692857 \times (\text{if diabetes}) + 0.4386871 \times (\text{if current smoker}) + 0.5378979 \times (\min(\text{eGFR}, 60) - 60) / -15 + 0.0164827 \times (\max(\text{eGFR}, 60) - 90) / -15 + 0.288879 \times (\text{if using anti hypertensive medication}) - 0.1337349 \times (\text{if using statin}) - 0.0475924 \times (\text{if using anti-hypertensive medication}) \times (\max(\text{SBP}, 110) - 130) / 20 + 0.150273 \times (\text{if using statin}) \times ((\text{TC} - \text{HDL-C}) \times 0.02586 - 3.5) - 0.0517874 \times (\text{age} - 55) / 10 \times ((\text{TC} - \text{HDL-C}) \times 0.02586 - 3.5) + 0.0191169 \times (\text{age} - 55) / 10 \times (\text{HDL-C} \times 0.02586 - 1.3) / 0.3 - 0.1049477 \times (\text{age} - 55) / 10 \times (\max(\text{SBP}, 110) - 130) / 20 - 0.2251948 \times (\text{age} - 55) / 10 \times (\text{if diabetes}) - 0.0895067 \times (\text{age} - 55) / 10 \times (\text{if current smoker}) - 0.1543702 \times (\text{age} - 55) / 10 \times (\min(\text{eGFR}, 60) - 60) / -15$ Risk = $1 / (1 + \exp(-\log\text{-Odds}))$
Women	log-Odds = $-3.307728 + 0.7939329 \times (\text{age} - 55) / 10 + 0.0305239 \times ((\text{TC} - \text{HDL-C}) \times 0.02586 - 3.5) - 0.1606857 \times (\text{HDL-C} \times 0.02586 - 1.3) / 0.3 - 0.2394003 \times (\min(\text{SBP}, 110) - 110) / 20 + 0.360078 \times (\max(\text{SBP}, 110) - 130) / 20 + 0.8667604 \times (\text{if diabetes}) + 0.5360739 \times (\text{if current smoker}) + 0.6045917 \times (\min(\text{eGFR}, 60) - 60) / -15 + 0.0433769 \times (\max(\text{eGFR}, 60) - 90) / -15 + 0.3151672 \times (\text{if using anti hypertensive medication}) - 0.1477655 \times (\text{if using statin}) - 0.0663612 \times (\text{if using anti-hypertensive medication}) \times (\max(\text{SBP}, 110) - 130) / 20 + 0.1197879 \times (\text{if using statin}) \times ((\text{TC} - \text{HDL-C}) \times 0.02586 - 3.5) - 0.0819715 \times (\text{age} - 55) / 10 \times ((\text{TC} - \text{HDL-C}) \times 0.02586 - 3.5) + 0.0306769 \times (\text{age} - 55) / 10 \times (\text{HDL-C} \times 0.02586 - 1.3) / 0.3 - 0.0946348 \times (\text{age} - 55) / 10 \times (\max(\text{SBP}, 110) - 130) / 20 - 0.27057 \times (\text{age} - 55) / 10 \times (\text{if diabetes}) - 0.078715 \times (\text{age} - 55) / 10 \times (\text{if current smoker}) - 0.1637806 \times (\text{age} - 55) / 10 \times (\min(\text{eGFR}, 60) - 60) / -15$

	Risk = 1 / (1 + exp(-log-Odds))
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TC: Total cholesterol; HDL-C: high-density lipoprotein cholesterol; SBP: systolic blood pressure; eGFR: estimated glomerular filtration rate.

Supplementary Table 2. Adjusted marginal means of TBS, FN BMD, and LS BMD across CKM syndrome stages

CKM Stage	TBS (95%CI)	FN BMD (95%CI), g/cm ²	LS BMD (95%CI), g/cm ²
0	1.4135 (1.402-1.425)	0.7621 (0.750-0.774)	0.9826 (0.969-0.997)
1	1.3785 (1.372-1.385)	0.8295 (0.823-0.836)	1.0319 (1.024-1.040)
2	1.3531 (1.348-1.359)	0.8374 (0.831-0.843)	1.0346 (1.028-1.042)
3	1.3646 (1.347-1.382)	0.8405 (0.822-0.859)	1.0691 (1.047-1.091)
4	1.3480 (1.335-1.361)	0.8334 (0.819-0.847)	1.0576 (1.041-1.074)

Values are adjusted marginal means with 95% confidence intervals derived from multivariable linear regression models (Model 3), adjusted for age; sex; race; poverty-income ratio; marital status; education level; levels of serum 25-hydroxyvitamin D, serum alkaline phosphatase, serum total calcium, serum phosphorus, serum uric acid, total calcium intake, Vit D supplementation, physical activity level, alcohol consumption, history of glucocorticoid use, history of female hormone use, rheumatoid arthritis, had cancer or malignancy, current anti-osteoporosis drug use. CI: Confidence interval; FN: femoral neck; BMD: bone mineral density; LS: lumbar spine; TBS: trabecular bone score.

Supplementary Table 3. Subgroup analysis of association between the cardiovascular-kidney-metabolic syndrome stage and the trabecular bone score

Subgroup	Stage 0 β (95%CI) <i>P</i> -value	Stage 1 β (95%CI) <i>P</i> -value	Stage 2 β (95%CI) <i>P</i> -value	Stage 3 β (95%CI) <i>P</i> -value	Stage 4 β (95%CI) <i>P</i> -value	<i>P</i> -interaction
Sex						0.0397
Male	Reference	-0.06 (-0.08, -0.04) < 0.0001	-0.09 (-0.11, -0.08) < 0.0001	-0.11 (-0.13, -0.08) < 0.0001	-0.12 (-0.14, -0.09) < 0.0001	
Female	Reference	-0.03 (-0.05, -0.02) < 0.0001	-0.06 (-0.08, -0.05) < 0.0001	-0.09 (-0.12, -0.06) < 0.0001	-0.07 (-0.10, -0.05) < 0.0001	
Menopause history						0.7212
No	Reference	-0.03 (-0.05, -0.02) 0.0002	-0.06 (-0.08, -0.05) < 0.0001	-0.02 (-0.21, 0.18) 0.8781	-0.07 (-0.11, -0.02) 0.0033	
Yes	Reference	-0.02 (-0.05, 0.00) 0.0878	-0.05 (-0.07, -0.02) 0.0006	-0.07 (-0.11, -0.04) 0.0001	-0.06 (-0.09, -0.03) 0.0003	
Age (years)						0.3644
(30.00-49.00)	Reference	-0.04 (-0.06, -0.03) < 0.0001	-0.09 (-0.10, -0.07) < 0.0001	-0.05 (-0.20, 0.10) 0.4838	-0.10 (-0.13, -0.07) < 0.0001	
(50.00-79.00)	Reference	-0.05 (-0.07, -	-0.08 (-0.10, -	-0.10 (-0.13, -	-0.10 (-0.13, -	

		0.03) < 0.0001	0.05) < 0.0001	0.07) < 0.0001	0.08) < 0.0001	
Race						0.0333
Mexican American	Reference	-0.04 (-0.07, -0.01) 0.0044	-0.08 (-0.11, -0.05) < 0.0001	-0.07 (-0.12, -0.02) 0.0049	-0.04 (-0.08, 0.00) 0.0563	
Other Hispanic	Reference	-0.02 (-0.07, 0.02) 0.2287	-0.07 (-0.11, -0.03) 0.0004	-0.06 (-0.13, 0.01) 0.0972	-0.14 (-0.21, -0.08) < 0.0001	
Non-Hispanic White	Reference	-0.05 (-0.07, -0.03) < 0.0001	-0.08 (-0.10, -0.06) < 0.0001	-0.10 (-0.13, -0.07) < 0.0001	-0.11 (-0.14, -0.09) < 0.0001	
Non-Hispanic Black	Reference	-0.06 (-0.10, -0.02) 0.0013	-0.10 (-0.13, -0.06) < 0.0001	-0.10 (-0.15, -0.05) 0.0003	-0.10 (-0.14, -0.05) < 0.0001	
Other Race	Reference	0.00 (-0.05, 0.06) 0.8778	-0.03 (-0.08, 0.02) 0.1860	-0.16 (-0.31, -0.02) 0.0243	-0.04 (-0.13, 0.04) 0.3279	
Marital status						0.8780
Married	Reference	-0.04 (-0.06, -0.03) < 0.0001	-0.08 (-0.09, -0.06) < 0.0001	-0.09 (-0.11, -0.06) < 0.0001	-0.09 (-0.11, -0.07) < 0.0001	
Single/With partner	Reference	-0.05 (-0.07, -0.03) < 0.0001	-0.08 (-0.11, -0.06) < 0.0001	-0.10 (-0.13, -0.06) < 0.0001	-0.11 (-0.13, -0.08) < 0.0001	
Education level						0.4962
Below high school	Reference	-0.04 (-0.07, -	-0.07 (-0.10, -	-0.07 (-0.11, -	-0.08 (-0.11, -	

		0.01) 0.0027	0.04) < 0.0001	0.03) 0.0002	0.04) < 0.0001	
High school or higher	Reference	-0.04 (-0.06, - 0.03) < 0.0001	-0.08 (-0.10, - 0.07) < 0.0001	-0.10 (-0.13, - 0.08) < 0.0001	-0.10 (-0.12, - 0.08) < 0.0001	
PIR						0.1347
< 1.0	Reference	-0.03 (-0.07, - 0.00) 0.0420	-0.07 (-0.10, - 0.04) < 0.0001	-0.03 (-0.09, 0.03) 0.3306	-0.07 (-0.11, - 0.03) 0.0013	
1.0-3.0	Reference	-0.05 (-0.07, - 0.03) < 0.0001	-0.09 (-0.11, - 0.07) < 0.0001	-0.09 (-0.12, - 0.06) < 0.0001	-0.11 (-0.14, - 0.09) < 0.0001	
> 3.0	Reference	-0.04 (-0.06, - 0.03) < 0.0001	-0.08 (-0.10, - 0.06) < 0.0001	-0.12 (-0.16, - 0.08) < 0.0001	-0.09 (-0.11, - 0.06) < 0.0001	
Alcohol use						0.2625
Never drinkers	Reference	-0.03 (-0.06, 0.00) 0.0927	-0.05 (-0.09, - 0.02) 0.0022	-0.10 (-0.15, - 0.05) < 0.0001	-0.07 (-0.13, - 0.02) 0.0105	
Former drinkers	Reference	-0.06 (-0.09, - 0.02) 0.0009	-0.10 (-0.14, - 0.07) < 0.0001	-0.10 (-0.15, - 0.05) < 0.0001	-0.10 (-0.13, - 0.06) < 0.0001	
Current moderate drinkers	Reference	-0.04 (-0.06, - 0.02) < 0.0001	-0.07 (-0.09, - 0.05) < 0.0001	-0.08 (-0.11, - 0.04) < 0.0001	-0.11 (-0.13, - 0.08) < 0.0001	
Current heavy drinkers	Reference	-0.05 (-0.07, - 0.03) < 0.0001	-0.09 (-0.11, - 0.07) < 0.0001	-0.10 (-0.15, - 0.05) 0.0001	-0.10 (-0.14, - 0.07) < 0.0001	

Physical activity level						0.9694
No activity	Reference	-0.04 (-0.07, -0.02) 0.0013	-0.08 (-0.11, -0.06) < 0.0001	-0.10 (-0.14, -0.07) < 0.0001	-0.10 (-0.13, -0.07) < 0.0001	
Insufficiently active	Reference	-0.05 (-0.08, -0.02) 0.0004	-0.09 (-0.12, -0.06) < 0.0001	-0.09 (-0.14, -0.04) 0.0001	-0.09 (-0.13, -0.05) < 0.0001	
Sufficiently active	Reference	-0.04 (-0.06, -0.02) 0.0001	-0.07 (-0.09, -0.05) < 0.0001	-0.08 (-0.12, -0.04) 0.0001	-0.10 (-0.14, -0.07) < 0.0001	
Highly active	Reference	-0.05 (-0.07, -0.02) 0.0001	-0.08 (-0.10, -0.06) < 0.0001	-0.10 (-0.15, -0.05) 0.0003	-0.08 (-0.12, -0.04) < 0.0001	
History of glucocorticoid use						0.8894
No	Reference	-0.04 (-0.06, -0.03) < 0.0001	-0.08 (-0.09, -0.07) < 0.0001	-0.09 (-0.11, -0.07) < 0.0001	-0.09 (-0.11, -0.07) < 0.0001	
Yes	Reference	-0.06 (-0.13, 0.01) 0.1139	-0.08 (-0.15, -0.01) 0.0228	-0.13 (-0.25, -0.00) 0.0480	-0.11 (-0.19, -0.03) 0.0085	
History of rheumatoid arthritis						0.2860
No	Reference	-0.04 (-0.06, -0.03) < 0.0001	-0.08 (-0.09, -0.07) < 0.0001	-0.09 (-0.11, -0.07) < 0.0001	-0.10 (-0.12, -0.08) < 0.0001	
Yes	Reference	-0.09 (-0.17, -0.00) 0.0405	-0.11 (-0.19, -0.03) 0.0063	-0.18 (-0.29, -0.07) 0.0016	-0.11 (-0.20, -0.02) 0.0150	

History of cancer or malignancy						0.4521
No	Reference	-0.04 (-0.06, -0.03) < 0.0001	-0.08 (-0.09, -0.07) < 0.0001	-0.09 (-0.11, -0.06) < 0.0001	-0.09 (-0.11, -0.07) < 0.0001	
Yes	Reference	-0.04 (-0.09, 0.01) 0.0941	-0.07 (-0.12, -0.03) 0.0027	-0.12 (-0.18, -0.06) < 0.0001	-0.11 (-0.17, -0.05) 0.0002	
Current anti-osteoporosis drug use						0.0010
No	Reference	-0.05 (-0.06, -0.03) < 0.0001	-0.08 (-0.09, -0.07) < 0.0001	-0.09 (-0.11, -0.06) < 0.0001	-0.10 (-0.12, -0.08) < 0.0001	
Yes	Reference	-0.02 (-0.09, 0.05) 0.6539	-0.01 (-0.07, 0.06) 0.8619	-0.17 (-0.26, -0.08) 0.0005	0.01 (-0.08, 0.10) 0.8038	

β: Regression coefficient; CI: confidence interval; CKM: cardiovascular-kidney-metabolic; PIR: poverty-income ratio; TBS: trabecular bone score.

Supplementary Table 4. Subgroup analysis of association between the cardiovascular-kidney-metabolic syndrome stage and femoral neck bone mineral density

Subgroup	Stage 0 β (95%CI)	Stage 1 β (95%CI) <i>P</i> -	Stage 2 β (95%CI) <i>P</i> -	Stage 3 β (95%CI) <i>P</i> -	Stage 4 β (95%CI) <i>P</i> -	<i>P</i> -interaction

	<i>P</i> -value	value	value	value	value	
Sex						0.4882
Male	Reference	0.07 (0.06, 0.09) < 0.0001	0.08 (0.06, 0.10) < 0.0001	0.06 (0.03, 0.09) < 0.0001	0.06 (0.04, 0.09) < 0.0001	
Female	Reference	0.07 (0.05, 0.09) < 0.0001	0.08 (0.06, 0.09) < 0.0001	0.02 (-0.01, 0.06) 0.1572	0.06 (0.03, 0.09) < 0.0001	
Menopause history						0.4369
No	Reference	0.04 (0.02, 0.06) 0.0003	0.06 (0.03, 0.08) < 0.0001	0.03 (-0.22, 0.27) 0.8202	0.03 (-0.03, 0.09) 0.2769	
Yes	Reference	0.08 (0.04, 0.11) < 0.0001	0.09 (0.05, 0.12) < 0.0001	0.08 (0.03, 0.13) 0.0019	0.09 (0.05, 0.13) < 0.0001	
Age (years)						0.1191
(30.00-49.00)	Reference	0.07 (0.05, 0.08) < 0.0001	0.07 (0.05, 0.08) < 0.0001	0.12 (-0.04, 0.29) 0.1454	0.08 (0.04, 0.11) < 0.0001	
(50.00-79.00)	Reference	0.07 (0.05, 0.10) < 0.0001	0.08 (0.06, 0.11) < 0.0001	0.04 (0.01, 0.07) 0.0034	0.05 (0.03, 0.08) < 0.0001	
Race						0.0298
Mexican American	Reference	0.06 (0.02, 0.10) 0.0016	0.05 (0.02, 0.09) 0.0046	0.10 (0.04, 0.16) 0.0019	0.09 (0.03, 0.14) 0.0014	

Other Hispanic	Reference	0.07 (0.02, 0.12) 0.0067	0.05 (0.00, 0.10) 0.0420	0.04 (-0.05, 0.13) 0.3598	0.07 (-0.01, 0.15) 0.0843	
Non-Hispanic White	Reference	0.05 (0.03, 0.07) < 0.0001	0.05 (0.03, 0.07) < 0.0001	0.08 (0.05, 0.12) < 0.0001	0.06 (0.03, 0.09) < 0.0001	
Non-Hispanic Black	Reference	0.03 (-0.02, 0.08) 0.1850	0.06 (0.01, 0.11) 0.0160	0.05 (-0.03, 0.12) 0.2126	0.08 (0.02, 0.14) 0.0132	
Other Race	Reference	0.06 (-0.00, 0.13) 0.0647	0.07 (0.00, 0.13) 0.0468	-0.13 (-0.31, 0.06) 0.1826	0.08 (-0.03, 0.19) 0.1483	
Marital status						0.3875
Married	Reference	0.07 (0.06, 0.09) < 0.0001	0.08 (0.06, 0.09) < 0.0001	0.06 (0.03, 0.08) < 0.0001	0.07 (0.05, 0.10) < 0.0001	
Single/With partner	Reference	0.07 (0.05, 0.09) < 0.0001	0.08 (0.05, 0.10) < 0.0001	0.03 (-0.01, 0.07) 0.0886	0.05 (0.02, 0.08) 0.0033	
Education level						0.6372
Below high school	Reference	0.08 (0.05, 0.11) < 0.0001	0.09 (0.07, 0.12) < 0.0001	0.07 (0.03, 0.10) 0.0009	0.08 (0.04, 0.11) < 0.0001	
High school or higher	Reference	0.07 (0.05, 0.08) < 0.0001	0.07 (0.06, 0.09) < 0.0001	0.05 (0.02, 0.07) 0.0013	0.06 (0.04, 0.08) < 0.0001	
PIR						0.8387

< 1.0	Reference	0.08 (0.05, 0.11) < 0.0001	0.08 (0.05, 0.12) < 0.0001	0.08 (0.02, 0.14) 0.0100	0.07 (0.02, 0.11) 0.0019	
1.0-3.0	Reference	0.06 (0.04, 0.08) < 0.0001	0.07 (0.05, 0.10) < 0.0001	0.05 (0.02, 0.08) 0.0038	0.06 (0.03, 0.09) < 0.0001	
>3.0	Reference	0.08 (0.06, 0.09) < 0.0001	0.07 (0.06, 0.09) < 0.0001	0.04 (0.01, 0.08) 0.0261	0.07 (0.04, 0.10) < 0.0001	
Alcohol use						0.1212
Never drinkers	Reference	0.04 (-0.00, 0.08) 0.0655	0.03 (-0.00, 0.07) 0.0814	-0.01 (-0.06, 0.05) 0.8396	-0.01 (-0.07, 0.05) 0.7386	
Former drinkers	Reference	0.06 (0.02, 0.09) 0.0013	0.08 (0.04, 0.11) < 0.0001	0.04 (-0.01, 0.09) 0.1054	0.07 (0.03, 0.11) 0.0014	
Current moderate drinkers	Reference	0.09 (0.07, 0.11) < 0.0001	0.09 (0.07, 0.11) < 0.0001	0.07 (0.03, 0.11) 0.0002	0.09 (0.06, 0.12) < 0.0001	
Current heavy drinkers	Reference	0.07 (0.05, 0.09) < 0.0001	0.07 (0.05, 0.09) < 0.0001	0.06 (0.01, 0.12) 0.0148	0.03 (-0.00, 0.07) 0.0675	
Physical activity level						0.0745
No activity	Reference	0.08 (0.05, 0.10) < 0.0001	0.10 (0.07, 0.12) < 0.0001	0.07 (0.03, 0.11) 0.0003	0.08 (0.05, 0.11) < 0.0001	
Insufficiently active	Reference	0.06 (0.03, 0.09)	0.07 (0.04, 0.10)	0.09 (0.04, 0.14)	0.07 (0.03, 0.11)	

		0.0002	< 0.0001	0.0006	0.0012	
Sufficiently active	Reference	0.07 (0.05, 0.10) < 0.0001	0.07 (0.05, 0.09) < 0.0001	0.03 (-0.01, 0.08) 0.1311	0.05 (0.01, 0.08) 0.0091	
Highly active	Reference	0.07 (0.05, 0.10) < 0.0001	0.06 (0.04, 0.09) < 0.0001	-0.01 (-0.07, 0.04) 0.6791	0.06 (0.02, 0.10) 0.0063	
History of glucocorticoid use						0.9288
No	Reference	0.07 (0.06, 0.08) < 0.0001	0.08 (0.06, 0.09) < 0.0001	0.05 (0.03, 0.07) < 0.0001	0.06 (0.04, 0.08) < 0.0001	
Yes	Reference	0.08 (0.01, 0.15) 0.0256	0.07 (0.00, 0.14) 0.0411	0.08 (-0.05, 0.20) 0.2317	0.07 (-0.01, 0.15) 0.1047	
History of rheumatoid arthritis						0.1602
No	Reference	0.07 (0.06, 0.08) < 0.0001	0.07 (0.06, 0.09) < 0.0001	0.04 (0.02, 0.07) 0.0001	0.06 (0.04, 0.08) < 0.0001	
Yes	Reference	0.08 (-0.00, 0.17) 0.0523	0.12 (0.04, 0.20) 0.0050	0.15 (0.04, 0.26) 0.0067	0.08 (-0.00, 0.17) 0.0612	
History of cancer or malignancy						0.7825
No	Reference	0.07 (0.06, 0.08)	0.07 (0.06, 0.09)	0.05 (0.02, 0.07)	0.06 (0.04, 0.08)	

		< 0.0001	< 0.0001	0.0002	< 0.0001	
Yes	Reference	0.10 (0.05, 0.15) 0.0001	0.10 (0.06, 0.15) < 0.0001	0.08 (0.02, 0.14) 0.0075	0.08 (0.02, 0.14) 0.0052	
Current anti-osteoporosis drug use						0.7760
No	Reference	0.07 (0.06, 0.08) < 0.0001	0.08 (0.06, 0.09) < 0.0001	0.05 (0.03, 0.07) < 0.0001	0.06 (0.05, 0.08) < 0.0001	
Yes	Reference	0.03 (-0.04, 0.09) 0.4367	0.02 (-0.04, 0.08) 0.4524	-0.02 (-0.11, 0.06) 0.5965	0.01 (-0.07, 0.09) 0.8606	

β: Regression coefficient; CI: confidence interval; CKM: cardiovascular-kidney-metabolic; FN: femoral neck; BMD: bone mineral density; PIR: poverty-income ratio.

Supplementary Table 5. Subgroup analysis of association between the cardiovascular-kidney-metabolic syndrome stage and lumbar spine bone mineral density

Subgroup	Stage 0 β (95%CI) <i>P</i> -value	Stage 1 β (95%CI) <i>P</i> - value	Stage 2 β (95%CI) <i>P</i> - value	Stage 3 β (95%CI) <i>P</i> - value	Stage 4 β (95%CI) <i>P</i> - value	<i>P</i> -interaction
Sex						0.6375
Male	Reference	0.06 (0.04, 0.08)	0.06 (0.04, 0.08)	0.08 (0.05, 0.11)	0.07 (0.04, 0.10)	

		< 0.0001	< 0.0001	< 0.0001	< 0.0001	
Female	Reference	0.05 (0.03, 0.07) < 0.0001	0.06 (0.04, 0.08) < 0.0001	0.04 (0.00, 0.08) 0.0354	0.06 (0.02, 0.09) 0.0005	
Menopause history						0.3899
No	Reference	0.04 (0.02, 0.06) 0.0003	0.06 (0.03, 0.08) < 0.0001	0.03 (-0.22, 0.27) 0.8202	0.03 (-0.03, 0.09) 0.2769	
Yes	Reference	0.08 (0.04, 0.11) < 0.0001	0.09 (0.05, 0.12) < 0.0001	0.08 (0.03, 0.13) 0.0019	0.09 (0.05, 0.13) < 0.0001	
Age (years)						0.3450
(30.00-49.00)	Reference	0.05 (0.03, 0.07) < 0.0001	0.05 (0.03, 0.06) < 0.0001	0.14 (-0.03, 0.32) 0.1050	0.05 (0.01, 0.09) 0.0100	
(50.00-79.00)	Reference	0.05 (0.02, 0.08) 0.0002	0.07 (0.04, 0.09) < 0.0001	0.07 (0.03, 0.10) < 0.0001	0.07 (0.04, 0.10) < 0.0001	
Race						0.4417
Mexican American	Reference	0.06 (0.02, 0.10) 0.0016	0.05 (0.02, 0.09) 0.0046	0.10 (0.04, 0.16) 0.0019	0.09 (0.03, 0.14) 0.0014	
Other Hispanic	Reference	0.07 (0.02, 0.12) 0.0067	0.05 (0.00, 0.10) 0.0420	0.04 (-0.05, 0.13) 0.3598	0.07 (-0.01, 0.15) 0.0843	
Non-Hispanic White	Reference	0.05 (0.03, 0.07)	0.05 (0.03, 0.07)	0.08 (0.05, 0.12)	0.06 (0.03, 0.09)	

		< 0.0001	< 0.0001	< 0.0001	< 0.0001	
Non-Hispanic Black	Reference	0.03 (-0.02, 0.08) 0.1850	0.06 (0.01, 0.11) 0.0160	0.05 (-0.03, 0.12) 0.2126	0.08 (0.02, 0.14) 0.0132	
Other Race	Reference	0.06 (-0.00, 0.13) 0.0647	0.07 (0.00, 0.13) 0.0468	-0.13 (-0.31, 0.06) 0.1826	0.08 (-0.03, 0.19) 0.1483	
Marital status						0.4211
Married	Reference	0.05 (0.03, 0.07) < 0.0001	0.05 (0.04, 0.07) < 0.0001	0.09 (0.05, 0.12) < 0.0001	0.07 (0.04, 0.09) < 0.0001	
Single/With partner	Reference	0.04 (0.02, 0.07) 0.0006	0.05 (0.03, 0.08) < 0.0001	0.04 (-0.00, 0.09) 0.0752	0.07 (0.03, 0.10) 0.0001	
Education level						0.2805
Below high school	Reference	0.07 (0.03, 0.10) < 0.0001	0.08 (0.05, 0.11) < 0.0001	0.08 (0.03, 0.13) 0.0007	0.09 (0.05, 0.13) < 0.0001	
High school or higher	Reference	0.05 (0.03, 0.06) < 0.0001	0.05 (0.03, 0.06) < 0.0001	0.08 (0.05, 0.11) < 0.0001	0.07 (0.04, 0.09) < 0.0001	
PIR						0.3370
< 1.0	Reference	0.06 (0.02, 0.10) 0.0030	0.07 (0.03, 0.11) 0.0005	0.08 (0.01, 0.15) 0.0248	0.09 (0.04, 0.14) 0.0008	
1.0-3.0	Reference	0.05 (0.02, 0.08)	0.07 (0.04, 0.09)	0.09 (0.06, 0.13)	0.09 (0.05, 0.12)	

		0.0001	< 0.0001	< 0.0001	< 0.0001	
>3.0	Reference	0.05 (0.03, 0.07) < 0.0001	0.04 (0.02, 0.06) 0.0006	0.04 (-0.01, 0.08) 0.0919	0.05 (0.01, 0.08) 0.0094	
Alcohol use						0.3831
Never drinkers	Reference	0.03 (-0.02, 0.08) 0.1926	0.05 (0.00, 0.09) 0.0414	0.05 (-0.02, 0.12) 0.1315	0.03 (-0.04, 0.11) 0.3743	
Former drinkers	Reference	0.04 (0.00, 0.08) 0.0462	0.06 (0.02, 0.10) 0.0043	0.05 (-0.01, 0.11) 0.0797	0.08 (0.03, 0.13) 0.0012	
Current moderate drinkers	Reference	0.06 (0.04, 0.09) < 0.0001	0.07 (0.04, 0.09) < 0.0001	0.11 (0.07, 0.15) < 0.0001	0.09 (0.05, 0.12) < 0.0001	
Current heavy drinkers	Reference	0.05 (0.03, 0.07) < 0.0001	0.04 (0.01, 0.06) 0.0027	0.08 (0.02, 0.14) 0.0076	0.04 (0.00, 0.08) 0.0500	
Physical activity level						0.6032
No activity	Reference	0.06 (0.03, 0.09) 0.0002	0.07 (0.04, 0.10) < 0.0001	0.06 (0.01, 0.10) 0.0099	0.09 (0.05, 0.12) < 0.0001	
Insufficiently active	Reference	0.03 (0.00, 0.07) 0.0491	0.05 (0.01, 0.08) 0.0098	0.08 (0.02, 0.14) 0.0086	0.07 (0.02, 0.12) 0.0063	
Sufficiently active	Reference	0.05 (0.03, 0.08) < 0.0001	0.05 (0.02, 0.07) 0.0006	0.10 (0.05, 0.15) < 0.0001	0.05 (0.01, 0.09) 0.0115	

Highly active	Reference	0.05 (0.02, 0.08) 0.0013	0.05 (0.02, 0.08) 0.0019	0.08 (0.02, 0.14) 0.0148	0.08 (0.03, 0.13) 0.0016	
History of glucocorticoid use						0.2821
No	Reference	0.05 (0.04, 0.07) < 0.0001	0.06 (0.04, 0.07) < 0.0001	0.07 (0.05, 0.10) < 0.0001	0.07 (0.05, 0.10) < 0.0001	
Yes	Reference	-0.02 (-0.10, 0.07) 0.7163	-0.00 (-0.08, 0.08) 0.9846	0.12 (-0.03, 0.27) 0.1217	0.02 (-0.08, 0.12) 0.7222	
History of rheumatoid arthritis						0.5580
No	Reference	0.05 (0.03, 0.06) < 0.0001	0.05 (0.04, 0.07) < 0.0001	0.07 (0.04, 0.09) < 0.0001	0.07 (0.05, 0.09) < 0.0001	
Yes	Reference	0.04 (-0.06, 0.14) 0.4549	0.05 (-0.05, 0.15) 0.2987	0.14 (0.01, 0.27) 0.0333	0.07 (-0.04, 0.17) 0.2108	
History of cancer or malignancy						0.4143
No	Reference	0.05 (0.03, 0.06) < 0.0001	0.05 (0.04, 0.07) < 0.0001	0.07 (0.05, 0.10) < 0.0001	0.07 (0.05, 0.10) < 0.0001	
Yes	Reference	0.07 (0.01, 0.13) 0.0320	0.08 (0.02, 0.14) 0.0127	0.07 (-0.00, 0.15) 0.0577	0.05 (-0.02, 0.13) 0.1485	
Current anti-osteoporosis drug						0.6168

use						
No	Reference	0.05 (0.04, 0.07) < 0.0001	0.05 (0.04, 0.07) < 0.0001	0.07 (0.05, 0.10) < 0.0001	0.07 (0.05, 0.09) < 0.0001	
Yes	Reference	-0.03 (-0.12, 0.06) 0.5149	0.01 (-0.08, 0.09) 0.8390	-0.02 (-0.13, 0.10) 0.8018	0.02 (-0.10, 0.13) 0.7698	

β: Regression coefficient; CI: confidence interval; CKM: cardiovascular-kidney-metabolic; LS: lumbar spine; BMD: bone mineral density; PIR: poverty-income ratio.