Electronic Supplementary Material

Dietary inflammatory index significantly affects lipids profile among adults: An updated systematic review and meta-analysis

Authors: Mahdi Vajdi[1], Mahdieh Abbasalizad Farhangi[2], Mahsa Mahmoudi-Nezhad[3]

[1] Research Center for Evidence Based Medicine, Tabriz University of Medical Sciences, Tabriz, Iran

[2] Drug Applied Research Center, Tabriz University of Medical Sciences, Tabriz, Iran

[3] Molecular Medicine Research Center, Tabriz University of Medical Sciences, Tabriz, Iran

Corresponding author: Dr Mahdieh Abbasalizad Farhangi, Attar Neyshabouri, Daneshgah Blv, Tabriz, Iran. Email address: abbasalizad_m@yahoo.com

Running head: Dietary inflammatory index, lipid profile

PROSPERO registration number: CRD42018110588

Conflict of interest: The authors declare that there is no financial or non-financial conflict of interest

Table E1. PRISMA checklist for the current meta-analysis*

Section/topic	#	Checklist item	Reported on page #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	Page:1
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	Page: 2
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	Page: 3-4
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	Page: 4
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	Page: 4
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	Page:5
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	Page: 4-5
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	Page: 4-5
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	Page: 5
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	Page: 5-6
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	Page: 5-6

Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	Page: 5-6
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	Page: 6
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	Page: 6
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	Page: 5-6
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	Page: 6
RESULTS			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	Page: 6-7
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	Page:6-7
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	Page: 8
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	Page: 6-7
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	Page: 8-9
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	Page: 7
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	Page:9
DISCUSSION			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	Page:9-10
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	Page:12-13
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	Page: 13
FUNDING			

| Funding | 27 | Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review. | Page:13 |

Table E2. Search strategy and number of publications in PubMed

Data base	Search strategy
PubMed	(cholesterol[MeSH Terms]) OR LDL, cholesterol[MeSH Terms]) OR HDL, cholesterol[MeSH Terms]) OR VLDL, cholesterol[MeSH Terms]) OR triglycerides[MeSH Terms]) OR triglyceride [Title/Abstract]) OR TG[Title/Abstract]) OR TC[Title/Abstract]) OR VLDL[Title/Abstract]) OR HDL[Title/Abstract] OR LDL [Title/Abstract] OR obesity[MeSH Terms]) OR body mass index[MeSH Terms]) OR BMI[Title/Abstract]) OR waist circumference[Title/Abstract]) OR waist to hip ratio[Title/Abstract]) OR weight[MeSH Terms]) OR adiposity[Title/Abstract]) OR) AND dietary inflammatory index[Title/Abstract]) OR dietray inflammatory potential[Title/Abstract]) OR DII[Title/Abstract]) OR DIP [Title/Abstract]).

Table E3. The PICO criteria used for the present systematic review

PICO criteria	Description
Participants	General adult population
Exposure (Interventions)	Highest category of dietary inflammatory index by higher scores of DII®
Comparisons	Lowest category of dietary inflammatory index by lower scores of DII®
Outcome	Higher serum lipids
Study design	Observational studies with the design of cross-sectional, case control or cohort

Table E4. Results of subgroup analyses of the association between mean of TC in different DII® categories according to study and participants' characteristics

Group	No. of studies	WMD (95% CI)	P within group	P between group	P heterogeneity	I², %
Total	10	5.49 (1.75, 9.23)	0.004		<0.001	96
Country				<0.001		
Australia	1	0.28 (0.25, 0.31)	<0.001		0	0
Colombia	1	-0.09 (-0.68, 0.49)	0.74		0	0
Mexico	1	2.71 (2.46, 2.96)	<0.001		0	0
France	1	0.11 (0.05, 0.17)	<0.001		0	0
USA	1	0.000 (-0.04, 0.04)	<0.001		0	0
Luxembourg	1	0.07 (-0.05, 0.20)	0.24		0	0
Brazil	1	0.33 (0.02, 0.64)	0.03		0	0
Iran	1	0.04 (-0.27, 0.36)	0.76		0	0
Korea	1	-0.31 (-0.37, -0.24)	<0.001		0	0
Spain	1	0.37 (-0.10, 0.84)	0.12		0	0
Continent				<0.001		
USA	4	0.07 (0.03, 0.11)	<0.001		<0.001	99.5
Europa/Australia	4	0.24 (0.21, 0.27)	<0.001		<0.001	93.5
Asia	2	-0.16 (-0.51, 0.17)	<0.001		<0.001	90.1
Dietary assessment				0.005		
FFQ	5	0.20 (0.18, 0.23)	<0.001		<0.001	99.4
24h-Recall	5	0.11 (0.04, 0.17)	<0.001		0.48	0
Sample size				0.20		
<1000	3	-0.09 (-0.68, 0.49)	0.74		<0.001	0
1000-10000	5	0.23 (0.177, 0.28)	<0.001		<0.001	95.5
>100000	2	0.18 (0.16, 0.21)	<0.001		<0.001	99.1

Studies eligible for inclusion in the systematic review and meta-analysis. CI, confidence interval; DII®, dietary inflammatory index; FFQ, food frequency; FR, Food record; questionnaire; 24h-Recall, 24-h dietary recall; WMD, weighted mean difference.

Table E5. Results of subgroup analyses of the association between mean of HDL-C in different DII® categories according to study and participants' characteristics

Group	No. of studies	WMD (95% CI)	P within group	P between group	P heterogeneity	I², %
Total	17	-2.83 (-11.77, 6.11)	0.42		0.320	99.9
Country				<0.001		
Luxembourg	1	1.30 (-0.93, 3.53)	0.25		-	-
Colombia	1	-6.90 (-12.02, -1.77)	0.008		-	-
USA	3	1.06 (0.56, 1.57)	<0.001		0.58	0
Iran	3	-0.22 (-0.26, -0.17)	<0.001		-	-
China	1	-1.29 (-3.2, 0.68)	0.20		0.95	0
Mexico	1	-3.50 (-3.51, -3.48)	<0.001		-	-
France	1	-1.10 (-1.26, -0.94)	<0.001		-	-
Indonesia	1	0.39 (-0.40, 1.18)	0.33		-	-
Korea	2	0.00 (-9.51, 9.51)	1		-	-
Sweden	1	-1.64 (-1.746, -1.54)	<0.001		-	-
Spain	1	0.00 (-0.453, 0.45)	1		-	-
Brazil	1	0.14 (-0.32, 0.61)	0.55		-	-
Continent				<0.001		
USA	6	0.31 (-0.90, 1.60)	0.58		<0.001	90.8
Europa	4	-0.04 (-0.58, 0.48)	0.86		0.13	56
Asia	7	-6.81 (-4.13, -0.94)	0.002		0.15	43.6
Dietary assessment				<0.001		
FFQ	8	-0.71 (-2.49, 1.06)	0.43		<0.001	100
24h-Recall	7	0.69 (-0.56, 1.95)	0.28		0.01	67.5
7-DDR	2	-0.40 (-2.91, 2.11)	0.75		-	-
Sample size				<0.001		
<1500	11	-0.62 (-1.76, 0.52)	0.28		0.06	47.2
1500-10000	4	0.57 (-0.28, 1.43)	0.19		0.002	79.4
>100000	2	-1.26 (-5.67, 3.14)	0.57		<0.001	99.5

Studies eligible for inclusion in the systematic review and meta-analysis. CI, confidence interval; DII®, dietary inflammatory index; FFQ, food frequency; FR, Food record; questionnaire; 24h-Recall, 24-h dietary recall; 7-DDR, 7 days food record; WMD, weighted mean difference.

Table E6. Results of subgroup analyses of the association between mean of LDL-C in different DII® categories according to study and participants' characteristics

Group	No. of studies	WMD (95% CI)	P within group	P between group	P heterogeneity	I^2, %
Total	11	3.99 (1.164, 6.815)	0.006		<0.001	96.2
Country				<0.001		
Colombia	1	-0.20 (-0.79, 0.38)	0.49		0	0
Mexico	1	1.67 (1.46, 1.88)	<0.001		0	0
France	1	0.06 (0.003, 0.12)	0.04		0	0
USA	3	0.02 (-0.01, 0.06)	0.26		<0.001	89.3
Luxembourg	1	0.023 (-0.10, 0.15)	0.73		0	0
Iran	1	0.04 (-0.27, 0.36)	0.78		0	0
Korea	1	0.61 (0.553, 0.68)	<0.001		0	0
Brazil	1	0.26 (-0.03, 0.57)	0.08		0	0
Spain	1	0.35 (-0.11, 0.82)	0.14		0	0
Continent				0.46		
USA	6	0.083 (0.04, 0.12)	<0.001		<0.001	98.4
Europa	3	0.05 (0.001, 0.11)	0.04		0.56	0
Asia	2	0.435 (0.35, 0.68)	0.08		0.43	0
Dietary assessment				0.002		
FFQ	4	0.06 (0.02, 0.10)	0.002		<0.001	99.1
24h-Recall	6	0.07 (0.01, 0.13)	0.02		0.47	0
7-DDR	1	0.44 (0.23, 0.64)	<0.001		0	0
Sample size				<0.001		
<1500	8	0.40 (0.31, 0.49)	<0.001		<0.001	97.8
1500-10000	2	0.000 (-0.04, 0.04)	0		0	0
>100000	1	0.06 (0.00, 0.12)	0.04		0	0

Studies eligible for inclusion in the systematic review and meta-analysis. CI, confidence interval; DII®, dietary inflammatory index; FFQ, food frequency; FR, Food record; questionnaire; 24h-Recall, 24-h dietary recall; 7-DDR, 7 days food record; WMD, weighted mean difference.

Table E7. Results of subgroup analyses of the association between mean of TG in different DII® categories according to study and participants' characteristics

Group	No. of studies	WMD (95% CI)	P within group	P between group	P heterogeneity	I^2, %
Total	15	4.39 (11.57, 20.37)	0.59		<0.001	100
Country				<0.001		
Luxembourg	1	5.10 (-6.91, 17.11)	0.40		-	-
Colombia	1	35.60 (-19.33, 90.53)	0.20		-	-
USA	3	-6.17 (-9.57, -2.77)	<0.001		<0.001	23.7
Ireland	1	-30.11 (-30.35, -29.86)	<0.001		-	-
Iran	3	14.25 (-2.35, 30.86)	0.09		0.32	0
China	1	31.51 (31.47, 31.54)	<0.001		-	-
Mexico	1	16.10 (13.92, 18.27)	<0.001		-	-
Indonesia	1	-8.85 (-25.06, 7.36)	0.28		-	-
Korea	1	4.74 (4.62, 4.86)	<0.001		-	-
Brazil	1	-0.16 (-0.47, 0.14)	0.29		-	-
Spain	1	0.04 (-0.42, 0.51)	0.86		-	-
Sweden	1	0.22 (-0.23, 0.67)	0.34		-	-
Continent				<0.001		
USA	6	-0.14 (-7.19, 9.27)	0.80		<0.001	98.8
Europa	3	-30.11 (-30.35, -29.86)	<0.001		-	-
Asia	6	7.19 (-8.72, 36.75)	0.22		<0.001	89.6
Dietary assessment				<0.001		
FFQ	8	5.31 (-25.00, 35.62)	0.73		<0.001	100
24h-Recall	6	-7.70 (-11.71, -3.68)	<0.001		<0.001	91
FR	1	0.22 (-0.233, 0.67)	0.34		-	-
Sample size				<0.001		
<1500	8	5.75 (-5.56, 17.07)	0.31		0.19	34.6
1500-10000	5	-7.52 (-25.03, 9.99)	0.4		<0.001	100
> 100000	2	14.78 (-18.05, 47.62)	0.37		<0.001	99.8

Studies eligible for inclusion in the systematic review and meta-analysis. CI, confidence interval; DII®, dietary inflammatory index; FFQ, food frequency; FR, Food record; questionnaire; 24h-Recall, 24-h dietary recall; FR, food record; WMD, weighted mean difference.

Table E8. Results of subgroup analyses of the association between OR's of HDL-C and DII® according to study and participants' characteristics

Group	No. of studies	OR (95% CI)	P within group	P between group	P heterogeneity	I², %
Total	9	1.01 (0.92, 1.12)	0.75		0.464	65
Continent				0.003		
USA	3	0.67 (0.53, 0.85)	0.001		0.10	61
Europe	1	1.46 (1.00, 2.13)	0.05		0	0
Asia	5	0.92 (0.813, 1.05)	0.24		0.44	0
Country				0.01		
USA	2	0.676 (0.53, 0.85)	0.09		0.10	61
Korea	2	0.87 (0.75, 1.02)	0.28		0.57	0
China	1	1.17 (0.87, 1.55)	0.28		0	0
Lebanon	1	0.74 (0.31, 1.75)	0.49		0	0
Iran	1	0.83 (0.44, 1.55)	0.56		0	0
Luxembourg	1	1.46 (1.00, 2.13)	0.05		0	0
Brazil	1	1.02 (0.80, 1.29)	0.87		0	0
Dietary assessment		1.48 (1.00, 2.15)	0.05		0	0
FFQ	5			0.50		
24h-Recall	4	0.83 (0.69, 0.99)	0.04		0.007	71.9
Sample size		0.93 (0.81, 1.07)	0.33		0.19	39.7
1500 <	4			0.15		
1500 >	5	1.14 (0.87, 1.49)	0.32		0.02	19
Gender		0.85 (0.76, 0.96)	0.01		0.01	73
Male	2			0.79		
Female	2	0.93 (0.72, 1.19)	0.57		0	0
Both gender	5	0.85 (0.70, 1.02)	0.09		0	0

CI, confidence interval; DII®, dietary inflammatory index; FFQ, food frequency; FR, Food record; questionnaire; 24h-Recall, 24-h dietary recall; WMD, weighted mean difference.
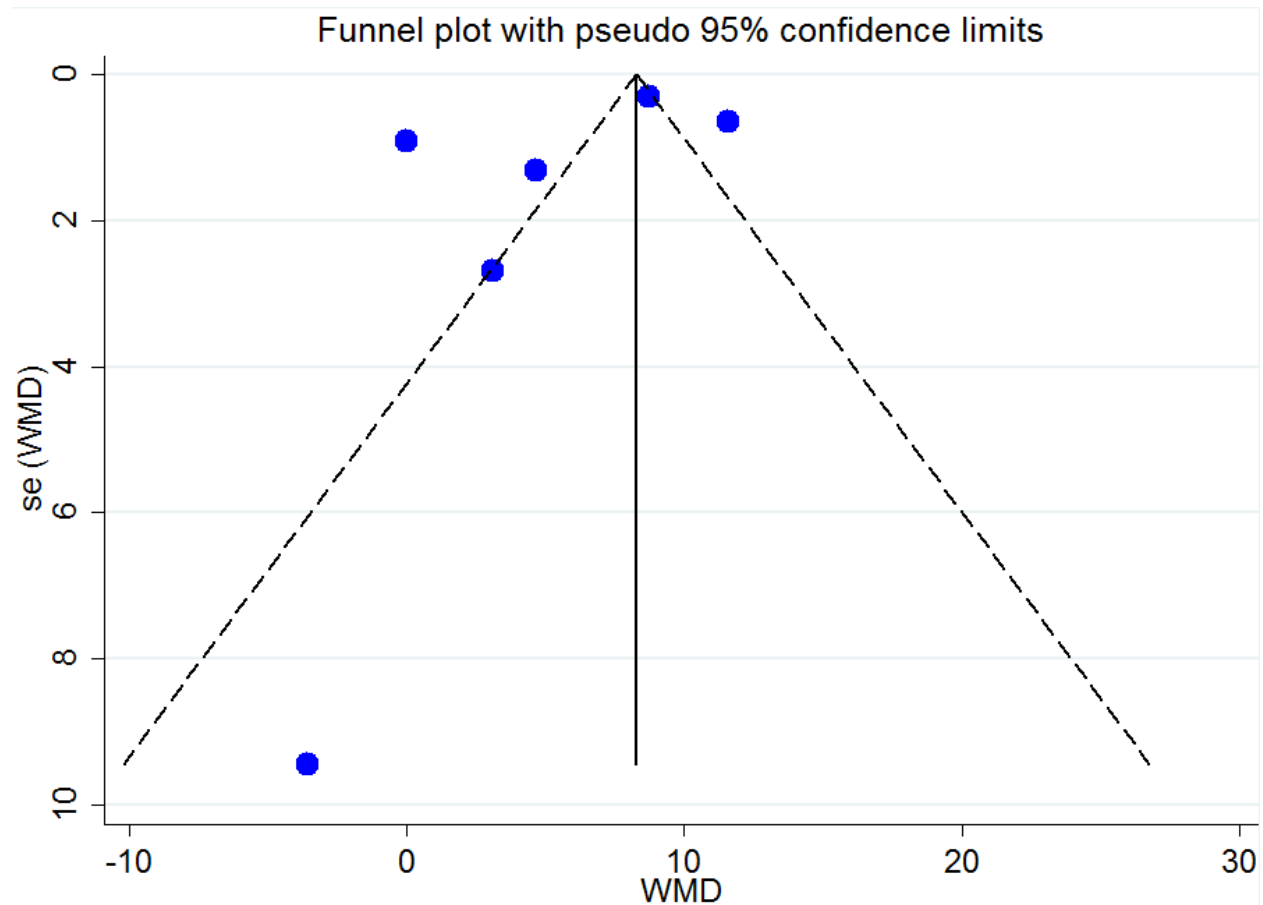
Figure E1. Begg's funnel plots (with pseudo 95% CIs) of the SMD versus the se (SMD) of the mean difference of TC for studies evaluating the association between TC and DII®. (The results of eggers test did not show evidence of publication bias P = 0. 356).
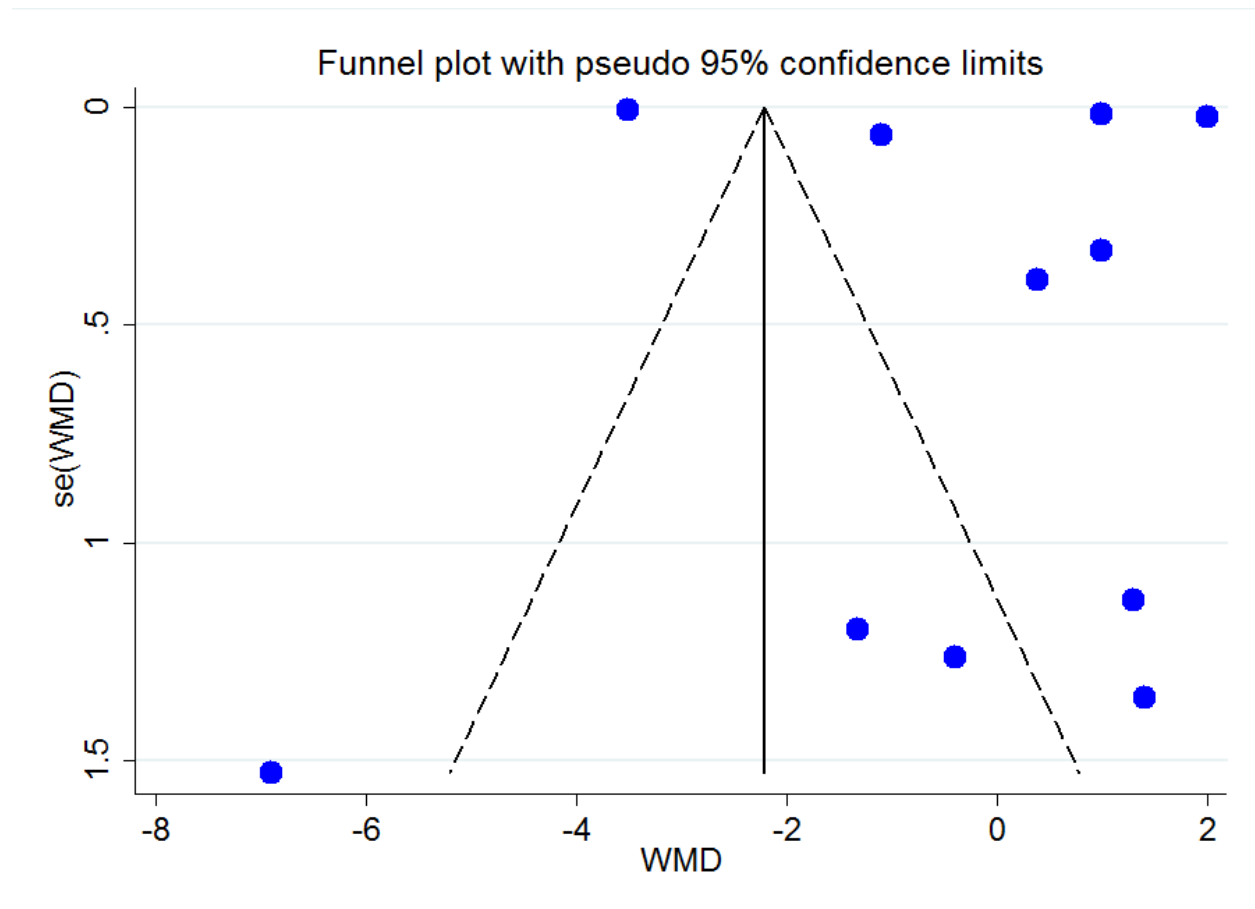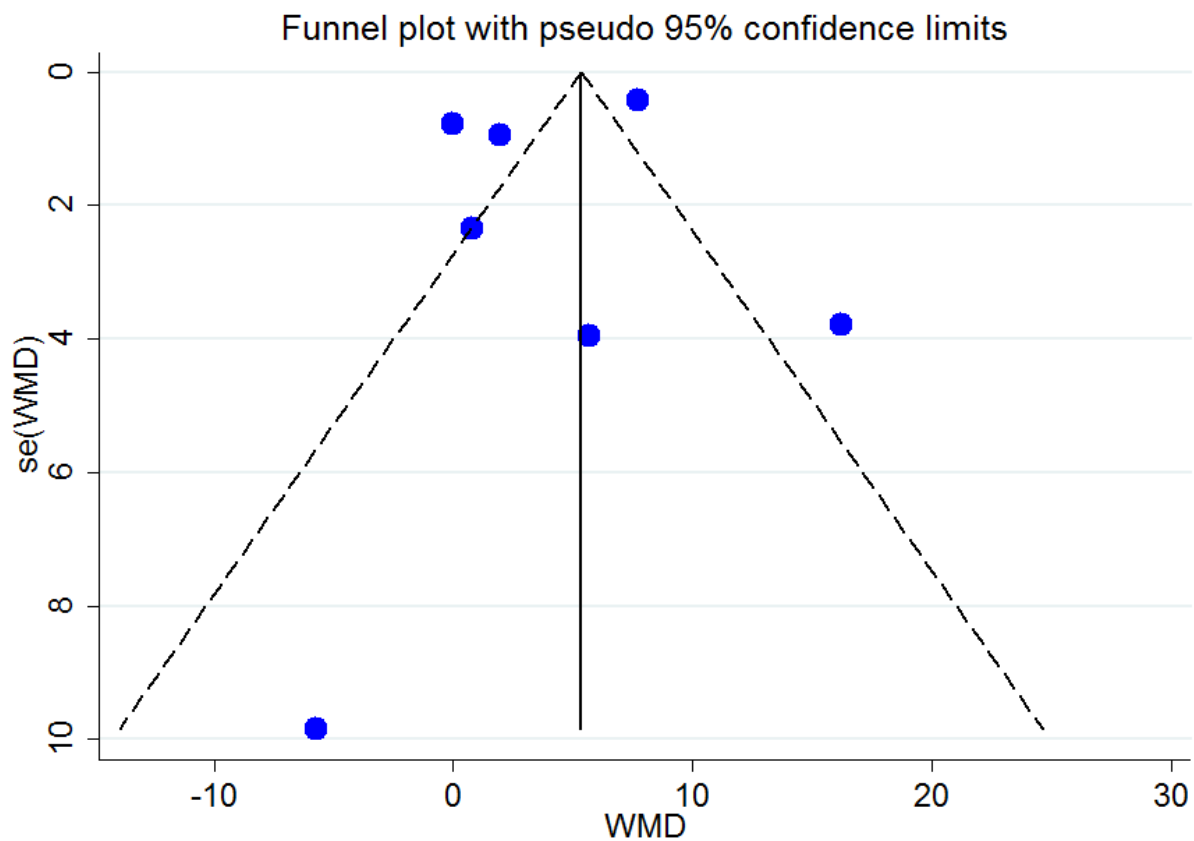
Figure E2. Begg's funnel plots (with pseudo 95% CIs) of the SMD versus the se (SMD) of the mean difference of HDL for studies evaluating the association between HDL-C and DII®. (The results of eggers test did not show evidence of publication bias Egger's test P = 0. 394).
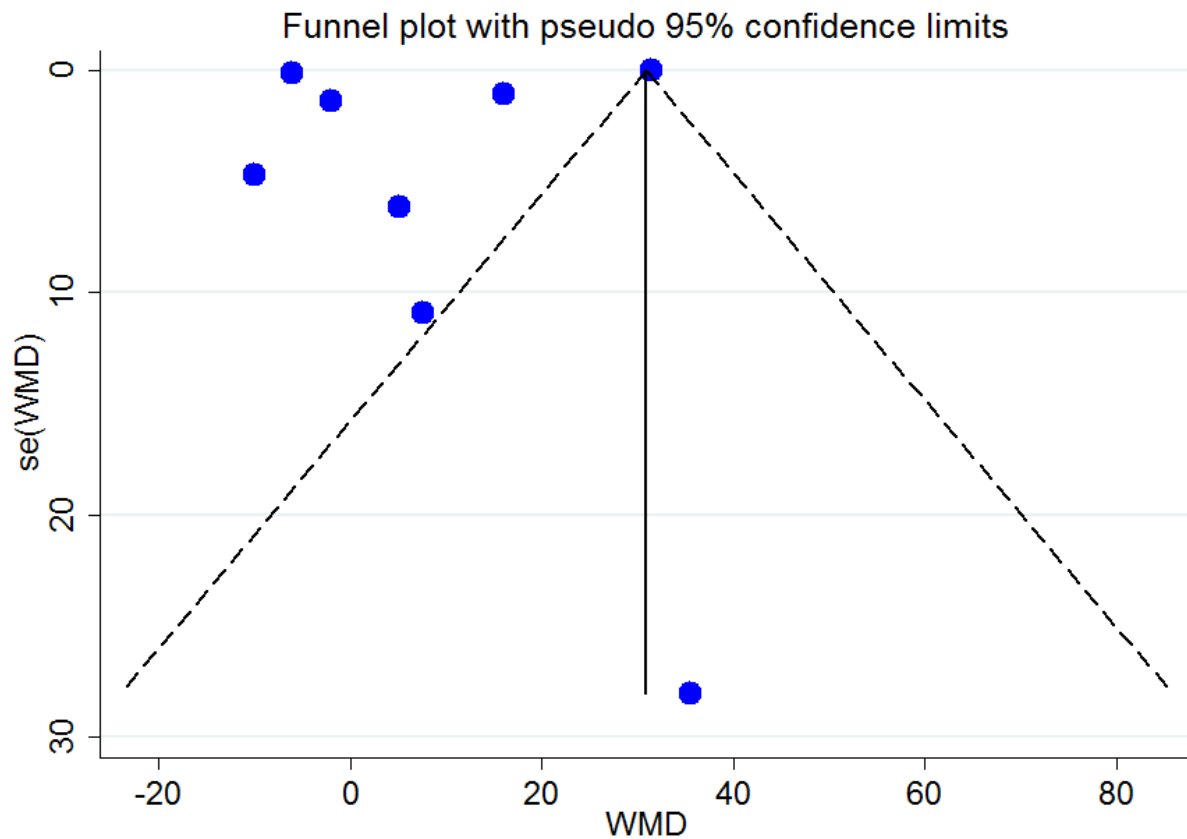
Figure E3. Begg's funnel plots (with pseudo 95% CIs) of the SMD versus the se (SMD) of the mean difference of LDL for studies evaluating the association between LDL-C and DII®. (The results of eggers test did not show evidence of publication bias Egger's test P = 0. 544).

Figure E4. Begg's funnel plots (with pseudo 95% CIs) of the SMD versus the se (SMD) of the mean difference of TG for studies evaluating the association between TG and DII[®]. (The results of eggers test did not show evidence of publication bias Egger's test P = 0. 305).
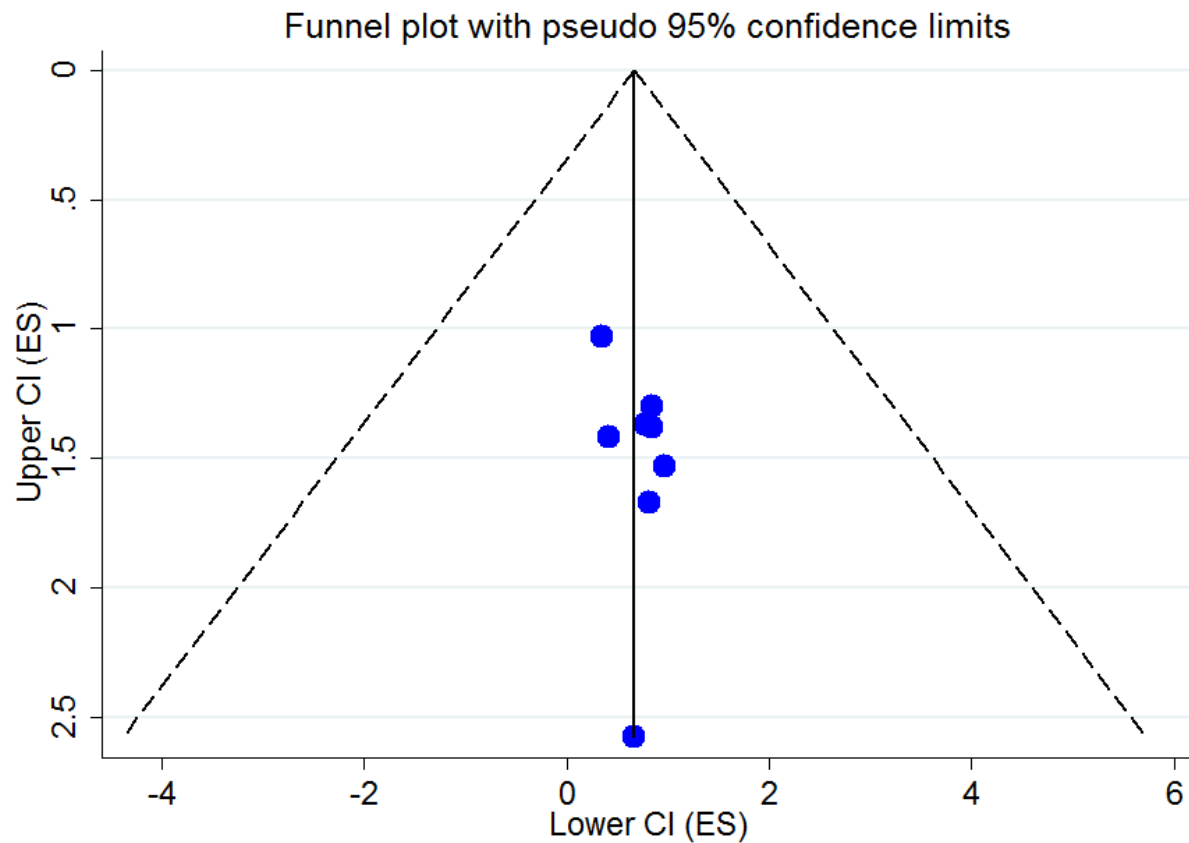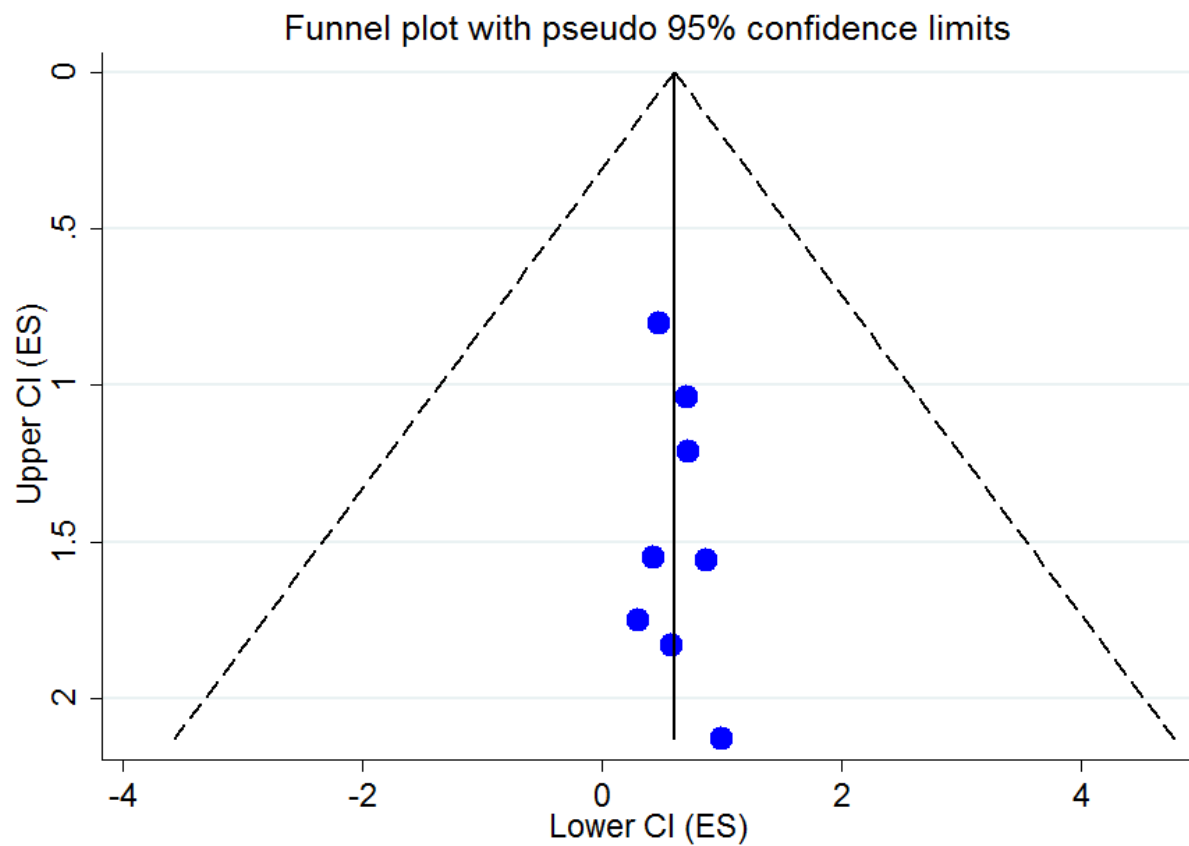
Figure E5. Begg's funnel plots (with pseudo 95% CIs) of the lower CI (ES) versus the upper CI (ES) of the OR for studies evaluating the association between TG and DII®. (The results of eggers test did not show evidence of publication bias Egger's test P = 0.273).

Figure E6. Begg's funnel plots (with pseudo 95% CIs) of the lower CI (ES) versus the upper CI (ES) of the OR for studies evaluating the association between HDL-C and DII®. (The results of eggers test did not show evidence of publication bias Egger's test P = 0.462).