

## Supplementary Material

### Association between eating speed with metabolic syndrome and its components: a systematic review and meta-analysis

Shu-qian Yuan<sup>1</sup>, Ying-ming Liu<sup>1</sup>, Wei Liang<sup>2,3</sup>, Fei-fei Li<sup>2,3</sup>, Yuan Zeng<sup>1</sup>, Yin-yue Liu<sup>1</sup>, Shu-zhen Huang<sup>1</sup>, Quan-yuan He<sup>1</sup>, Binh Quach<sup>3</sup>, Jiao Jiao<sup>4</sup>, Julien S. Baker<sup>2,3\*</sup>, Yi-de Yang<sup>1\*</sup>

<sup>1</sup>Key Laboratory of Molecular Epidemiology of Hunan Province, School of Medicine, Hunan Normal University, Changsha, 410006, China

<sup>2</sup>Centre for Health and Exercise Science Research, Hong Kong Baptist University, Kowloon Tong 999077, Hong Kong, China;

<sup>3</sup>Department of Sport, Physical Education and Health, Hong Kong Baptist University, Kowloon Tong 999077, Hong Kong, China;

<sup>4</sup>Dr. Stephen Hui Research Centre for Physical Recreation and Wellness, Hong Kong Baptist University, Kowloon Tong 999077, Hong Kong, China.

#### \*Correspondence:

**Yi-de Yang**

[yangyide2007@126.com](mailto:yangyide2007@126.com)

**Julien S Baker**

[jsbaker@hkbu.edu.hk](mailto:jsbaker@hkbu.edu.hk)

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**Table S1. The detailed characteristics of the studies reporting on the association between eating speed and metabolic syndrome and its components**

Reference	Study design	Country	sample size (% men)	Age (years)	population	Evaluation of eating rate	Category of eating rate		Outcome	OR/P
							Quickly	Reference		
Pey Sze Teo, et al <sup>45</sup>	Cross-sectional study	Singapore	7011(44.8)	49.8±13.0	adults	Self-report	Medium/Fast	Slow	Abdominal overweight	Medium: OR=1.40(1.18-1.67) Fast: OR=1.84(1.52-2.21)
Lixin Tao, et al <sup>23</sup>	Cross-sectional study	China	7972(88.26)	29-48	adults	Self-report	Medium/Fast	Slow	MetS; central obesity; BP; FPG;TG; HDL	Medium: OR=1.65(1.32-2.07) Fast: OR=2.27(1.80-2.86) OR=1.39(1.12-1.72) OR=1.68(1.35-2.09) OR=1.57(1.28-1.92) OR=1.82(1.48-2.24) OR=1.11(0.88-1.41) OR=1.18(0.93-1.51) OR=1.25(1.00-1.55) OR=1.51(1.21-1.88) OR=1.22(1.02-1.45) OR=1.33(1.11-1.60)
Chikanobu Sonoda, et al <sup>46</sup>	Cross-sectional study	Japan	863(100)	34-59	adults	Self-report	Ordinary/Fast/Very fast	Slow, very slow	WC≥85cm, WC≥90cm,	Ordinary: OR=1.72 (0.96–3.11) OR=2.34 (1.08–5.05) Fast: OR=3.13 (1.74–5.64) OR=3.90 (1.82–8.34) Very fast: OR=6.59 (2.37–18.48) OR=5.22 (1.81–15.06)
AESUN SHIN, et al <sup>35</sup>	Cross-sectional study	Korea	7081(100)	≥30	adults	Self-report	Average/Fast	Slow	MetS	Average: OR= 1.66 (1.19-2.32) Fast: OR= 2.23 (1.60-3.12)
Xia Zeng, et al <sup>48</sup>	Cross-sectional study	China	50037(51.1)	11.28±3.07	children	Self-report	Slow/Fast	Medium	Abdominal obesity, WHtR≥0.5	Slow: OR=0.70 (0.65,0.75) Fast: OR=1.51 (1.41,1.61) OR=0.71 (0.65,0.78) OR=1.54 (1.43,1.65)
Rei Otsuka, et al <sup>57</sup>	Cross-sectional study	Japan	3465(78.1)	35-69	adults	Self-report	Very slow/Relatively slow/Relatively Fast/Very fast	Medium	Insulin resistance (HOMA-IR)	P<0.01
Hirota Ochiai, et al <sup>44</sup>	Cross-sectional study	Japan	2136(50.3)	12-13	children	Self-report	Eating quickly	Not Eating quickly	WHtR ≥ 0.5	Boys: Eating quickly: OR=2.05 (1.31–3.23) Girls: Eating quickly: OR=2.09 (1.15–3.81)
K.S. Lee, et al <sup>53</sup>	Cross-sectional study	Korea	8775(54.9)	20-80	adults	Self-report	10≤and <15 min/ 5≤and <10 min/<5 min	NA	Low HDL-C, High TG, High blood glucose, High blood pressure	P<0.05
Shiun Dong Hsieh, et al <sup>55</sup>	Cross-sectional study	Japan	11195(74.0)	men:51.6±9.4 women:52.9±10.1	adults	Self-report	Eating rapidly	Not eating until feeling full and not eating rapidly	Hypertension, Hyperglycaemia, Hypertriglyceridemia, Low HDL-C	Men: OR= 1.36(1.22–1.51) OR= 1.29(1.16–1.43) OR= 1.43(1.27–1.61) OR= 1.30(1.10–1.54) Women: OR= 1.16(0.93–1.44) OR= 1.37(1.07–1.73) OR= 1.59(1.13–2.22) OR= 1.26(0.95–1.68)
Alihiro Kudo, et al <sup>59</sup>	Cohort study	Japan	197825(38.0)	64	adults	Self-report	Fast	Slow	Diabetes	OR=1.10(1.05-1.17)
Kazumasa Yamagishi, et al <sup>54</sup>	Cohort Study	Japan	1490(42.8)	6-12	children	Self-report	Never/ Quit/ Newly/ Continuous	NA	SBP	P=0.01
Mizuki Saito, et al <sup>36</sup>	Cross-sectional study	Japan	2379(40.35)	75-80	adults	Self-report	Normal/Fast	Slow	MetS	Normal: OR=1.34(0.92-1.95) Fast: OR=2.06(1.35-3.16)
Parvane Saneci, et al <sup>49</sup>	Cross-sectional study	Iranian	7958(NA)	NA	adults	Self-report	Moderate to slow/ Moderate to fast	Moderate	WC ≥80 cm for women and ≥94 cm for men WC ≥88 cm for women and ≥102 cm for men	Moderate to slow: OR=0.87 (0.73–1.05) OR=0.86 (0.70–1.06) Moderate to fast: OR=1.19 (0.95–1.49) OR=1.07 (0.83–1.37)
Saleem Perwaiz Iqbal, et al <sup>38</sup>	Cross-sectional study	Malaysia	481(35.1)	≥18	adults	Self-report	Fast	Not Fast	Metabolic syndrome	OR=1.15 (0.75–1.78)
Satsue Nagahama, et al <sup>50</sup>	Cross-sectional study	Japan	56865(73.54)	17-99	adults	Self-report	Slow/Fast	Normal	Central obesity, High blood pressure, High fasting plasma glucose, High triglyceride, Low HDL-C	Men: Slow: OR=0.63 (0.56-0.70) OR=0.74 (0.68-0.81) OR=0.78 (0.71-0.87) OR=0.90 (0.82-0.98) OR=0.83 (0.73-0.96) Fast: OR=1.97 (1.88-2.07) OR=1.20 (1.15-1.26) OR=1.16 (1.11-1.22) OR=1.33 (1.27-1.39) OR=1.36 (1.28-1.45) Women: Slow: OR=0.73 (0.64-0.83) OR=0.76 (0.65-0.88) OR=1.03 (0.85-1.25) OR=0.81 (0.66-1.00) OR=0.89 (0.74-1.08) Fast: OR=1.44 (1.33-1.56) OR=1.10 (1.15-1.20) OR=1.16 (1.03-1.31) OR=1.13 (1.01-1.27) OR=1.12(1.00-1.26)
Masaru Sakurai, et al <sup>58</sup>	Cross-sectional study	Japan	2050(100)	45.9±6.0	adults	Self-report	Medium/Fast	Slow	type 2 diabetes	Medium: OR=1.68 (0.93 - 3.02) Fast: OR=1.97 (1.10 - 3.55)

Bing Zhu, et al <sup>39</sup>	Cohort Study	Japan	8941(38.3)	63.7 ±7.9	adults	Self-report	Fast	Not fast	metabolic syndrome WC, HDL-C, TG, BP, BG	Fast: OR=1.3(1.05-1.60) OR=1.35(1.10-1.66) OR=1.37(1.12-1.67) OR=1.15(0.99-1.31) OR=1.10(0.94-1.27) OR=0.93(0.75-1.16)		
Indira Paz-Graniel, et al <sup>37</sup>	Cross-sectional study	Spain	792(42.93)	50-80	adults	Self-report	Medium/Fast	Slow	MetS, Central obesity, Hypertriglyceridemia, Low HDL-C, High Blood Pressure, High fasting glucose	Fast: OR=0.99(0.86-1.14) OR=0.95(0.87-1.04) OR=1.47(1.08-2.02) OR=0.94(0.68-1.30) OR=1.00(0.97-1.04) OR=0.92(0.80-1.06)	Medium: OR=1.02 (0.88–1.18) OR=1.00 (0.91–1.10) OR=1.32 (0.95–1.85) OR=0.96 (0.68–1.37) OR=1.00 (0.96–1.03) OR=1.00 (0.87–1.15)	
Daisuke Ekuni, et al <sup>43</sup>	Cohort Study	Japan	141(53.19)	65.0 ±6.7	adults	Self-report	Intervention	Control	WC, SBP, DBP, Triglyceride, High-density lipoprotein cholesterol, Low-density lipoprotein cholesterol	Waist circumference: Systolic blood pressure: Diastolic blood pressure: Triglyceride: High-density lipoprotein cholesterol: Low-density lipoprotein cholesterol:	P<0.001 P<0.001 P=0.942 P=0.002 P=0.242 P=0.195	
Akiko Nanri, et al <sup>24</sup>	Cohort Study	Japan	1018(88.41)	19-68	adults	Self-report	Slow/Fast	Medium	MetS, Central obesity High blood pressure, High fasting plasma glucose, High triglyceride, Low HDL-C	Slow: OR=0.93(0.34-2.53) OR=0.65(0.37-1.13) OR=0.70(0.45-1.10) OR=0.93(0.51-1.68) OR=0.68(0.38-1.23) OR=0.52(0.27-1.01)	Fast: OR=2.13 (1.23–3.68) OR=1.64 (1.22–2.20) OR=1.22 (0.93–1.59) OR=1.24 (0.87–1.76) OR=1.31 (0.95–1.81) OR=0.96 (0.67–1.37)	
T. Ohkuma, et al <sup>47</sup>	Cross-sectional study	Japan	7275(51.39)	≥40	adults	Self-report	Medium/Relatively fast/Very fast	Slow	Elevated waist circumference Elevated blood pressure	Normal glucose Medium: OR=1.44 (1.07, 1.95) OR=1.01 (0.74, 1.37)	IFG OR=1.97 (1.33, 2.92) OR=1.28 (0.86, 1.90)	Diabetes OR=0.89 (0.67, 1.17) OR=1.17 (0.87, 1.57)
T. Ohkuma, et al <sup>47</sup>	Cross-sectional study	Japan	7275(51.39)	≥40	adults	Self-report	Medium/Relatively fast/Very fast	Slow	Elevated waist circumference Elevated blood pressure	Relatively fast: OR=2.30 (1.62, 3.27) OR=1.31 (0.93, 1.86)	OR=1.84 (1.19, 2.86) OR=1.60 (1.02, 2.51)	OR=1.06 (0.74, 1.52) OR=1.07 (0.74, 1.57)
Ford AL, et al <sup>56</sup>	Randomised controlled trial	England	106(NA)	9-18	children	by a computerised device	Mandometer group	Standard care group	HDL-C			P<0.05
Tajima Miki, et al <sup>22</sup>	Cohort Study	Japan	3137(56.80)	47.5 ±9.1	adults	Self-report	Slow	Others	MetS			OR=0.49 (0.24-0.996)
Radzevičienė, Lina, et al <sup>60</sup>	A case-control study	America	234(39.28)	34-86	adults	Self-report	The same/Faster	Slow	Type 2 diabetes			OR=2.52 (1.56-4.06)
Hurst Yumi, et al <sup>52</sup>	Cross-sectional study	Japan	59717(100)	40-69	adults	Self-report	Slow/normal	Faster	WC	Slow: OR= 0.58 ( 0.54 -0.63) Normal: OR=0.71 (0.68 -0.75)		
Sonia Gómez-Martínez, et al <sup>51</sup>	Cross-sectional study	Spain	1978(48.58)	13-18.5	adolesce nts	Self-report	Quick	adequate	WC	Boy: P<0.001 Girl: P=0.002		
Youji Sogai, et al <sup>40</sup>	Cross-sectional study	Japan	4,912(20.72)	30-39	adults	Self-report	Fast	Not fast	MetS	Men: OR=1.65(1.25-2.18) Women:OR=2.07(1.50-2.85)		
Eiichi Ashizawa, et al <sup>42</sup>	Cohort Study	Japan	8316(74.13)	20-64	adults	Self-report	After the intervention	Before the intervention	MetS High blood pressure diabetes	Men: OR=0.84(0.70-1.00) OR=0.98(0.84-1.20) OR=0.76(0.59-0.96) Women:OR=1.5(0.88-2.40) OR=0.8(0.56-1.10) OR=0.71(0.36-1.4)		
Joe, Heegyung, et al <sup>41</sup>	Cross-sectional study	Korea	1005(0.00)	20-49	adults	Self-report	Fast	Not fast	MetS			P=0.017

MetS, metabolic syndrome; BP, blood pressure; SBP, systolic blood pressure; DBP, Diastolic blood pressure; BG, blood glucose; FPG, fasting plasma glucose; TG, triglycerides; HDL, high-density lipoprotein; IFG, impaired fasting glucose; WC, waist circumference; WHtI, waist-to-height index; PI, periodontal index.

**Table S2. Assessment of the quality of 20 cross-sectional studies the Agency for Healthcare Research and Quality (AHRQ) scale.**

Study	1	2	3	4	5	6	7	8	9	10	11	Total points	Quality evaluation
Indira Paz-Graniel, et al <sup>37</sup>	1	0	1	0	1	0	1	0	1	1	1	7	moderate
Pey Sze Teo, et al <sup>45</sup>	1	0	1	1	0	1	1	0	1	1	1	8	high
Lixin Tao, et al <sup>23</sup>	1	0	1	0	0	1	1	1	1	1	1	8	high
Chikanobu Sonoda, et al <sup>46</sup>	1	1	1	1	0	0	0	1	0	0	1	6	moderate
AESUN SHIN, et al <sup>35</sup>	1	0	1	0	0	1	1	1	1	1	1	8	high
Xia Zeng, et al <sup>48</sup>	1	0	1	1	0	0	0	1	0	0	1	5	moderate
Rei Otsuka, et al <sup>57</sup>	1	0	1	0	0	1	1	1	0	1	1	7	moderate
Hirota Ochiai, et al <sup>44</sup>	1	0	1	0	0	1	1	1	0	1	1	7	moderate
K.S. Lee, et al <sup>53</sup>	1	0	1	0	0	1	1	0	0	1	1	6	moderate
Shiun Dong Hsieh, et al <sup>55</sup>	1	0	0	1	0	1	0	0	0	0	1	4	moderate
Mizuki Saito, et al <sup>36</sup>	1	0	1	0	0	1	0	1	0	0	1	5	moderate
T. Ohkuma, et al <sup>47</sup>	1	0	1	0	0	1	1	1	0	1	1	7	moderate
Parvane Saneci, et al <sup>49</sup>	1	1	1	0	0	1	0	1	0	1	1	6	moderate
Saleem Perwaiz Iqbal, et al <sup>38</sup>	1	1	1	0	0	1	1	1	0	0	1	7	moderate
Hurst Yumi, et al <sup>52</sup>	1	1	1	0	0	1	1	1	0	0	1	7	moderate
Satsue Nagahama, et al <sup>50</sup>	1	0	1	0	0	1	1	1	1	0	1	7	moderate
Masaru Sakurai, et al <sup>58</sup>	1	0	1	0	0	1	0	1	0	0	1	5	moderate
Sonia GÓmez-MartÍnez, et al <sup>51</sup>	1	0	1	0	0	1	1	0	1	0	1	6	moderate
Youji Sogai, et al <sup>40</sup>	1	1	1	0	0	0	1	0	0	1	0	5	moderate
Joe, Heegyung, et al <sup>41</sup>	1	1	1	0	0	0	1	1	1	1	0	7	moderate

**Table S3. Assessment of the quality of 7 cohort studies and 1 case-control study by Newcastle-Ottawa Scale (NOS).**

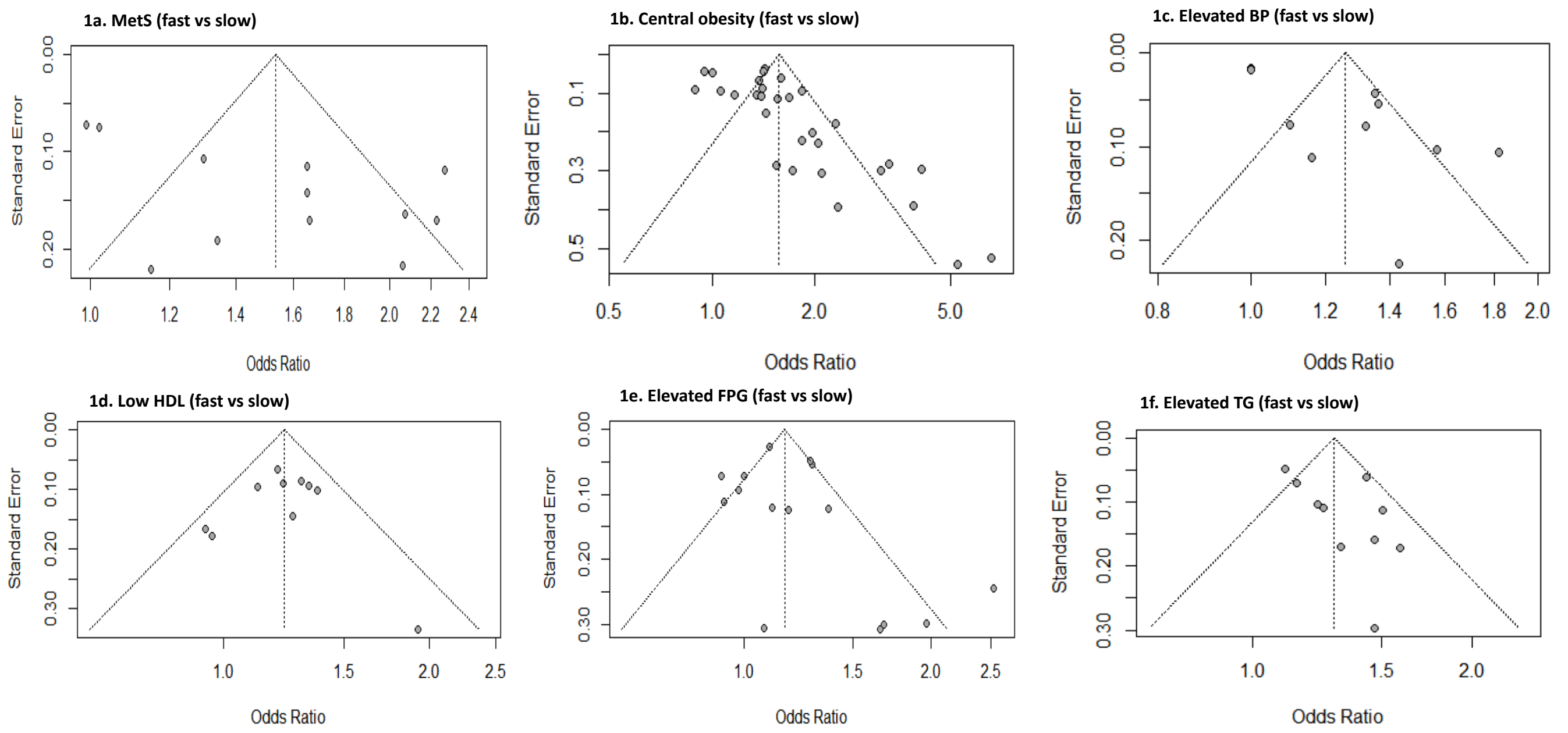
Cohort study	Selection			Comparability			Outcomes			total quality evaluation
	representativeness of the cohort	Selection of the non-exposed cohort	ascertainment of exposure	demonstration that outcome of interest was not present at start of study	comparability	assessment of outcome	follow-up long enough for outcomes to occur	adequacy of follow up of cohorts		
Alihiro Kudo, et al <sup>59</sup>	1	1	1	1	1	1	1	+1	8	high
Kazumasa Yamagishi, et al <sup>54</sup>	1	1	1	-	1	1	1	-	6	moderate
Bing Zhu, et al <sup>39</sup>	1	1	1	1	2	1	1	+1	9	high
Daisuke Ekuni, et al <sup>43</sup>	1	1	1	-	1	1	1	+1	7	high
Akiko Nanri, et al <sup>24</sup>	1	1	1	1	2	1	1	+1	9	high
Tajima Miki, et al <sup>22</sup>	1	1	1	1	1	1	1	+1	8	high
Eiichi Ashizawa, et al <sup>42</sup>	1	1	1	-	1	1	1	+1	7	high

Case-control study	case definition	Representativeness	control selection	Control definition	comparability	assessment of exposure	Same method of ascertainment for cases and controls	Non-Response rate	total quality evaluation
Radzevičienė, Lina, et al <sup>60</sup>	1	1	-	1	1	1	1	-	6 moderate

**Table S4. Assessment of the quality of 1 randomised controlled trial by Cochrane scale.**

Study	Random Sequence Generation	Allocation Concealment	Blind	Incomplete Outcome Data	Selective Reporting	Other Sources of Bias
Ford AL, et al <sup>56</sup>	randomisation lists	Unclear	Single blind	Complete	Low risk	Unclear



**Figure S1.** Begg's funnel plots of the included studies in the meta-analysis. (Only when the number of included studies was more than 5, the Begg's test and plot were conducted. MetS, metabolic syndrome; BP, blood pressure; FPG, fasting plasma glucose; TG, triglycerides; HDL, high-density lipoprotein)

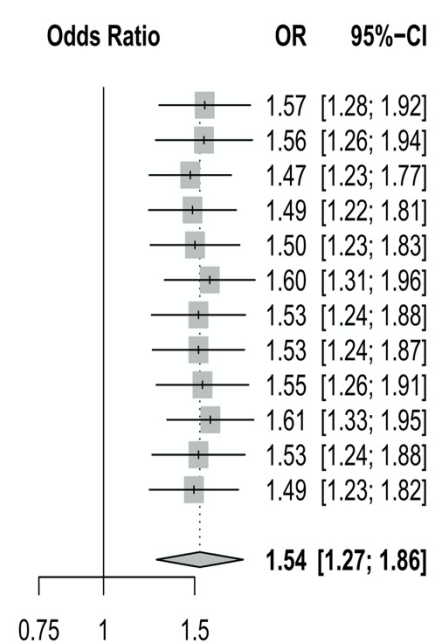
**Table S5. Begg's test and Egger's test of the included studies in the meta-analysis**

Outcomes	Sample size	Eating speed	OR	95%CI	Begg's test P value	Egger's test P value
		slow	Ref			
MetS 7 studies <sup>23,35-40</sup>	32558	faster	1.54	1.27-1.86	0.337	0.014
Central obesity 11 studies <sup>23,24,37,39,44-50</sup>	150868	faster	1.54	1.37-1.73	0.019	0.001
Elevated BP 6 studies <sup>23,24,37,39,50,55</sup>	86783	faster	1.26	1.13-1.40	0.421	0.006
Low HDL 6 studies <sup>23,24,37,39,50,55</sup>	86783	faster	1.23	1.15-1.37	0.929	0.898
Elevated FPG 9 studies <sup>23,24,37,39,50,55,58-60</sup>	286892	faster	1.16	1.06-1.27	0.347	0.056
Elevated TG 6 studies <sup>23,24,37,39,50,55</sup>	86783	faster	1.29	1.18-1.42	0.180	0.115

MetS, metabolic syndrome; BP, blood pressure; FPG, fasting plasma glucose; TG, triglycerides; HDL, high-density lipoprotein.

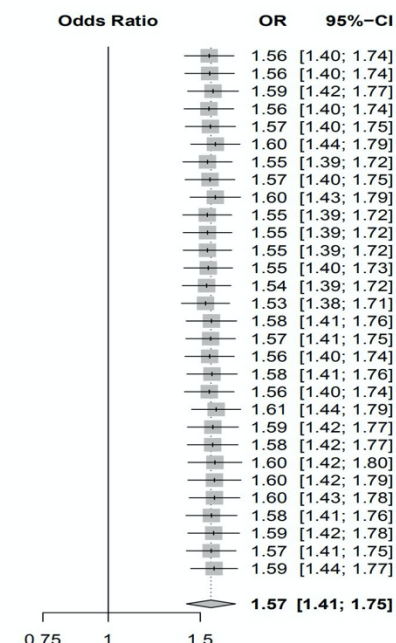
**1a. MetS (Fast eating)**

Study (n=32558)	Odds Ratio	OR	95%-CI
Omitting Saleem Perwaiz Iqbal, et al(2020)	1.57	1.57	[1.28; 1.92]
Omitting Bing Zhu, et al(2015)	1.56	1.56	[1.26; 1.94]
Omitting Lixin Tao, et al(2018)(Fast)	1.47	1.47	[1.23; 1.77]
Omitting ESUN SHIN, et al(2009)(Fast)	1.49	1.49	[1.22; 1.81]
Omitting Mizuki Saito, et al(2017)(Fast)	1.50	1.50	[1.23; 1.83]
Omitting Indira Paz-Graniel, et al(2019)(Medium)	1.60	1.60	[1.31; 1.96]
Omitting Lixin Tao, et al(2018)(Medium)	1.53	1.53	[1.24; 1.88]
Omitting ESUN SHIN, et al(2009)(Medium)	1.53	1.53	[1.24; 1.87]
Omitting Mizuki Saito, et al(2017)(Medium)	1.55	1.55	[1.26; 1.91]
Omitting Indira Paz-Graniel, et al(2019)(Fast)	1.61	1.61	[1.33; 1.95]
Omitting Youji Sogai, et al(2013)(Men)	1.53	1.53	[1.24; 1.88]
Omitting Youji Sogai, et al(2013)(Women)	1.49	1.49	[1.23; 1.82]
<b>Random effects model</b>	<b>1.54</b>	<b>1.54</b>	<b>[1.27; 1.86]</b>



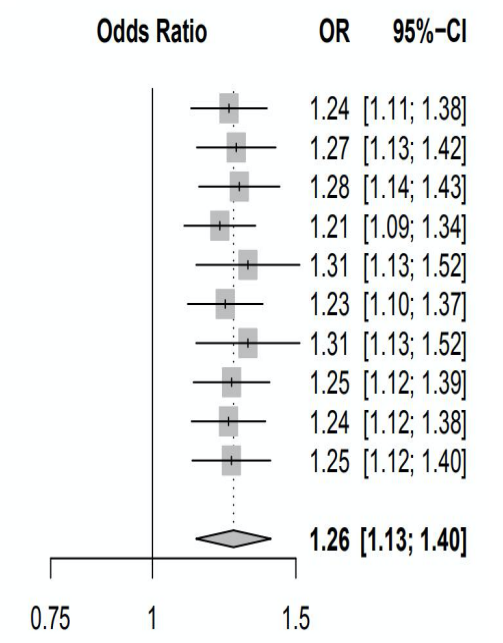
**1b. Central obesity (Fast eating)**

Study (n=150868)	Odds Ratio	OR	95%-CI
Omitting Hirotsuka Ochiai, et al(2016)(boy)	1.56	1.56	[1.40; 1.74]
Omitting Hirotsuka Ochiai, et al(2016)(girl)	1.56	1.56	[1.40; 1.74]
Omitting Bing Zhu, et al(2015)	1.59	1.59	[1.42; 1.77]
Omitting Pey Sze Teo, et al(2020)(Fast)	1.56	1.56	[1.40; 1.74]
Omitting Lixin Tao, et al(2018)(Fast)	1.57	1.57	[1.40; 1.75]
Omitting Indira Paz-Graniel, et al(2019)(Medium)	1.60	1.60	[1.44; 1.79]
Omitting T. Ohkuma & H. Fujii, et al(2012)(Normal glucose)	1.55	1.55	[1.39; 1.72]
Omitting T. Ohkuma & H. Fujii, et al(2012)(IFG)	1.57	1.57	[1.40; 1.75]
Omitting T. Ohkuma & H. Fujii, et al(2012)(Diabetes)	1.60	1.60	[1.43; 1.79]
Omitting Chikanobu Sonoda, et al(2018)(WC>=85)	1.55	1.55	[1.39; 1.72]
Omitting Chikanobu Sonoda, et al(2018)(WC>=90)	1.55	1.55	[1.39; 1.72]
Omitting Chikanobu Sonoda, et al(2018)(WC>=85)	1.55	1.55	[1.39; 1.72]
Omitting Chikanobu Sonoda, et al(2018)(WC>=90)	1.55	1.55	[1.40; 1.73]
Omitting T. Ohkuma & H. Fujii, et al(2012)(Normal glucose)	1.54	1.54	[1.39; 1.72]
Omitting T. Ohkuma & H. Fujii, et al(2012)(IFG)	1.53	1.53	[1.38; 1.71]
Omitting T. Ohkuma & H. Fujii, et al(2012)(Diabetes)	1.58	1.58	[1.41; 1.76]
Omitting Chikanobu Sonoda, et al(2018)(WC>=85)	1.57	1.57	[1.41; 1.75]
Omitting Chikanobu Sonoda, et al(2018)(WC>=90)	1.56	1.56	[1.40; 1.74]
Omitting T. Ohkuma & H. Fujii, et al(2012)(Normal glucose)	1.58	1.58	[1.41; 1.76]
Omitting T. Ohkuma & H. Fujii, et al(2012)(IFG)	1.56	1.56	[1.40; 1.74]
Omitting T. Ohkuma & H. Fujii, et al(2012)(Diabetes)	1.61	1.61	[1.44; 1.79]
Omitting Pey Sze Teo, et al(2020)(Medium)	1.59	1.59	[1.42; 1.77]
Omitting Lixin Tao, et al(2018)(Medium)	1.58	1.58	[1.42; 1.77]
Omitting XiaZeng, et al(2018)(WC percentile<=90th)	1.60	1.60	[1.42; 1.80]
Omitting XiaZeng, et al(2018)(WHR<=0.5)	1.60	1.60	[1.42; 1.79]
Omitting Farvane Saneel, et al(2015)	1.60	1.60	[1.43; 1.78]
Omitting Satsue Nagahama, et al(2014)(men)	1.59	1.59	[1.41; 1.76]
Omitting Satsue Nagahama, et al(2014)(women)	1.59	1.59	[1.42; 1.78]
Omitting Nanri Akiko, et al(2020)	1.57	1.57	[1.41; 1.75]
Omitting Indira Paz-Graniel, et al(2019)(Fast)	1.59	1.59	[1.44; 1.77]
<b>Random effects model</b>	<b>1.57</b>	<b>1.57</b>	<b>[1.41; 1.75]</b>



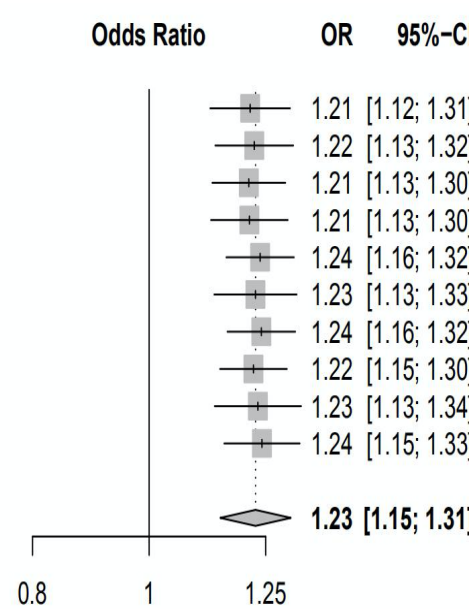
**1c. Elevated BP (Fast eating)**

Study (n=86783)	Odds Ratio	OR	95%-CI
Omitting Shiun Dong Hsieh, et al(2010)(Men)	1.24	1.24	[1.11; 1.38]
Omitting Shiun Dong Hsieh, et al(2010)(Women)	1.27	1.27	[1.13; 1.42]
Omitting Bing Zhu, et al(2015)	1.28	1.28	[1.14; 1.43]
Omitting Lixin Tao, et al(2018)(Fast)	1.21	1.21	[1.09; 1.34]
Omitting Indira Paz-Graniel, et al(2019)(Fast)	1.31	1.31	[1.13; 1.52]
Omitting Lixin Tao, et al(2018)(Medium)	1.23	1.23	[1.10; 1.37]
Omitting Indira Paz-Graniel, et al(2019)(Medium)	1.31	1.31	[1.13; 1.52]
Omitting Nanri Akiko, et al(2020)	1.25	1.25	[1.12; 1.39]
Omitting Satsue Nagahama, et al(2014)(men)	1.24	1.24	[1.12; 1.38]
Omitting Satsue Nagahama, et al(2014)(women)	1.25	1.25	[1.12; 1.40]
<b>Random effects model</b>	<b>1.26</b>	<b>1.26</b>	<b>[1.13; 1.40]</b>



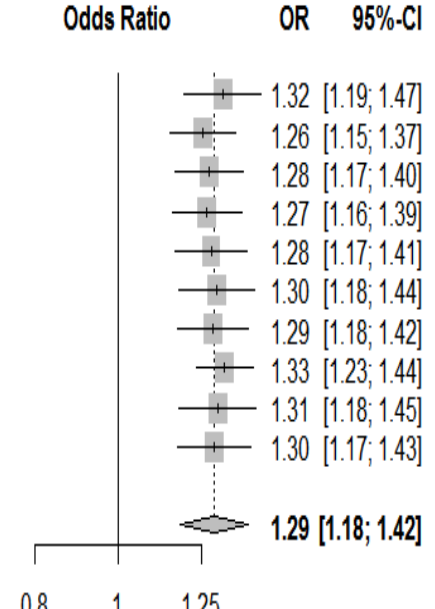
**1d. Low HDL (Fast eating)**

Study (n=86783)	Odds Ratio	OR	95%-CI
Omitting Shiun Dong Hsieh, et al(2010)(Men)	1.21	1.21	[1.12; 1.31]
Omitting Shiun Dong Hsieh, et al(2010)(Women)	1.22	1.22	[1.13; 1.32]
Omitting Bing Zhu, et al(2015)	1.21	1.21	[1.13; 1.30]
Omitting Lixin Tao, et al(2018)(Fast)	1.21	1.21	[1.13; 1.30]
Omitting Indira Paz-Graniel, et al(2019)(Medium)	1.24	1.24	[1.16; 1.32]
Omitting Lixin Tao, et al(2018)(Medium)	1.23	1.23	[1.13; 1.33]
Omitting Indira Paz-Graniel, et al(2019)(Fast)	1.24	1.24	[1.16; 1.32]
Omitting Nanri Akiko, et al(2020)	1.22	1.22	[1.15; 1.30]
Omitting Satsue Nagahama, et al(2014)(men)	1.23	1.23	[1.13; 1.34]
Omitting Satsue Nagahama, et al(2014)(women)	1.24	1.24	[1.15; 1.33]
<b>Random effects model</b>	<b>1.23</b>	<b>1.23</b>	<b>[1.15; 1.31]</b>



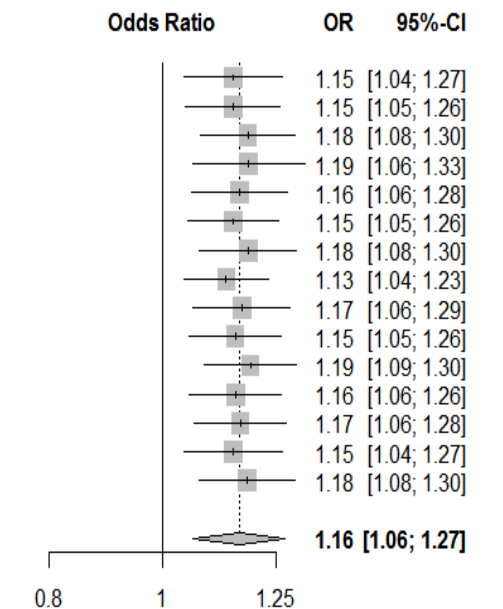
**1e. Elevated TG (Fast eating)**

Study (n=86783)	Odds Ratio	OR	95%-CI
Omitting Bing Zhu, et al(2015)	1.32	1.32	[1.19; 1.47]
Omitting Shiun Dong Hsieh, et al(2010)(Men)	1.26	1.26	[1.15; 1.37]
Omitting Shiun Dong Hsieh, et al(2010)(Women)	1.28	1.28	[1.17; 1.40]
Omitting Lixin Tao, et al(2018)	1.27	1.27	[1.16; 1.39]
Omitting Indira Paz-Graniel, et al(2019)	1.28	1.28	[1.17; 1.41]
Omitting Lixin Tao, et al(2018)	1.30	1.30	[1.18; 1.44]
Omitting Nanri Akiko, et al(2020)	1.29	1.29	[1.18; 1.42]
Omitting Satsue Nagahama, et al(2014) (men)	1.33	1.33	[1.23; 1.44]
Omitting Satsue Nagahama, et al(2014) (women)	1.31	1.31	[1.18; 1.45]
Omitting Indira Paz-Graniel, et al(2019)	1.30	1.30	[1.17; 1.43]
<b>Random effects model</b>	<b>1.29</b>	<b>1.29</b>	<b>[1.18; 1.42]</b>



**1f. Elevated FPG (Fast eating)**

Study (n=286892)	Odds Ratio	OR	95%-CI
Omitting Shiun Dong Hsieh, et al(2010)(Men)	1.15	1.15	[1.04; 1.27]
Omitting Shiun Dong Hsieh, et al(2010)(Women)	1.15	1.15	[1.05; 1.26]
Omitting Bing Zhu, et al(2015)	1.18	1.18	[1.08; 1.30]
Omitting Ahihiro Kudo, et al(2019)	1.19	1.19	[1.06; 1.33]
Omitting Lixin Tao, et al(2018)	1.16	1.16	[1.06; 1.28]
Omitting Masaru Sakurai, et al(2012)	1.15	1.15	[1.05; 1.26]
Omitting Indira Paz-Graniel, et al(2019)	1.18	1.18	[1.08; 1.30]
Omitting Radzeviciene, Lina, et al(2021)	1.13	1.13	[1.04; 1.23]
Omitting Lixin Tao, et al(2018)	1.17	1.17	[1.06; 1.29]
Omitting Masaru Sakurai, et al(2012)	1.15	1.15	[1.05; 1.26]
Omitting Indira Paz-Graniel, et al(2019)	1.19	1.19	[1.09; 1.30]
Omitting Radzeviciene, Lina, et al(2021)	1.16	1.16	[1.06; 1.26]
Omitting Nanri Akiko, et al(2020)	1.17	1.17	[1.06; 1.28]
Omitting Satsue Nagahama, et al(2014) (men)	1.15	1.15	[1.04; 1.27]
Omitting Satsue Nagahama, et al(2014) (women)	1.18	1.18	[1.08; 1.30]
<b>Random effects model</b>	<b>1.16</b>	<b>1.16</b>	<b>[1.06; 1.27]</b>



**Figure S2.** Sensitivity analysis of the included studies in the meta-analysis. (The slow eating group was used as the reference group. MetS, metabolic syndrome; BP, blood pressure; FPG, fasting plasma glucose; TG, triglycerides; HDL, high-density lipoprotein)



**Table S6. Meta-regression models of multivariable adjusted analyses**

Outcomes	Variables	<i>P</i>	Regression coefficients (95% CI)	Tau <sup>2</sup>	I <sup>2</sup> residual (%)
MetS	Location	0.003	-0.53(-0.84; -0.22)	0.02	54.32
	Speed	0.371	0.18(-0.24; 0.61)	0.08	86.11
	Study design	0.586	-0.18(-0.90; 0.54)	0.08	87.23
Central Obesity	Location	0.606	-0.04(-0.20; 0.12)	0.13	87.99
	Speed	0.002	0.33(0.13; 0.53)	0.09	87.67
	Study design	0.608	-0.03(-0.54; 0.47)	0.12	88.04
	Gender	0.002	0.72(0.28; 1.17)	0.08	86.31
	Age	0.810	0.17(-1.81; 0.14)	0.12	87.39
Elevated BP	Location	0.010	-0.30(-0.51; -0.01)	0.01	58.38
	Speed	0.784	-0.04(-0.35; 0.27)	0.04	93.53
	Study design	0.729	-0.07 (-0.49; 0.36)	0.04	93.52
Elevated TG	Location	0.566	0.07(-0.22; 0.37)	0.01	54.66
	Speed	0.139	0.21(0.06; 0.36)	0.01	35.24
	Study design	0.426	-0.20(-0.400; 0.01)	0.01	53.95
Elevated FPG	Location	0.942	-0.12(-0.33; -0.31)	0.03	70.61
	Speed	0.719	0.05(-0.23; 0.33)	0.03	74.09
	Study design	0.239	-0.13(-0.10; 0.35)	0.03	74.03
	Gender	0.003	0.35(0.14; 0.56)	0.01	62.66

MetS, Metabolic syndrome; BP, blood pressure; FPG, fasting plasma glucose; TG, triglyceride.