Supplemental Methods: principal factor analysis

To adjust for other dietary factors as potential confounders of the associations between rice with diabetes and dyslipidemia measures, we generated factor scores using principal factor analysis (PFA, factormat command in Stata) with rotation, using food groups that the participants consumed other than white rice [wheat products as staple food (noodles, wheat buns etc.), low-sugar wheat products (biscuits, bread, dumplings), whole grains (millet, corn), fruits & vegetables, red meat, poultry, milk, soymilk, dried legumes, cakes & pastries, fish & seafood, eggs, and starchy tubers & starch] [50]. Most food groups had a high proportion of non-consumers (interquartile range: 34.7%-81.2%) during the three days. Thus, we categorized consumption of each food group as two- (non-consumers vs. consumers, for food groups with <25% consumers) or three-level variables (non-consumers, consumers >/< median intake for food groups with ≥25% consumers) [51]. PFA on ordinal variables was then performed with a polychoric correlation matrix. We used a criterion of eigenvalues above 1 to determine the number of factors. Using this criterion, we retained two patterns with the largest eigenvalues in each region. For every individual, we generated two pattern scores (one for each pattern) by standardizing each food group intake to zero mean and unit variance, and then weighting with factor loadings and summing for each pattern.

Supplement Table 1. Pearson's correlation coefficients between consumption (% energy) of white rice and other food groups by geographic region[a]

	North	Central	South
Food groups, % energy			
Wheat products as staple food[b]	-0.51*	-0.72*	-0.43*
Low-sugar wheat products[c]	-0.21*	-0.20*	-0.17*
Whole grains[d]	-0.24*	-0.24*	-0.19*
Cakes & pastries	-0.16*	-0.01	-0.12*
Starchy tubers & starch	0.15*	-0.20*	-0.08*
Fruits & vegetables	0.02	0.12*	-0.04*
Red meat	-0.10*	0.16*	-0.18*
Poultry	0.00	0.10*	-0.03
Fish & seafood	-0.03	0.32*	-0.13*
Dried legumes	-0.04	0.02	-0.09*
Eggs	0.03	-0.14*	-0.14*
Milk	-0.16*	0.02	-0.15*
Soymilk	-0.22*	-0.05*	-0.11*

[a] Geographic regions: North: Heilongjiang, Liaoning; Central: Shandong, Henan, Jiangsu; South: Hunan, Hubei, Guangxi, Guizhou.. [b] Noodles, wheat buns etc. [c] Biscuits, bread, dumplings. [d] Corn and millet. * $p<0.05$.

Supplement Table 2. ORs (95% CIs) of diabetes according to categories of percent energy from white rice and geographic region[a]

	Percent energy from white rice, %			P – trend[b]
	Tertile 1	Tertile 2	Tertile 3	
North (total prevalence: 5.2%)				
Median intake (range), %	16.2 (0-23.9)	30.1 (23.9-36.9)	45.9 (36.9-86.8)	
Participants, n	504	512	513	
No. (%) of cases	25 (5.0)	28 (5.5)	26 (5.1)	
Age and gender adjusted	1.00 (reference)	1.24 (0.70, 2.21)	1.11 (0.64, 1.95)	0.71
Multivariable adjusted without BMI[c]	1.00 (reference)	1.10 (0.61, 1.99)	1.00 (0.53, 1.87)	0.98
Central (total prevalence: 5.7%)				
Median intake (range), %	0.0 (0-3.5)	13.5 (3.6-24.1)	39.9 (24.2-87.5)	
Participants, n	908	899	912	
No. (%) of cases	57 (6.3)	60 (6.7)	38 (4.2)	
Age and gender adjusted	1.00 (reference)	1.06 (0.72, 1.56)	0.62 (0.41, 0.97)	0.02
Multivariable adjusted without BMI[c]	1.00 (reference)	0.94 (0.63, 1.42)	0.56 (0.34, 0.94)	0.02
South (total prevalence: 3.7%)				
Median intake (range), %	27.7 (0-36.4)	43.0 (36.4-49.8)	57.9 (49.8-86.6)	
Participants, n	1106	1136	1138	
No. (%) of cases	48 (4.3)	42 (3.7)	35 (3.1)	
Age and gender adjusted	1.00 (reference)	0.88 (0.57, 1.37)	0.75 (0.47, 1.18)	0.21
Multivariable adjusted without BMI[c]	1.00 (reference)	0.94 (0.60, 1.46)	0.88 (0.53, 1.45)	0.62

Diabetes was defined as a fasting blood glucose measurement ≥ 7.0 mmol/L. [a] Geographic regions: North: Heilongjiang, Liaoning; Central: Shandong, Henan, Jiangsu; South: Hunan, Hubei, Guangxi, Guizhou. [b] Median values were assigned to each category and the variable was modeled as continuous to test linear trend. [c] Additionally adjusted for age (continuous with linear and quadratic terms), gender, education (below high school/high school/above high school), urbanicity (low/medium/high), hypertension diagnosis (yes/no), total physical activity (METs/week, quartiles), total energy intake (kcal/day, quartiles), fiber intake (g/day, quartiles), magnesium intake (mg/day, quartiles), and dietary pattern scores (quartiles).

Supplement Table 3. ORs (95% CIs) of dyslipidemia markers according to categories of percent energy from white rice and geographic region[a]

	Percent energy from white rice, %			P – trend[b]
	Tertile 1	Tertile 2	Tertile 3	
High triglycerides				
North (total prevalence: 37.2%)				
Median intake (range), %	16.2 (0-23.9)	30.1 (23.9-36.9)	45.9 (36.9-86.8)	
Participants, n	533	532	532	
No. (%) of cases	182 (34.2)	204 (38.4)	208 (39.1)	
Age and gender adjusted	1.00 (reference)	1.28 (1.00, 1.65)	1.31 (1.02, 1.69)	0.04
Multivariable adjusted without BMI[c]	1.00 (reference)	1.33 (1.02, 1.72)	1.52 (1.15, 2.01)	0.004
Central (total prevalence: 29.5%)				
Median intake (range), %	0.0 (0-3.5)	13.5 (3.6-24.1)	39.9 (24.2-87.5)	
Participants, n	942	941	941	
No. (%) of cases	278 (29.5)	284 (30.2)	271 (28.8)	
Age and gender adjusted	1.00 (reference)	1.04 (0.84, 1.28)	0.96 (0.78, 1.18)	0.62
Multivariable adjusted without BMI[c]	1.00 (reference)	0.96 (0.77, 1.19)	0.85 (0.68, 1.07)	0.16
South (total prevalence: 31.2%)				
Median intake (range), %	27.7 (0-36.4)	43.0 (36.4-49.8)	57.9 (49.8-86.6)	
Participants, n	1153	1152	1152	
No. (%) of cases	407 (35.3)	357 (30.7)	318 (27.6)	
Age and gender adjusted	1.00 (reference)	0.81 (0.68, 0.97)	0.69 (0.57, 0.83)	<0.001
Multivariable adjusted without BMI[c]	1.00 (reference)	0.85 (0.70, 1.03)	0.82 (0.66, 1.04)	0.09
High LDL				
North (total prevalence: 30.8%)				
No. (%) of cases	175 (32.8)	150 (28.2)	166 (31.2)	
Age and gender adjusted	1.00 (reference)	0.86 (0.65, 1.13)	0.99 (0.76, 1.30)	0.99
Multivariable adjusted without BMI[c]	1.00 (reference)	0.91 (0.68, 1.21)	1.20 (0.89, 1.63)	0.23
Central (total prevalence: 32.7%)				
No. (%) of cases	348 (36.9)	325 (34.5)	251 (26.7)	
Age and gender adjusted	1.00 (reference)	0.89 (0.72, 1.09)	0.59 (0.47, 0.73)	<0.001
Multivariable adjusted without BMI[c]	1.00 (reference)	0.76 (0.61, 0.94)	0.51 (0.40, 0.65)	<0.001
South (total prevalence: 30.4%)				
No. (%) of cases	352 (30.5)	367 (31.9)	331 (28.7)	
Age and gender adjusted	1.00 (reference)	1.12 (0.94, 1.34)	0.99 (0.82, 1.20)	0.92
Multivariable adjusted without BMI[c]	1.00 (reference)	1.18 (0.97, 1.43)	1.17 (0.91, 1.51)	0.19
Low HDL				
North (total prevalence: 31.3%)				
No. (%) of cases	147 (27.6)	176 (33.1)	176 (33.1)	
Age and gender adjusted	1.00 (reference)	1.27 (0.98, 1.66)	1.31 (1.00, 1.71)	0.05
Multivariable adjusted without BMI[c]	1.00 (reference)	1.32 (1.01, 1.73)	1.44 (1.08, 1.91)	0.01
Central (total prevalence: 26.3%)				
No. (%) of cases	244 (25.9)	240 (25.5)	258 (27.4)	
Age and gender adjusted	1.00 (reference)	0.96 (0.76, 1.21)	1.08 (0.86, 1.35)	0.44
Multivariable adjusted without BMI[c]	1.00 (reference)	0.90 (0.70, 1.15)	0.96 (0.74, 1.23)	0.86
South (total prevalence: 23.1%)				
No. (%) of cases	282 (24.5)	254 (22.1)	264 (22.9)	
Age and gender adjusted	1.00 (reference)	0.91 (0.74, 1.11)	0.99 (0.81, 1.22)	0.94
Multivariable adjusted without BMI[c]	1.00 (reference)	0.98 (0.79, 1.22)	1.16 (0.88, 1.51)	0.32
Atherogenic dyslipidemia				
North (total prevalence: 19.5%)				
No. (%) of cases	86 (16.1)	111 (20.9)	114 (21.4)	
Age and gender adjusted	1.00 (reference)	1.43 (1.05, 1.95)	1.49 (1.10, 2.02)	0.01
Multivariable adjusted without BMI[c]	1.00 (reference)	1.46 (1.06, 2.00)	1.69 (1.21, 2.36)	0.002
Central (total prevalence: 14.0%)				
No. (%) of cases	133 (14.1)	128 (13.6)	133 (14.1)	
Age and gender adjusted	1.00 (reference)	0.95 (0.72, 1.26)	0.99 (0.75, 1.31)	0.98
Multivariable adjusted without BMI[c]	1.00 (reference)	0.86 (0.64, 1.15)	0.87 (0.64, 1.19)	0.49
South (total prevalence: 12.8%)				
No. (%) of cases	173 (15.0)	137 (11.9)	133 (11.6)	
Age and gender adjusted	1.00 (reference)	0.79 (0.61, 1.00)	0.76 (0.61, 0.99)	0.04
Multivariable adjusted without BMI[c]	1.00 (reference)	0.88 (0.67, 1.14)	1.00 (0.73, 1.37)	0.89

High triglycerides: ≥150 mg/dL or taking lipid lowering medication; high LDL: >130 mg/dL or taking lipid lowering medication; low HDL: Men: <40 mg/dL, women <50 mg/dL; atherogenic dyslipidemia: high total triglycerides *and* low HDL. [a] Geographic regions: North: Heilongjiang, Liaoning; Central: Shandong, Henan, Jiangsu; South: Hunan, Hubei, Guangxi, Guizhou. [b] Median values were assigned to each category and the variable was modeled as continuous to test linear trend. [c] Additionally adjusted for age (continuous with linear and quadratic terms), gender, education (below high school/high school/above high school), urbanicity (low/medium/high), hypertension diagnosis (yes/no), total physical activity (METs/week, quartiles), total energy intake (kcal/day, quartiles), fat intake (% of total energy,

quartiles), and dietary pattern scores (quartiles).

Supplement Table 4. ORs (95% CIs) of diabetes according to categories of percent energy from white rice and geographic region[a]

	Percent energy from white rice, %			P – trend[b]
	Tertile 1	Tertile 2	Tertile 3	
North (total prevalence: 5.2%)				
Median intake (range), %	16.2 (0-23.9)	30.1 (23.9-36.9)	45.9 (36.9-86.8)	
Participants, n	504	512	513	
No. (%) of cases	23 (4.6)	30 (5.9)	27 (5.3)	
Fully adjusted multivariable model[c]	1.00 (reference)	1.16 (0.64, 2.10)	1.07 (0.58, 1.98)	0.94
Central (total prevalence: 5.7%)				
Median intake (range), %	0.0 (0-3.5)	13.5 (3.6-24.1)	39.9 (24.2-87.5)	
Participants, n	908	899	912	
No. (%) of cases	87 (9.7)	90 (10.0)	70 (7.7)	
Fully adjusted multivariable model[c]	1.00 (reference)	0.95 (0.70, 1.29)	0.66 (0.44, 0.99)	0.04
South (total prevalence: 3.7%)				
Median intake (range), %	27.7 (0-36.4)	43.0 (36.4-49.8)	57.9 (49.8-86.6)	
Participants, n	1106	1136	1138	
No. (%) of cases	61 (5.5)	32 (2.8)	27 (2.4)	
Fully adjusted multivariable model[c]	1.00 (reference)	0.60 (0.38, 0.97)	0.80 (0.45, 1.42)	0.27

Diabetes was defined as hemoglobin A1c (HbA1c) measurement $\geq$ 6.5%. [a] Geographic regions: North: Heilongjiang, Liaoning; Central: Shandong, Henan, Jiangsu; South: Hunan, Hubei, Guangxi, Guizhou. [b] Median values were assigned to each category and the variable was modeled as continuous to test linear trend. [c] Adjusted for age (continuous with linear and quadratic terms), gender, education (below high school/high school/above high school), urbanicity (low/medium/high), hypertension diagnosis (yes/no), total physical activity (METs/week, quartiles), total energy intake (kcal/day, quartiles), fiber intake (g/day, quartiles), magnesium intake (mg/day, quartiles), dietary pattern scores (quartiles), and BMI (kg/m², quartiles).

Supplement Figure 1. ORs and 95% CIs of diabetes and dyslipidemia markers associated with replacement of 10% energy from wheat products as staple food with 10% energy from white rice in each geographic region[a]
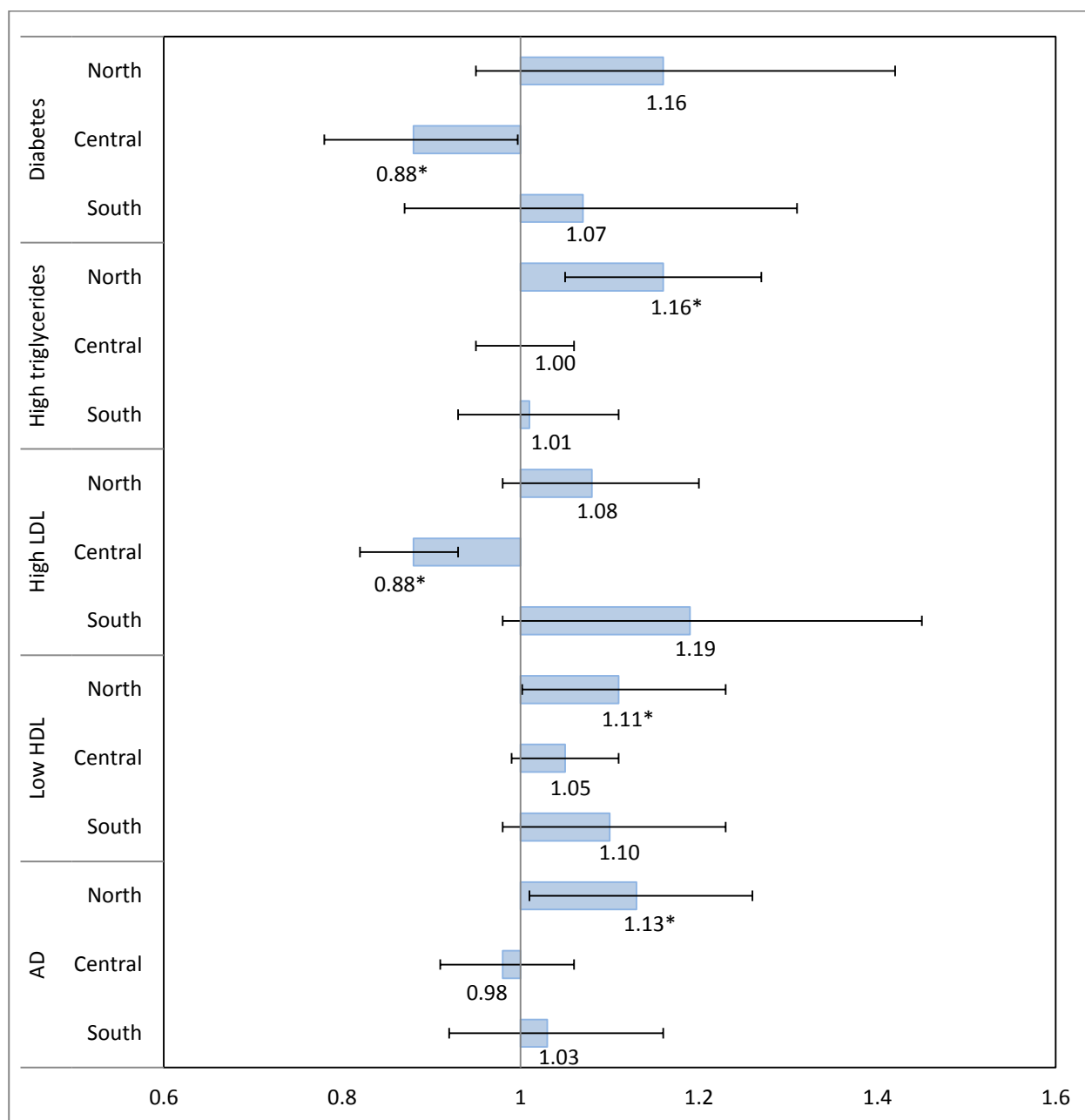
Diabetes was defined as a fasting blood glucose measurement ≥ 7.0 mmol/L. High triglycerides: ≥150 mg/dL or taking lipid lowering medication; high LDL: >130 mg/dL or taking lipid lowering medication; low HDL: Men: <40 mg/dL, women <50 mg/dL; atherogenic dyslipidemia: high total triglycerides *and* low HDL. [a] Geographic regions: North: Heilongjiang, Liaoning; Central: Shandong, Henan, Jiangsu; South: Hunan, Hubei, Guangxi, Guizhou. *p<0.05