Systematic Review on Palm Oil and Obesity

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Presentation Outline

- Introduction
- Palm oil consumption and risk of obesity
  - Objectives
  - Outcomes
  - Results
  - Conclusion
- Overall conclusion

Introduction

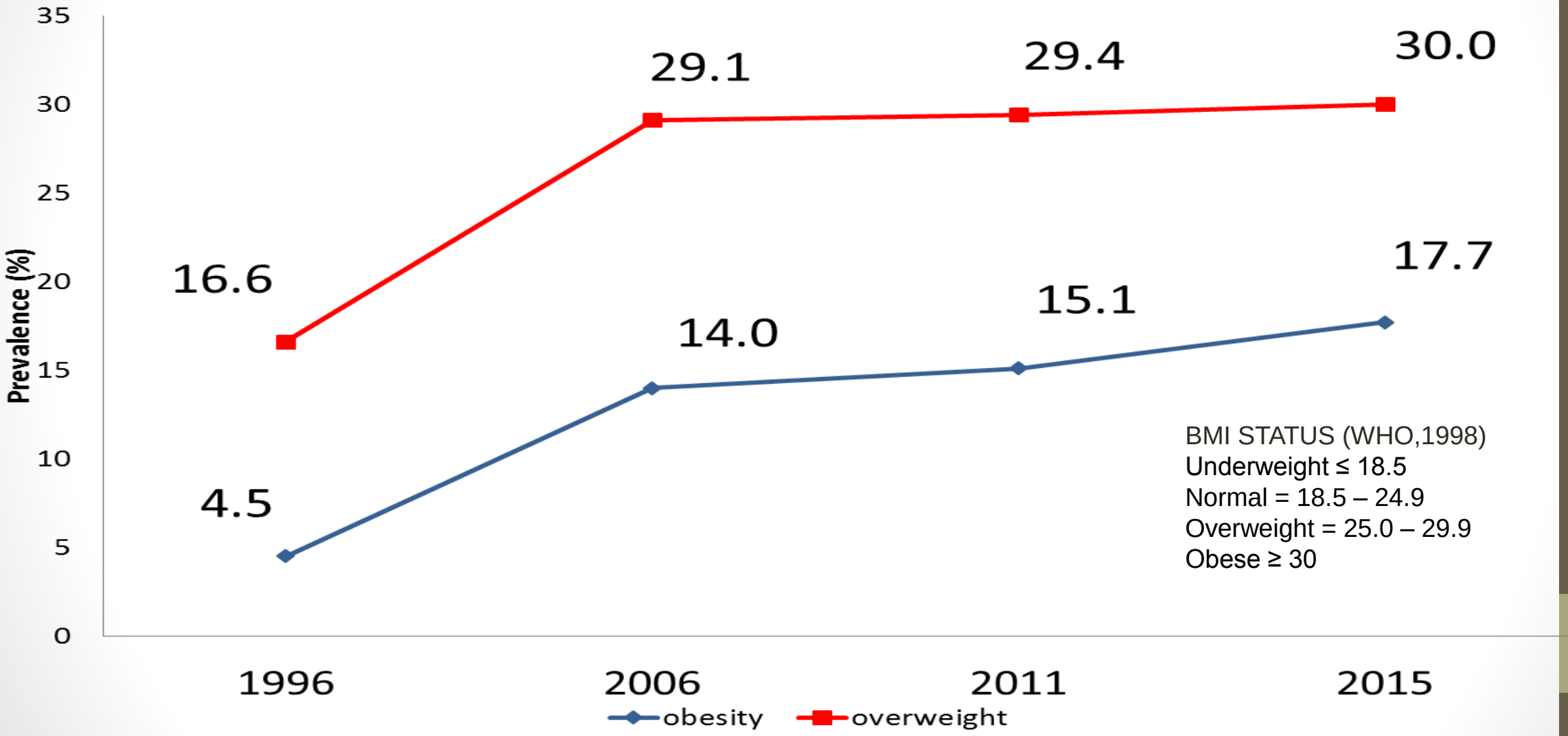
- Obesity is a notably major health concern all over the world (Pell et al, 2016) including Malaysia that recorded an increment for the last 20 years (Khambalia & Seen, 2010). This is now a critical public health issue and the prevalence of obesity has increased substantially over the past decade from 43.1% in 2006, 44.5% in 2011 and 47.7% in 2015 (Alwan, 2011)
- The abundance and variety of food available in Malaysia for the last several decades showed the rise in prevalence of obesity in the population. According to Lim (2016) total availability of calories per capita per day in Malaysia has increased 20% over 40 years since 1961.
- Malaysia as one of the important players in world production of palm oil. In 2009, 2.5 million tons of palm oil were used globally for biodiesel production and these play an important role in the world food and biofuel markets (Gan & Li, 2014).

- In the last few decades, there are reports linking palm oil, especially its palmitic acid content to adverse health effects, including overweight and obesity (May & Kalanithi, 2014).
- Based on individual studies, it is difficult to clearly determine if palm oil consumption is directly associated to overweight and/or obesity, as obesity is likely to be multifactorial, with factors such as other dietary habits, level of activity as well as lifestyle playing important parts.

Introduction

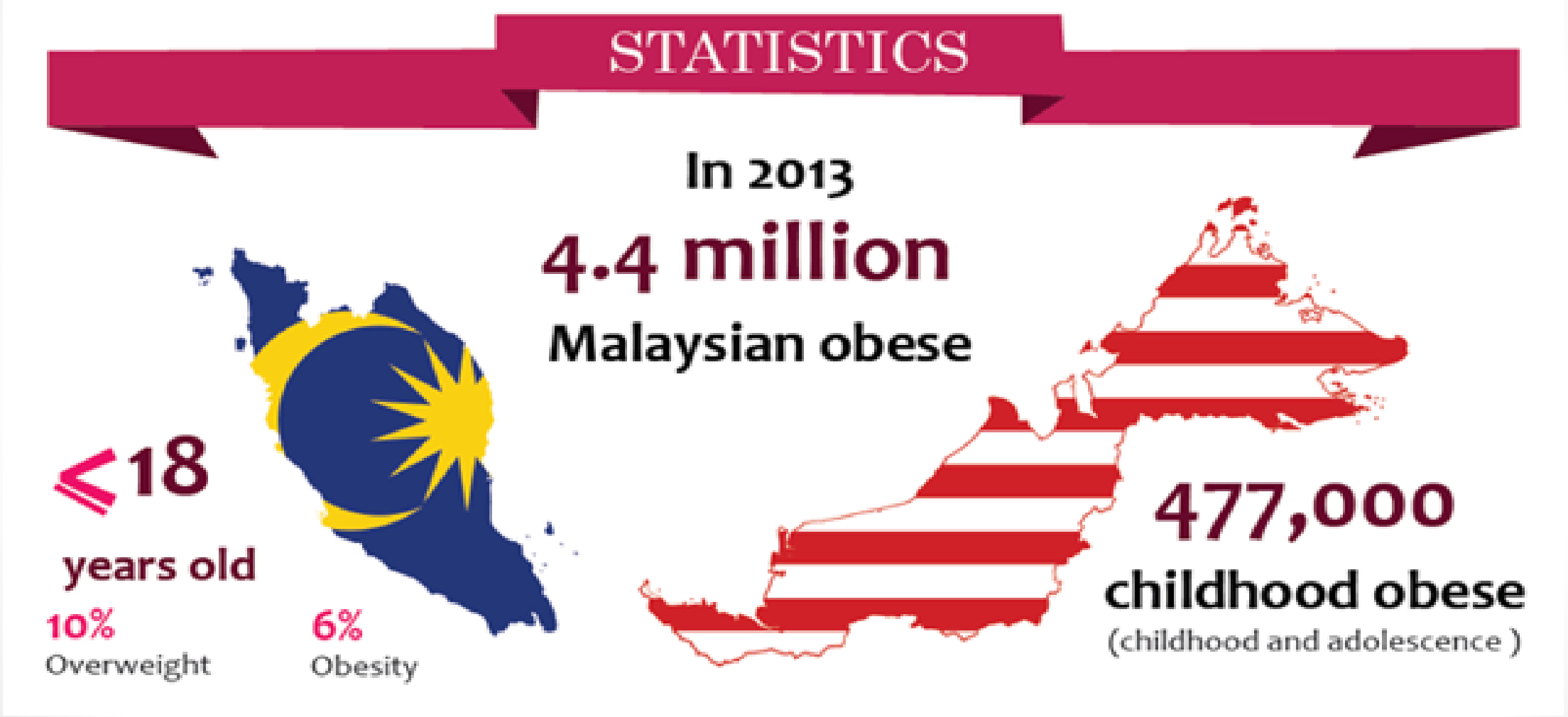
- Overweight and obesity problems are the alarming trend and have become major health problems globally, including Malaysia.
- Obesity prevalence is increasing every year.
- Besides causing high health care cost burden, obesity is known to cause poor quality of life, cardiovascular diseases, type 2 diabetes and some type of cancers.
- Findings from National Health and Morbidity Survey (NHMS) 2015, estimated that 5.6 million adult age 18 and above was overweight and 3.3 million was obese

Trend of obesity and overweight from 1996 to 2015, ≥18 years (WHO 1998)

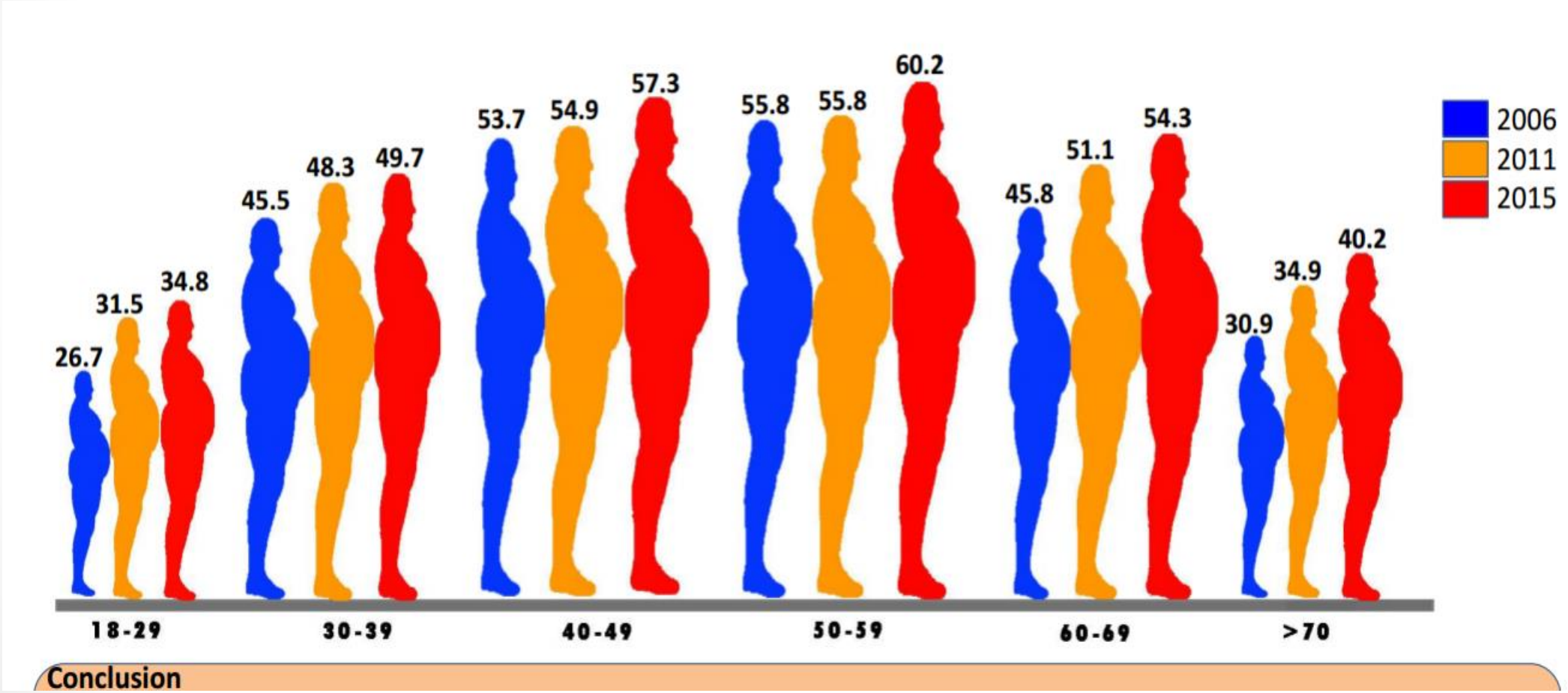


Overweight in Malaysia

Overweight for children of both sexes (BMI of > 25kg/m^2)



Overall overweight and obesity by age categories



Conclusion

Objective

- To determine the association between palm oil intake and obesity.

Search Method

- We conducted electronic searches for eligible papers via various databases which include EMBASE, PUBMED, CENTRAL, SCOPUS, PROQUEST and LILAC using predetermined methodologies according to Cochrane methods.
- We also conducted a search of via ClinicalTrials.gov (www.clinicaltrials.gov)

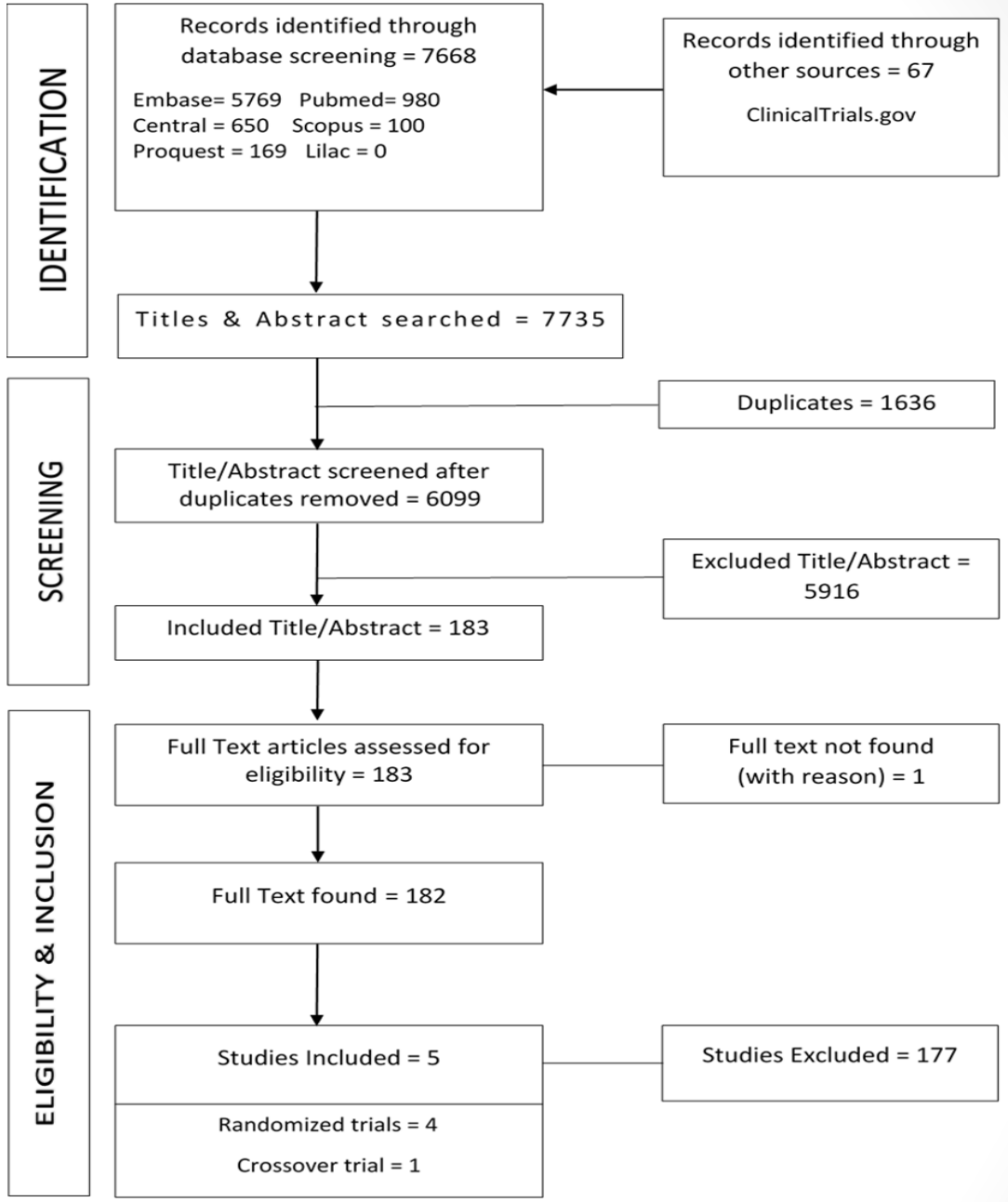
Selection criteria

- We included all studies that assessed the association between consumption of palm oil and/or its derivatives to changes in **weight or Body Mass Index (BMI).**
- These included interventional studies such as randomized controlled trials, cluster-randomized controlled trials and quasi-randomized controlled trials as well as observational studies without any language restriction.
- By using the PICO framework, the keyword and MeSH term can be identified to find evidence based practice resources.

Outcomes

- In our review, we looked into these outcomes to associate palm oil intake and obesity:
  - Change in body weight
  - Change in body mass index
  - Change in body fat measurement

- **PRISM Flowchart**



Included studies

1. Association between palm oil intake and increase in **body weight**
   i. Iggman 2014, double blind RCT, Sweden.
   ii. Tholstrup 2011, double blind RCT with cross-over, Denmark.
   iii. Kien 2014, quasi randomized trial, USA.
2. Association between palm oil intake and changes in **body mass index**
   i. Lucci 2015, RCT, Columbia.
   ii. Kien 2014, quasi randomized trial, USA.
   iii. Kien 2005, double blind RCT, USA.

Characteristics of Included Studies

Studies	Method	Participant	Intervention	Main outcome measure
Iggman 2014	– Randomised control trial – Double blinded – Parallel group	39 healthy lean individuals with mean age of 27±4 years	Palm oil rich in saturated fatty acid vs sunflower oil rich in polyunsaturated fatty acid	weight gain (kg)

Characteristics of Included Studies

Studies	Method	Participant	Intervention	Main outcome measure
Kien 2005	– Randomised Control Trial – Double blinded	43 healthy, non-obese young adults (21-34 years old)	High Palmitic Acid (source from palm oil) vs High Oleic Acid (source from sunflower oil)	BMI

Characteristics of Included Studies

Studies	Method	Participant	Intervention	Main outcome measure
Kien 2014	– Quasi randomized, cross-over clinical trial	9 men and 9 women	High palmitic acid (source from palm oil 89%, peanut oil 6.75%, olive oil 4.25%) vs low palmitic acid with high oleic acid (source from sunflower oil 19.3%, hazelnut oil 43.8%, palm oil 36.9%)	Body weight BMI (kg),

Characteristics of Included Studies

Studies	Method	Participant	Intervention	Main outcome measure
Lucci, 2015	– Randomised control trial	160 Eligible participants were community-dwelling men and women, aged ≥50 years.	Rich extra-virgin olive oil (EVOO) diet (n = 82) or hybrid palm oil-rich (HPO) diet (n = 78)	BMI

Characteristics of Included Studies

Studies	Method	Participant	Intervention	Main outcome measure
Tholstrup 2011	Randomized Controlled Double blinded 3x3 wk crossover dietary intervention (without washout period)	32 healthy men (19-64 years old)	palm olein vs olive oil vs lard	weight (kg)

Risk of bias of the included studies

- Study done by Iggman 2014 was considered to have low risks of bias across all domains.
- Risk of bias profiles of the remaining studies were unclear in most domains due to insufficient information provided by the authors. A detailed risk of bias assessment, displayed at the domain level and the study level, and are available in figure 1 and 2 respectively.

Risk of bias graph: review authors' judgements about each risk of bias item presented as percentages for each included studies.

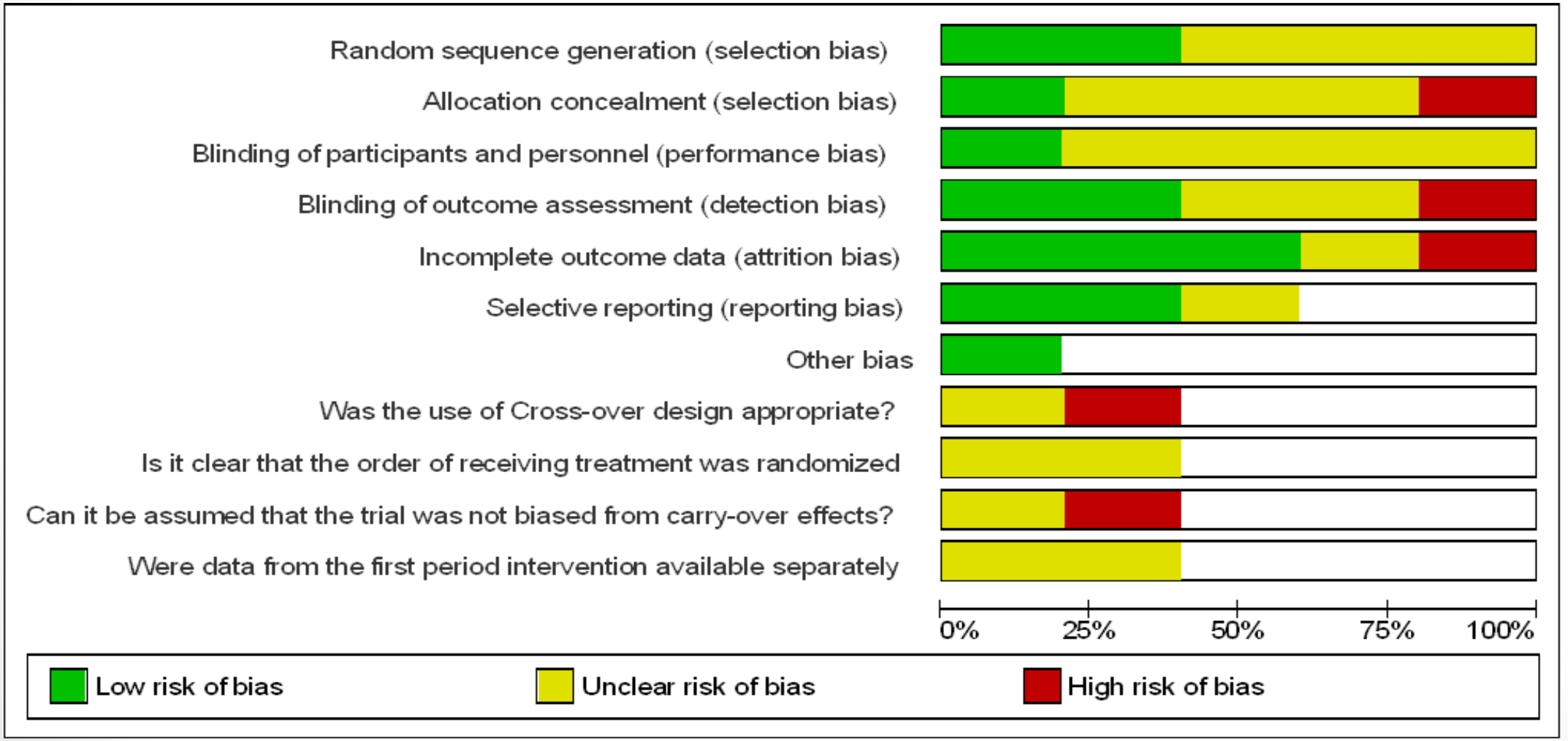
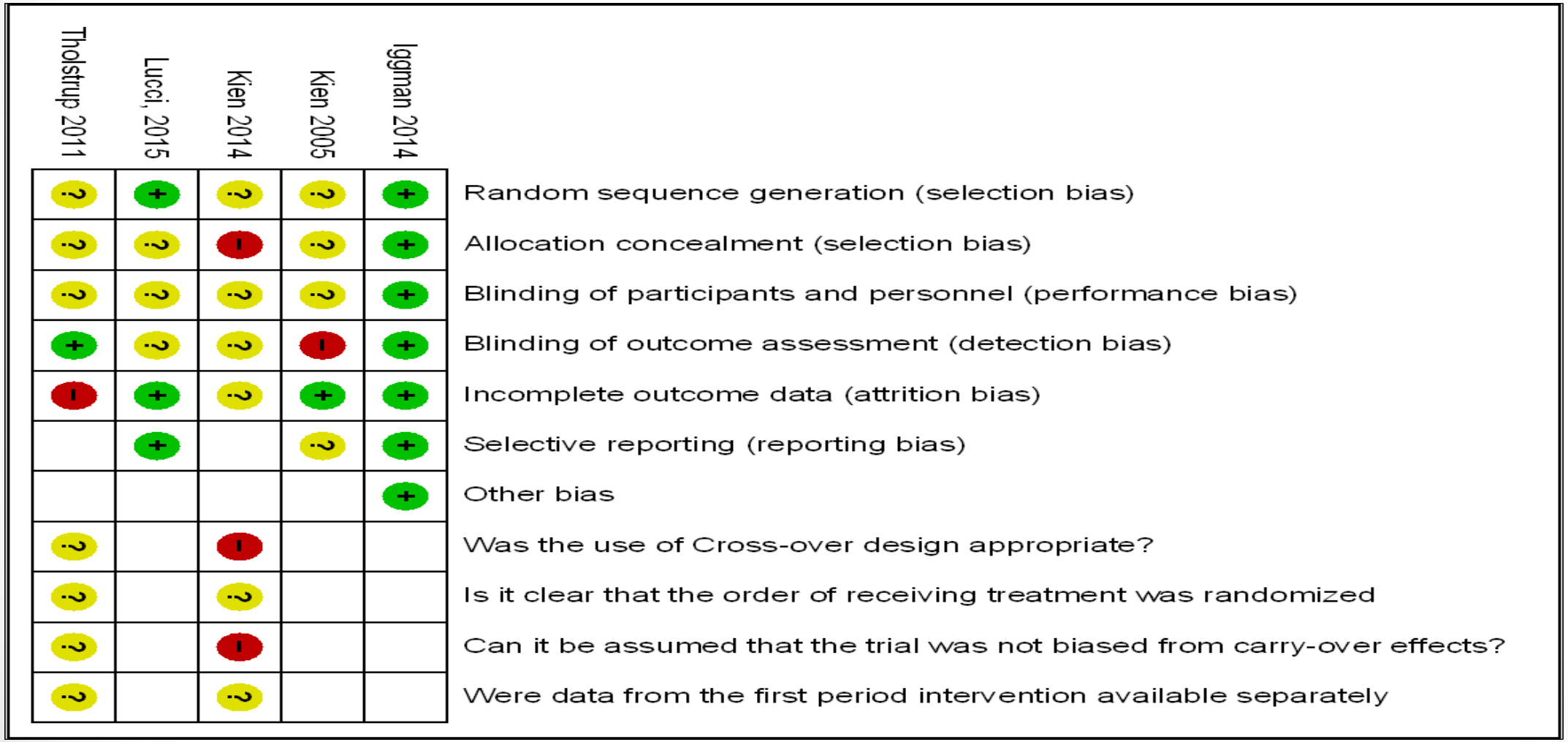


Figure 2: Risk of bias summary: review authors' judgements about each risk of bias item for each included study



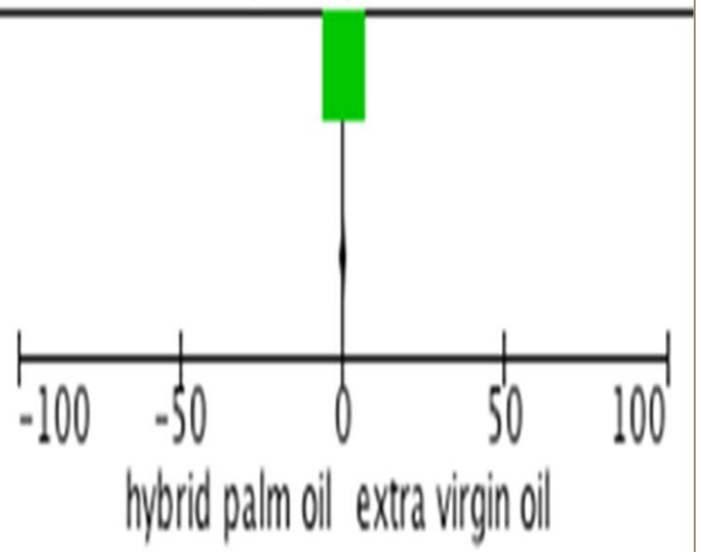
The effect of hybrid palm oil versus extra virgin olive oil on BMI.

- Based on one a single study (**Lucci 2015**) there was no difference in the changes of BMI between the group that received hybrid palm oil and extra virgin olive oil (mean difference (MD) 0.60, 95% CI; 0.55 -1.75).

	Hybrid Palm oil			extra virgin olive oil				Mean Difference	Mean Difference
Study or Subgroup	Mean	SD	Total	Mean	SD	Total	Weight	IV, Fixed, 95% CI	IV, Fixed, 95% CI
Lucci, 2015	28.3	3.3	78	27.7	4.1	82	100.0%	0.60 [-0.55, 1.75]	
Total (95% CI)			78			82	100.0%	0.60 [-0.55, 1.75]	

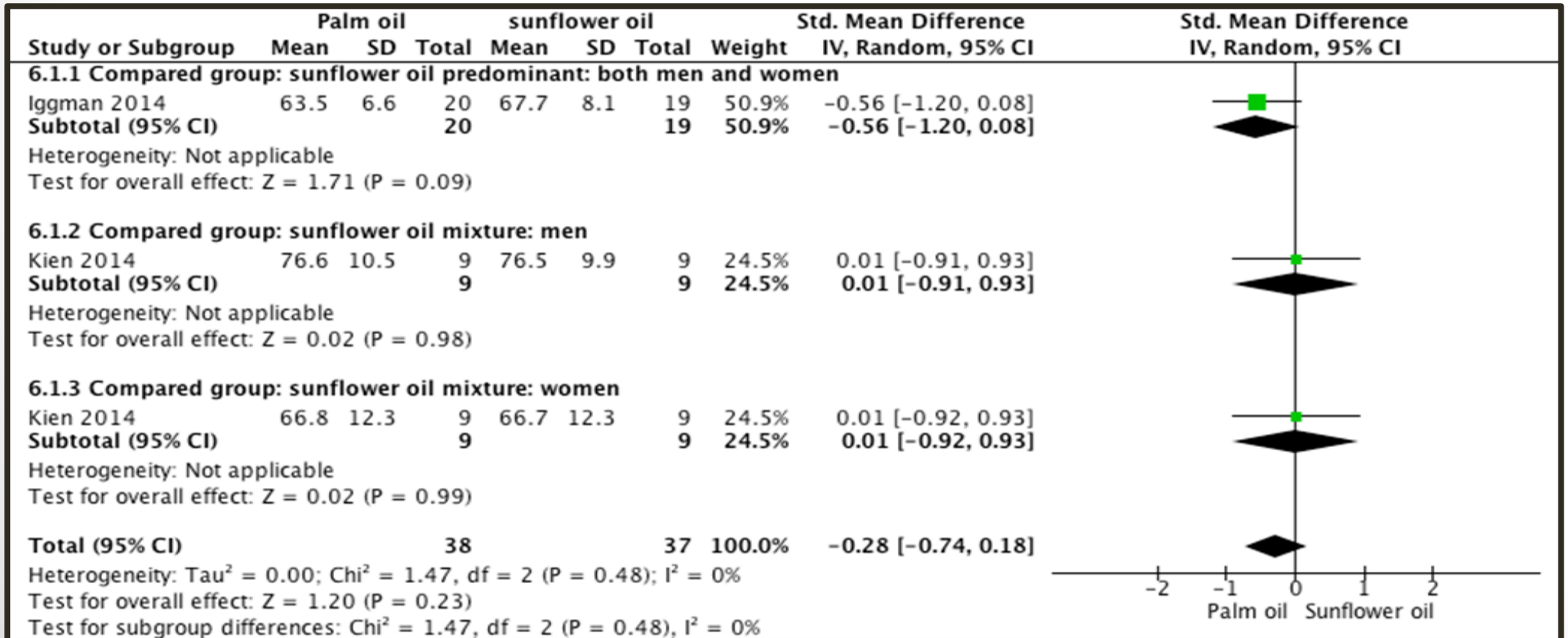
Heterogeneity: Not applicable

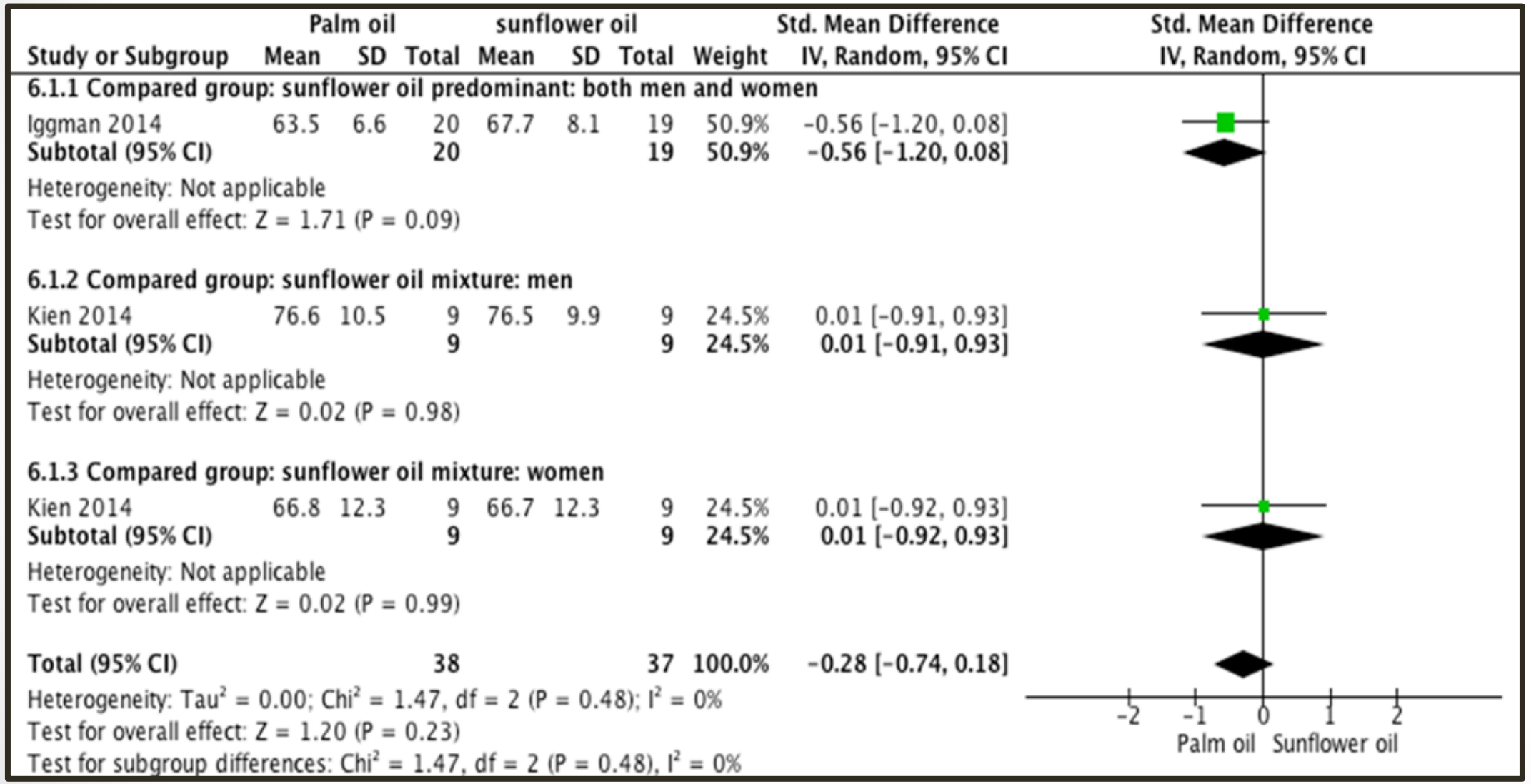
Test for overall effect: Z = 1.02 (P = 0.31)



The effect of palm oil versus sunflower oil on body weight

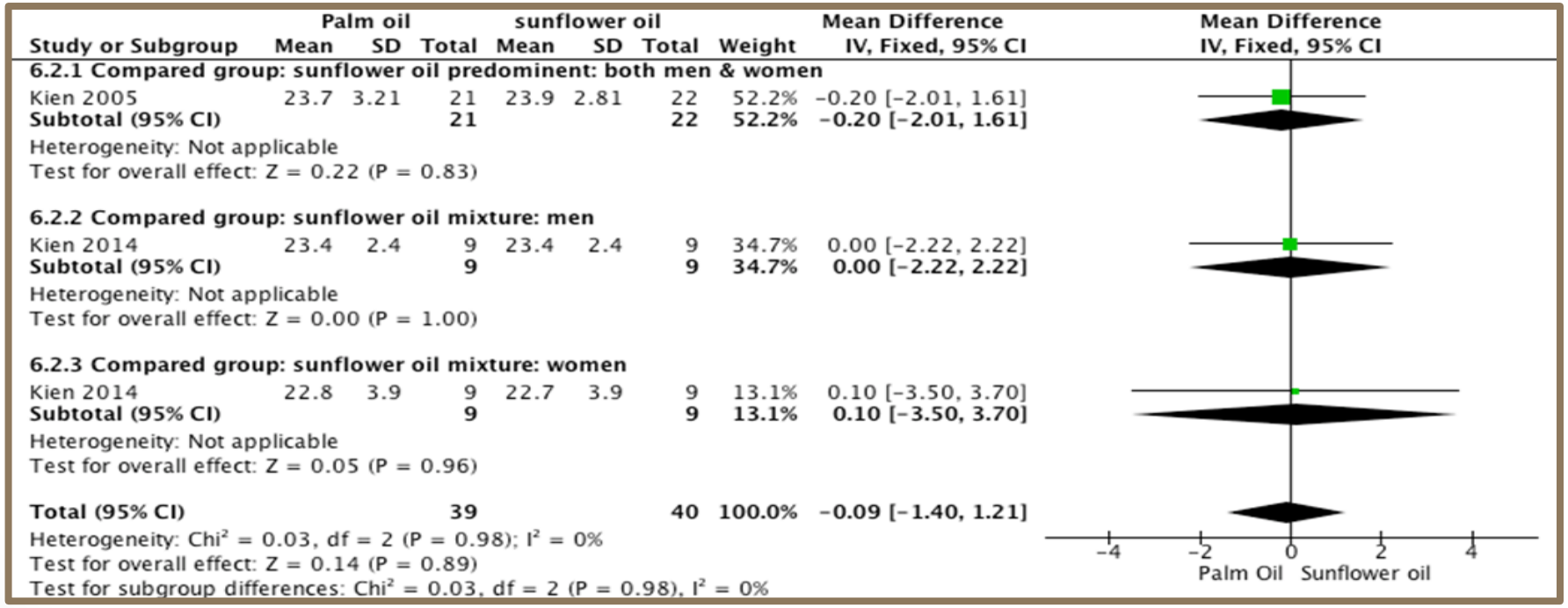
- Two of the studies (**Iggman 2014 and Kien 2014**) reported there was no difference in body weight changes between the group that received palm oil and sunflower oil (Standard Mean Difference (SMD) -0.56, 95% CI;1.20-0.08 and SMD- 0.01, 95% CI-0.91-0.93 respectively).



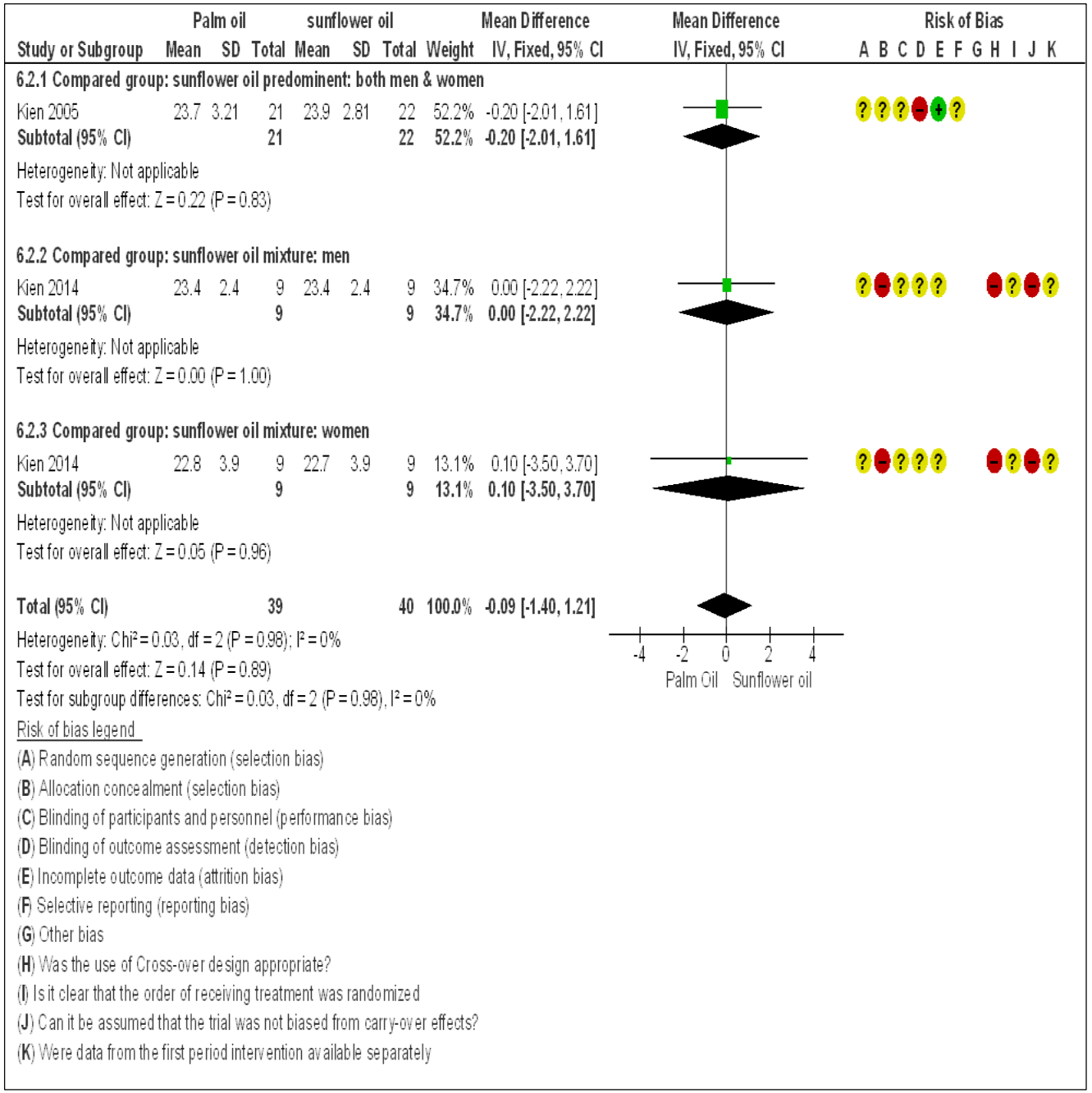

Palm oil
sunflower oil
Std. Mean Difference
Std. Mean Difference
Study or Subgroup Mean SD Total Mean SD Total Weight IV, Random, 95% CI
IV, Random, 95% CI
6.1.1 Compared group: sunflower oil predominant: both men and women
Iggman 2014 63.5 6.6 20 67.7 8.1 19 50.9% -0.56 [-1.20, 0.08]
Subtotal (95% CI) 20 19 50.9% -0.56 [-1.20, 0.08]
Heterogeneity: Not applicable
Test for overall effect: Z = 1.71 (P = 0.09)
6.1.2 Compared group: sunflower oil mixture: men
Kien 2014 76.6 10.5 9 76.5 9.9 9 24.5% 0.01 [-0.91, 0.93]
Subtotal (95% CI) 9 9 24.5% 0.01 [-0.91, 0.93]
Heterogeneity: Not applicable
Test for overall effect: Z = 0.02 (P = 0.98)
6.1.3 Compared group: sunflower oil mixture: women
Kien 2014 66.8 12.3 9 66.7 12.3 9 24.5% 0.01 [-0.92, 0.93]
Subtotal (95% CI) 9 9 24.5% 0.01 [-0.92, 0.93]
Heterogeneity: Not applicable
Test for overall effect: Z = 0.02 (P = 0.99)
Total (95% CI) 38 37 100.0% -0.28 [-0.74, 0.18]
Heterogeneity: Tau² = 0.00; Chi² = 1.47, df = 2 (P = 0.48); I² = 0%
Test for overall effect: Z = 1.20 (P = 0.23)
Test for subgroup differences: Chi² = 1.47, df = 2 (P = 0.48), I² = 0%
-2
-1
0
1
2
Palm oil
Sunflower oil

The effect of palm oil versus sunflower oil on BMI

- Based on two studies (Kien 2005, Kien 2014) there was no differences in changes of BMI between the group that received palm oil and sunflower oil (MD -0.20 , 95% CI; 2.01-1.61 and MD 0.00 , 95% CI; -2.22-2.22 respectively).
- Subgroup analysis between genders (Kien 2014) showed no difference between the groups.

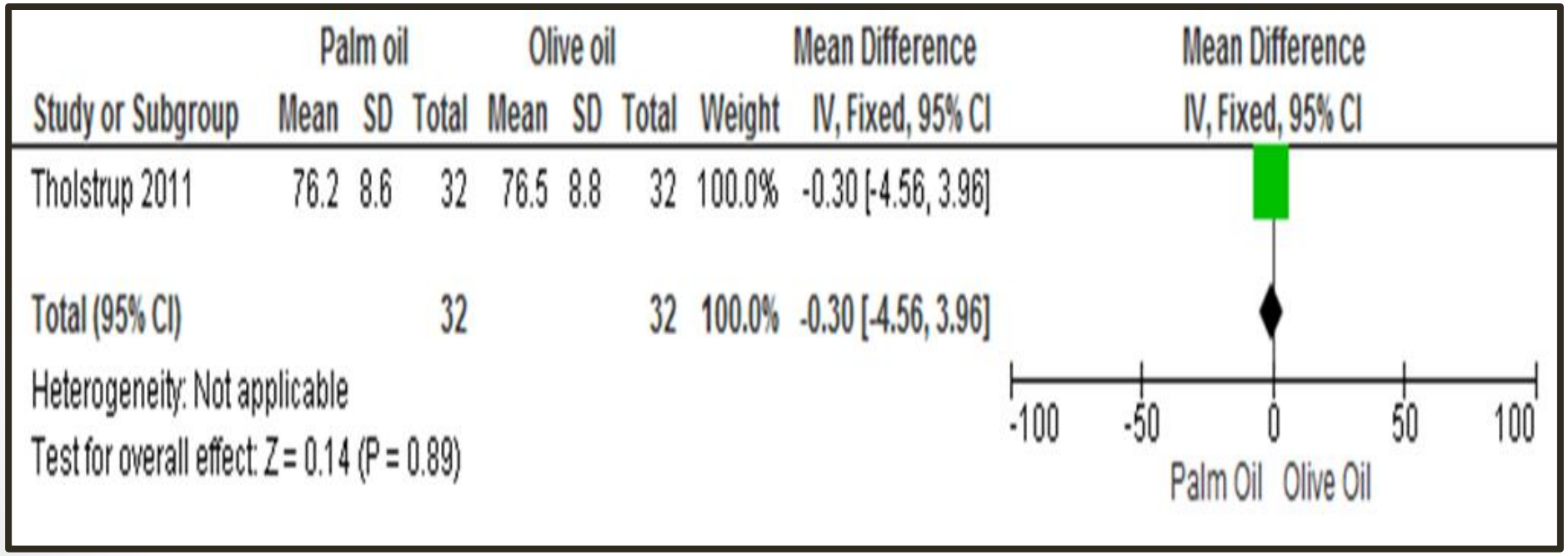


Comparison palm oil versus sunflower oil.



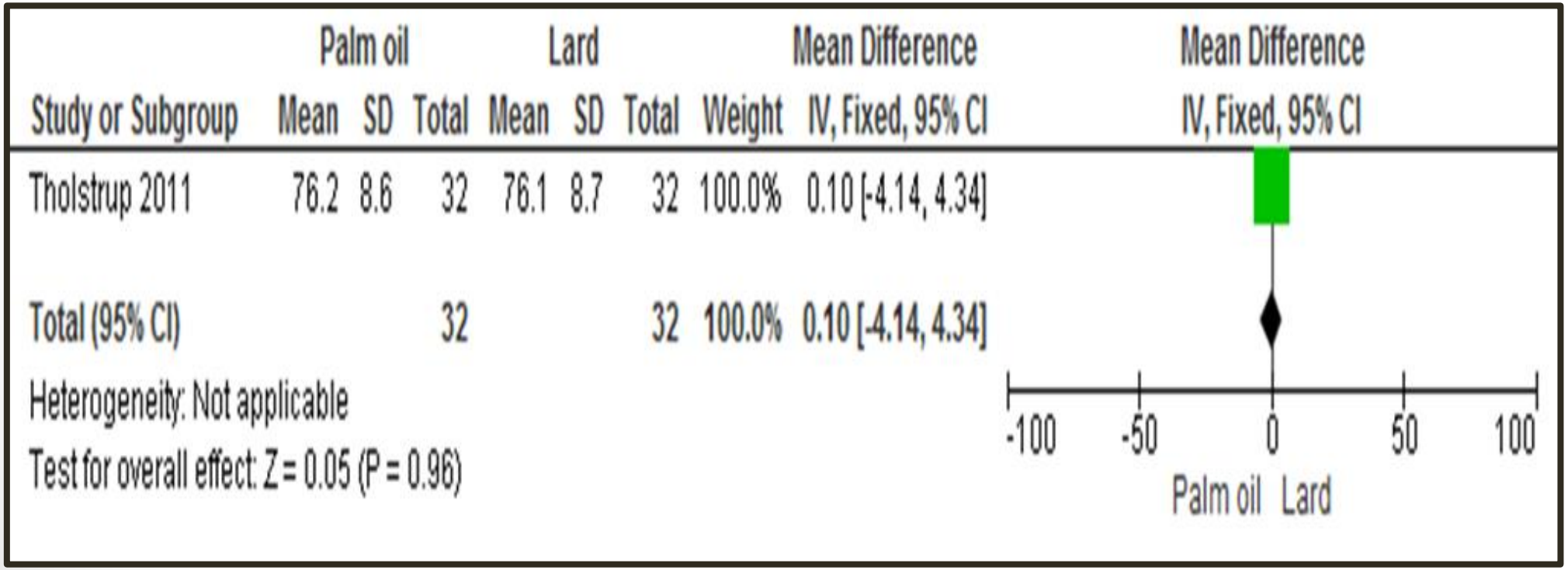
The effects of palm oil vs olive oil on body weight

- Based on a single study (Tholstrup 2011) there was no difference in body weight changes between the groups that received palm oil versus olive oil (MD; -0.30, 95% CI; 4.56-3.96).



The effect of palm oil vs lard on body weight

- Based on a single study (Tholstrup 2011) there was no difference in body weight changes between the groups that received palm oil versus lard (MD; 0.1, 95% CI; 4.14 - 4.34).



Conclusion

- We included five studies that evaluated body weight and BMI of the participants using palm oil. However, all studies were only represented by small number of participants.
- Overall, the effect of palm oil on BMI or body weight has not been shown to achieve statistically significant association.
- There is insufficient evidence to relate the association between dietary palm oil intake and obesity. There are no clear differences between palm oil and its comparators across all outcomes.

Recommendations

- More research is needed to investigate the association between palm oil intake and obesity.
- Future research should be modelled in such a way that:
  - they reflect the actual usage of palm oil in Asian population (eg. stir fry and deep fry).
  - Interventions using pure palm oil vs comparator instead of mixed palm oil.

THANK YOU


120
0 kg
10


PINGGAN SIHAT MALAYSIA
Ikan, Ayam, Daging dan Kekacang
Buah-buahan
Nasi, Mee, Roti, Bijirin, Produk Bijirin dan Ubi
Sayur-sayuran
#SukuSukuSeparuh