

Supplemental Information to:

Blood lipid metabolism and risk of gallstone disease: a multi-center study and systematic review and meta-analysis

Min Zhang¹, Min Mao², Chi Zhang³, Fulan Hu⁴, Ping Cui⁵, Guangcan Li⁶, Jia Shi⁷, Xin Wang^{8*}, Xuefeng Shan^{9*}

Affiliations:

1 Department of Epidemiology and Health Statistics, School of Public Health and Management, Chongqing Medical University, Chongqing 400016, China.

2 Department of Pathology and Southwest Cancer Center, First Affiliated Hospital of Army Medical University, Chongqing 400016, China.

3 Department of prevention, Tianjin Medical University Cancer Institute and Hospital, Tianjin 300060, China

4 Department of Epidemiology and Health Statistics, School of Public Health, Shenzhen University Health Science Center, Shenzhen, Guangdong, People's Republic of China.

5 Department of Public Health, Jining Medical University, Jining 272067, China.

6 Department of Pharmacy, The People's Hospital of Kaizhou District, No. 8, Ankang Road, Hanfeng Street, Kaizhou District, Chongqing 405400, China.

7 Department of Clinical Laboratory, the Second Affiliated Hospital of Dalian Medical University, No. 467 Zhongshan Road, Shahekou District, Dalian, Liaoning 116027, China.

8 Department of Epidemiology and Medicine, West China School of Public Health, West China Fourth Hospital, Sichuan University, South Renmin Road, Wuhou District, Chengdu 610041, China.

9 Department of Pharmacy, The First Affiliated Hospital of Chongqing Medical University, Chongqing 400016, China.

Contact information for corresponding author:

Xin Wang

Department of Epidemiology and Medicine, West China School of Public Health, West China Fourth Hospital, Sichuan University, South Renmin Road, Wuhou District, Chengdu 610041, China.

Phone: +8617830912151

Email: wangxinmarine@126.com

Xuefeng Shan

Department of Pharmacy, The First Affiliated Hospital of Chongqing Medical University, No.1 Road Youyi Road, Yuanjiagang Community, Yuzhong District, Chongqing 400016, China

Phone: 86-023-89012069

Email: 83846674@qq.com

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Supplemental Table 1. Search terms for the electronic literature database search in the meta-analysis

	Boolean connectives	Key words
Medline database (A+B: N = 1018)		
A		("gallstone"[Title/Abstract] OR "gallstone disease"[Title/Abstract] OR "gallbladder stone"[Title/Abstract] OR "gallbladder calculus"[Title/Abstract] OR "biliary tract stone"[Title/Abstract] OR "bile duct stone"[Title/Abstract] OR "choledocholithiasis"[Title/Abstract] OR "cholelithiasis"[Title/Abstract] OR "cholecystolithiasis"[Title/Abstract] OR "hepatolithiasis"[Title/Abstract])
B	AND	("lipid"[Title/Abstract] OR "blood lipid"[Title/Abstract] OR "total cholesterol"[Title/Abstract] OR "triglyceride"[Title/Abstract] OR "high density lipoprotein"[Title/Abstract] OR "HDL"[Title/Abstract] OR "hdl cholesterol"[Title/Abstract] OR "HDL-C"[Title/Abstract] OR "low density lipoprotein"[Title/Abstract] OR "LDL"[Title/Abstract] OR "ldl cholesterol"[Title/Abstract] OR "LDL-C"[Title/Abstract])
Embase database (A+B: N = 1376)		
A		(gallstone:ab,ti OR 'gallstone disease':ab,ti OR 'gallbladder stone':ab,ti OR 'gallbladder calculus':ab,ti OR 'biliary tract stone':ab,ti OR bile duct stone:ab,ti OR choledocholithiasis:ab,ti OR cholelithiasis:ab,ti OR cholecystolithiasis:ab,ti OR hepatolithiasis:ab,ti)
B	AND	(lipid:ab,ti OR 'blood lipid':ab,ti OR total cholesterol':ab,ti OR triglyceride:ab,ti OR 'high density lipoprotein':ab,ti OR hdl:ab,ti OR hdl cholesterol':ab,ti OR 'hdl c':ab,ti OR 'low density lipoprotein':ab,ti OR ldl:ab,ti OR 'ldl cholesterol':ab,ti OR 'ldl c':ab,ti)

Supplemental Table 2. Associations between blood lipid levels and gallstones or cholecystectomy in our cross-sectional study in each hospital

Subgroup		First Affiliated Hospital of Chongqing Medical University Jinshan Hospital		The People's Hospital of Kaizhou District of Chongqing		Tianjin Medical University Cancer Institute and Hospital	
		OR (95%CI)	<i>P</i>	OR (95%CI)	<i>P</i>	OR (95%CI)	<i>P</i>
Gallstones	TC, mmol/L						
	<3.1	Ref		Ref			
	3.1-5.7	0.829 (0.645, 1.066)	0.144	1.092 (0.770, 1.549)	0.622		
	>5.7	0.816 (0.627, 1.061)	0.129	0.987 (0.686, 1.419)	0.943	0.927 (0.735, 1.169)	0.522
	TG, mmol/L						
	<0.4	Ref		Ref			
	0.4-1.7	0.549 (0.362, 0.831)	0.005	0.978 (0.310, 3.087)	0.969	Ref	
	>1.7	0.598 (0.393, 0.911)	0.017	1.029 (0.325, 3.256)	0.961	0.926 (0.709, 1.208)	0.570
	LDL-C, mmol/L						
	<2.07	Ref		Ref			
	2.07-3.1	0.994 (0.900, 1.099)	0.913	0.988 (0.905, 1.079)	0.792		
	>3.1	1.064 (0.955, 1.185)	0.261	1.134 (1.005, 1.279)	0.041		
	HDL-C, mmol/L						
	<0.9	Ref		Ref			
	0.9-2.0	0.815 (0.718, 0.925)	0.001	0.846 (0.728, 0.983)	0.029		
	>2.0	0.580 (0.475, 0.707)	<0.001	0.734 (0.594, 0.907)	0.004		
Cholecystectomy	TC, per unit	1.022 (0.925, 1.130)	0.664	0.926 (0.849, 1.010)	0.082	0.990 (0.885, 1.106)	0.854
	TG, per unit	1.006 (0.977, 1.036)	0.692	1.012 (0.984, 1.040)	0.403	0.910 (0.795, 1.043)	0.176
	LDLC, per unit	1.016 (0.917, 1.125)	0.767	1.123 (1.002, 1.259)	0.046		
	HDLC, per unit	0.649 (0.560, 0.751)	<0.001	0.862 (0.761, 0.975)	0.018		
	TC, mmol/L						

<3.1	Ref		Ref			
3.1-5.7	0.664 (0.529, 0.834)	<0.001	0.739 (0.565, 0.967)	0.028	1	
>5.7	0.604 (0.475, 0.769)	<0.001	0.665 (0.501, 0.883)	0.005	0.720 (0.504, 1.029)	0.071
TG, mmol/L						
<0.4	Ref		Ref			
0.4-1.7	1.374 (0.677, 2.787)	0.379	1.169 (0.368, 3.715)	0.791	Ref	
>1.7	1.730 (0.851, 3.521)	0.130	1.457 (0.458, 4.635)	0.524	1.117 (0.756, 1.651)	0.580
LDL-C, mmol/L						
<2.07	Ref		Ref			
2.07-3.1	0.880 (0.798, 0.970)	0.010	0.845 (0.781, 0.913)	<0.001		
>3.1	0.744 (0.669, 0.828)	<0.001	0.751 (0.671, 0.840)	<0.001		
HDL-C, mmol/L						
<0.9	Ref		Ref			
0.9-2.0	1.016 (0.892, 1.158)	0.810	0.984 (0.853, 1.136)	0.826		
>2.0	0.864 (0.714, 1.047)	0.136	0.738 (0.605, 0.901)	0.003		
TC, per unit	0.799 (0.727, 0.878)	<0.001	0.858 (0.792, 0.930)	<0.001	0.835 (0.701, 0.995)	0.044
TG, per unit	1.088 (1.061, 1.115)	<0.001	1.073 (1.048, 1.099)	<0.001	1.065 (0.907, 1.249)	0.444
LDLC, per unit	1.103 (1.001, 1.216)	0.049	1.020 (0.918, 1.135)	0.709		
HDLC, per unit	1.060 (0.927, 1.212)	0.393	0.992 (0.890, 1.105)	0.882		

The ORs were adjusted for age, sex, BMI, fatty liver disease, kidney stone, hypertension, FBG, Cr, UA, UN, TBIL, ALT, AST, and TC, TG, LDL-C, HDL-C. Bold means $p < 0.05$, TC: total cholesterol, TG: triglycerides, LDL: low density lipoprotein cholesterol, HDL: high density lipoprotein cholesterol.

Supplemental Table 3. Subgroup analysis for relationships between blood lipid profiles and gallstone disease by age group in our cross-sectional study

Subgroup		First Affiliated Hospital of Chongqing Medical University Jinshan Hospital		The People's Hospital of Kaizhou District of Chongqing		Tianjin Medical University Cancer Institute and Hospital	
		OR (95%CI)	<i>P</i>	OR (95%CI)	<i>P</i>	OR (95%CI)	<i>P</i>
Age <40	TC, mmol/L						
	<3.1	Ref		Ref			
	3.1-5.7	0.529 (0.391, 0.717)	<0.001	0.976 (0.614, 1.552)	0.918	Ref	
	>5.7	0.493 (0.350, 0.694)	<0.001	1.000 (0.602, 1.661)	0.999	0.786 (0.419, 1.474)	0.452
	TG, mmol/L						
	<0.4	Ref		Ref			
	0.4-1.7	0.687 (0.444, 1.063)	0.092	1.778 (0.436, 7.257)	0.422	Ref	
	>1.7	0.922 (0.587, 1.45)	0.727	2.151 (0.524, 8.836)	0.288	1.395 (0.713, 2.730)	0.330
	LDL-C, mmol/L						
	<2.07	Ref		Ref			
	2.07-3.1	1.086 (0.952, 1.240)	0.218	0.982 (0.863, 1.117)	0.784		
	>3.1	1.086 (0.926, 1.274)	0.312	0.896 (0.718, 1.118)	0.330		
	HDL-C, mmol/L						
	<0.9	Ref		Ref			
	0.9-2.0	0.979 (0.797, 1.204)	0.844	0.830 (0.646, 1.066)	0.144		
	>2.0	0.775 (0.560, 1.073)	0.125	0.586 (0.392, 0.874)	0.009		
	TC, per unit	0.851 (0.724, 1.000)	0.051	1.075 (0.916, 1.262)	0.376	0.953 (0.712, 1.277)	0.749
	TG, per unit	1.067 (1.023, 1.113)	0.002	1.037 (0.989, 1.088)	0.136	0.899 (0.594, 1.359)	0.613
	LDLC, per unit	1.194 (1.009, 1.412)	0.038	0.896 (0.727, 1.104)	0.302		
	HDLC, per unit	0.738 (0.586, 0.929)	0.010	0.682 (0.538, 0.866)	0.002		
Age 40-60	TC, mmol/L						

Age >60	<3.1	Ref		Ref			
	3.1-5.7	0.737 (0.541, 1.004)	0.053	1.122 (0.790, 1.595)	0.520	Ref	
	>5.7	0.704 (0.512, 0.968)	0.031	0.988 (0.688, 1.417)	0.946	1.073 (0.814, 1.415)	0.615
	TG, mmol/L						
	<0.4	Ref		Ref			
	0.4-1.7	1.338 (0.536, 3.339)	0.533	0.787 (0.237, 2.616)	0.696	Ref	
	>1.7	1.554 (0.622, 3.886)	0.346	0.907 (0.273, 3.016)	0.873	0.753 (0.538, 1.056)	0.100
	LDL-C, mmol/L						
	<2.07	Ref		Ref			
	2.07-3.1	0.917 (0.820, 1.024)	0.123	0.868 (0.803, 0.939)	<0.001		
	>3.1	0.876 (0.780, 0.983)	0.025	0.917 (0.824, 1.020)	0.112		
	HDL-C, mmol/L						
	<0.9	Ref		Ref			
	0.9-2.0	0.843 (0.745, 0.953)	0.006	0.941 (0.823, 1.075)	0.369		
	>2.0	0.622 (0.512, 0.755)	<0.001	0.775 (0.645, 0.930)	0.006		
	TC, per unit	0.923 (0.841, 1.014)	0.094	0.851 (0.788, 0.918)	<0.001	1.015 (0.887, 1.162)	0.824
	TG, per unit	1.042 (1.015, 1.070)	0.002	1.053 (1.029, 1.077)	<0.001	0.927 (0.801, 1.073)	0.310
	LDLC, per unit	1.051 (0.955, 1.157)	0.305	1.129 (1.021, 1.248)	0.018		
	HDLC, per unit	0.756 (0.657, 0.871)	<0.001	1.005 (0.908, 1.112)	0.929		
	TC, mmol/L						
	<3.1	Ref		Ref			
	3.1-5.7	0.895 (0.663, 1.208)	0.468	0.545 (0.371, 0.801)	0.002		
	>5.7	0.833 (0.604, 1.149)	0.265	0.475 (0.314, 0.718)	<0.001		
	TG, mmol/L						
	<0.4	Ref		Ref			

0.4-1.7	0.472 (0.164, 1.362)	0.165	0.506 (0.042, 6.052)	0.591	Ref	
>1.7	0.544 (0.188, 1.575)	0.262	0.601 (0.050, 7.197)	0.688	0.648 (0.466, 0.899)	0.009
LDL-C, mmol/L						
<2.07	Ref		Ref			
2.07-3.1	0.822 (0.713, 0.947)	0.007	0.938 (0.813, 1.083)	0.385	Ref	
>3.1	0.754 (0.648, 0.877)	<0.001	0.868 (0.716, 1.051)	0.147	1.143 (0.807, 1.618)	0.453
HDL-C, mmol/L						
<0.9	Ref		Ref			
0.9-2.0	1.123 (0.902, 1.397)	0.299	0.971 (0.744, 1.267)	0.829		
>2.0	0.874 (0.656, 1.164)	0.356	0.684 (0.478, 0.979)	0.038		
TC, per unit	0.835 (0.714, 0.977)	0.025	0.873 (0.764, 0.998)	0.046	0.828 (0.706, 0.971)	0.020
TG, per unit	1.064 (1.013, 1.118)	0.013	1.038 (0.990, 1.089)	0.122	1.008 (0.824, 1.233)	0.940
LDLC, per unit	1.085 (0.923, 1.276)	0.322	1.036 (0.868, 1.237)	0.692		
HDLC, per unit	1.072 (0.873, 1.316)	0.510	0.859 (0.705, 1.047)	0.133		

The ORs were adjusted for age, sex, BMI, fatty liver disease, kidney stone, hypertension, FBG, Cr, UA, UN, TBIL, ALT, AST, and TC, TG, LDL-C, HDL-C. Bold means $p < 0.05$, TC: total cholesterol, TG: triglycerides, LDL: low density lipoprotein cholesterol, HDL: high density lipoprotein cholesterol.

Supplemental Table 4. Subgroup analysis for relationships between blood lipid levels and gallstone disease by gender in our cross-sectional study

Subgroup		First Affiliated Hospital of Chongqing Medical University Jinshan Hospital		The People's Hospital of Kaizhou District of Chongqing		Tianjin Medical University Cancer Institute and Hospital	
		OR (95%CI)	<i>P</i>	OR (95%CI)	<i>P</i>	OR (95%CI)	<i>P</i>
Male	TC, mmol/L						
	<3.1	Ref		Ref			
	3.1-5.7	0.719 (0.577, 0.897)	0.003	0.838 (0.628, 1.120)	0.233	Ref	
	>5.7	0.643 (0.509, 0.811)	<0.001	0.737 (0.544, 0.999)	0.049	0.869 (0.658, 1.147)	0.321
	TG, mmol/L						
	<0.4	Ref		Ref			
	0.4-1.7	0.705 (0.350, 1.421)	0.329	0.395 (0.112, 1.390)	0.148	Ref	
	>1.7	0.824 (0.408, 1.663)	0.589	0.447 (0.127, 1.575)	0.210	1.034 (0.771, 1.385)	0.825
	LDL-C, mmol/L						
	<2.07	Ref		Ref			
	2.07-3.1	0.929 (0.835, 1.032)	0.170	0.907 (0.829, 0.993)	0.034		
	>3.1	0.854 (0.765, 0.954)	0.005	0.895 (0.795, 1.007)	0.066		
	HDL-C, mmol/L						
	<0.9	Ref		Ref			
	0.9-2.0	0.908 (0.817, 1.009)	0.072	0.875 (0.777, 0.986)	0.029		
	>2.0	0.636 (0.492, 0.821)	<0.001	0.770 (0.630, 0.940)	0.010		
Female	TC, per unit	0.941 (0.860, 1.029)	0.180	0.879 (0.810, 0.954)	0.002	0.891 (0.775, 1.023)	0.101
	TG, per unit	1.033 (1.008, 1.059)	0.011	1.042 (1.017, 1.067)	<0.001	0.973 (0.860, 1.100)	0.661
	LDLC, per unit	0.977 (0.891, 1.071)	0.615	1.038 (0.932, 1.156)	0.496		
	HDLC, per unit	0.776 (0.673, 0.895)	<0.001	0.958 (0.857, 1.070)	0.447		
	TC, mmol/L						

<3.1	Ref		Ref			
3.1-5.7	0.779 (0.575, 1.055)	0.106	0.897 (0.637, 1.264)	0.536	Ref	
>5.7	0.777 (0.566, 1.067)	0.118	0.822 (0.575, 1.175)	0.282	0.888 (0.677, 1.166)	0.394
TG, mmol/L						
<0.4	Ref		Ref			
0.4-1.7	0.808 (0.527, 1.240)	0.330	1.814 (0.572, 5.750)	0.312	Ref	
>1.7	0.997 (0.646, 1.540)	0.990	2.211 (0.696, 7.025)	0.179	0.897 (0.645, 1.246)	0.516
LDL-C, mmol/L						
<2.07	Ref		Ref			
2.07-3.1	0.956 (0.865, 1.055)	0.371	0.917 (0.844, 0.997)	0.041		
>3.1	0.951 (0.848, 1.067)	0.400	0.939 (0.828, 1.065)	0.325		
HDL-C, mmol/L						
<0.9	Ref		Ref			
0.9-2.0	0.864 (0.688, 1.084)	0.206	1.024 (0.791, 1.326)	0.856		
>2.0	0.708 (0.548, 0.915)	0.008	0.772 (0.576, 1.035)	0.084		
TC, per unit	0.786 (0.693, 0.891)	<0.001	0.874 (0.797, 0.958)	0.004	1.003 (0.882, 1.141)	0.967
TG, per unit	1.126 (1.082, 1.172)	<0.001	1.089 (1.054, 1.125)	<0.001	0.925 (0.765, 1.119)	0.423
LDLC, per unit	1.276 (1.122, 1.451)	<0.001	1.132 (1.002, 1.279)	0.047		
HDLC, per unit	1.022 (0.868, 1.203)	0.793	0.930 (0.818, 1.058)	0.269		

The ORs were adjusted for age, sex, BMI, fatty liver disease, kidney stone, hypertension, FBG, Cr, UA, UN, TBIL, ALT, AST, and TC, TG, LDL-C, HDL-C. Bold means $p < 0.05$, TC: total cholesterol, TG: triglycerides, LDL: low density lipoprotein cholesterol, HDL: high density lipoprotein cholesterol.

Supplemental Table 5. The characteristics of the included publications regarding the mean difference of the blood lipid levels between groups

Study	Period	Study_design	Geographic background	Cases	Controls	Sex	Traits	GSD	Non_GSD	Units
								mean±SD	mean±SD	
Sepehrimanesh, 2020[1]	Jan. 2012 - Jan. 2018	cross-sectional study	Asia	59	177	Both	TG	137.2±103.8	124.2±107.9	mg/dL
						Both	HDL-C	44.5±10.7	47.2±11.8	mg/dL
Wang, 2020[2]	Jan. 2014 - Jan. 2015	cross-sectional study	Asia	168,092	1,900,432	Both	TC	5.0±1.0	4.8±1.0	mmol/L
						Both	TG	1.7±1.3	1.5±1.3	mmol/L
						Both	LDL-C	3.0±0.8	2.9±0.8	mmol/L
						Both	HDL-C	1.3±0.4	1.3±0.3	mmol/L
Song, 2020[3]	NA	cross-sectional study	Europe	274	3,735	Both	TC	5.2±0.9	5.1±1.0	mmol/L
						Both	TG	1.7±1.4	1.5±1.3	mmol/L
						Both	LDL-C	3.3±0.8	3.2±0.9	mmol/L
						Both	HDL-C	1.5±0.4	1.5±0.4	mmol/L
Gu, 2020[4]	Jul. 2010 - Dec. 2012	case-control study	Asia	94	2,194	Both	TC	4.1±1.5	4.2±1.6	mmol/L
						Both	TG	1.4±0.9	1.8±1.7	mmol/L
						Both	LDL-C	3.5±1.9	2.7±1.0	mmol/L
						Both	HDL-C	1.8±0.9	1.8±1.2	mmol/L
Kim, 2019[5]	Jan. 2009 - Dec. 2017	cross-sectional study	Asia	355	7,531	Both	TC	198.6±36.7	198.9±37.2	mg/dL
						Both	TG	121.8±76.0	118.8±91.0	mg/dL
						Both	LDL-C	122.3±33.8	121.1±34.3	mg/dL
						Both	HDL-C	52.0±13.6	54.1±13.7	mg/dL
Hayat, 2019[6]	Aug. 2017 - Aug. 2018	cross-sectional study	Asia	50	50	Both	TC	184.6±37.7	181.1±34.0	mg/dL
						Both	TG	198.1±48.4	172.0±54.6	mg/dL
						Both	LDL-C	118.4±24.0	122.1±35.9	mg/dL
						Both	HDL-C	29.5±8.4	40.3±11.6	mg/dL
Kim, 2019[7]	Jun. 2014 - May. 2015	cross-sectional study	Asia	806	36,495	Male	TC	110.8±27.1	110.3±27.5	mg/dL
			Asia	554	21,544	Female	TC	97.9±24.6	94.9±24.2	mg/dL
			Europe	806	36,495	Male	LDL-C	189.3±30.9	190.5±30.2	mg/dL
			Europe	554	21,544	Female	LDL-C	178.9±28.2	177.7±26.8	mg/dL
			Asia	806	36,495	Male	HDL-C	53.2±11.6	55.0±12.4	mg/dL
			Asia	554	21,544	Female	HDL-C	65.1±13.9	68.4±13.7	mg/dL
Dhamnetiya, 2018[8]	Jan. 2013 - Dec. 2013	case-control study	Asia	120	120	Both	TC	183.5±34.4	163.7±27.8	mg/dL
						Both	TG	169.1±63.2	149.8±19.4	mg/dL
						Both	LDL-C	123.9±19.7	113±18.8	mg/dL
						Both	HDL-C	40.9±8.1	41.3±7.8	mg/dL

Kwon, 2018[9]	Jan. 2003 - Dec. 2015	cross-sectional study	Asia	821	19,942	Both	TC	193.9±36.7	196.3±37.2	mg/dL
						Both	TG	118.2±75.7	117.4±85	mg/dL
						Both	LDL-C	118.7±33.4	118.7±33.7	mg/dL
						Both	HDL-C	52.2±13.3	54.5±13.6	mg/dL
Serin, 2017[10]	Jan. 2015 - Mar. 2015	cross-sectional study	Other	48	88	Both	TC	184.9±45.1	205.2±50.3	mg/dL
Ravikanth, 2016[11]	NA	case-control study	Asia	305	177	Both	TC	171.0±36.7	169.0±24.1	mg/dL
						Both	TG	148.0±70.0	152.0±76.6	mg/dL
						Both	LDL-C	104.0±31.8	100.0±16.1	mg/dL
						Both	HDL-C	37.6±16.9	39.4±25.8	mg/dL
Zhan, 2016[12]	NA	cross-sectional study	Asia	171	125	Both	LDL-C	130.7±35.1	113.3±28.9	mg/dL
Zhang, 2015[13]	Jan. 2010 - Jan. 2014	cross-sectional study	Asia	882	9,134	Both	HDL-C	46.8±10.5	51.8±12.0	mg/dL
						Both	TG	1.8±3.9	1.5±1.3	mg/dL
						Both	TC	4.9±1.1	4.7±1.0	mmol/L
						Both	LDL-C	2.9±6.7	2.6±2.0	mmol/L
Dai, 2015[14]	Jun. 2012 - Oct. 2013	case-control study	Asia	20	10	Both	HDL-C	1.2±0.4	1.3±2.4	mmol/L
						Both	TC	3.9±1.3	3.2±0.6	mmol/L
						Both	TG	1.3±0.2	1.2±0.2	mmol/L
						Both	TG	1.3±0.2	1.2±0.2	mmol/L
Dwivedi, 2015[15]	NA	case-control study	Asia	102	256	Both	TC	175.4±67.4	156.7±38.0	mg/dL
						Both	TG	165.5±63.3	125.8±59.6	mg/dL
						Both	LDL-C	113.3±68.9	90.4±39.7	mg/dL
						Both	HDL-C	29.0±13.3	41.1±12.2	mg/dL
Kwak, 2015[16]	Jan. 2010 - Dec. 2010	cross-sectional study	Asia	1,069	16,543	Both	TC	194.4±33.7	193.4±33.7	mg/dL
						Both	TG	103.2±68.0	111.1±62.3	mg/dL
						Both	HDL-C	55.1±12.2	53.2±12.1	mg/dL
						Both	HDL-C	55.1±12.2	53.2±12.1	mg/dL
Martinez-Lopez, 2015[17]	Apr. 2007 - Dec. 2009	case-control study	America	90	371	Both	TC	172.9±41.5	184.9±36.3	mg/dL
						Both	TG	146.6±60.2	145±87.5	mg/dL
						Both	LDL-C	128.2±10.0	110.9±30.9	mg/dL
						Both	HDL-C	40.3±7.7	45.0±19.2	mg/dL
Sarac, 2015[18]	Nov. 2008 - Dec. 2010	case-control study	Other	90	50	Both	TC	190.7±27.8	162.4±11.4	mg/dL
						Both	TG	160±20.4	112.3±10.9	mg/dL
						Both	HDL-C	32.1±14.9	45.2±12.4	mg/dL
						Both	HDL-C	32.1±14.9	45.2±12.4	mg/dL
Zamani, 2014[19]	2008 – 2010	cross-sectional study	Asia	51	6,143	Both	TC	194.6±42.1	180.3±47.4	mg/dL
						Both	TG	166.9±131.8	134±110.2	mg/dL
Zhu, 2014[20]	Mar. 2013 - Jun. 2013	cross-sectional study	Asia	1,240	8,215	Both	TC	4.9±0.9	4.8±1.0	mmol/L
						Both	TG	2.0±1.4	1.8±1.5	mmol/L
						Both	LDL-C	2.8±0.8	2.8±1.6	mmol/L

Lin, 2014[21]	2011 - 2012	cross-sectional study	Asia	734	11,180	Both	HDL-C	1.3±0.3	1.3±0.4	mmol/L
						Both	TC	191.8±37.3	192.8±35.7	mg/dL
						Both	TG	126.8±111.9	115.1±105	mg/dL
						Both	LDL-C	119.9±33.2	119.9±31	mg/dL
Lee, 2014[22]	Jan. 2000 - Aug. 2009	cross-sectional study	Asia	768	11,265	Both	HDL-C	46.1±12.1	49.2±12.8	mg/dL
						Both	TC	202.2±38.4	197.6±36.8	mg/dL
						Both	TG	140.0±83.1	132.0±88.5	mg/dL
						Both	HDL-C	47.7±12.5	49.3±13.7	mg/dL
Ajdarkosh, 2013[23]	Jan. 2008 - Feb. 2012	case-control study	Asia	151	347	Both	TC	189.8±61.1	188.2±43.1	mg/dL
						Both	TG	169.8±133	143.1±101	mg/dL
						Both	LDL-C	64.8±39.5	111.0±39.7	mg/dL
						Both	HDL-C	73.4±43.1	46.4±13.6	mg/dL
Chen, 2014[24]	2002 - Dec. 2007	cohort study	Asia	23	1,273	Both	TC	218.2±35.7	209.8±36.8	mg/dL
						Both	TG	150.7±88.0	147.3±79.5	mg/dL
						Both	HDL-C	55.7±16.3	54.2±15.9	mg/dL
						Both	LDL-C	113.5±32.7	102.0±27.9	mg/dL
Batajoo, 2013[25]	Jan. 2010 - Dec. 2011	cross-sectional study	Asia	61	67	Female	TC	189.3±34.0	178.6±28.6	mg/dL
						Female	TG	130.4±48.5	125.2±42.2	mg/dL
						Female	LDL-C	113.5±32.7	102.0±27.9	mg/dL
						Female	HDL-C	42.2±3.4	43.1±2.4	mg/dL
Takahashi, 2014[26]	2010	cross-sectional study	Asia	694	14,857	Both	TC	205.4±33.3	201.6±32.6	mg/dL
						Both	TG	121.2±121.2	103.1±72.2	mg/dL
						Both	LDL-C	127.6±30.7	123.2±31.0	mg/dL
						Both	HDL-C	62.3±16.9	65.4±16.8	mg/dL
Chen, 2012[27]	NA	cross-sectional study	Asia	918	6,652	Both	TG	201.1±183.3	183.7±182.7	mg/L
						Both	HDL-C	44.6±10.9	46.0±0.6	mg/L
Kim, 2011[28]	Jan. 2006 - Dec. 2007	cross-sectional study	Asia	173	3,952	Female	TC	200.7±35.6	196.3±34.7	mg/dL
						Female	TG	103.0±51.7	98.0±55.7	mg/dL
						Female	LDL-C	124.8±31.3	120.2±31.0	mg/dL
						Female	HDL-C	58.8±13.9	60.5±13.8	mg/dL
Karayalcin, 2010[29]	May. 2007 - Nov. 2007	cross-sectional study	Other	73	401	Female	TC	216.5±44.9	215.9±44.4	mg/dL
						Female	TG	134.5±54.8	143.3±77.1	mg/dL
						Female	LDL-C	138.3±38.4	130.7±40.7	mg/dL
						Female	HDL-C	51.7±14.0	55.7±19.3	mg/dL
Wang, 2010[30]	Jan. 2008 - Jul. 2008	case-control study	Asia	100	147	Both	TC	199.0±50.4	181.4±33.8	mg/dL
						Both	TG	140.6±81.1	104.0±56.8	mg/dL
Siddapuram, 2010[31]	NA	case-control study	Asia	226	289	Both	TC	182.6±56.0	225.0±0.4	mg/dL

Tirziu, 2008[32]	Nov. 2002 - Sep. 2007	case-control study	Europe	109	271	Both	TG	149.7±84.0	147.2±89.2	mg/dL
						Both	LDL-C	120.3±43.3	138.9±39.7	mg/dL
						Both	HDL-C	32.2±9.1	39.1±9.8	mg/dL
						Both	TC	213.4±49.9	226.5±48.4	mg/dL
						Both	TG	172.9±95.9	133.4±78.4	mg/dL
Chang, 2008[33]	Jan. 2005 - Oct. 2005	cross-sectional study	Asia	440	19,063	Both	HDL-C	48.8±14.9	55.4±13.9	mg/dL
						Male	TC	196.5±34.3	195.8±32.3	mg/dL
						Male	TG	145.1±83.9	148.5±89.3	mg/dL
						Male	LDL-C	115.8±28.4	114.7±27.2	mg/dL
						Male	HDL-C	50.0±11.0	50.4±10.3	mg/dL
Kuo, 2008[34]	2005	cross-sectional study	Asia	74	905	Both	TC	167.3±32.0	182.8±34	mg/dL
						Both	TG	124.2±37.7	138±116.5	mg/dL
						Both	LDL-C	110.4±28.5	123.8±33.5	mg/dL
						Both	HDL-C	48.8±10.2	53.0±13.7	mg/dL
Andreotti, 2008[35]	Jun. 1997 - May. 2001	case-control study	Asia	981	858	Both	TC	170.9±43.9	182.3±55.7	mg/dL
						Both	TG	127.4±68.9	107.3±67.4	mg/dL
						Both	LDL-C	101.5±43.9	108.2±52.7	mg/dL
						Both	HDL-C	37.4±12.5	43.9±14.7	mg/dL
Wang, 2007[36]	NA	case-control study	Asia	287	205	Both	TC	4.3±1.2	4.1±1.3	mmol/L
						Both	TG	1.7±1.0	1.7±1.9	mmol/L
						Both	LDL-C	2.4±1.2	2.1±1.2	mmol/L
						Both	HDL-C	1.2±0.5	1.2±0.4	mmol/L
Mella, 2007[37]	NA	case-control study	America	117	122	Both	TC	198.0±39.0	187.0±39.0	mg/dL
			Europe	184	184	Both	TC	200.0±53.0	202.0±55.0	mg/dL
			America	117	122	Both	TG	135.0±86.0	120.0±78.0	mg/dL
			Europe	184	184	Both	TG	143.0±79.0	146.0±105.0	mg/dL
			America	117	122	Both	LDL-C	124.0±36.0	119.0±3.0	mg/dL
			Europe	184	184	Both	LDL-C	122.0±46.0	125.0±42.0	mg/dL
			America	117	122	Both	HDL-C	47.0±11.0	44.0±11.0	mg/dL
			Europe	184	184	Both	HDL-C	48.0±19.0	50.0±20.0	mg/dL
Acalovschi, 2006[38]	NA	case-control study	Europe	34	68	Both	TC	202.8±34.9	207.2±62.4	mg/dL
						Both	TG	163.8±69.7	133.2±70.2	mg/dL
						Both	HDL-C	40.3±11.6	58.9±16.4	mg/dL
Méndez-Sánchez, 2006[39]	Jun. 2003 - Apr. 2004	cross-sectional study	America	54	43	Both	TC	208.4±44.5	203.6±34.2	mg/dL
						Both	TG	186.5±139.6	171.4±97.5	mg/dL
						Both	LDL-C	135.5±48.5	130.3±26.0	mg/dL

Liu, 2006[40]	Jan. 2002 - Dec. 2007	cross-sectional study	Asia	126	2,260	Both	HDL-C	40.3±10.8	39.6±11.3	mg/dL
						Both	TC	216.9±41.1	210.5±37.7	mg/dL
						Both	TG	143.4±98.6	130.1±108.1	mg/dL
Nervi, 2006[41]	1993 - 2000	nested case-control study	America	299	582	Both	HDL-C	57.0±16.6	57.7±15.8	mg/dL
						Both	TC	5.4±1.1	5.4±1.3	mmol/L
						Both	TG	1.5±1.0	1.3±0.7	mmol/L
						Both	LDL-C	3.4±0.9	3.4±1.0	mmol/L
Wang, 2006[42]	Feb. 2004 - Sep. 2004	case-control study	Asia	90	91	Both	HDL-C	1.3±0.3	1.4±0.3	mmol/L
						Both	TC	200.4±40.4	197.8±33.2	mg/dL
						Both	TG	143.7±100.9	119.8±74.7	mg/dL
Sakuta, 2005[43]	NA	cross-sectional study	Asia	39	926	Female	TC	214.0±34.0	213.0±31.0	mg/dL
						Female	TG	143.0±77.0	146.0±61.0	mg/dL
Méndez-Sánchez, 2005[44]	NA	case-control study	America	97	190	Both	TC	5.4±1.1	5.4±1.0	mmol/L
						Both	TG	1.9±1.2	1.7±1.0	mmol/L
						Both	LDL-C	3.4±0.9	3.5±0.9	mmol/L
						Both	HDL-C	1.2±0.4	1.2±0.4	mmol/L
Mendez-Sanchez, 2005[45]	NA	cross-sectional study	America	65	180	both	TC	5.3±1.2	5.3±1.1	mmol/L
						both	HDL-C	1.0±0.3	1.1±0.3	mmol/L
						both	LDL-C	3.3±0.9	3.4±0.9	mmol/L
						both	TG	1.9±0.9	1.8±1.2	mmol/L
Volzke, 2005[46]	NA	cross-sectional study	Europe	891	3,311	Both	TC	5.9±1.3	5.7±1.2	mmol/L
						Both	LDL-C	3.7±1.2	3.6±1.2	mmol/L
						Both	HDL-C	1.5±0.4	1.4±0.5	mmol/L
Jiang, 2004[47]	Feb. 1998 - May. 1998	case-control study	Asia	105	274	Both	TC	4.7±0.9	4.9±1.0	mmol/L
						Both	TG	1.3±1.2	1.2±0.8	mmol/L
						Both	LDL-C	2.6±0.7	2.7±0.7	mmol/L
						Both	HDL-C	1.3±0.4	1.4±0.3	mmol/L
Galman, 2004[48]	1992 - 2000	cross-sectional study	America	45	80	Female	TC	5.4±5.9	1.3±1.0	mmol/L
			America	20	20	Female	TC	4.8±1.1	4.7±1.2	mmol/L
			America	45	80	Female	TG	1.6±1.5	0.7±0.7	mmol/L
			America	20	20	Female	TG	1.6±1.1	1.3±0.5	mmol/L
			America	45	80	Female	LDL-C	3.4±3.8	1.1±0.9	mmol/L
			America	20	20	Female	LDL-C	2.9±1.0	2.9±0.9	mmol/L
			America	45	80	Female	HDL-C	1.3±1.4	0.3±0.3	mmol/L
			America	20	20	Female	HDL-C	1.2±0.4	1.1±0.3	mmol/L
Hasegawa, 2003[49]	NA	case-control study	Asia	79	53	Both	TC	159.0±44.4	173.0±29.1	mg/dL

Gustafsson, 2003[50]	NA	case-control study	Europe	81	36	Both	TG	81.0±44.4	97.0±43.7	mg/dL
						Both	LDL-C	100.0±35.6	106.0±29.1	mg/dL
						Both	HDL-C	41.0±8.9	45.0±7.3	mg/dL
						Both	TC	5.7±0.9	5.8±1.2	mmol/L
						Both	TG	1.5±0.9	1.4±0.6	mmol/L
Kurtul, 2002[51]	NA	case-control study	Other	32	32	Both	TC	209.2±11.6	185.6±19.3	mg/dL
						Both	TG	186.9±9.4	136.4±23.2	mg/dL
						Both	LDL-C	132.7±8.0	95.4±13.7	mg/dL
						Both	HDL-C	43.4±3.6	48.4±7.8	mg/dL
Devesa, 2001[52]	Feb. 1991 - Apr. 1993	cross-sectional study	Asia	92	572	Female	TC	244.5±58.0	220.7±48.4	mg/dL
			Asia	34	564	Male	TC	224.4±44.1	223.1±48.4	mg/dL
			Asia	92	572	Female	TG	123.4±80.0	90.6±63.1	mg/dL
			Asia	34	564	Male	TG	151.9±131.9	133.2±90.2	mg/dL
			Europe	126	1,136	Both	LDL-C	151.3±49.5	141.8±41.7	mg/dL
Misciagna, 2000[53]	May. 1985 - Jun. 1993	case-control study	Europe	126	1,136	Both	HDL-C	62.1±15.2	60.6±16.6	mg/dL
			Europe	54	162	Male	TC	5.0±1.0	5.2±1.1	mmol/L
			Asia	47	141	Female	TC	5.5±1.3	5.1±1.1	mmol/L
			Asia	54	162	Male	TG	1.5±0.7	1.6±1.3	mmol/L
			Asia	47	141	Female	TG	1.7±1.3	1.3±0.9	mmol/L
			Europe	54	162	Male	HDL-C	1.2±0.3	1.2±0.3	mmol/L
			Europe	47	141	Female	HDL-C	1.3±0.3	1.3±0.3	mmol/L
Han, 2000[54]	Jan. 1998 - May. 1998	case-control study	Asia	190	441	Both	TC	4.6±0.9	4.8±1.0	mmol/L
						Both	TG	1.4±1.1	1.2±0.9	mmol/L
						Both	LDL-C	2.6±0.7	2.6±0.7	mmol/L
						Both	HDL-C	1.3±0.3	1.4±0.3	mmol/L
Chen, 1999[55]	NA	case-control study	Asia	236	1,092	Both	TC	192.5±36.1	192.9±38.1	mg/dL
						Both	TG	160.4±128.8	138.8±92.9	mg/dL
						Both	LDL-C	119.9±30.4	121.1±31.7	mg/dL
						Both	HDL-C	42.8±12.2	45.5±14.0	mg/dL
Duque, 1999[56]	Aug. 1991 - Aug. 1992	cross-sectional study	America	113	1,463	Male	TC	209.9±46.9	214.9±44.6	mg/dL
				72	441	Female	TC	205.5±45.0	205.1±48.7	mg/dL
				185	1,904	Both	TG	5.0±0.6	5.0±0.6	mg/dL
				113	1,463	Male	HDL-C	42.8±13.4	42.2±11.9	mg/dL
				72	441	Female	HDL-C	50.9±14.3	50.4±12.5	mg/dL
Sasazuki, 1999[57]	Oct. 1986 - Dec. 1994	cross-sectional study	Asia	277	6,895	Male	TG	4.8±0.5	4.7±0.8	mg/dL
Niemi, 1999[58]	NA	cross-sectional study	Europe	47	220	Female	TC	5.7±1.1	5.5±0.8	mmol/L

Chen, 1998[59]	Jan. 1995 - Jul. 1995	cross-sectional study	Asia	17	242	Male	TC	5.1±0.6	5.8±0.8	mmol/L
				47	220	Female	TG	1.5±1.1	1.1±0.8	mmol/L
				17	242	Male	TG	1.6±0.8	1.6±0.8	mmol/L
				47	220	Female	LDL-C	3.4±1.1	3.3±0.8	mmol/L
				17	242	Male	LDL-C	3.2±0.8	3.8±1.6	mmol/L
				47	220	Female	HDL-C	1.5±0.4	1.6±0.8	mmol/L
				17	242	Male	HDL-C	1.1±0.2	1.2±0.8	mmol/L
				386	2,946	Both	TC	4.9±1.0	4.9±0.9	mmol/L
						Both	TG	1.7±1.4	1.8±1.4	mmol/L
						Both	LDL-C	3.0±0.8	3.1±0.8	mmol/L
Borch, 1998[60]	NA	cross-sectional study	Europe			Both	HDL-C	1.2±0.4	1.1±0.3	mmol/L
				59	57	Female	TC	6.6±1.2	6.6±1.2	mmol/L
				45	44	Male	TC	6.1±1.1	6.4±1.2	mmol/L
				58	57	Female	TG	1.7±1.0	1.6±1.0	mmol/L
				45	44	Male	TG	1.9±0.9	1.6±0.8	mmol/L
				45	41	Female	LDL-C	4.1±1.1	4.1±1.0	mmol/L
				24	24	Male	LDL-C	3.9±0.9	4.0±1.0	mmol/L
				51	45	Female	HDL-C	1.5±0.4	1.6±0.5	mmol/L
Fu, 1997[61]	Jan. 1994 - Jun. 1994	case-control study	Asia	28	28	Male	HDL-C	1.1±0.3	1.3±0.4	mmol/L
				47	19	Both	TC	4.2±1.1	4.5±0.8	mmol/L
				47	19	Both	TG	1.5±0.6	1.2±0.4	mmol/L
				47	19	Both	LDL-C	1.8±1.0	2.3±1.1	mmol/L
				47	19	Both	HDL-C	1.1±0.6	1.2±0.3	mmol/L
				52	40	Both	TC	181.0±10.0	205.0±7.0	mg/dL
Miquel, 1998[62]	NA	cross-sectional study	America							
Singh, 1997[63]	NA	cross-sectional study	Asia	50	26	Both	TC	262.9±39.2	224.7±29.3	mg/dL
						Both	TG	157±25.7	124.1±24.7	mg/dL
						Both	LDL-C	180.8±24.9	121.8±22.4	mg/dL
						Both	HDL-C	42.7±10.0	65.3±12.5	mg/dL
Tang, 1996[64]	NA	cross-sectional study	Asia	51	19	Both	TC	138.2±28.9	144.7±35.2	mg/dL
						Both	TG	101.7±50.0	91.1±30.2	mg/dL
						Both	LDL-C	99.9±25.5	113.5±29.1	mg/dL
						Both	HDL-C	26.4±7.1	23.1±4.6	mg/dL
Bertomeu, 1996[65]	Apr. 1992 - May. 1994	case-control study	Europe	160	125	Both	TC	243.0±49.3	228.0±45.8	mg/dL
						Both	TG	133.0±73.4	126.0±79.4	mg/dL
						Both	LDL-C	168.0±45.5	156.0±51.4	mg/dL
						Both	HDL-C	50.0±12.7	53.0±16.8	mg/dL

Villalpando, 1997[66]	NA	cross-sectional study	America	124	1,211	Female	TC	196.6±43.6	190.9±44.2	mg/dL
				19	920	Male	TC	178.6±35.8	191.8±41.9	mg/dL
				19	920	Male	TG	226.3±103.6	246.4±175.5	mg/dL
				124	1,211	Female	TG	195.2±93.5	185.3±123.6	mg/dL
				19	920	Male	LDL-C	117.1±33.3	123.4±38.0	mg/dL
				124	1,211	Female	LDL-C	126.1±36.8	122.6±40.4	mg/dL
				19	920	Male	HDL-C	26.4±4.1	30.3±8.5	mg/dL
				124	1,211	Female	HDL-C	34.5±8.5	34.8±9.0	mg/dL
Shinchi, 1993[67]	Oct. 1986 - Dec. 1990	case-control study	Asia	61	2,494	Male	TC	189.9±30.5	195.3±35	mg/dL
						Male	TG	4.8±0.6	4.7±0.5	mg/dL
						Male	LDL-C	109.7±32.8	116.5±35.0	mg/dL
						Male	HDL-C	53.2±14.1	53.7±15.0	mg/dL
Loria, 1994[68]	Nov. 1985 - Apr. 1986	cross-sectional study	Europe	26	967	Male	TC	205.8±6.8	210.8±251.0	mg/100 ml
				35	837	Female	TC	203.5±7.2	197.1±167.2	mg/100 ml
				26	967	Male	TG	2.1±0.1	2.1±1.6	mg/100 ml
				35	837	Female	TG	1.9±0.1	2.0±0.9	mg/100 ml
				26	967	Male	HDL-C	49.1±1.8	52.2±67.8	mg/100 ml
				35	837	Female	HDL-C	58.1±2.7	53.5±62.2	mg/100 ml
Juvonen, 1995[69]	Aug. 1989 - Feb. 1990	case-control study	Europe	93	92	Both	TC	5.3±1.2	5.7±1.2	mmol/L
				93	92	Both	TG	1.4±0.7	1.3±0.6	mmol/L
				93	92	Both	LDL-C	3.0±1.0	3.4±2.4	mmol/L
				93	92	Both	HDL-C	1.3±0.3	1.4±0.4	mmol/L
Sarin, 1995[70]	NA	cross-sectional study	Asia	105	105	Both	TC	197.0±11.0	181±13.0	mg/dL
				105	105	Both	TG	129.0±14.0	125±9.0	mg/dL
Scragg, 1984[71]	Dec. 1978 - Sep. 1980	case-control study	Oceania	127	182	Female	TC	5.5±0.1	5.6±0.1	mmol/L
				46	102	Male	TC	5.4±0.2	5.4±0.1	mmol/L
				124	175	Female	TG	1.4±0.1	1.2±0.1	mmol/L
				44	99	Male	TG	1.7±0.2	1.5±0.1	mmol/L
				127	182	Female	HDL-C	1.2±0.02	1.2±0.02	mmol/L
				46	102	Male	HDL-C	1.0±0.03	1.1±0.02	mmol/L
GREPCO, 1988[72]	NA	cross-sectional study	Europe	65	1,137	Male	TC	217.3±40.3	209.5±43.8	mg/dL
				66	979	Female	TC	205.9±39.9	202.8±37.0	mg/dL
				65	1,137	Male	LDL-C	144.8±37.2	133.5±47.4	mg/dL
				66	979	Female	LDL-C	132.1±36.1	128.6±41.5	mg/dL
				65	1,137	Male	HDL-C	44.0±11.2	39.2±12.1	mg/dL
				66	979	Female	HDL-C	56.6±11.0	53.1±14.7	mg/dL

Mellstrom, 1988[73]	1906 - 1907	cross-sectional study	Europe	65	1,137	Male	TG	4.8±0.7	5.0±0.8	mmol/L
				66	979	Female	TG	4.4±0.3	4.5±0.6	mmol/L
				29	54	Female	TC	6.3±1.0	6.4±1.3	mmol/L
				29	54	Female	TG	1.7±0.8	1.3±0.7	mmol/L
Mohr, 1991[74]	1984 - 1987	cross-sectional study	America	214	1,089	Female	TC	225.0±39.4	229.6±39.1	mg/dL
				214	1,089	Female	TG	122.5±1.7	98.0±1.7	mg/dL
				214	1,089	Female	LDL-C	134.5±36.7	138.1±38.0	mg/dL
				214	1,089	Female	HDL-C	63.7±18.6	69.5±18.9	mg/dL

GSD: gallstone disease, TC: total cholesterol, TG: triglyceride, LDL-C: low-density lipoprotein cholesterol, HDL-C: high-density lipoprotein cholesterol.

Supplemental Table 6. The characteristics of the included publications regarding OR and 95%CI of the blood lipid levels on GSD

Study	Period	Study_design	Geographic background	Cases	Controls	Sex	Traits	Comparison	OR (95%CI)
Kim, 2021[75]	2009-2013	cohort study	Asia	2,929	204,921	Both	HDL-C	High vs Low	0.72 (0.54, 0.95)
Sheng, 2020[76]	Aug. 2012 - Jul.2018	case-control study	Asia	835	835	Both	Triglyceride	High vs Low	0.93 (0.72, 1.21)
						Both	Triglyceride	High vs Low	0.82 (0.71, 0.94)
						Both	Total cholesterol	High vs Low	1.29 (1.15, 1.44)
						Both	LDL-C	High vs Low	2.63 (2.33, 2.96)
						Both	HDL-C	High vs Low	0.14 (0.10, 0.19)
Wang, 2020[2]	Jan. 2014 - Jan. 2015	cross-sectional study	Asia	168,092	1,900,432	Both	Total cholesterol	High vs Low	1.04 (1.02, 1.06)
						Both	Triglyceride	High vs Low	1.00 (0.99, 1.02)
						Both	LDL-C	High vs Low	1.12 (1.09, 1.15)
Song, 2020[3]	NA	cross-sectional study	Asia	274	3,735	Both	HDL-C	High vs Low	0.81 (0.79, 0.83)
						Both	Total cholesterol	High vs Low	1.26 (0.81, 1.95)
						Both	Triglyceride	High vs Low	1.35 (0.87, 2.12)
						Both	LDL-C	High vs Low	1.21 (0.94, 1.56)
Gu, 2020[4]	Jul. 2010 - Dec. 2012	case-control study	Asia	94	2,194	Both	HDL-C	High vs Low	0.89 (0.49, 1.61)
						Both	Total cholesterol	Per unit	0.95 (0.83, 1.09)
						Both	Triglyceride	Per unit	0.68 (0.41, 1.14)
						Both	LDL-C	Per unit	1.92 (1.31, 2.81)
Kim, 2019[5]	Jan. 2009 - Dec. 2017	cross-sectional study	Asia	355	7,531	Both	HDL-C	Per unit	1.01 (0.83, 1.23)
						Both	Total cholesterol	High vs Low	0.84 (0.59, 1.18)
						Both	Triglyceride	High vs Low	1.05 (0.75, 1.47)
						Both	LDL-C	High vs Low	1.32 (0.73, 2.41)
Kim, 2019[7]	Jun. 2014 - May. 2015	cross-sectional study	Asia	806	36,495	Male	HDL-C	High vs Low	0.60 (0.43, 0.83)
						Male	Total cholesterol	Per unit	0.85 (0.70, 1.02)
				554	21,544	Female	Total cholesterol	Per unit	0.88 (0.69, 1.12)
				806	36,495	Male	LDL-C	Per unit	1.09 (0.90, 1.33)
				554	21,544	Female	LDL-C	Per unit	1.07 (0.84, 1.36)
				806	36,495	Male	HDL-C	Per unit	0.86 (0.74, 0.99)
				554	21,544	Female	HDL-C	Per unit	0.75 (0.57, 0.97)
Chang, 2019[77]	2007 - Dec. 2014	cohort study	Asia	104	4,735	Both	Total cholesterol	High vs Low	1.69 (1.12, 2.55)
Dhamnetiya, 2018[8]	Jan. 2013 - Dec. 2013	case-control study	Asia	120	120	Both	Total cholesterol	Per unit	1.01 (1.00, 1.02)
						Both	Triglyceride	Per unit	1.01 (1.00, 1.02)
						Both	LDL-C	Per unit	1.02 (1.00, 1.03)

Hu, 2018[78]	Sept. 2012 - Aug. 2013	cross-sectional study	Asia	404	8,085	Both	HDL-C	Per unit	0.97 (0.93, 1.00)
						Both	Total cholesterol	High vs Low	1.05 (0.76, 1.44)
						Both	Triglyceride	High vs Low	0.99 (0.76, 1.30)
						Both	LDL-C	High vs Low	1.01 (0.73, 1.38)
Kwon, 2018[9]	Jan. 2003 - Dec. 2015	cross-sectional study	Asia	821	19,942	Both	HDL-C	High vs Low	0.97 (0.73, 1.31)
						Both	Total cholesterol	High vs Low	0.90 (0.72, 1.11)
						Both	Triglyceride	High vs Low	1.04 (0.74, 1.45)
						Both	LDL-C	High vs Low	1.02 (0.75, 1.38)
Shabanzadeh, 2017[79]	Oct. 1982-1992	cohort study	Europe	132	1,007	Both	HDL-C	High vs Low	0.60 (0.49, 0.74)
						Women	HDL-C	Per unit	0.99 (0.96, 1.02)
						Women	Triglyceride	Per unit	1.06 (0.95, 1.17)
						Men	HDL-C	Per unit	0.98 (0.93, 1.03)
Kim, 2017[80]	Jan. 2014 - Dec. 2014	cross-sectional study	Asia	103	1,124	Men	HDL-C	Per unit	0.98 (0.93, 1.03)
						Men	Triglyceride	Per unit	1.00 (0.98, 1.02)
						Male	Triglyceride	High vs Low	0.96 (0.82, 1.13)
						Female	Triglyceride	High vs Low	1.55 (1.23, 1.96)
Shabanzadeh, 2016[81]	1982 - 1993	cohort study	Europe	256	2,592	Male	LDL-C	High vs Low	0.91 (0.78, 1.07)
						Female	HDL-C	High vs Low	0.95 (0.76, 1.19)
						Both	Triglyceride	Per unit	1.08 (0.97, 1.21)
						Both	HDL-C	Per unit	0.82 (0.57, 1.19)
Ansari-Moghaddam, 2015[82]	2012	cross-sectional study	Asia	40	1,522	Both	Total cholesterol	High vs Low	1.14 (0.60, 2.18)
						Both	Triglyceride	High vs Low	1.60 (0.79, 3.22)
						Both	LDL-C	High vs Low	0.89 (0.46, 1.72)
						Both	HDL-C	High vs Low	0.51 (0.26, 0.99)
Zhang, 2015[13]	Jan. 2010 - Jan. 2014	cross-sectional study	Asia	882	9,134	Both	Total cholesterol	Per unit	1.02 (1.01, 1.03)
						Both	Triglyceride	Per unit	0.89 (0.60, 0.98)
						Both	LDL-C	Per unit	1.00 (0.90, 1.02)
Dwivedi, 2015[15]	NA	case-control study	Asia	102	256	Both	Triglyceride	Per unit	1.01 (1.00, 1.02)
						Both	HDL-C	Per unit	0.93 (0.90, 0.95)
Chen, 2014[83]	Oct. 2007 - Nov. 2010	cross-sectional study	Asia	141	1,580	Both	Total cholesterol	Per unit	1.00 (0.99, 1.00)
						Both	Triglyceride	Per unit	1.00 (0.99, 1.00)
						Both	LDL-C	Per unit	1.00 (0.99, 1.01)
						Both	HDL-C	Per unit	1.00 (0.98, 1.01)
Lin, 2014	2011 - 2012	cross-sectional study	Asia	734	11,180	Both	Triglyceride	High vs Low	1.25 (1.05, 1.49)
						Both	HDL-C	High vs Low	0.63 (0.54, 0.74)

Lee, 2014[22]	Jan. 2000 - Aug. 2009	cross-sectional study	Asia	768	11,265	Both	Triglyceride	Per unit	1.00 (1.00, 1.10)
						Both	HDL-C	Per unit	0.99 (0.98, 0.99)
						Both	Total cholesterol	Per unit	1.02 (1.00, 1.04)
						Both	Triglyceride	Per unit	0.99 (0.98, 1.00)
Takahashi, 2014[26]	2010	cross-sectional study	Asia	694	14,857	Both	HDL-C	Per unit	0.92 (0.85, 0.99)
						Both	Triglyceride	Per unit	1.01 (1.01, 1.01)
						Both	LDL-C	Per unit	1.00 (1.00, 1.00)
Xu, 2012[84]	Jan. 2007 - Jun. 2010	cross-sectional study	Asia	2,527	53,569	Both	HDL-C	Per unit	1.00 (0.99, 1.00)
						Both	Total cholesterol	High vs Low	1.04 (0.83, 1.31)
						Both	Triglyceride	High vs Low	0.93 (0.82, 1.06)
						Both	LDL-C	High vs Low	0.87 (0.74, 1.03)
Kim, 2011[28]	Jan. 2006 - Dec. 2007	cross-sectional study	Asia	173	3,952	Both	HDL-C	High vs Low	0.93 (0.77, 1.14)
						Female	HDL-C	High vs Low	0.55 (0.33, 0.93)
Krawczyk, 2011[85]	NA	case-control study	Europe	229	258	Both	Total cholesterol	Per unit	0.99 (0.98, 1.00)
						Both	Triglyceride	Per unit	1.00 (1.00, 1.01)
						Both	LDL-C	Per unit	0.99 (0.99, 1.00)
						Both	HDL-C	Per unit	0.99 (0.97, 1.00)
Banim, 2011[86]	1993 and 1997 - Jun. 2007	cohort study	America	95	11,093	Male	Total cholesterol	High vs Low	0.68 (0.36, 1.25)
				201	12,874	Female	Total cholesterol	High vs Low	1.14 (0.70, 1.72)
				95	11,093	Male	Triglyceride	High vs Low	2.02 (1.03, 3.98)
				201	12,874	Female	Triglyceride	High vs Low	2.43 (1.52, 3.90)
				201	12,874	Female	LDL-C	High vs Low	1.13 (0.72, 1.77)
				95	11,093	Male	LDL-C	High vs Low	1.05 (0.56, 1.95)
				201	12,874	Female	HDL-C	High vs Low	0.55 (0.36, 0.85)
				95	11,093	Male	HDL-C	High vs Low	0.22 (0.09, 0.52)
Wang, 2010[30]	Jan. 2008 - Jul. 2008	case-control study	Asia	100	147	Both	Total cholesterol	Per unit	1.02 (1.01, 1.04)
						Both	Triglyceride	Per unit	1.01 (0.99, 1.02)
Halldestam, 2009[87]	NA	cohort study	Europe	42	503	Both	Triglyceride	Per unit	0.90 (0.42, 1.90)
						Both	LDL-C	Per unit	1.59 (1.32, 1.91)
						Both	HDL-C	Per unit	1.29 (0.49, 3.42)
Walcher, 2009[88]	Nov. 2002 - Dec. 2002	cross-sectional study	Europe	167	1,962	Both	Total cholesterol	Per unit	0.65 (0.52, 0.79)
						Both	Triglyceride	Per unit	0.91 (0.79, 1.04)
						Both	LDL-C	Per unit	0.69 (0.55, 0.86)
						Both	HDL-C	Per unit	0.63 (0.39, 1.03)
Sun, 2009[89]	Jan. 2007 - Dec. 2007	cross-sectional study	Asia	384	3,189	Both	Total cholesterol	High vs Low	1.70 (1.20, 2.43)

						Both	Triglyceride	High vs Low	1.67 (1.31, 2.13)
						Both	LDL-C	High vs Low	1.71 (1.09, 2.68)
						Both	HDL-C	High vs Low	0.48 (0.31, 0.74)
Tirziu, 2008[32]	Nov. 2002 - Sept.2007	case-control study	Europe	109	271	Both	HDL-C	Per unit	0.98 (0.96, 1.00)
Festi, 2008[90]	1985 and 1988 - 10 years	cross-sectional study	Europe	485	9,032	Both	Total cholesterol	Per unit	1.00 (0.99, 1.00)
						Both	Triglyceride	Per unit	1.00 (1.00, 1.00)
						Both	HDL-C	Per unit	0.99 (0.98, 1.00)
Andreotti, 2008[35]	Jun. 1997 - May. 2001	case-control study	Asia	981	858	Both	Total cholesterol	High vs Low	0.84 (0.54, 1.31)
						Both	Triglyceride	High vs Low	1.43 (1.08, 1.90)
						Both	LDL-C	High vs Low	0.91 (0.59, 1.42)
						Both	HDL-C	High vs Low	0.44 (0.30, 0.64)
Chen, 2006[91]	Aug. 2003 - Apr. 2004	cross-sectional study	Asia	74	1,518	Male	Total cholesterol	High vs Low	0.52 (0.16, 1.52)
				94	1,647	Female	Total cholesterol	High vs Low	2.19 (1.18, 4.05)
				94	1,647	Female	Triglyceride	High vs Low	2.12 (1.29, 3.46)
				74	1,518	Male	Triglyceride	High vs Low	1.16 (0.66, 2.03)
Liu, 2006[40]	Jan. 2002 - Dec. 2007	cross-sectional study	Asia	126	2,260	Both	Total cholesterol	High vs Low	0.99 (0.64, 1.53)
						Both	Triglyceride	High vs Low	1.25 (0.75, 2.08)
						Both	HDL-C	High vs Low	0.50 (0.17, 1.44)
Nervi, 2006[41]	1993 - 2000	case-control study	America	299	582	Female	Triglyceride	High vs Low	0.83 (0.63, 1.25)
						Female	HDL-C	High vs Low	0.67 (0.50, 0.91)
Sakuta, 2005[43]	NA	cross-sectional study	Asia	39	926	Male	Total cholesterol	Per unit	0.95 (0.69, 1.31)
						Male	Triglyceride	Per unit	0.99 (0.72, 1.36)
Mendez-Sanchez, 2005[45]	NA	cross-sectional study	America	65	180	Both	HDL-C	High vs Low	0.43 (0.20, 0.95)
						Both	Triglyceride	High vs Low	1.46 (0.78, 2.74)
						Both	Total cholesterol	High vs Low	1.20 (0.59, 2.47)
						Both	LDL-C	High vs Low	1.22 (0.63, 2.38)
Volzke, 2005[46]	NA	cross-sectional study	Europe	305	1,747	Male	LDL-C	Per unit	0.88 (0.77, 0.99)
				586	1,564	Female	LDL-C	Per unit	0.85 (0.76, 0.94)
				305	1,747	Male	HDL-C	Per unit	0.66 (0.44, 1.00)
				586	1,564	Female	HDL-C	Per unit	0.76 (0.58, 0.99)
Boland, 2002[92]	1987 - 1996	cohort study	America	179	5,660	Male	Total cholesterol	High vs Low	0.91 (0.60, 1.40)
				370	6,564	Female	Total cholesterol	High vs Low	1.07 (0.80, 1.50)
				179	5,660	Male	Triglyceride	High vs Low	1.65 (1.00, 2.70)
				370	6,564	Female	Triglyceride	High vs Low	2.57 (1.70, 3.90)
				370	6,564	Female	LDL-C	High vs Low	0.99 (0.70, 1.40)

Brasca, 2000[93]	NA	cross-sectional study	America	179	5,660	Male	LDL-C	High vs Low	0.85 (0.50, 1.40)
				179	5,660	Male	HDL-C	High vs Low	0.42 (0.30, 0.70)
				370	6,564	Female	HDL-C	High vs Low	0.64 (0.50, 0.90)
				169	539	Female	Total cholesterol	High vs Low	0.80 (0.50, 1.20)
				72	393	Male	Total cholesterol	High vs Low	1.00 (0.50, 1.90)
				72	393	Male	Triglyceride	High vs Low	0.80 (0.40, 1.80)
				169	539	Female	Triglyceride	High vs Low	1.90 (1.00, 3.60)
				72	393	Male	LDL-C	High vs Low	0.90 (0.50, 1.70)
				169	539	Female	LDL-C	High vs Low	0.80 (0.50, 1.20)
				72	393	Male	HDL-C	High vs Low	0.60 (0.20, 1.70)
				169	539	Female	HDL-C	High vs Low	0.90 (0.50, 1.50)
Misciagna, 2000[53]	May. 1985 - Jun. 1993	case-control study	Europe	84	271	Both	Total cholesterol	High vs Low	0.83 (0.37, 1.88)
						Both	Triglyceride	High vs Low	2.94 (1.17, 7.36)
						Both	HDL-C	High vs Low	0.66 (0.29, 1.47)
						Both	Total cholesterol	Per unit	0.60 (0.39, 0.93)
						Both	Triglyceride	Per unit	1.72 (0.97, 3.05)
Attili, 1997[94]	Dec. 1984 - Apr. 1987	cohort study	Europe	1,511	14,399	Male	Total cholesterol	High vs Low	0.66 (0.57, 0.78)
				2,584	11,090	Female	Total cholesterol	High vs Low	0.77 (0.68, 0.88)
				1,511	14,399	Male	Triglyceride	High vs Low	0.94 (0.80, 1.09)
				2,584	11,090	Female	Triglyceride	High vs Low	1.31 (1.15, 1.49)
				2,584	11,090	Female	HDL-C	High vs Low	0.70 (0.62, 0.79)
Villalpando, 1997[66]	NA	cross-sectional study	America	1,511	14,399	Male	HDL-C	High vs Low	0.73 (0.63, 0.85)
				19	920	Male	Total cholesterol	High vs Low	0.41 (0.05, 1.76)
				124	1,211	Female	Total cholesterol	High vs Low	1.27 (0.81, 1.99)
				19	920	Male	Triglyceride	High vs Low	1.01 (0.35, 3.28)
				124	1,211	Female	Triglyceride	High vs Low	1.57 (1.05, 2.36)
Shinchi, 1993[67]	Oct. 1986 - Dec. 1990	case-control study	Asia	61	2,494	Male	Total cholesterol	High vs Low	0.40 (0.20, 0.90)
						Male	Triglyceride	High vs Low	1.20 (0.50, 2.60)
						Male	LDL-C	High vs Low	0.50 (0.30, 1.20)
						Male	HDL-C	High vs Low	1.00 (0.40, 2.30)
Loria, 1994[68]	Nov. 1985 - Apr. 1986	cross-sectional study	Europe	61	1,804	Both	Total cholesterol	High vs Low	1.14 (0.78, 1.66)
						Both	Triglyceride	High vs Low	1.03 (0.65, 1.63)
						Both	HDL-C	High vs Low	0.91 (0.60, 1.39)
Petitti, 1981[95]	NA	cross-sectional study	America	65	803	Female	LDL-C	Per unit	1.00 (0.90, 1.10)
						Female	HDL-C	Per unit	0.80 (0.60, 1.00)
Scragg, 1984[71]	Dec. 1978 - Sept. 1980	case-control study	Oceania	46	102	Male	Total cholesterol	Per unit	0.64 (0.41, 0.99)

GREPCO, 1988[72]	NA	cross-sectional study	Europe	127	182	Female	Total cholesterol	Per unit	0.79 (0.61, 1.03)
				124	175	Female	Triglyceride	Per unit	2.94 (1.38, 6.25)
				44	99	Male	Triglyceride	Per unit	1.48 (1.00, 2.18)
				65	1,137	Male	Triglyceride	Per unit	1.01 (1.00, 1.03)
				66	979	Female	Triglyceride	Per unit	1.01 (1.00, 1.01)
Nomura, 1988[96]	May. 1984 - Dec. 1984	cross-sectional study	Asia	82	1,760	Both	Total cholesterol	High vs Low	1.60 (0.80, 3.20)
						Both	Triglyceride	High vs Low	0.60 (0.30, 1.20)
Jorgensen, 1989[97]	Nov. 1982 - Feb. 1984	cross-sectional study	Europe	280	3,128	Both	Total cholesterol	Per unit	0.87 (0.77, 0.99)
						Both	Triglyceride	Per unit	1.09 (0.97, 1.22)
						Both	LDL-C	Per unit	0.88 (0.77, 1.00)
						Both	HDL-C	Per unit	0.72 (0.50, 1.04)
Thijs, 1990[98]	1983 - 1985	case-control study	Europe	250	526	Both	Total cholesterol	Per unit	0.71 (0.61, 0.83)
						Both	Triglyceride	Per unit	3.77 (2.21, 6.44)
						Both	HDL-C	Per unit	0.14 (0.07, 0.28)
Sichieri, 1990[99]	1971 - 1984	cohort study	America	368	10,551	Both	Total cholesterol	High vs Low	1.12 (1.02, 1.22)
Maurer, 1990[100]	1982 - 1984	cross-sectional study	America	253	1,072	Female	Total cholesterol	Per unit	0.80 (0.70, 0.90)
				53	915	Male	Total cholesterol	Per unit	1.00 (0.70, 1.30)
				53	915	Male	HDL-C	Per unit	0.80 (0.60, 1.00)
				253	1,072	Female	HDL-C	Per unit	1.00 (0.90, 1.20)
Mohr, 1991[74]	1984 - 1987	cross-sectional study	America	216	1,087	Female	Triglyceride	Per unit	5.29 (4.45, 6.12)
						Female	LDL-C	Per unit	0.99 (0.99, 1.00)
						Female	HDL-C	Per unit	1.00 (0.98, 1.01)
Kato, 1992[101]	1900 - 1919	cohort study	America	471	7,381	Both	Total cholesterol	High vs Low	0.90 (0.70, 1.20)
						Both	Triglyceride	High vs Low	1.40 (1.10, 1.90)

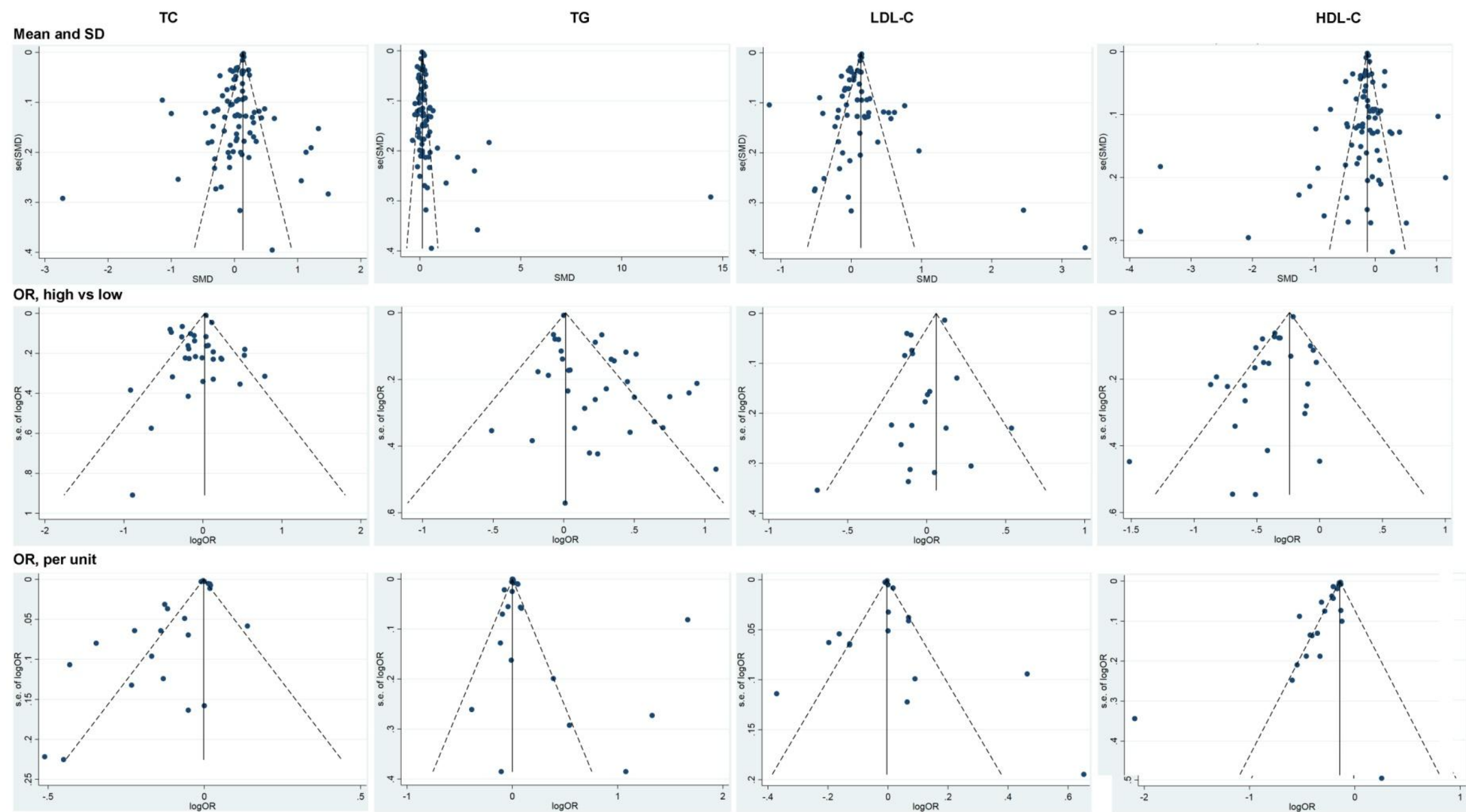
LDL-C: low-density lipoprotein cholesterol, HDL-C: high-density lipoprotein cholesterol

Supplemental Table 7. Subgroup analysis for relationships between blood lipid profiles, fasting glucose and gallstone disease in meta-analysis

	Standardized Mean Difference				Odd Ratio (High vs Low)				Odd Ratio (Per Unit)			
	Datasets	SMD (95%CI)	P	I ²	Datasets	OR (95%CI)	P	I ²	Datasets	OR (95%CI)*	P	I ²
Total cholesterol	85	0.040 (0.009, 0.071)	0.012	90.9%	34	0.974 (0.896, 1.059)	0.539	76.5%	23	0.992 (0.981, 1.004)	0.177	84.5%
Study_design												
cross-sectional study	49	0.081 (0.051, 0.111)	1.44×10⁻⁰⁷	88.2%	21	0.993 (0.891, 1.107)	0.901	63.9%	16	0.992 (0.967, 1.018)	0.071	83.6%
case-control study	33	0.009 (-0.129, 0.147)	0.899	91.7%	4	0.846 (0.523, 1.369)	0.497	76.9%	7	0.992 (0.981, 1.004)	0.564	88.1%
cohort study	2	0.148 (0.075, 0.220)	7.19×10⁻⁰⁵	0.0%	9	0.944 (0.777, 1.147)	0.562	85.1%				
Geographic background												
Asia	45	0.059 (0.027, 0.091)	3.44×10⁻⁰⁴	91.9%	19	1.014 (0.905, 1.137)	0.810	72.8%	13	0.999 (0.984, 1.015)	0.925	79.1%
Europe	22	-0.05 (-0.194, 0.094)	0.495	84.9%	4	0.780 (0.644, 0.945)	0.011	59.9%	6	0.979 (0.960, 1.000)	0.047	89.6%
America	14	-0.087 (-0.303, 0.130)	0.431	90.6%	11	1.074 (0.996, 1.158)	0.063	0.0%	2	0.854 (0.7.00, 1.041)	0.118	41.7%
Gender												
Female	18	0.094 (-0.059, 0.247)	0.228	87.2%	6	1.060 (0.807, 1.391)	0.677	72.2%	3	0.812 (0.733, 0.900)	6.90×10⁻⁰⁵	0.0%
Male	12	-0.058 (-0.153, 0.038)	0.236	52.6%	7	0.680 (0.593, 0.779)	2.76×10⁻⁰⁸	0.0%	4	0.868 (0.756, 0.998)	0.047	2.2%
Triglyceride	82	0.302 (0.251, 0.354)	1.32×10⁻³⁰	97.7%	37	1.192 (1.097, 1.295)	3.47×10⁻⁰⁵	75.8%	28	1.011 (1.006, 1.016)	5.12×10⁻⁰⁵	96.0%
Study_design												
cross-sectional study	48	0.252 (0.189, 0.314)	2.38×10⁻¹⁵	98.4%	24	1.148 (1.046, 1.260)	0.004	64.5%	15	1.012 (1.006, 1.019)	0.002	97.7%
case-control study	33	0.455 (0.279, 0.631)	3.98×10⁻⁰⁷	94.9%	5	1.126 (0.791, 1.602)	0.510	78.7%	9	1.010 (0.996, 1.024)	0.173	81.5%
cohort study	1	0.043 (-0.369, 0.455)	0.838	NA	8	1.448 (1.143, 1.835)	0.002	83.1%	4	1.004 (0.985, 1.024)	0.663	0.0%
Geographic background												
Asia	46	0.126 (0.095, 0.158)	3.84×10⁻¹⁵	91.3%	22	1.101 (1.008, 1.201)	0.032	69.7%	13	1.011 (1.004, 1.018)	0.002	79.2%
Europe	21	0.398 (0.091, 0.704)	0.011	95.2%	4	1.181 (0.889, 1.569)	0.251	79.5%	12	1.006 (0.999, 1.012)	0.088	80.2%
America	12	1.356 (0.308, 2.405)	0.011	99.5%	11	1.537 (1.205, 1.960)	0.001	62.1%	1	5.290 (4.511, 6.204)	2.64×10⁻⁹³	NA
Oceania									2	1.925 (0.998, 3.711)	0.051	60.4%
Gender												
Female	16	1.295 (0.338, 2.251)	0.008	99.4%	8	1.621 (1.285, 2.045)	4.70×10⁻⁰⁵	74.6%	4	1.961 (1.021, 3.764)	0.043	99.3%
Male	11	0.159 (-0.057, 0.375)	0.148	88.4%	8	1.05 (0.898, 1.227)	0.497	27.7%	4	1.006 (0.988, 1.026)	0.501	30.8%
LDL-C	59	0.059 (0.027, 0.092)	3.85×10⁻⁰⁴	91.6%	21	1.054 (0.912, 1.219)	0.473	93.0%	18	0.998 (0.987, 1.008)	0.641	82.2%
Study_design												
cross-sectional study	37	0.079 (0.057, 0.107)	5.33×10⁻⁰⁸	85.8%	14	0.996 (0.898, 1.105)	0.939	80.7%	13	0.993 (0.981, 1.004)	0.224	74.4%

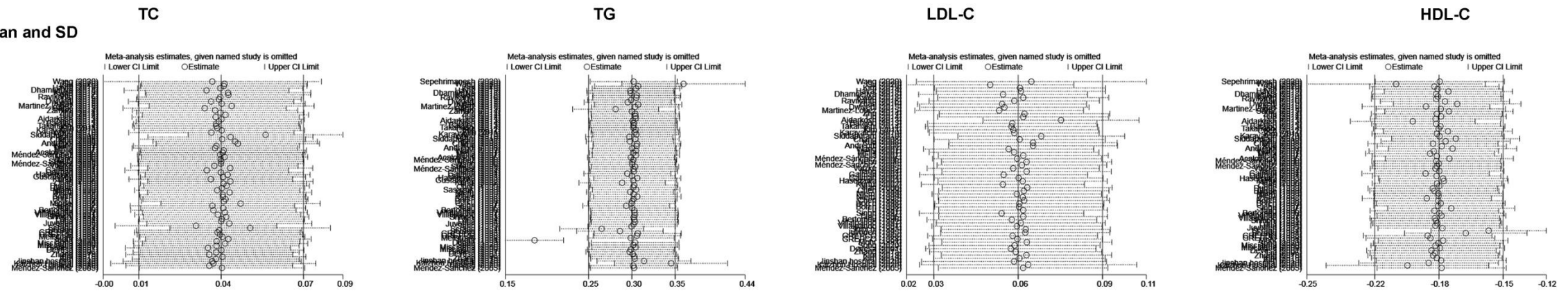
case-control study	22	0.086 (-0.097, 0.269)	0.357	94.4%	3	1.106 (0.401, 3.045)	0.846	95.1%	3	1.010 (0.973, 1.047)	0.602	89.8%
cohort study					4	1.002 (0.799, 1.255)	0.988	0.0%	1	1.590 (1.322, 1.913)	0.768	NA
Geographic background												
Asia	35	0.040 (0.004, 0.076)	0.029	93.7%	14	1.084 (0.912, 1.289)	0.729	82.6%	11	1.008 (0.991, 1.025)	0.376	73.9%
Europe	11	0.081 (-0.012, 0.174)	0.089	40.1%					6	0.947 (0.829, 1.081)	0.417	90.0%
America	11	0.126 (-0.052, 0.306)	0.165	82.3%	7	0.968 (0.806, 1.169)	0.361	0.0%	2	0.990 (0.985, 0.995)	8.86×10⁻⁰⁵	0.0%
Gender												
Female	11	0.141 (0.023, 0.259)	0.020	67.9%	3	0.966 (0.765, 1.219)	0.594	0.0%	4	0.963 (0.893, 1.039)	0.332	63.8%
Male	7	-0.018 (-0.115, 0.079)	0.719	42.1%	5	0.893 (0.776, 1.026)	0.409	0.0%	2	0.968 (0.784, 1.197)	0.766	70.6%
HDL-C	76	-0.182 (-0.217, -0.147)	3.67×10⁻²⁴	93.9%	30	0.636 (0.570, 0.710)	5.97×10⁻¹⁶	85.0%	27	0.974 (0.961, 0.987)	6.07×10⁻⁰⁵	76.4%
Study_design												
cross-sectional study	46	-0.119 (-0.147, -0.090)	2.21×10⁻¹⁶	87.8%	18	0.734 (0.669, 0.805)	7.70×10⁻¹¹	61.8%	18	0.982 (0.970, 0.995)	0.007	87.1%
case-control study	29	-0.467 (-0.685, -0.250)	2.55×10⁻⁰⁵	96.5%	5	0.465 (0.221, 0.982)	0.045	93.1%	7	0.966 (0.932, 1.002)	0.064	66.7%
cohort study	1	0.092 (-0.321, 0.504)	0.663	NA	7	0.634 (0.545, 0.739)	4.63×10⁻⁰⁹	56.1%	2	0.868 (0.615, 1.225)	0.420	0.0%
Geographic background												
Asia	41	-0.170 (-0.202, -0.137)	3.67×10⁻²⁴	92.6%	18	0.635 (0.545, 0.740)	5.89×10⁻⁰⁹	89.6%	12	0.970 (0.955, 0.986)	3.44×10⁻⁰⁴	79.9%
Europe	19	-0.553 (-0.925, -0.181)	0.004	96.9%	4	0.719 (0.657, 0.788)	1.55×10⁻¹²	0.0%	10	0.961 (0.923, 1.001)	0.054	80.9%
America	13	-0.086 (-0.215, 0.052)	0.221	80.5%	8	0.565 (0.454, 0.702)	2.61×10⁻⁰⁷	37.9%	5	0.983 (0.944, 1.024)	0.407	36.5%
Gender												
Female	15	-0.234 (-0.54, 0.072)	0.134	96.5%	7	0.714 (0.619, 0.824)	3.84×10⁻⁰⁶	41.4%	5	0.899 (0.796, 1.016)	0.252	65.4%
Male	11	-0.341 (-0.612, -0.071)	0.013	94.9%	5	0.543 (0.349, 0.844)	0.007	69.2%	3	0.825 (0.731, 0.932)	0.012	0.0%

Bold means $p < 0.05$, LDL: low density lipoprotein cholesterol, HDL:high density lipoprotein cholesterol.

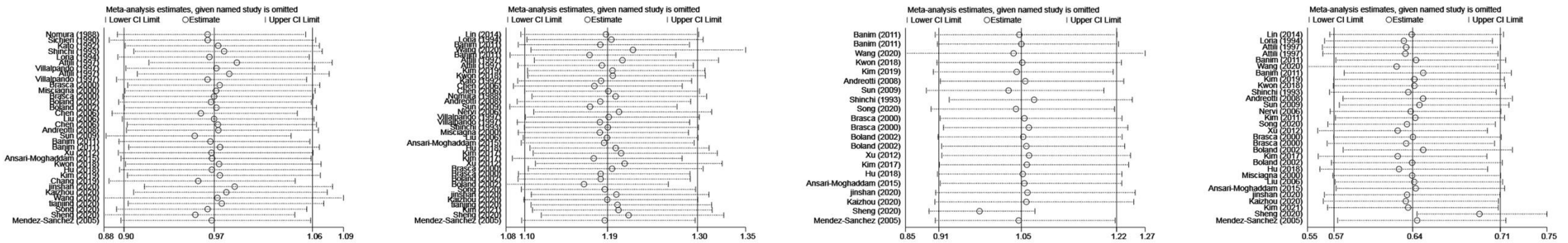


Supplemental Figure 1. Funnel plots for the final meta-analyses. TC: total cholesterol, LDL-C: low-density lipoprotein cholesterol, HDL-C: high-density lipoprotein cholesterol, SD: standard deviation, OR: odd ratios.

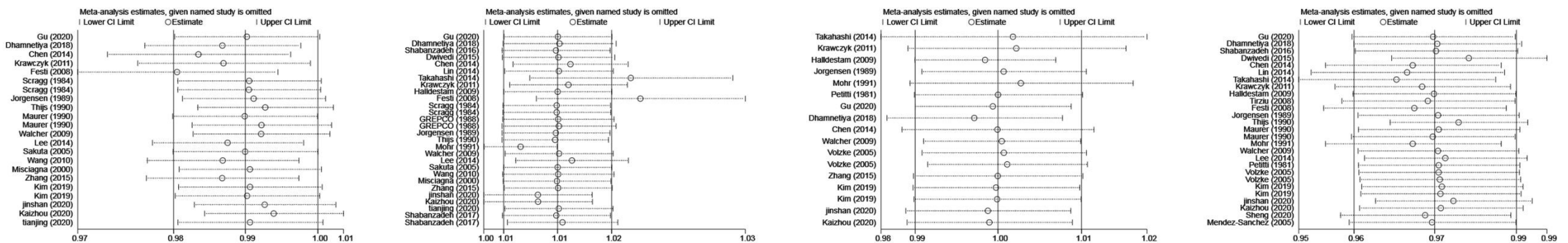
Mean and SD



OR, high vs low



OR, per unit



Supplemental Figure 2. Sensitivity analysis for the final meta-analyses. TC: total cholesterol, LDL-C: low-density lipoprotein cholesterol, HDL-C: high-density lipoprotein cholesterol, SD: standard deviation, OR: odd ratios.

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