Catalogue

## Search Strategy

Search Strategy Free text search strategy: Initial search date: 25 May 2024

**PubMed 1216**

(tinnitus OR Ringing-Buzzing) AND (diet OR food OR water OR milk OR fish OR fruit OR vegetable OR fiber OR sugar OR meat OR margarine OR fat OR egg OR diversity OR caffeine OR carbohydrate).

**EMBASE 1942**

('Tinnitus'/exp OR 'Tinnitus':ab,ti,kw OR 'Ringing-Buzzing'/exp OR 'Ringing-Buzzing':ab,ti,kw OR 'ear buzzing':ab,ti,kw) AND (('Diet'/exp OR 'Diets':ab,ti,kw) OR ('Food'/exp OR 'Food':ab,ti,kw OR 'Foods':ab,ti,kw) OR ('Water'/exp OR 'Water':ab,ti,kw OR 'Hydrogen Oxide':ab,ti,kw) OR ('Milk'/exp OR 'Milk':ab,ti,kw OR 'Cow Milk':ab,ti,kw) OR ('fish'/exp OR 'fish':ab,ti,kw) OR ('vegetable'/exp OR 'vegetable':ab,ti,kw) OR ('Dietary Fiber'/exp OR 'alimentary fiber':ab,ti,kw) OR ('sugar'/exp OR 'sugar':ab,ti,kw) OR ('meat'/exp OR 'meat':ab,ti,kw OR 'sausage':ab,ti,kw) OR ('margarine'/exp OR 'margarine':ab,ti,kw OR 'oleomargarine':ab,ti,kw) OR ('fat'/exp OR 'fat':ab,ti,kw) OR ('egg'/exp OR 'egg':ab,ti,kw) OR ('varietas'/exp OR 'plant variety':ab,ti,kw) OR ('caffeine'/exp OR 'caffeine':ab,ti,kw OR 'coffein':ab,ti,kw) OR ('carbohydrate'/exp OR 'carbohydrate':ab,ti,kw OR 'carbon hydrate':ab,ti,kw OR 'synthetic carbohydrate':ab,ti,kw OR 'saccharide':ab,ti,kw) OR ('protein'/exp OR 'protein':ab,ti,kw))

**Web of Science 29**

("Tinnitus"(Topic) OR "Tinnitus"(Topic) OR "Ringing-Buzzing"(Topic) OR "Ringing-Buzzing"(Topic) OR "ear buzzing"(Topic)) AND (("Diet"(Topic) OR "Diets"(Topic)) OR ("Food"(Topic) OR "Foods"(Topic)) OR ("Water"(Topic) OR "Hydrogen Oxide"(Topic)) OR ("Milk"(Topic) OR "Cow Milk"(Topic)) OR ("fish"(Topic)) OR ("vegetable"(Topic)) OR ("Dietary Fiber"(Topic) OR "alimentary fiber"(Topic)) OR ("sugar"(Topic)) OR ("meat"(Topic) OR "sausage"(Topic)) OR ("margarine"(Topic) OR "oleomargarine"(Topic)) OR ("fat"(Topic)) OR ("egg"(Topic)) OR ("varietas"(Topic) OR "plant variety"(Topic)) OR ("caffeine"(Topic) OR "coffein"(Topic)) OR ("carbohydrate"(Topic) OR "carbon hydrate"(Topic) OR "synthetic carbohydrate"(Topic) OR "saccharide"(Topic)) OR ("protein"(Topic)))

**Cochrane 297**

((tinnitus OR Ringing-Buzzing) AND (diet OR food OR water OR milk OR fish OR fruit OR vegetable OR fiber OR sugar OR meat OR margarine OR fat OR egg OR diversity OR caffeine OR carbohydrate) in Title Abstract Keyword

## Stata analysis

We used mixed-effects models to pool maximally covariate-adjusted odds ratios (ORs) from each study. Due to the low incidence of events and short follow-up events, OR, RR, and HR were approximately equal, so our results were uniformly expressed in OR. If the P-value of the q test was <0.10 or the I2 statistic was ≥50%, we assessed and considered the inter-study heterogeneity to be significant. For observational studies, we maximally support covariate-adjusted estimates. If a study uses an analytical method that is incompatible with synthesis for most other studies, we convert the effect estimate to the appropriate combined ratio or exclude the study from the meta-analysis.

## Publication bias

If the article heterogeneity is large in the analysis with statistical differences, we will use meta regression to investigate the source of heterogeneity. We assessed the asymmetry of the funnel plot with visual and Egger's bias, and estimated the possible missing studies with eMethods if publication bias is suspected.

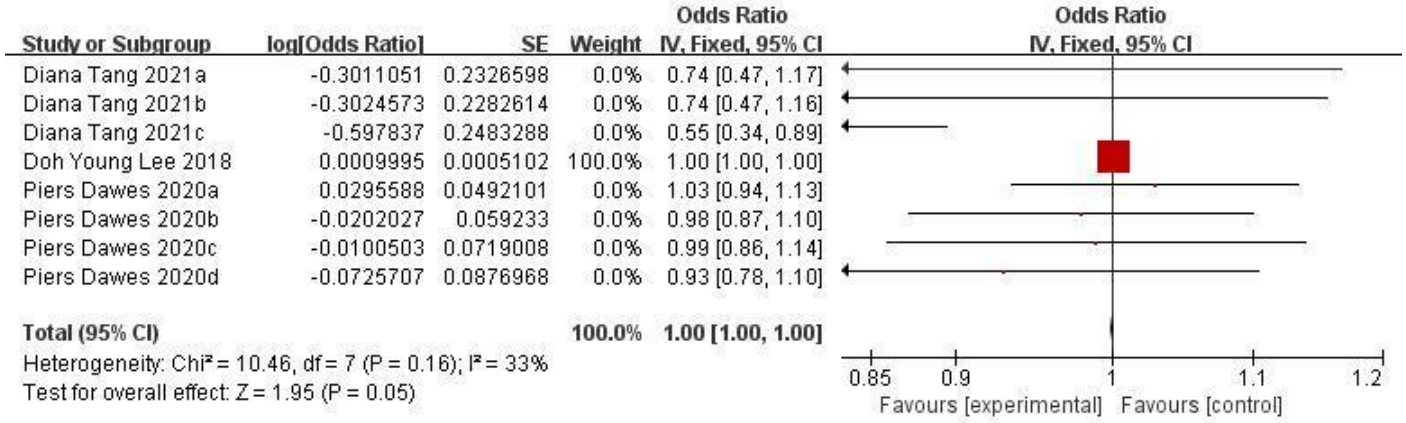
## Analysis software

We conducted all analyses using stata (version 16) and Review Manager (version 5.3). Unless otherwise specified, we considered a two-sided P value of <0.05 as statistically significant.

## eFigure 1: Forest Plot Showing the Association Between carbohydrate and tinnitus.

Black diamonds are the estimated pooled odd ratio (OR) for each random-effects meta-analysis; Red box sizes reflect the relative weight apportioned to studies in the meta- analysis.

Carbohydrate: OR=1.00, [95%CI 1.00,1.00], $I^2$=33%, p=0.05.



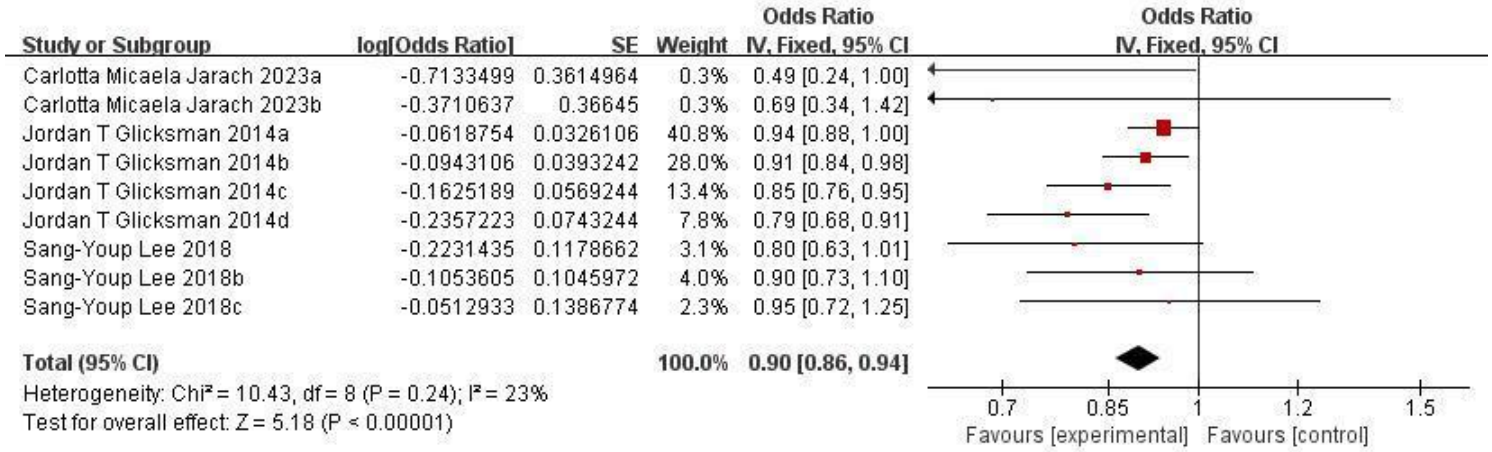
```
. metan logrr selogrr, label(namevar=author) fixed eform

          Study |     ES    [95% Conf. Interval]     % Weight
----------------+-------------------------------------------------
Diana Tang 2021a |  0.740       0.469     1.168          0.00
Diana Tang 2021b |  0.739       0.472     1.156          0.00
Diana Tang 2021c |  0.550       0.338     0.895          0.00
Doh Young Lee 2018 |  1.001       1.000     1.002         99.97
Piers Dawes 2020a |  1.030       0.935     1.134          0.01
Piers Dawes 2020b |  0.980       0.873     1.101          0.01
Piers Dawes 2020c |  0.990       0.860     1.140          0.01
Piers Dawes 2020d |  0.930       0.783     1.104          0.00
----------------+-------------------------------------------------
I-V pooled ES |  1.001       1.000     1.002        100.00
----------------+-------------------------------------------------
```

Actually: Carbohydrate: OR=1.001, [95%CI 1.000,1.002]

## eFigure 2: Forest Plot Showing the Association Between caffeine and tinnitus.

Black diamonds are the estimated pooled odd ratio (OR) for each random-effects meta-analysis; Red box sizes reflect the relative weight apportioned to studies in the meta- analysis. Caffeine: OR=0.90, [95%CI 0.86,0.94], $I^2$=23% p<0.000001.



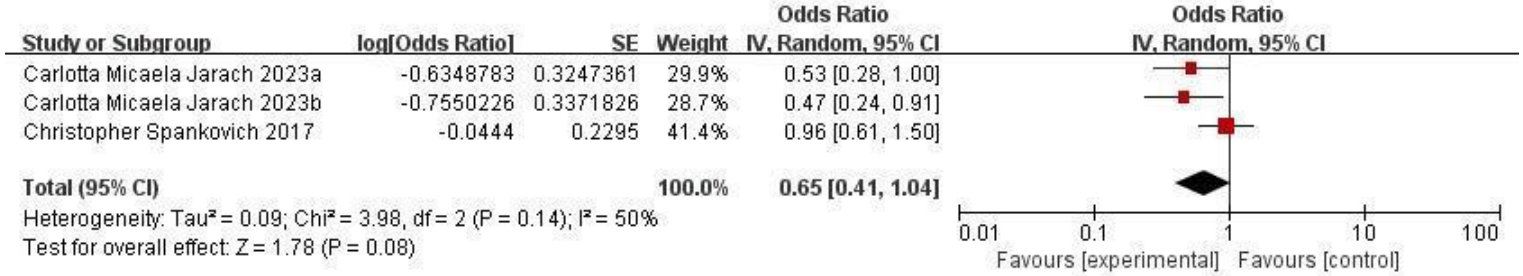
```
. metan logrr selogrr, label(namevar=author) fixed eform

          Study |     ES    [95% Conf. Interval]     % Weight
----------------+-------------------------------------------------
Carlotta Micaela Jar |  0.490       0.241     0.995          0.33
Carlotta Micaela Jar |  0.690       0.336     1.415          0.32
Jordan T 2014a       |  0.940       0.882     1.002         40.76
Jordan T 2014b       |  0.910       0.842     0.983         28.03
Jordan T 2014c       |  0.850       0.760     0.950         13.38
Jordan T 2014d       |  0.790       0.683     0.914          7.85
Sang-Youp Lee 2018   |  0.800       0.635     1.008          3.12
Sang-Youp Lee 2018   |  0.900       0.733     1.105          3.96
Sang-Youp Lee 2018   |  0.950       0.724     1.247          2.25
----------------+-------------------------------------------------
I-V pooled ES        |  0.898       0.862     0.935        100.00
----------------+-------------------------------------------------
```

Actually: Caffeine: OR=0.898, [95%CI 0.862,0.935]

## eFigure 3: Forest Plot Showing the Association Between diversity and tinnitus.

Black diamonds are the estimated pooled odd ratio (OR) for each random-effects meta-analysis; Red box sizes reflect the relative weight apportioned to studies in the meta- analysis. Diversity: OR=0.65, [95%CI 0.41,1.04], $I^2$=50% p=0.08.



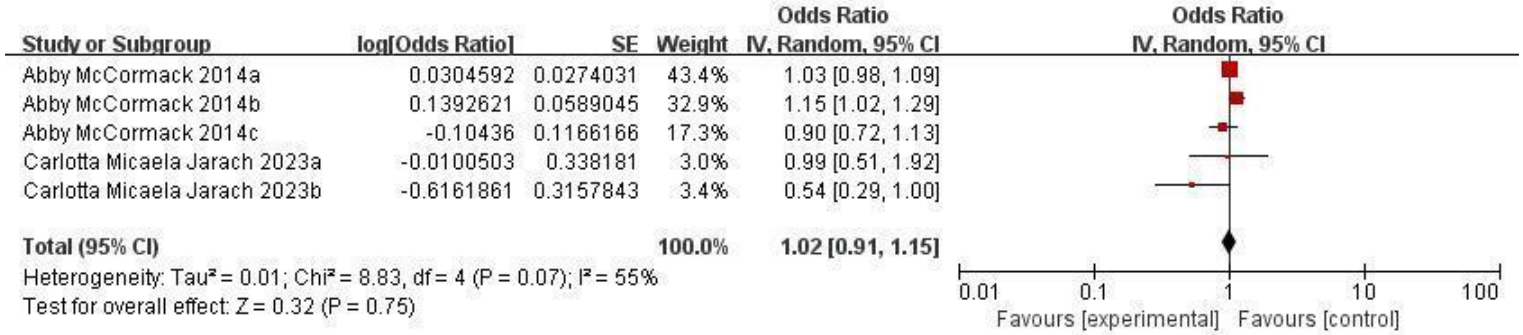
```
. metan logrr selogrr, label(namevar=author) random eform

          Study     |     ES    [95% Conf. Interval]     % Weight
--------------------+---------------------------------------------------
Carlotta Micaela Jar |  0.530       0.280     1.002         29.86
Carlotta Micaela Jar |  0.470       0.243     0.910         28.60
Christopher Spankovi |  0.950       0.606     1.490         41.54
--------------------+---------------------------------------------------
D+L pooled ES        |  0.653       0.410     1.038        100.00
--------------------+---------------------------------------------------
```

Actually: diversity: OR=0.653, [95%CI 0.410, 1.038].

## eFigure 4: Forest Plot Showing the Association Between egg and tinnitus.

Black diamonds are the estimated pooled odd ratio (OR) for each random-effects meta-analysis; Red box sizes reflect the relative weight apportioned to studies in the meta-analysis.
Egg: OR=1.02, [95%CI 0.91,1.15], $I^2$=55% p=0.75.



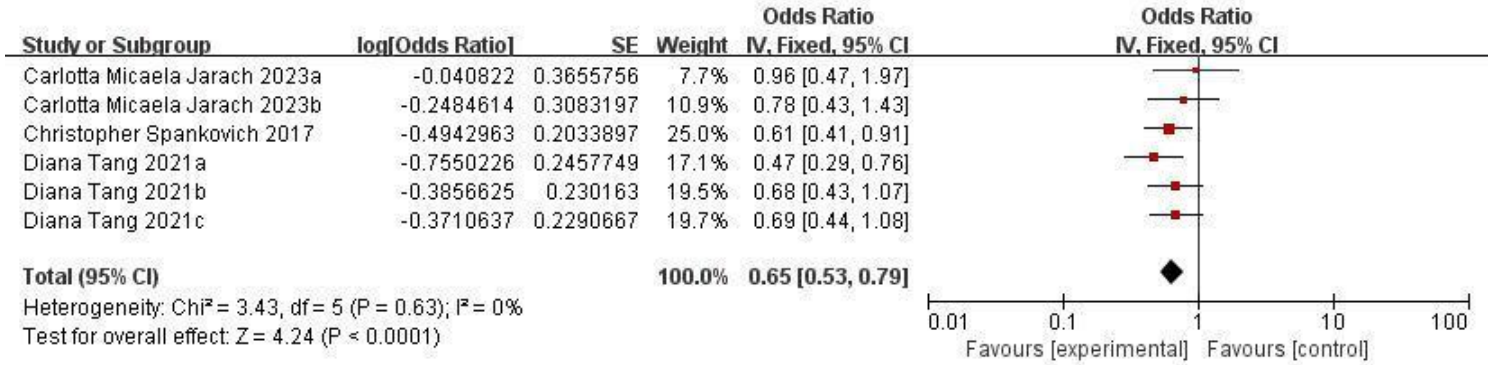
```
. metan logrr selogrr, label(namevar=author) random eform

          Study      |     ES    [95% Conf. Interval]     % Weight
---------------------+---------------------------------------------------
Abby McCormack 2014  |  1.031       0.926     1.148         36.13
Abby McCormack 2014a |  1.149       1.024     1.290         35.00
Abby McCormack 2014b |  0.901       0.717     1.133         20.41
Carlotta Micaela Jar |  0.990       0.510     1.921          3.97
Carlotta Micaela Jar |  0.540       0.291     1.003          4.50
---------------------+---------------------------------------------------
D+L pooled ES        |  1.010       0.880     1.160        100.00
---------------------+---------------------------------------------------
```

Actually: diversity: OR=1.010, [95%CI 0.880, 1.160].

## eFigure 5: Forest Plot Showing the Association Between fruit and tinnitus.

Black diamonds are the estimated pooled odd ratio (OR) for each random-effects meta-analysis; Red box sizes reflect the relative weight apportioned to studies in the meta-analysis.
Fruit: OR=0.65, [95%CI 0.53,0.79], $I^2$=0% p<0.0001.



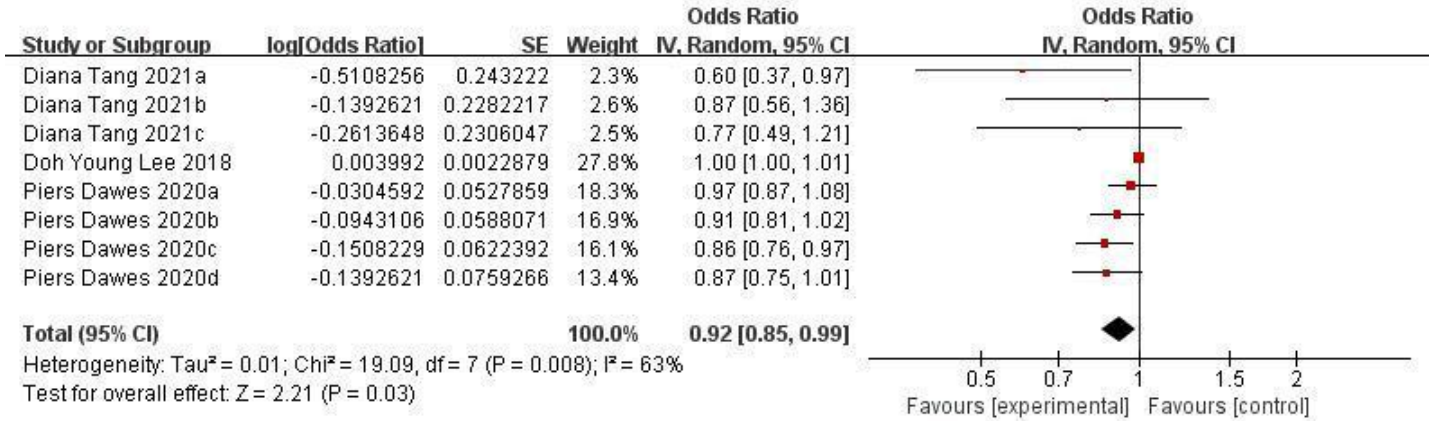
```
. metan logrr selogrr, label(namevar=author) fixed eform

          Study     |     ES    [95% Conf. Interval]     % Weight
--------------------+---------------------------------------------------
Carlotta Micaela Jar |  0.960       0.469     1.965         7.74
Carlotta Micaela Jar |  0.780       0.426     1.427        10.88
Christopher Spankovi |  0.610       0.409     0.909        25.01
Diana Tang 2021a     |  0.470       0.290     0.761        17.13
Diana Tang 2021b     |  0.680       0.433     1.068        19.53
Diana Tang 2021d     |  0.690       0.440     1.081        19.72
--------------------+---------------------------------------------------
I-V pooled ES        |  0.649       0.532     0.793       100.00
--------------------+---------------------------------------------------
```

Actually: fruit: OR=0.649, [95%CI 0.532, 0.793].

## eFigure 6: Forest Plot Showing the Association Between fiber and tinnitus.

Black diamonds are the estimated pooled odd ratio (OR) for each random-effects meta-analysis; Red box sizes reflect the relative weight apportioned to studies in the meta- analysis.
Fiber: OR=0.92, [95%CI 0.85,0.99], $I^2$=63% p=0.03.



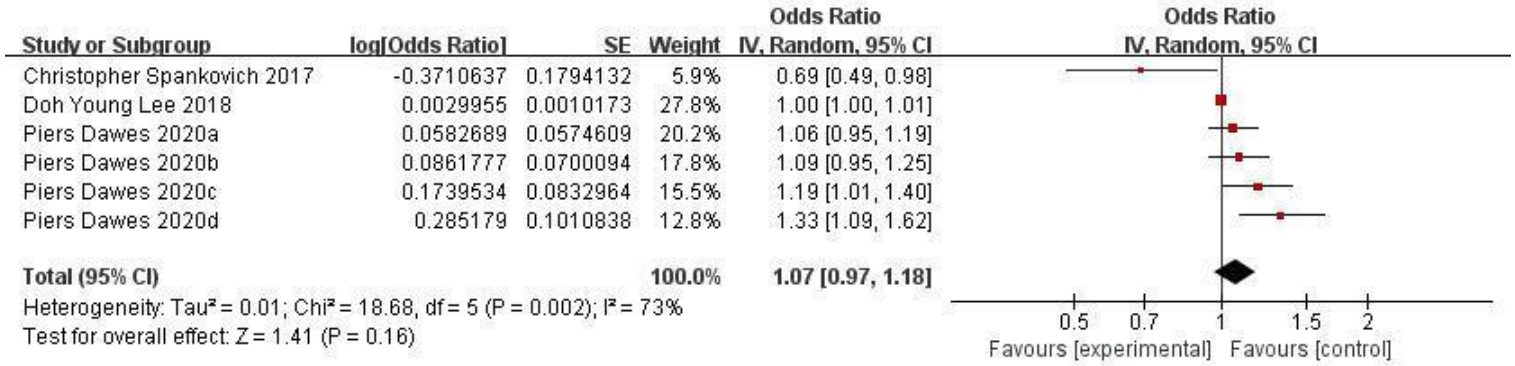
```
. metan logrr selogrr, label(namevar=author) random eform

          Study |     ES    [95% Conf. Interval]     % Weight
----------------+-------------------------------------------------
Diana Tang 2021a |  0.600       0.372     0.966          2.31
Diana Tang 2021b |  0.870       0.556     1.361          2.59
Diana Tang 2021d |  0.770       0.490     1.210          2.54
Doh Young Lee 2018 |  1.004       1.000     1.009         27.81
Piers Dawes 2020a |  0.970       0.875     1.076         18.30
Piers Dawes 2020b |  0.910       0.811     1.021         16.90
Piers Dawes 2020c |  0.860       0.761     0.972         16.14
Piers Dawes 2020d |  0.870       0.750     1.010         13.40
----------------+-------------------------------------------------
D+L pooled ES |  0.918       0.851     0.990        100.00
----------------+-------------------------------------------------
```

Actually: fruit: OR=0.918, [95%CI 0.851, 0.990].

## eFigure 7: Forest Plot Showing the Association Between fat and tinnitus.

Black diamonds are the estimated pooled odd ratio (OR) for each random-effects meta-analysis; Red box sizes reflect the relative weight apportioned to studies in the meta- analysis.
Fat: OR=1.07, [95%CI 0.97,1.18], $I^2$=73% p=0.16.



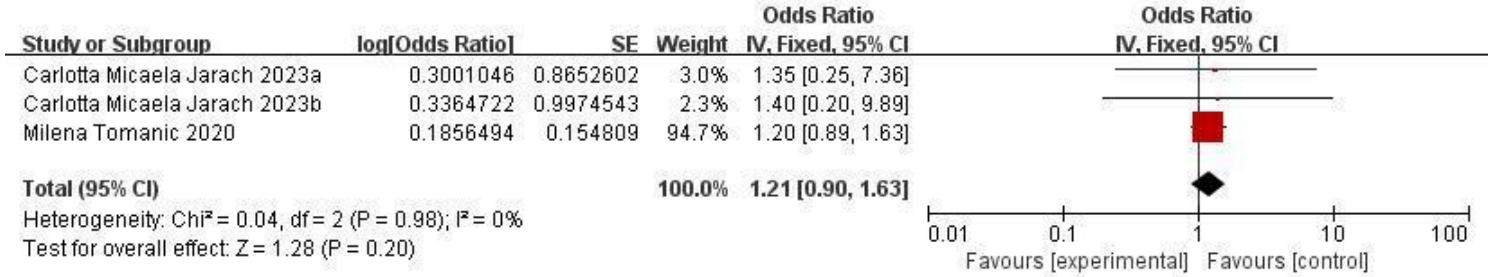
```
. metan logrr selogrr, label(namevar=author) random eform

          Study |     ES    [95% Conf. Interval]     % Weight
----------------+-------------------------------------------------
Christopher Spankovi |  0.690       0.485     0.981          5.95
Doh Young Lee 2018   |  1.003       1.001     1.005         27.75
Piers Dawes 2020a    |  1.060       0.947     1.186         20.17
Piers Dawes 2020b    |  1.090       0.950     1.250         17.81
Piers Dawes 2020c    |  1.190       1.011     1.401         15.50
Piers Dawes 2020d    |  1.330       1.091     1.621         12.82
----------------+-------------------------------------------------
D+L pooled ES        |  1.072       0.973     1.181        100.00
----------------+-------------------------------------------------
```

Actually: fat: OR=1.072, [95%CI 0.973, 1.181].

## eFigure 8: Forest Plot Showing the Association Between margarine and tinnitus.

Black diamonds are the estimated pooled odd ratio (OR) for each random-effects meta-analysis; Red box sizes reflect the relative weight apportioned to studies in the meta- analysis. Margarine: OR=1.21, [95%CI 0.90,1.63], $I^2$=0% p=0.20.



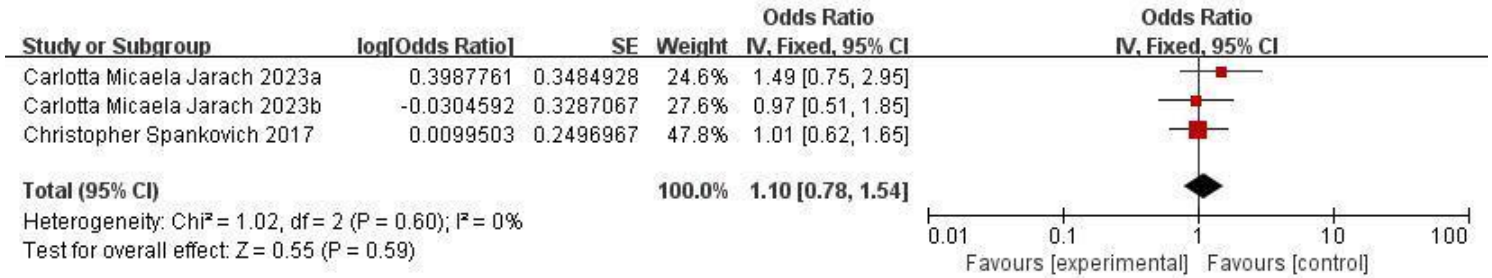
```
. metan logrr selogrr, label(namevar=author) fixed eform

          Study     |     ES    [95% Conf. Interval]     % Weight
--------------------+---------------------------------------------------
Carlotta Micaela Jar |  1.350       0.248     7.359          3.01
Carlotta Micaela Jar |  1.400       0.198     9.889          2.27
Milena Tomanic 2020  |  1.200       0.887     1.624         94.72
--------------------+---------------------------------------------------
I-V pooled ES        |  1.208       0.900     1.622        100.00
--------------------+---------------------------------------------------
```

Actually: margarine: OR=1.208, [95%CI 0.900, 1.622].

## eFigure 9: Forest Plot Showing the Association Between meat and tinnitus.

Black diamonds are the estimated pooled odd ratio (OR) for each random-effects meta-analysis; Red box sizes reflect the relative weight apportioned to studies in the meta- analysis. Meat: OR=1.10, [95%CI 0.78,1.54], $I^2$=0% p=0.59.



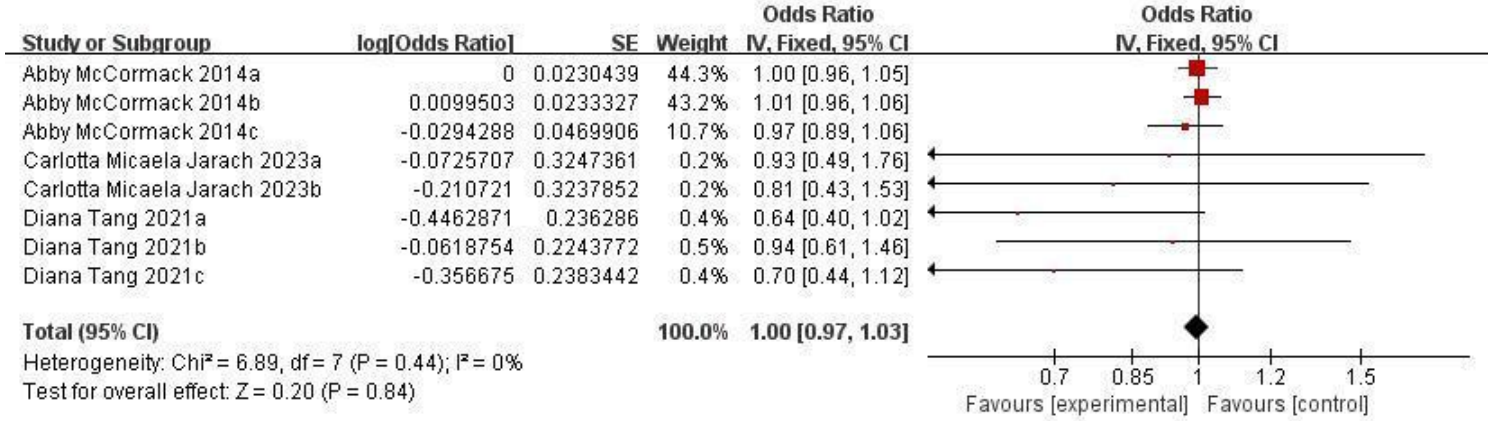
```
. metan logrr selogrr, label(namevar=author) fixed eform

          Study     |     ES    [95% Conf. Interval]     % Weight
--------------------+---------------------------------------------------
Carlotta Micaela Jar |  1.490       0.753     2.950         24.56
Carlotta Micaela Jar |  0.970       0.509     1.847         27.60
Christopher Spankovi |  1.010       0.619     1.648         47.84
--------------------+---------------------------------------------------
I-V pooled ES        |  1.099       0.783     1.542        100.00
--------------------+---------------------------------------------------
```

Actually: meat: OR=1.099, [95%CI 0.783, 1.542].

## eFigure 10: Forest Plot Showing the Association Between sugar and tinnitus.

Black diamonds are the estimated pooled odd ratio (OR) for each random-effects meta-analysis; Red box sizes reflect the relative weight apportioned to studies in the meta- analysis. Sugar: OR=1.00, [95%CI 0.97,1.03], $I^2$=0% p=0.84.



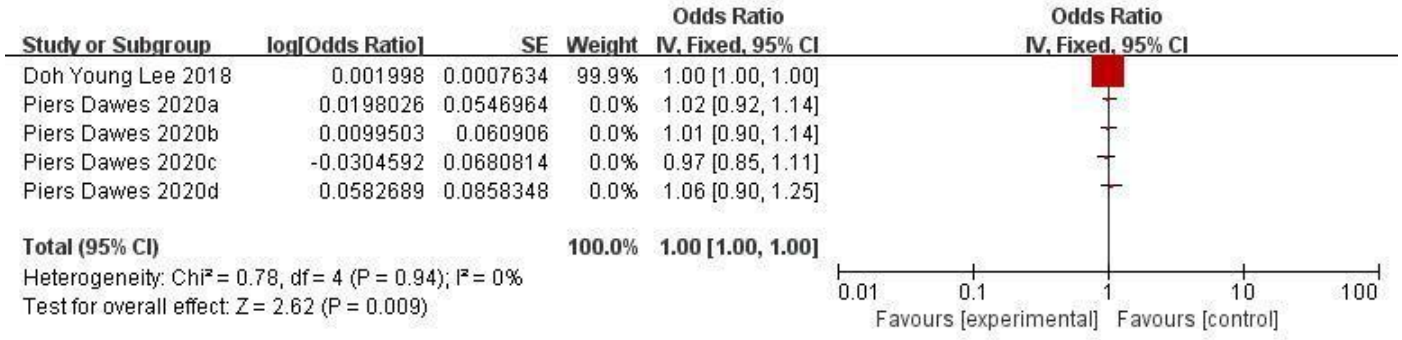
```
. metan logrr selogrr, label(namevar=author) fixed eform

          Study     |     ES    [95% Conf. Interval]     % Weight
--------------------+---------------------------------------------------
Abby McCormack 2014 |  1.000       0.956     1.046         44.34
Abby McCormack 2014a|  1.010       0.965     1.057         43.25
Abby McCormack 2014b|  0.971       0.886     1.065         10.66
Carlotta Micaela Jar|  0.930       0.492     1.758          0.22
Carlotta Micaela Jar|  0.810       0.429     1.528          0.22
Diana Tang 2021a    |  0.640       0.403     1.017          0.42
Diana Tang 2021b    |  0.940       0.606     1.459          0.47
Diana Tang 2021c    |  0.700       0.439     1.117          0.41
--------------------+---------------------------------------------------
I-V pooled ES       |  0.997       0.967     1.027        100.00
--------------------+---------------------------------------------------
```

Actually: sugar: OR=0.997, [95%CI 0.967, 1.027].

## eFigure 11: Forest Plot Showing the Association Between protein and tinnitus.

Black diamonds are the estimated pooled odd ratio (OR) for each random-effects meta-analysis; Red box sizes reflect the relative weight apportioned to studies in the meta-analysis.
Fish: OR=1.00, [95%CI 1.00,1.00], $I^2$=0% p=0.009.



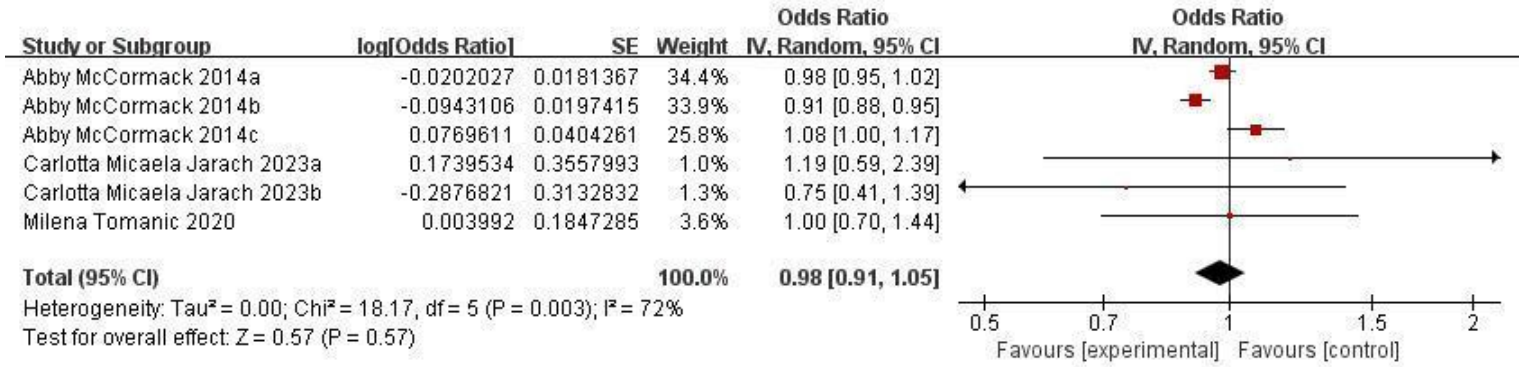
```
. metan logrr selogrr, label(namevar=author) fixed eform

          Study |     ES    [95% Conf. Interval]     % Weight
----------------+-------------------------------------------------
Doh Young Lee 2018 |  1.002       1.001     1.004         99.94
Piers Dawes 2020a  |  1.020       0.916     1.135          0.02
Piers Dawes 2020b  |  1.010       0.896     1.138          0.02
Piers Dawes 2020c  |  0.970       0.849     1.108          0.01
Piers Dawes 2020d  |  1.060       0.896     1.254          0.01
----------------+-------------------------------------------------
I-V pooled ES      |  1.002       1.001     1.004        100.00
----------------+-------------------------------------------------
```

Actually: protein: OR=1.002, [95%CI 1.001, 1.004].

## eFigure 12: Forest Plot Showing the Association Between fish and tinnitus.

Black diamonds are the estimated pooled odd ratio (OR) for each random-effects meta-analysis; Red box sizes reflect the relative weight apportioned to studies in the meta-analysis.
Fish: OR=0.98, [95%CI 0.91,1.05], $I^2$=72% p=0.57.



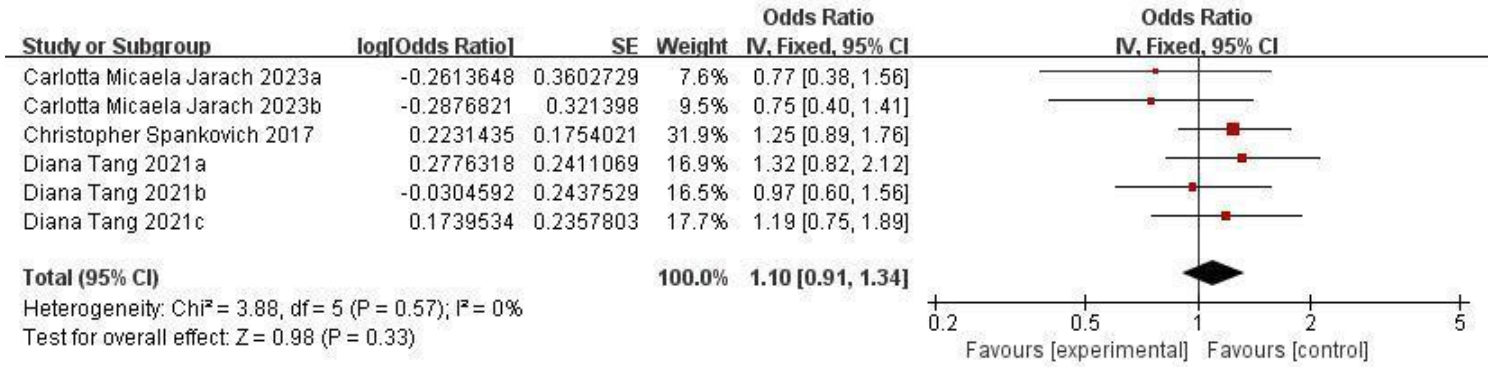
```
. metan logrr selogrr, label(namevar=author) random eform

          Study     |     ES    [95% Conf. Interval]     % Weight
--------------------+---------------------------------------------------
Abby McCormack 2014 |  0.980       0.946     1.015         35.43
Abby McCormack 2014a|  0.910       0.875     0.946         34.93
Abby McCormack 2014b|  1.080       0.998     1.169         27.04
Carlotta Micaela Jar|  1.190       0.593     2.390          1.14
Carlotta Micaela Jar|  0.750       0.406     1.386          1.46
--------------------+---------------------------------------------------
D+L pooled ES       |  0.979       0.907     1.056        100.00
--------------------+---------------------------------------------------
```

Actually: fish: OR=0.979, [95%CI 0.907, 1.056].

## eFigure 13: Forest Plot Showing the Association Between vegetable and tinnitus.

Black diamonds are the estimated pooled odd ratio (OR) for each random-effects meta-analysis; Red box sizes reflect the relative weight apportioned to studies in the meta- analysis. Vegetable: OR=1.10, [95%CI 0.91,1.34], $I^2$=0% p=0.33..



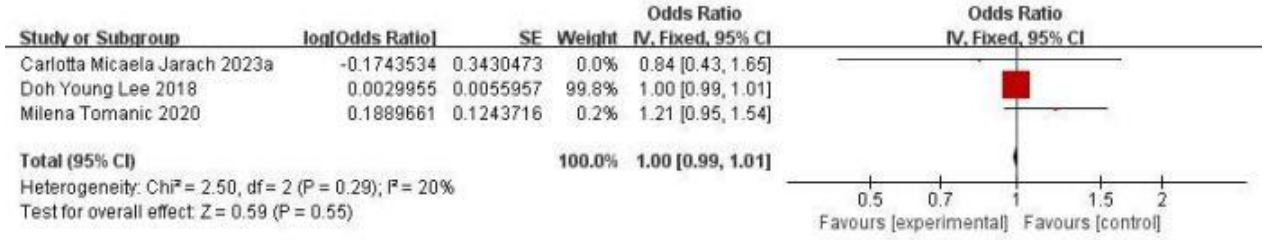
```
. metan logrr selogrr, label(namevar=author) fixed eform

          Study      |     ES    [95% Conf. Interval]     % Weight
---------------------+---------------------------------------------------
Carlotta Micaela Jar |  0.770       0.380     1.560          7.56
Carlotta Micaela Jar |  0.750       0.399     1.408          9.50
Christopher Spankovi |  1.250       0.886     1.763         31.89
Diana Tang 2021a     |  1.320       0.823     2.117         16.88
Diana Tang 2021b     |  0.970       0.602     1.564         16.52
Diana Tang 2021c     |  1.190       0.750     1.889         17.65
---------------------+---------------------------------------------------
I-V pooled ES        |  1.101       0.907     1.337        100.00
---------------------+---------------------------------------------------
```

Actually: vegetable: OR=1.101, [95%CI 0.907, 1.337].

## eFigure 14: Forest Plot Showing the Association Between water and tinnitus.

Black diamonds are the estimated pooled odd ratio (OR) for each random-effects meta-analysis; Red box sizes reflect the relative weight apportioned to studies in the meta- analysis.
Water: OR=1.00, [95%CI 0.99,1.01], $I^2$=20% p=0.55.



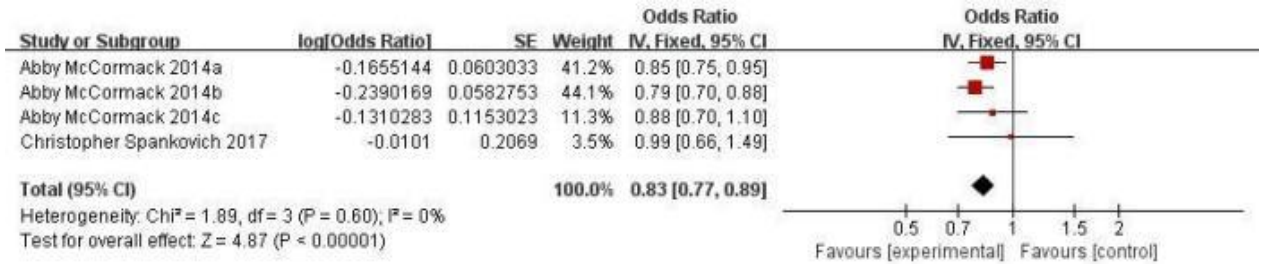
```
. metan logrr selogrr, label(namevar=author) fixed eform

          Study     |     ES    [95% Conf. Interval]     % Weight
--------------------+-------------------------------------------------
Carlotta Micaela Jar |  0.840       0.429     1.645          0.03
Doh Young Lee 2018   |  1.003       0.992     1.014         99.77
Milena Tomanic 2020  |  1.210       0.950     1.541          0.21
--------------------+-------------------------------------------------
I-V pooled ES        |  1.003       0.992     1.014        100.00
--------------------+-------------------------------------------------
```

Actually: water: OR=1.003, [95%CI 0.992, 1.014].

## eFigure 15: Forest Plot Showing the Association Between dairy and tinnitus.

Black diamonds are the estimated pooled odd ratio (OR) for each random-effects meta-analysis; Red box sizes reflect the relative weight apportioned to studies in the meta- analysis.
Dairy: OR=0.83, [95%CI 0.77,0.89], $I^2$=0% p<0.00001



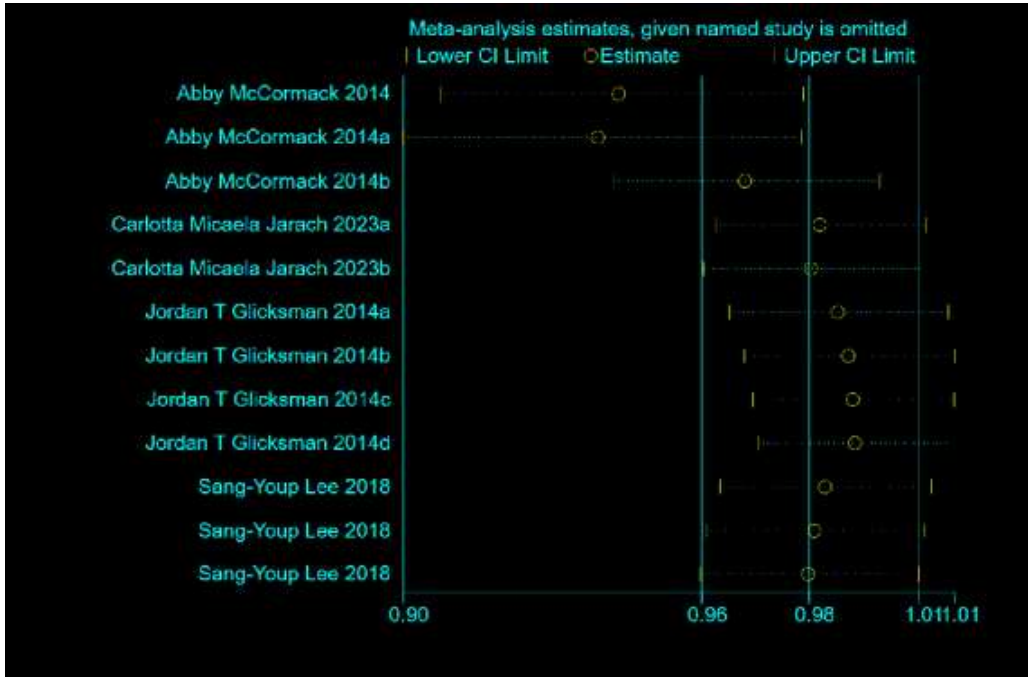
```
. metan logrr selogrr, label(namevar=author) fixed eform

           Study     |     ES    [95% Conf. Interval]     % Weight
---------------------+-------------------------------------------------
Abby McCormack 2014  |  0.847       0.753     0.953         41.62
Abby McCormack 2014a |  0.787       0.702     0.882         44.21
Abby McCormack 2014b |  0.877       0.699     1.100         11.30
Christopher Spankovi |  0.990       0.631     1.552          2.86
---------------------+-------------------------------------------------
I-V pooled ES        |  0.827       0.766     0.892        100.00
---------------------+-------------------------------------------------
```

Actually: dairy: OR=0.83, [95%CI 0.766, 0.892].

## eFigure 16: Sensitivity analysis between caffeine and tinnitus.

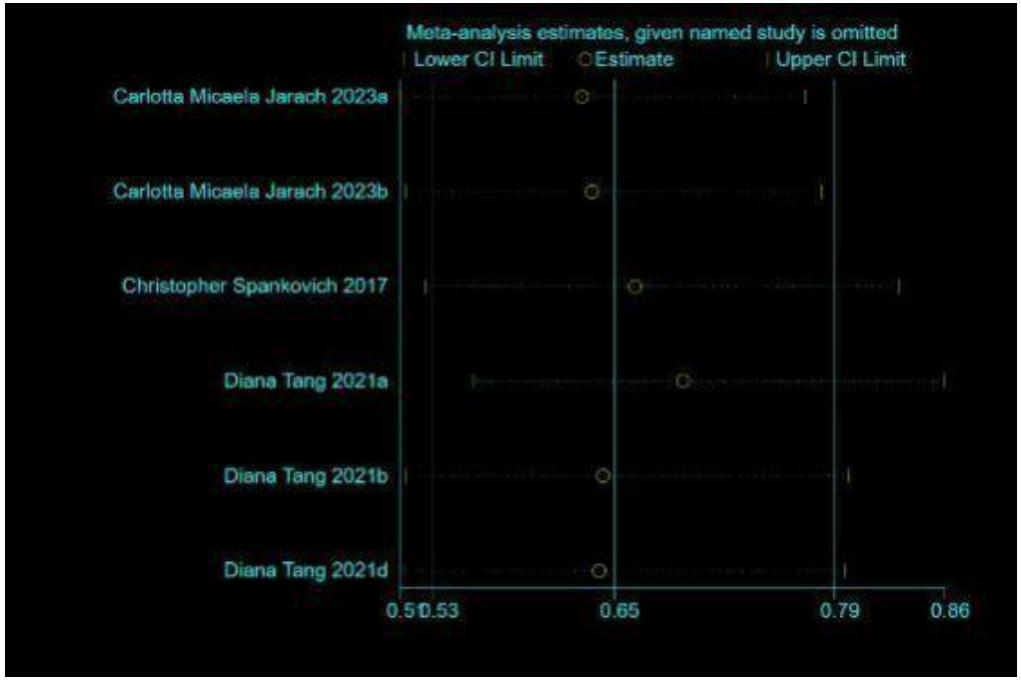
**(NOTE: The sensitivity analysis was carried out by one-by-one elimination method for the analysis with more than 6 included articles.)**




After deleting one study at a time, conflicting results emerged and further identification of the source of heterogeneity was needed.
It has been confirmed that the main contradiction comes from Abby McCormack 2017, and the sensitivity analysis after removal the reseach did not show contradictory outcome, indicating the robustness of the results.

## eFigure 17:Sensitivity analysis between fruit and tinnitus.

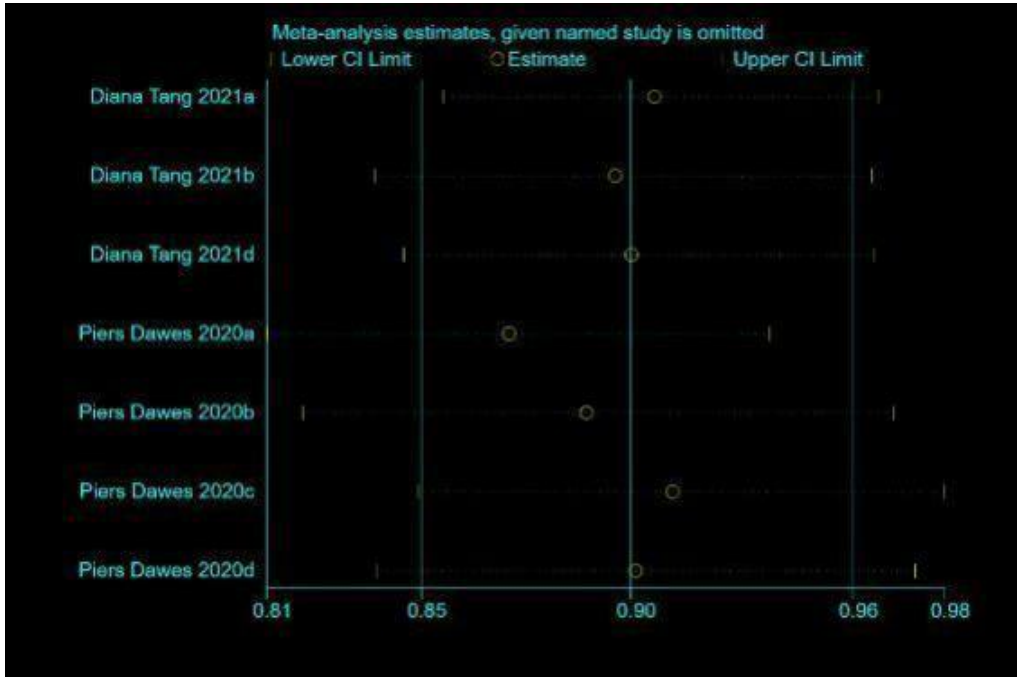
**(NOTE: The sensitivity analysis was carried out by one-by-one elimination method for the analysis with more than 6 included articles.)**




After deleting one study one by one, there was no contradictory outcome, and the outcome was relatively stable.

## eFigure 18:Sensitivity analysis between fiber and tinnitus.

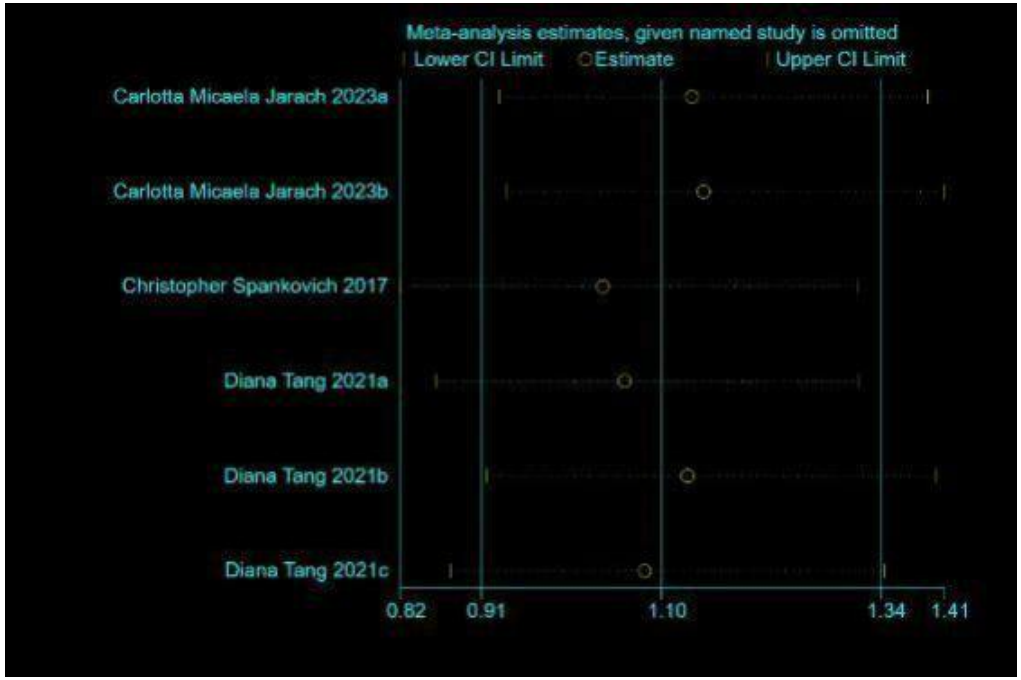
**(NOTE: The sensitivity analysis was carried out by one-by-one elimination method for the analysis with more than 6 included articles.)**




After deleting one study one by one, there was no contradictory outcome, and the outcome was relatively stable.

## eFigure 19:Sensitivity analysis between vegetable and tinnitus.

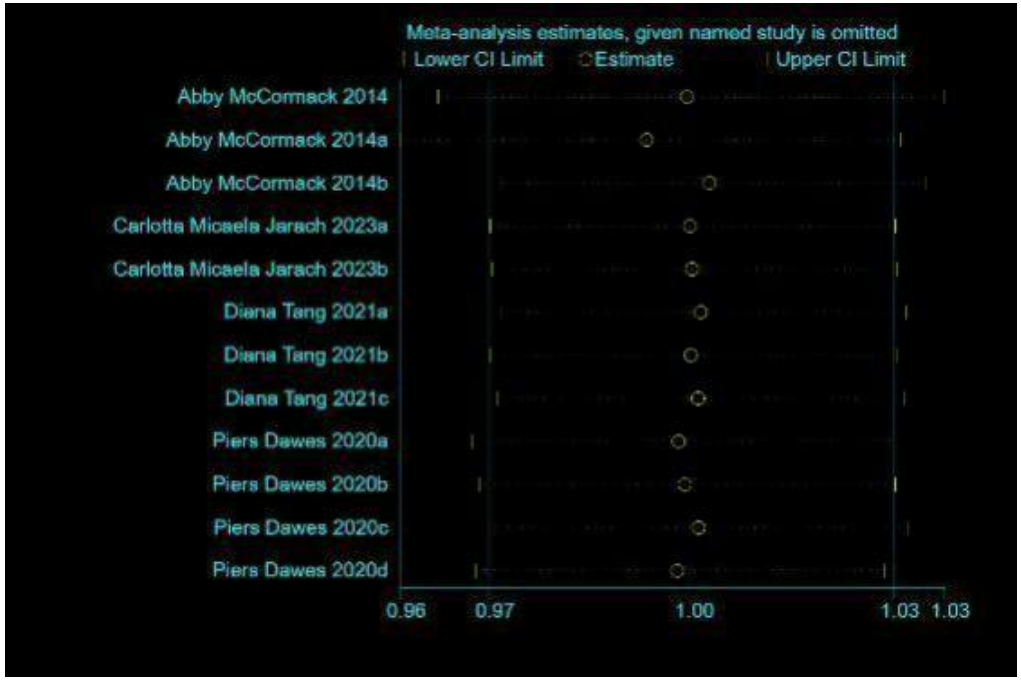
**(NOTE: The sensitivity analysis was carried out by one-by-one elimination method for the analysis with more than 6 included articles.)**




After deleting one study one by one, there was no contradictory outcome, and the outcome was relatively stable.

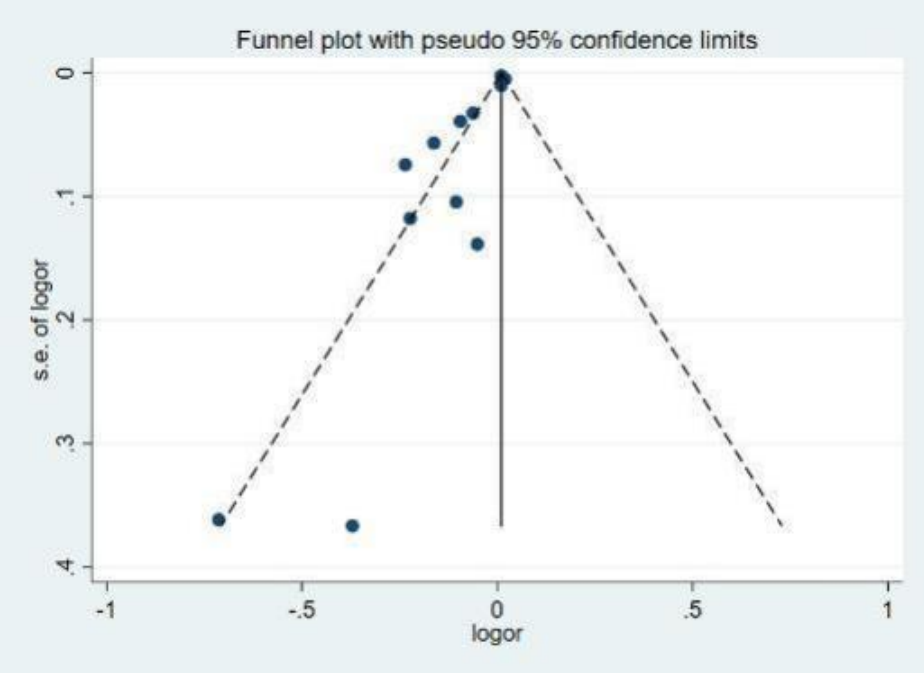
## eFigure 20:Sensitivity analysis between sugar and tinnitus.

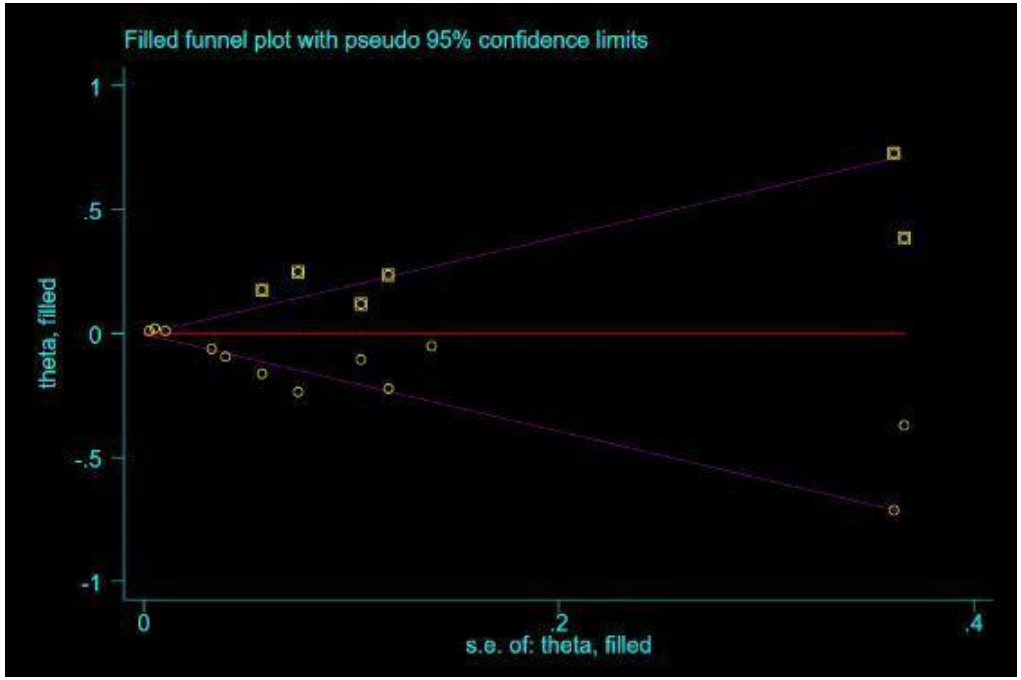
**(NOTE: The sensitivity analysis was carried out by one-by-one elimination method for the analysis with more than 6 included articles.)**




After deleting one study one by one, there was no contradictory outcome, and the outcome was relatively stable.

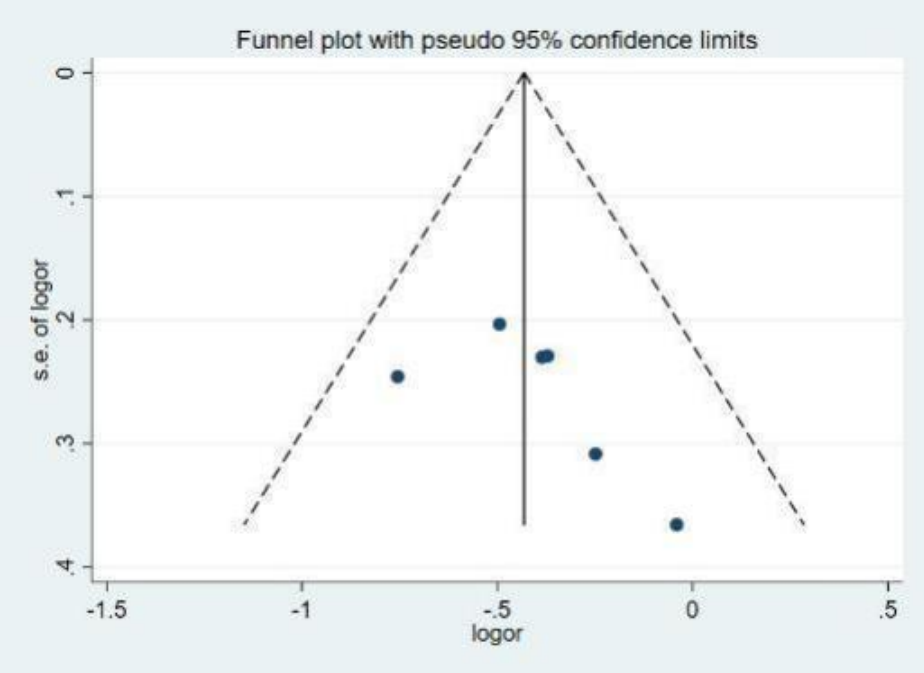
**eFigure 21:Publication bias and Egger test on caffeine**





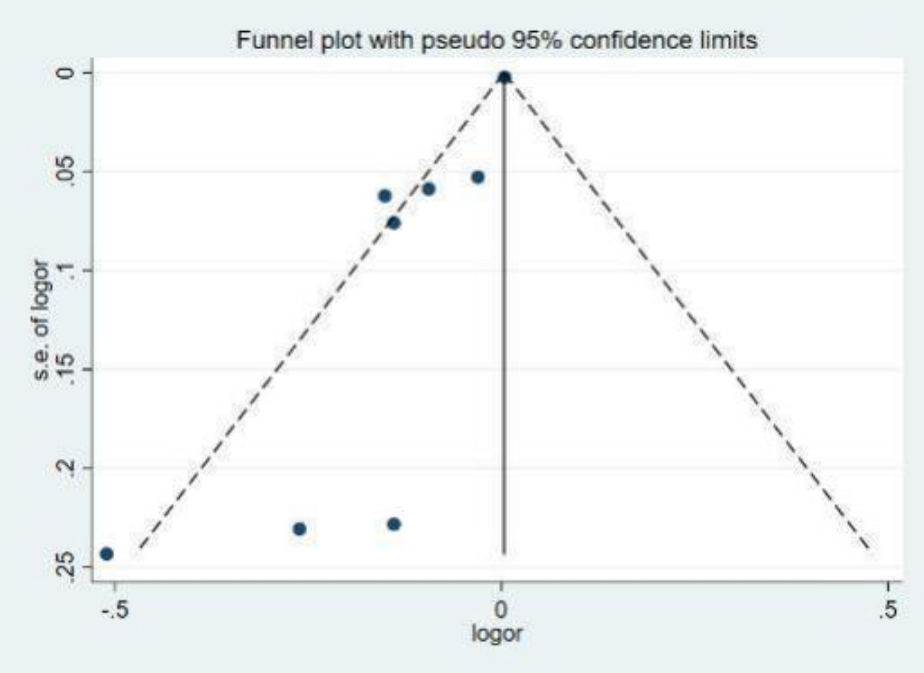

Cut and complement method tips, there was no significant publication bias.

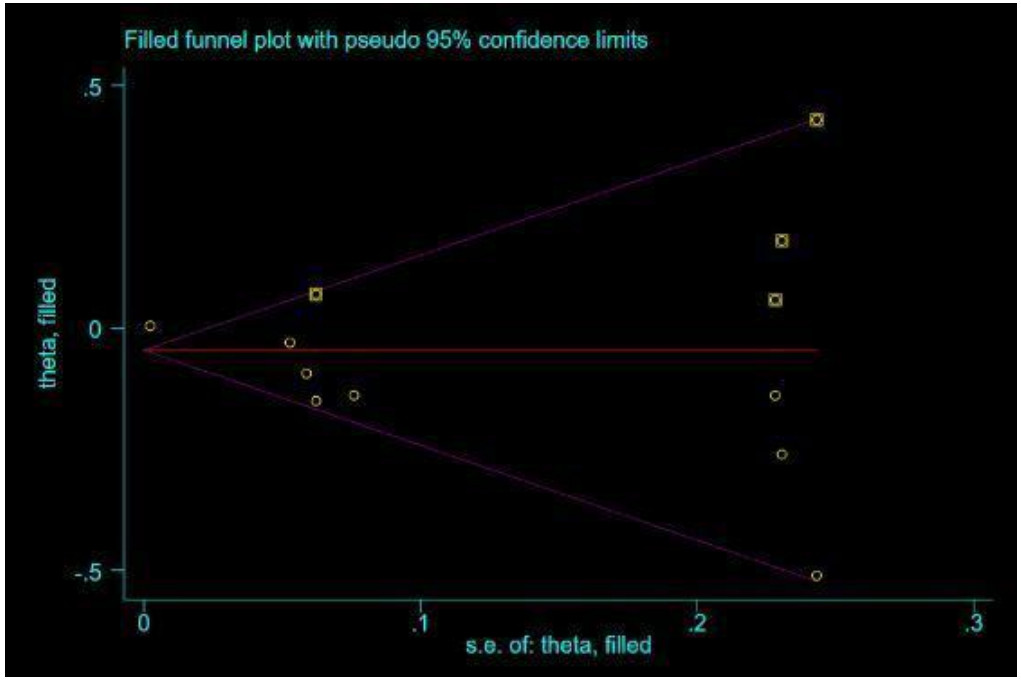
## eFigure 22: Publication bias and Egger test on fruit




Egger test: Fruit p=0.205>0.05, there was no significant publication bias.

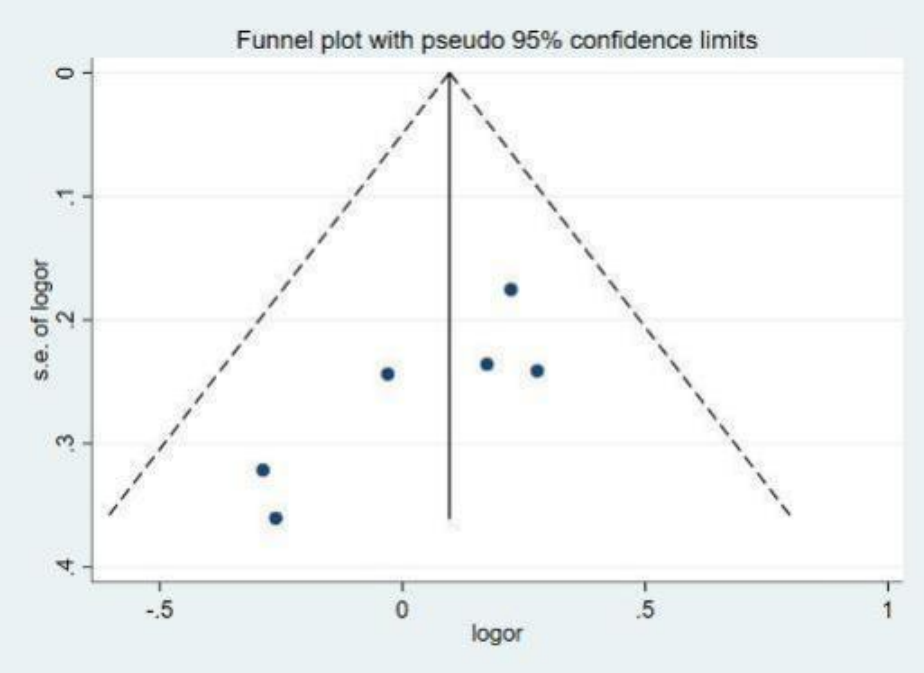
**eFigure 23:Publication bias and Egger test on fiber**

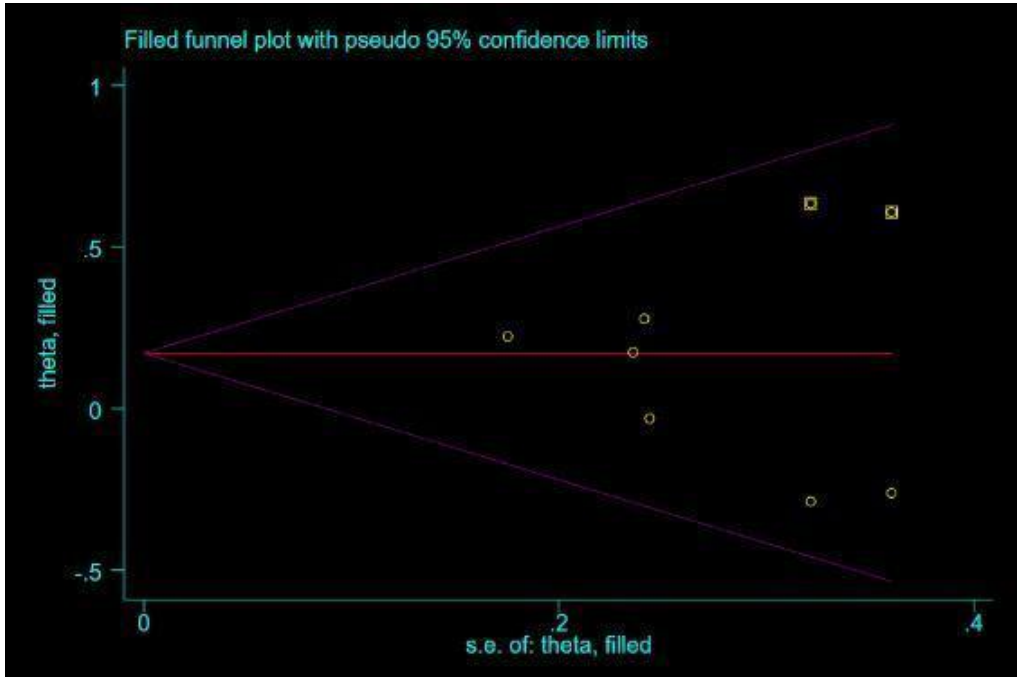





Egger test: Fruit p=0.006<0.05. Cut and complement method tips, there was no significant publication bias.

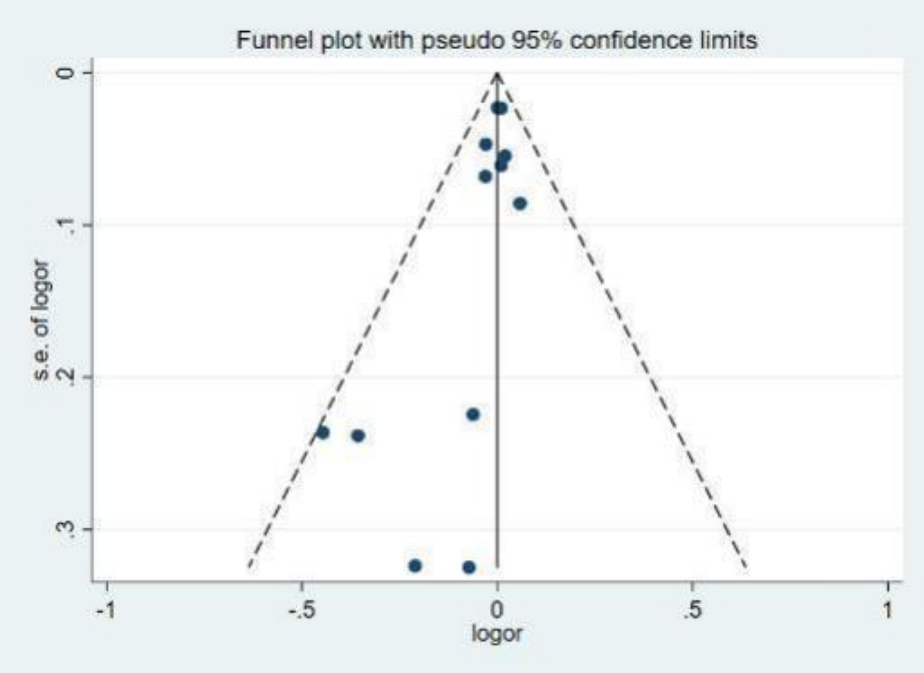
**eFigure 24:Publication bias and Egger test on vegetable.**

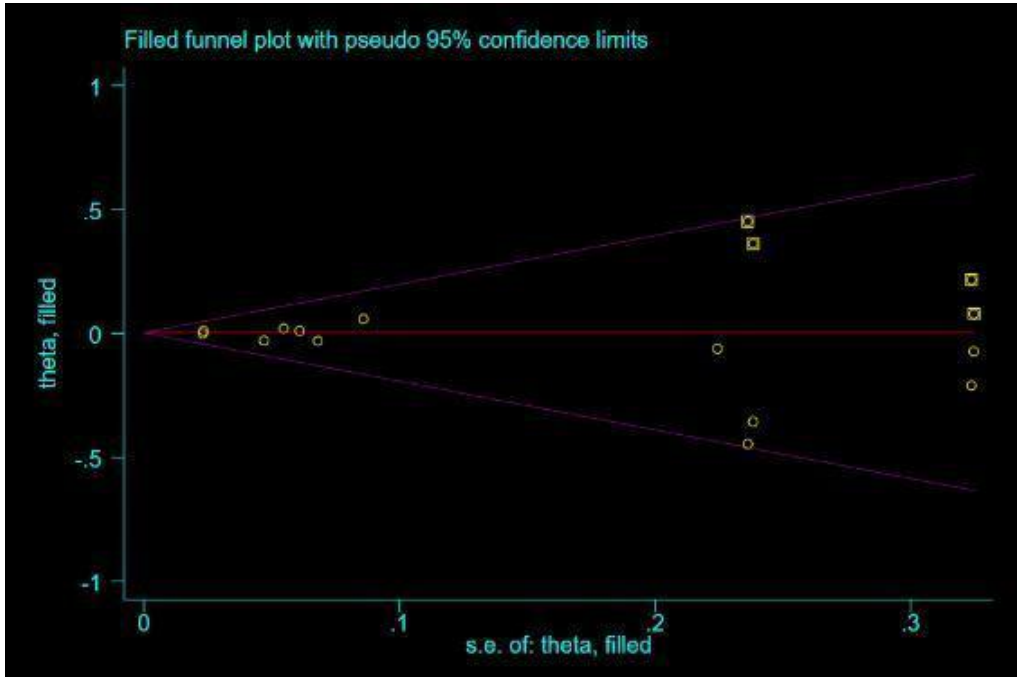





Egger test: Fruit p=0.041<0.05. Cut and complement method tips, there was no significant publication bias.

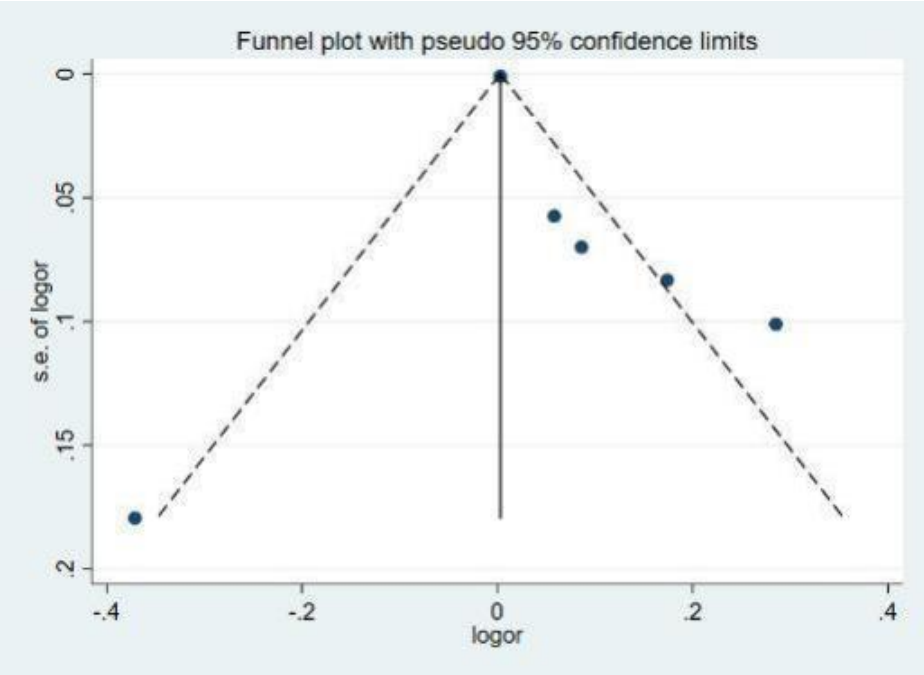
**eFigure 25:Publication bias and Egger test on sugar.**






Egger test: Fruit p=0.035<0.05. Cut and complement method tips, there was no significant publication bias.

**eFigure 26:Publication bias and Egger test on fat.**




Egger test: Fat p=0.306>0.05, there was no significant publication bias.

## eTable 1. Meta-analysis of Observational Studies in Epidemiology (MOOSE) Checklist

| Item No. | Recommendation | Reported on Page No |
|---|---|---|
| Reporting of background should include | | |
| 1 | Problem definition | 3-5 |
| 2 | Hypothesis statement | 3-5 |
| 3 | Description of study outcome(s) | 3-5 |
| 4 | Type of exposure or intervention used | 3-5 |
| 5 | Type of study designs used | - |
| 6 | Study population | 5 |
| Reporting of search strategy should include | | |
| 7 | Qualifications of searchers (eg, librarians and investigators) | 6 |
| 8 | Search strategy, including time period included in the synthesis and keywords | 6 |
| 9 | Effort to include all available studies, including contact with authors | 6, 7 |
| 10 | Databases and registries searched | 5,6 |
| 11 | Search software used, name and version, including special features used (eg, explosion) | 8 |
| 12 | Use of hand searching (eg, reference lists of obtained articles) | 6 |
| 13 | List of citations located and those excluded, including justification | 6, Fig 1 |
| 14 | Method of addressing articles published in languages other than English | 7 |
| 15 | Method of handling abstracts and unpublished studies | 6, 7 |
| 16 | Description of any contact with authors | - |
| Reporting of methods should include | | |

| | | |
|---|---|---|
| 17 | Description of relevance or appropriateness of studies assembled for assessing the hypothesis to be tested | 8 |
| 18 | Rationale for the selection and coding of data (eg, sound clinical principles or convenience) | 7-8 |
| 19 | Documentation of how data were classified and coded (eg, multiple raters, blinding and interrater reliability) | 7 |
| 20 | Assessment of confounding (eg, comparability of cases and controls in studies where appropriate) | 7 |
| 21 | Assessment of study quality, including blinding of quality assessors, stratification or regression on possible predictors of study results | 7 |
| 22 | Assessment of heterogeneity | 8 |
| 23 | Description of statistical methods (eg, complete description of fixed or random effects models, justification of whether the chosen models account for predictors of study results, dose-response models, or cumulative meta-analysis) in sufficient detail to be replicated | 8 |
| 24 | Provision of appropriate tables and graphics | Table 1, Fig 1 |
| Reporting of results should include | | |
| 25 | Graphic summarizing individual study estimates and overall estimate | Fig 2, Table 1 |
| 26 | Table giving descriptive information for each study included | eTable2 |
| 27 | Results of sensitivity testing (eg, subgroup analysis) | eFig16-20 |
| 28 | Indication of statistical uncertainty of findings | 10,11 |
| Reporting of discussion should include | | |
| 29 | Quantitative assessment of bias (eg, publication bias) | eFig21-26 |
| 30 | Justification for exclusion (eg, exclusion of non-English language citations) | Fig 1 |
| 31 | Assessment of quality of included studies | eTable 5 |
| Reporting of conclusions should include | | |
| 32 | Consideration of alternative explanations for observed results | 11-19 |
| 33 | Generalization of the conclusions (ie, appropriate for the data presented and within the domain of the literature review) | 11-19 |

| | | |
|---|---|---|
| 34 | Guidelines for future research | 19-20 |
| 35 | Disclosure of funding source | 1 |

## eTable 2: Dietary risk ratio associated with tinnitus

| | | | | | | |
|---|---|---|---|---|---|---|
| Carlotta Micaela Jarach 2023a | scarce | butter | tinnitus | 0.98 | 0.54 | 1.77 |
| Carlotta Micaela Jarach 2023b | normal use or high use | butter | tinnitus | 0.46 | 0.23 | 0.93 |
| Diana Tang 2021a | 2nd quartile (>188.4–231.7) | carbohydrate | tinnitus | 0.74 | 0.47 | 1.17 |
| Diana Tang 2021b | 3rd quartile (231.8–280.8) | carbohydrate | tinnitus | 0.739 | 0.47 | 1.15 |
| Diana Tang 2021c | 4th quartile (>280.8–577.7) | carbohydrate | tinnitus | 0.55 | 0.34 | 0.9 |
| Doh Young Lee 2018 | direct | carbohydrate | tinnitus | 1.001 | 0.999 | 1.001 |
| Piers Dawes 2020a | quintile 2 | Carbohydrate | tinnitus | 1.03 | 0.94 | 1.14 |
| Piers Dawes 2020b | quintile 3 | Carbohydrate | tinnitus | 0.98 | 0.88 | 1.11 |
| Piers Dawes 2020c | quintile 4 | Carbohydrate | tinnitus | 0.99 | 0.86 | 1.14 |
| Piers Dawes 2020d | quintile 5 | Carbohydrate | tinnitus | 0.93 | 0.78 | 1.1 |
| Carlotta Micaela Jarach 2023a | 50-100g/week | cheese | tinnitus | 1.29 | 0.63 | 2.67 |
| Carlotta Micaela Jarach 2023b | 100+g/week | cheese | tinnitus | 0.85 | 0.46 | 1.58 |
| Abby McCormack 2014 | direct | coffee | Transient tinnitus | 1.020 | 1.010 | 1.031 |
| Abby McCormack 2014a | direct | coffee | Persistent tinnitus | 1.010 | 1.010 | 1.020 |
| Abby McCormack 2014b | direct | coffee | Bothersome tinnitus | 1.010 | 0.990 | 1.031 |
| Carlotta Micaela Jarach 2023a | 2nd quartile (850-1749mg) | coffee | tinnitus | 0.49 | 0.24 | 0.99 |
| Carlotta Micaela Jarach 2023b | 3rd quartile (≥1750mg） | coffee | tinnitus | 0.69 | 0.34 | 1.43 |
| Jordan T Glicksman 2014a | 150-299 mg/day | coffee | tinnitus | 0.94 | 0.88 | 1 |
| Jordan T Glicksman 2014b | 300-449 mg/day | coffee | tinnitus | 0.91 | 0.84 | 0.98 |
| Jordan T Glicksman 2014c | 450-599 mg/day | coffee | tinnitus | 0.85 | 0.76 | 0.95 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Jordan T Glicksman 2014d | 600+ mg/day | coffee | tinnitus | 0.79 | 0.68 | 0.91 |
| Sang-Youp Lee 2018 | Age 19–39（Daily） | coffee | tinnitus | 0.8 | 0.63 | 1 |
| Sang-Youp Lee 2018 | Age 40-64（Daily） | coffee | tinnitus | 0.9 | 0.73 | 1.1 |
| Sang-Youp Lee 2018 | Age >65（Daily） | coffee | tinnitus | 0.95 | 0.72 | 1.24 |
| Abby McCormack 2014 | direct | dairy | Transient tinnitus | 0.847 | 0.952 | 0.752 |
| Abby McCormack 2014a | direct | dairy | Persistent tinnitus | 0.787 | 0.885 | 0.704 |
| Abby McCormack 2014b | direct | dairy | Bothersome tinnitus | 0.877 | 1.099 | 0.699 |
| Christopher Spankovich 2017 | direct | dairy | Persistent tinnitus | 0.99 | 0.61 | 1.50 |
| Carlotta Micaela Jarach 2023a | 16-19 | diversity | tinnitus | 0.53 | 0.28 | 1 |
| Carlotta Micaela Jarach 2023b | ≥20 | diversity | tinnitus | 0.47 | 0.24 | 0.9 |
| Abby McCormack 2014 | direct | egg | Transient tinnitus | 1.031 | 1.149 | 0.926 |
| Abby McCormack 2014a | direct | egg | Persistent tinnitus | 1.149 | 1.299 | 1.031 |
| Abby McCormack 2014b | direct | egg | Bothersome tinnitus | 0.901 | 1.136 | 0.719 |
| Carlotta Micaela Jarach 2023a | 1/week | eggs | tinnitus | 0.99 | 0.51 | 1.92 |
| Carlotta Micaela Jarach 2023b | 2+/week | eggs | tinnitus | 0.54 | 0.29 | 1 |
| Christopher Spankovich 2017 | direct | fat | Persistent tinnitus | 0.69 | 0.49 | 0.99 |
| Doh Young Lee 2018 | direct | fat | tinnitus | 1.003 | 1.001 | 1.005 |
| Piers Dawes 2020a | quintile 2 | fat | tinnitus | 1.06 | 0.95 | 1.19 |
| Piers Dawes 2020b | quintile 3 | fat | tinnitus | 1.09 | 0.95 | 1.25 |
| Piers Dawes 2020c | quintile 4 | fat | tinnitus | 1.19 | 1.01 | 1.40 |
| Piers Dawes 2020d | quintile 5 | fat | tinnitus | 1.33 | 1.09 | 1.62 |
| Diana Tang 2021a | 2nd quartile (>17.8–23.8) | fiber | tinnitus | 0.6 | 0.37 | 0.96 |
| Diana Tang 2021b | 3rd quartile (>23.8–30.6) | fiber | tinnitus | 0.87 | 0.56 | 1.37 |
| Diana Tang 2021d | 4th quartile (>30.6–89.3) | fiber | tinnitus | 0.77 | 0.49 | 1.21 |
| Doh Young Lee 2018 | direct | fiber | tinnitus | 1.004 | 0.999 | 1.008 |
| Piers Dawes 2020a | quintile 2 | fiber | tinnitus | 0.97 | 0.87 | 1.07 |
| Piers Dawes 2020b | quintile 3 | fiber | tinnitus | 0.91 | 0.81 | 1.02 |
| Piers Dawes 2020c | quintile 4 | fiber | tinnitus | 0.86 | 0.76 | 0.97 |
| Piers Dawes 2020d | quintile 5 | fiber | tinnitus | 0.87 | 0.75 | 1.01 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Abby McCormack 2014 | direct | fish | Transient tinnitus | 0.980 | 0.950 | 1.020 |
| Abby McCormack 2014a | direct | fish | Persistent tinnitus | 0.910 | 0.870 | 0.940 |
| Abby McCormack 2014b | direct | fish | Bothersome tinnitus | 1.080 | 0.990 | 1.160 |
| Carlotta Micaela Jarach 2023a | 300g/week | fish | tinnitus | 1.19 | 0.59 | 2.38 |
| Carlotta Micaela Jarach 2023b | ≥450g/week | fish | tinnitus | 0.75 | 0.41 | 1.4 |
| Carlotta Micaela Jarach 2023a | 900-1050g/week | fruit | tinnitus | 0.96 | 0.47 | 1.97 |
| Carlotta Micaela Jarach 2023b | ≥1200g/week | fruit | tinnitus | 0.78 | 0.43 | 1.44 |
| Christopher Spankovich 2017 | direct | fruit | Persistent tinnitus | 0.61 | 0.41 | 0.91 |
| Diana Tang 2021a | 2nd quartile (>3.6–6.2) | fruit | tinnitus | 0.47 | 0.29 | 0.76 |
| Diana Tang 2021b | 3rd quartile (>6.2–9.7) | fruit | tinnitus | 0.68 | 0.43 | 1.06 |
| Diana Tang 2021d | 4th quartile (>9.7–43.9) | fruit | tinnitus | 0.69 | 0.44 | 1.08 |
| Carlotta Micaela Jarach 2023a | scarce | margarine | tinnitus | 1.35 | 0.25 | 7.43 |
| Carlotta Micaela Jarach 2023b | normal use or high use | margarine | tinnitus | 1.4 | 0.2 | 9.98 |
| Carlotta Micaela Jarach 2023a | 300g/week | meat | tinnitus | 1.49 | 0.75 | 2.94 |
| Carlotta Micaela Jarach 2023b | ≥450g/week | meat | tinnitus | 0.97 | 0.51 | 1.85 |
| Christopher Spankovich 2017 | direct | meat | Persistent tinnitus | 1.01 | 0.62 | 1.65 |
| Carlotta Micaela Jarach 2023a | 2nt quartile (1-6 cops/week) | milk | tinnitus | 0.68 | 0.3 | 1.52 |
| Carlotta Micaela Jarach 2023b | 3rt quartile (7+ cops/week) | milk | tinnitus | 0.85 | 0.46 | 1.55 |
| Doh Young Lee 2018 | direct | protein | tinnitus | 1.002 | 1.001 | 1.004 |
| Piers Dawes 2020a | quintile 2 | protein | tinnitus | 1.02 | 0.92 | 1.14 |
| Piers Dawes 2020b | quintile 3 | protein | tinnitus | 1.01 | 0.89 | 1.13 |
| Piers Dawes 2020c | quintile 4 | protein | tinnitus | 0.97 | 0.85 | 1.11 |
| Piers Dawes 2020d | quintile 5 | protein | tinnitus | 1.06 | 0.9 | 1.26 |
| Abby McCormack 2014 | direct | sugar | Transient tinnitus | 1.000 | 0.952 | 1.042 |
| Abby McCormack 2014a | direct | sugar | Persistent tinnitus | 1.010 | 0.971 | 1.064 |
| Abby McCormack 2014b | direct | sugar | Bothersome tinnitus | 0.971 | 0.885 | 1.064 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Carlotta Micaela Jarach 2023a | 2nt quartile (1-7 spoon/week) | sugar | tinnitus | 0.93 | 0.49 | 1.75 |
| Carlotta Micaela Jarach 2023b | 3rt quartile (8+ spoon/week) | sugar | tinnitus | 0.81 | 0.43 | 1.53 |
| Diana Tang 2021a | 2nd quartile (>91.0–120.1) | sugar | tinnitus | 0.64 | 0.4 | 1.01 |
| Diana Tang 2021b | 3rd quartile (>120.1–154.0) | sugar | tinnitus | 0.94 | 0.61 | 1.47 |
| Diana Tang 2021c | 4th quartile (>154.0–350.8) | sugar | tinnitus | 0.7 | 0.44 | 1.12 |
| Piers Dawes 2020a | quintile 2 | sugar | tinnitus | 1.02 | 0.92 | 1.14 |
| Piers Dawes 2020b | quintile 3 | sugar | tinnitus | 1.01 | 0.89 | 1.13 |
| Piers Dawes 2020c | quintile 4 | sugar | tinnitus | 0.97 | 0.85 | 1.11 |
| Piers Dawes 2020d | quintile 5 | sugar | tinnitus | 1.06 | 0.9 | 1.26 |
| Christopher Spankovich 2017 | direct | variety | Persistent tinnitus | 0.95 | 0.61 | 1.5 |
| Carlotta Micaela Jarach 2023a | 900-1050g/week | vegetable | tinnitus | 0.77 | 0.38 | 1.56 |
| Carlotta Micaela Jarach 2023b | ≥1200g/week | vegetable | tinnitus | 0.75 | 0.4 | 1.41 |
| Christopher Spankovich 2017 | direct | vegetable | Persistent tinnitus | 1.25 | 0.9 | 1.79 |
| Diana Tang 2021a | 2nd quartile (>7.2–9.7) | vegetable | tinnitus | 1.32 | 0.82 | 2.11 |
| Diana Tang 2021b | 3rd quartile (>9.7–12.3) | vegetable | tinnitus | 0.97 | 0.60 | 1.56 |
| Diana Tang 2021c | 4th quartile (>12.3–54.5) | vegetable | tinnitus | 1.19 | 0.75 | 1.89 |
| Abby McCormack 2014 | direct | vegetable and fruit | Transient tinnitus | 1.000 | 1.000 | 1.010 |
| Abby McCormack 2014a | direct | vegetable and fruit | Persistent tinnitus | 1.010 | 1.000 | 1.010 |
| Abby McCormack 2014b | direct | vegetable and fruit | Bothersome tinnitus | 1.010 | 1.000 | 1.020 |
| Carlotta Micaela Jarach 2023a | >1 liter/per day | water | tinnitus | 0.84 | 0.43 | 1.65 |
| Doh Young Lee 2018 | direct | water | tinnitus | 1.003 | 0.992 | 1.014 |

## eTable 3. Evaluation of Risk of Bias Using Newcastle-Ottawa Scale（NOS) for Observational Studies

| Study | Item 1 | Item 2 | Item 3 | Item 4 | Item 5 | Item 6 | Item 7 | Item 8 | Item 9 | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| Carlotta Micaela Jarach 2023 | * | * | * | * | * | * | * | * | | 8 |
| Diana Tang 2021 | * | * | * | | * | * | * | * | * | 8 |
| Milena Tomanic 2020 | * | * | * | | | | * | | | 4 |
| Piers Dawes 2020 | * | * | * | | * | * | * | | | 6 |
| Sang-Yeon Lee 2019 | * | * | * | | * | * | * | | | 6 |
| Doh Young Lee 2018 | * | * | * | | * | * | * | | | 6 |
| Sang-Youp Lee 2018 | * | * | * | | * | * | * | | | 6 |
| Christopher Spankovich 2017 | * | * | * | | * | * | * | | | 6 |
| Abby McCormack 2014 | * | * | * | | * | * | * | | | 6 |
| Jordan T Glicksman 2014 | * | * | * | | * | * | * | | * | 7 |

## eTable 4. Literature screening process

| Title | Author | Whether to include |
|---|---|---|
| The Role of Diet in Tinnitus Onset: A Hospital-Based Case-Control Study from Italy. | Carlotta Micaela Jarach 2023 | YES |
| Associations between intake of dietary flavonoids and the 10-year incidence of tinnitus in older adults. | Diana Tang 2022 | YES |
| Dietary Fibre Intake and the 10-Year Incidence of Tinnitus in Older Adults. | Diana Tang 2021 | YES |
| Relationship Between Diet, Tinnitus, and Hearing Difficulties. | Piers Dawes 2020 | YES |
| Association of Chocolate Consumption with Hearing Loss and Tinnitus in Middle-Aged People Based on the Korean National Health and Nutrition Examination Survey 2012-2013. | Sang-Yeon Lee 2019 | YES |
| Relationship Between Diet and Tinnitus: Korea National Health and Nutrition Examination Survey. | Doh Young Lee 2018 | YES |
| Association of Coffee Consumption with Hearing and Tinnitus Based on a National Population-Based Survey | Sang-Youp Lee 2018 | YES |
| Relationship between dietary quality, tinnitus and hearing level: data from the national health and nutrition examination survey, 1999-2002. | Christopher Spankovich 2017 | YES |
| Association of dietary factors with presence and severity of tinnitus in a middle-aged UK population. | Abby McCormack 2014 | YES |
| A prospective study of caffeine intake and risk of incident tinnitus | Jordan T. Glicksman 2014 | YES |
| The effect of MemoVigor 2 on recent-onset idiopathic tinnitus: a randomized double-blind placebo-controlled clinical trial. | Dimitrios G Balatsouras 2024 | No |
| The effects of dietary and physical activity interventions on tinnitus symptoms: An RCT. | Ümüş Özbey-Yücel 2023 | No |

| | | |
|---|---|---|
| Effectiveness of Tinnitan Duo in Subjective Tinnitus with Emotional Affectation: A Prospective, Interventional Study. | Jennifer Knäpper 2023 | No |
| Hyperlipidemia and its relation with tinnitus: Cross-sectional approach. | A Musleh 2022 | No |
| Diet Quality and the Risk of Impaired Speech Reception Threshold in Noise: The UK Biobank cohort | Humberto Yévenes-Briones 2022 | No |
| The effect of caffeine on tinnitus: Randomized triple-blind placebo-controlled clinical trial. | Alleluia Lima Losno Ledesma 2021 | No |
| The effects of diet and physical activity induced weight loss on the severity of tinnitus and quality of life: A randomized controlled trial. | Ümüş Özbey-Yücel 2021 | No |
| Dietary Factors and Tinnitus among Adolescents. | Milena Tomanic 2020 | No |
| Restriction of salt, caffeine and alcohol intake for the treatment of Ménière's disease or syndrome. | Kiran Hussain 2018 | No |
| The effect of supplemental dietary taurine on tinnitus and auditory discrimination in an animal model. | Thomas J Brozoski 2010 | No |
| Low energy diet and intracranial pressure in women with idiopathic intracranial hypertension: prospective cohort study. | Alexandra J Sinclair 2010 | No |
| Caffeine abstinence: an ineffective and potentially distressing tinnitus therapy. | Lindsay St Claire 2010 | No |
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