**Title:**

The Association between Frequency of Away-from Home Meals and Type 2 Diabetes Mellitus in Rural Chinese Adults: the Henan Rural Cohort Study

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**Table S1**. Odds ratios of T2DM according to weekly frequency of away from home breakfasts.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Weekly frequency of all away-from home meals** | | | | **Per SD risk** | ***P* trend** |
| **0 Time (N=28335)** | **1-2 Times (N=494)** | **3-6 Times (N=464)** | **7 Times (N=617)** |
| Total |  |  |  |  |  |  |
| Prevalence, % (95%*CI*) | 8.86 (8.53-9.19) | 6.07 (3.96-8.19) | 6.47 (4.22-8.71) | 9.89 (7.52-12.25) |  |  |
| Model 1 | 1.00 | **0.67 (0.46-0.96)** | 0.71 (0.49-1.03) | 1.13 (0.86-1.47) | 0.99 (0.95-1.03) | 0.735 |
| Model 2 | 1.00 | 1.20 (0.82-1.78) | 1.27 (0.87-1.85) | **1.56 (1.19-2.05)** | **1.07 (1.03-1.12)** | 0.001 |
| Model 3 | 1.00 | 1.06 (0.72-1.57) | 1.19 (0.81-1.76) | **1.49 (1.13-1.97)** | **1.06 (1.02-1.11)** | 0.005 |
| Male |  |  |  |  |  |  |
| Prevalence, % (95%*CI*) | 8.40 (7.89-8.92) | 7.81 (4.58-11.03) | 8.13 (5.12-11.13) | 10.77 (7.68-13.86) |  |  |
| Model 1 | 1.00 | 0.92 (0.59-1.45) | 0.96 (0.64-1.45) | 1.32 (0.95-1.82) | 1.03 (0.98-1.08) | 0.239 |
| Model 2 | 1.00 | 1.28 (0.81-2.02) | 1.29 (0.85-1.95) | **1.57 (1.13-2.19)** | **1.07 (1.02-1.13)** | 0.006 |
| Model 3 | 1.00 | 1.08 (0.67-1.76) | 1.19 (0.78-1.82) | **1.49 (1.06-2.11)** | **1.06 (1.01-1.12)** | 0.027 |
| Female |  |  |  |  |  |  |
| Prevalence, % (95%*CI*) | 9.16 (8.73-9.60) | 4.00 (1.42-6.58) | 2.78 (0.60-5.50) | 8.37 (4.74-12.00) |  |  |
| Model 1 | 1.00 | **0.41 (0.21-0.81)** | **0.28 (0.12-0.77)** | 0.91 (0.56-1.45) | 0.93 (0.86-1.01) | 0.076 |
| Model 2 | 1.00 | 0.90 (0.45-1.77) | 0.67 (0.25-1.83) | 1.32 (0.81-2.14) | 1.03 (0.96-1.11) | 0.405 |
| Model 3 | 1.00 | 0.87 (0.44-1.75) | 0.70 (0.25-1.95) | 1.29 (0.79-2.11) | 1.03 (0.96-1.11) | 0.439 |

Model 1 was unadjusted; Model 2 was adjusted for age and gender (only for total participants); Model 3 was adjusted for age, gender, education level, average monthly individual income, marital status, smoking, alcohol drinking, physical activity, household size, dietary pattern, household history and family history of T2DM. Trends of odds ratios were performed using the median of weekly frequency of away-from home meals group as a continuous variable in the logistic regression model. *CI*, confidence interval.

**Table S2**. Odds ratios of T2DM according to weekly frequency of away-from home lunches.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Weekly frequency of all away-from home meals | | | | Per SD risk | *P* trend |
| 0 Time (N=27212) | 1-2 Times (N=877) | 3-6 Times (N=737) | 7 Times (N=1084) |
| Total |  |  |  |  |  |  |
| Prevalence, %(95%*CI*) | 8.98 (8.64-9.32) | 6.61 (4.97-8.26) | 7.06 (5.20-8.91) | 7.20 (5.65-8.74) |  |  |
| Model 1 | 1.00 | **0.72 (0.55-0.94)** | 0.77 (0.59-1.02) | **0.77 (0.62-0.99)** | **0.94 (0.90-0.98)** | 0.004 |
| Model 2 | 1.00 | 1.12 (0.85-1.47) | 1.33 (0.99-1.79) | 1.22 (0.96-1.56) | **1.05 (1.01-1.10)** | 0.027 |
| Model 3 | 1.00 | 1.02 (0.77-1.36) | 1.20 (0.89-1.63) | 1.21 (0.95-1.55) | **1.04 (1.01-1.09)** | 0.049 |
| Male |  |  |  |  |  |  |
| Prevalence,%(95%*CI*) | 8.51 (7.97-9.04) | 6.90 (4.72-9.08) | 8.52 (6.16-10.88) | 8.90 (6.78-11.01) |  |  |
| Model 1 | 1.00 | 0.80 (0.56-1.13) | 1.01 (0.74-1.37) | 1.05 (0.80-1.38) | 1.00 (0.95-1.05) | 0.949 |
| Model 2 | 1.00 | 1.01 (0.71-1.44) | 1.35 (0.97-1.84) | **1.36 (1.03-1.79)** | **1.07 (1.01-1.13)** | 0.014 |
| Model 3 | 1.00 | 0.86 (0.59-1.24) | 1.13 (0.81-1.57) | **1.32 (1.00-1.76)** | **1.05 (1.01-1.10)** | 0.048 |
| Female |  |  |  |  |  |  |
| Prevalence,%(95%*CI*) | 9.28 (8.84-9.72) | 6.20 (3.68-8.72) | 3.05 (0.63-5.47) | 4.13 (2.14-6.13) |  |  |
| Model 1 | 1.00 | **0.65 (0.42-0.99)** | **0.31 (0.14-0.69)** | **0.42 (0.26-0.70)** | **0.80 (0.72-0.88)** | <0.001 |
| Model 2 | 1.00 | 1.16 (0.75-1.81) | 0.67 (0.80-1.53) | 0.70 (0.42-1.17) | 0.93 (0.85-1.03) | 0.170 |
| Model 3 | 1.00 | 1.21 (0.77-1.90) | 0.73 (0.32-1.68) | 0.73(0.44-1.23) | 0.94 (0.85-1.04) | 0.241 |

Model 1 was unadjusted; Model 2 was adjusted for age and gender (only for total participants); Model 3 was adjusted for age, gender, education level, average monthly individual income, marital status, smoking, alcohol drinking, physical activity, household size, dietary pattern, household history and family history of T2DM. Trends of odds ratios were performed using the median of weekly frequency of away-from home meals group as a continuous variable in the logistic regression model. *CI*, confidence interval.

**Table S3.** Mediation analysis of the relationship between frequency of AFHs and T2DM by BMI.

|  |  |  |
| --- | --- | --- |
| Mediation Analysis | Parameter Estimate (95% CI) | *OR* (95% *CI*) |
| All T2DM |  |  |
| Total effect | 0.019(0.005-0.033) | 1.018(1.004-1.033) |
| Direct effect-path c | 0.016(0.002-0.023) | 1.016(1.002-1.023) |
| Path a | 0.036(0.023-0.049) | 1.037(1.023-1.050) |
| Path b | 0.123(0.112-0.134) | 1.131(1.119-1.143) |
| Indirect effect-path ab | 0.005(0.003-0.006) | 1.005(1.003-1.006) |

AFHs, away-from home meals; T2DM, type 2 diabetes mellitus; *CI*, confidence interval; BMI, body mass index.

Adjusted for age, gender, education level, average monthly individual income, marital status, smoking, alcohol drinking, physical activity, household size, dietary pattern, household history and family history of T2DM.

Path ab coefficients represent 10,000 bootstrapped samples and bias-corrected 95% *CIs*.

**Table S4.** Characteristics of the Henan Rural Cohort Study participants who were and were not included in the current analysis

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Variables** | **Total (N=39196)** | | **Male (N=15462)** | | **Female (N=23734)** | |
| **Included**  **(n=29910)** | **Excluded**  **(n-9286)** | **Included**  **(n=12177)** | **Excluded**  **(n-3285)** | **Included**  **(n=17733)** | **Excluded**  **(n-6001)** |
| Age(years), (mean ±SD) | 54.4±12.4 | 56.1±11.6 | 56.5±12.4 | 57.2±11.9 | 54.7±12.3 | 55.5±11.4 |
| Gender, n (%) |  |  |  |  |  |  |
| Male | 12177(40.7) | 3285(35.4) | - | - | - | - |
| Female | 17733(59.3) | 6001(64.6) | - | - | - | - |
| Marital status, n (%) |  |  |  |  |  |  |
| Married/cohabitating | 26970(90.2) | 8218(88.5) | 10988(90.2) | 2922(88.9) | 15982(90.1) | 5296(88.3) |
| Unmarried/divorced/widowed | 2940(9.8) | 1068(11.5) | 1189(9.8) | 363(11.1) | 1751(9.9) | 705(11.7) |
| Education level, n (%) |  |  |  |  |  |  |
| Elementary school or below | 4497(16.7) | 1533(16.5) | 1110(9.1) | 215(6.5) | 3887(21.9) | 1318(22.0) |
| Junior high school | 23895(79.9) | 7625(82.1) | 1076(87.1) | 3002(91.4) | 13288(74.9) | 4623(77.0) |
| High school or above | 1018(3.4) | 128(1.4) | 460(3.8) | 68(2.1) | 558(3.1) | 60(1.0) |
| Average monthly individual income, n (%) |  |  |  |  |  |  |
| <500 RMB | 10794(36.1) | 3193(34.4) | 4452(36.6) | 1143(34,8) | 6342(35.8) | 2050(34.2) |
| 500-1000 RMB | 18174(60.8) | 6037(65.0) | 7265(59.7) | 2116(64.4) | 10909(61.5) | 3921(65.3) |
| ≥1000 RMB | 942(3.1) | 56(0.6) | 460(3.8) | 26(0.8) | 482(2.7) | 30(0.5) |
| Smoking, n (%) |  |  |  |  |  |  |
| Never | 21534(72.0) | 7002(75.4) | 3870(31.8) | 1020(31.1) | 17664(99.6) | 5982(99.7) |
| Ever | 2376(7.9) | 810(8.7) | 2358(19.4) | 805(24.5) | 18(0.1) | 5(0.1) |
| Current | 6000(20.1) | 1474(15.9) | 5949(48.9) | 1460(44.4) | 451(0.3) | 14(0.2) |
| Drinking, n (%) |  |  |  |  |  |  |
| Never | 23215(77.6) | 7083(76.3) | 5870(48.2) | 1373(41.8) | 17345(97.8) | 5710(95.2) |
| Ever | 1485(5.0) | 344(3.7) | 1442(11.8) | 323(9.8) | 43(0.2) | 21(0.3) |
| Current | 5210(17.4) | 1859(20.0) | 4865(40.0) | 1589(48.4) | 345(1.9) | 270(4.5) |
| Physical activity, n (%) |  |  |  |  |  |  |
| Low | 9535(31.9) | 3152(33.9) | 4222(34.7) | 1292(39.3) | 5313(30.0) | 1860(31.0) |
| Moderate | 11006(36.8) | 3782(40.7) | 3426(28.1) | 872(26.5) | 7580(42.7) | 2910(48.5) |
| High | 9369(31.3) | 2352(25.3) | 4529(37.2) | 1121(34.1) | 4840(27.3) | 1231(20.5) |
| Household size, (mean ±SD) | 2.1±1.1 | 2.0±0.9 | 1.98±1.02 | 2.08±1.05 | 1.98±1.02 | 2.08±1.05 |
| GLU (mmol/L), (mean ±SD) | 5.5±1.5 | 5.6±1.6 | 5.5±1.5 | 5.7±1.7 | 5.5±1.5 | 5.7±1.6 |
| WC, (mean ±SD) | 83.7±10.5 | 85.3±10.1 | 85.3±10.6 | 86.5±10.5 | 82,6±10.2 | 84.7±9.8 |
| BMI (kg/m2), (mean ±SD) | 24.8±3.6 | 25.1±3.6 | 24.5±3.5 | 24.8±3.5 | 24.9±3.6 | 25.3±3.6 |
| Family history of T2DM, n (%) | 1136(3.8) | 504(5.4) | 407(3.3) | 150(4.6) | 729(4.1) | 354(5.9) |
| T2DM, n (%) | 2632(8.8) | 1076(11.6) | 1030(8.5) | 381(11.6) | 1602(9.0) | 695(11.6) |

Participants who were missing data on T2DM (n=63) are not represented in the table. BMI, body mass index; RMB: renminbi; SD, standard deviation; T2DM, type 2 diabetes mellitus; GLU, glucose; AFHs, away-from home meals. Values are numbers and percentages for categorical variables, and means and standard deviation for continuous variables. \**P*<0.05 for comparison between groups.

**Table S5. Odds ratios of T2DM according to weekly frequency of away from home meals from the modified Poisson regression models.**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Weekly frequency of all away-from home meals | | | | | *Ptrend* |
| 0 Time  (N=26211) | 1-2 Times (N=1065) | 3-6 Times  (N=864) | 7-10 Times  (N=858) | ≥11 Times  (N=912) |
| Total |  |  |  |  |  |  |
| Prevalence,%(95%*CI*) | 9.08 (8.74-9.43) | 6.67 (5.17-8.17) | 5.56 (4.03-7.09) | 6.88 (5.18-8.57) | 8.00 (6.24-9.77) |  |
| Model 1 | 1.00 | **0.73 (0.63-0.86)** | **0.61 (0.51-0.74)** | **0.76 (0.64-0.90)** | 0.88 (0.76-1.03) | <0.001 |
| Model 2 | 1.00 | 1.07 (0.92-1.25) | 1.07 (0.89-1.30) | **1.23 (1.04-1.46)** | **1.38 (1.18-1.61)** | <0.001 |
| Model 3 | 1.00 | 1.02 (0.88-1.18) | 0.99 (0.82-1.19) | 1.13 (0.95-1.33) | **1.31 (1.13-1.52)** | 0.001 |
| Male |  |  |  |  |  |  |
| Prevalence,%(95%*CI*) | 8.58 (8.03-9.13) | 7.02 (4.83-9.21) | 7.29 (5.11-9.47) | 8.01 (5.79-10.24) | 9.20 (6.93-1.45) |  |
| Model 1 | 1.00 | 0.82 (0.66-1.01) | 0.85 (0.69-1.04) | 0.93 (0.77-1.13) | 1.07 (0.90-1.27) | 0.795 |
| Model 2 | 1.00 | 0.99 (0.80-1.23) | 1.16 (0.94-1.43) | **1.23 (1.01-1.49)** | **1.42 (1.19-1.69)** | <0.001 |
| Model 3 | 1.00 | 0.88 (0.72-1.08) | 1.01 (0.82-1.24) | 1.08 (0.90-1.31) | **1.27 (1.07-1.51)** | 0.008 |
| Female |  |  |  |  |  |  |
| Prevalence,%(95%*CI*) | 9.39 (8.94-9.84) | 6.32 (4.26-8.38) | 2.54 (0.79-4.29) | 4.58 (2.13-7.02) | 5.34 (2.69-7.98) |  |
| Model 1 | 1.00 | **0.67 (0.54-0.84)** | **0.27 (0.17-0.43)** | **0.49 (0.34-0.70)** | **0.57 (0.41-0.79)** | <0.001 |
| Model 2 | 1.00 | 1.15 (0.93-1.43) | **0.59 (0.38-0.92)** | 0.92 (0.65-1.30) | 0.90 (0.65-1.24) | 0.303 |
| Model 3 | 1.00 | 1.17 (0.95-1.04) | **0.61 (0.39-0.94)** | 0.92 (0.65-1.30) | 0.94 (0.68-1.29) | 0.404 |

Model 1 was unadjusted; Model 2 was adjusted for age and gender (only for total participants); Model 3 was adjusted for age, gender, education level, average monthly individual income, marital status, smoking, alcohol drinking, physical activity, household size, dietary pattern, household history and family history of T2DM. Trends of odds ratios were performed using the median of weekly frequency of away from home meals group as a continuous variable in the logistic regression model. *CI*, confidence interval.