Carotenoids, vitamin A, and their association with the metabolic syndrome: a systematic review and meta-analysis

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AIM

This systematic review and meta-analysis aimed to

summarize | **interpret** | **evaluate**

research evidence over 20 years (1997-2017) linking carotenoids with the occurrence of metabolic syndrome

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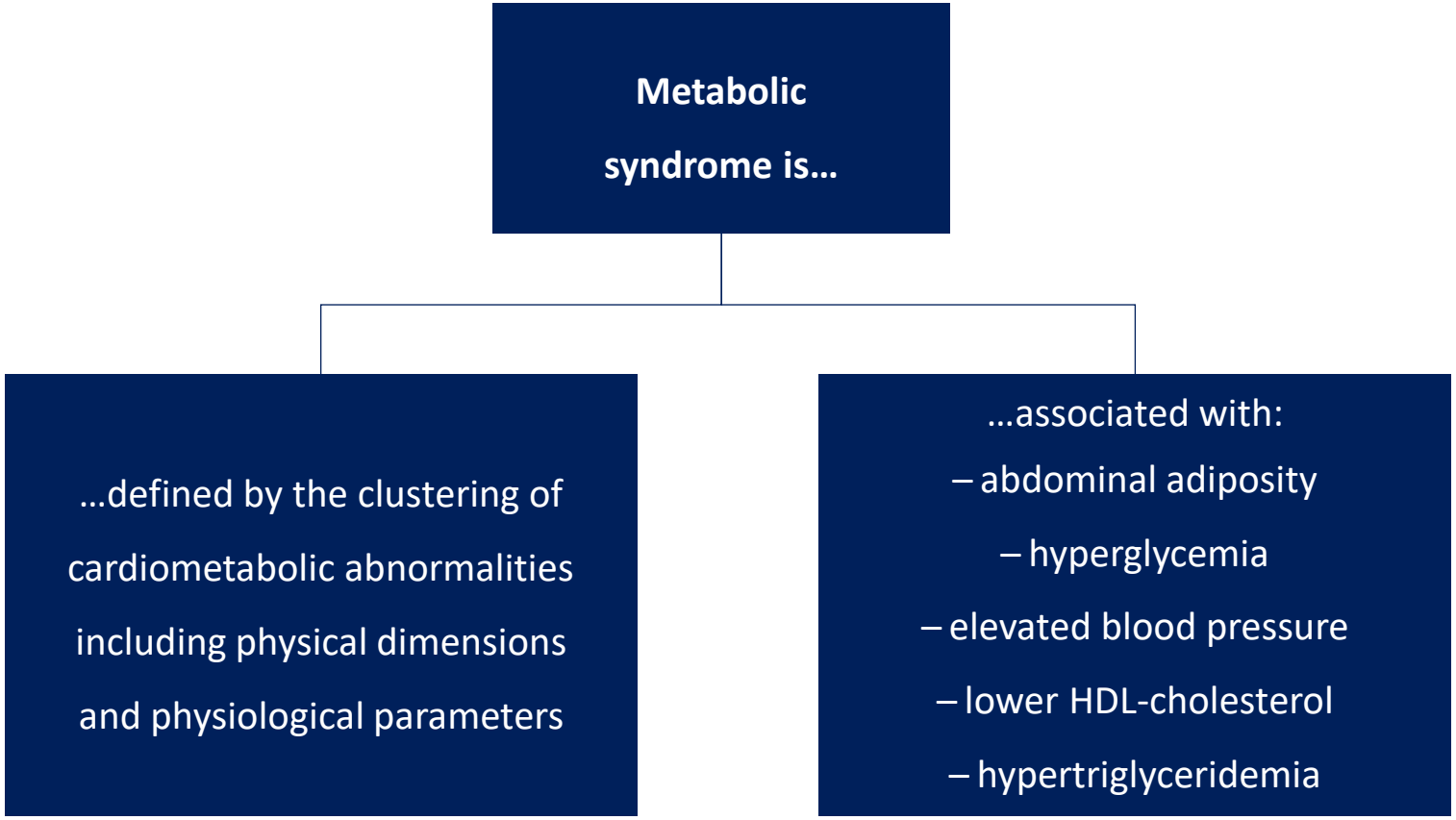
BACKGROUND



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BACKGROUND

Carotenoids are…

- …mostly found in fruits and vegetables but also occur in bread, eggs, beverages, fat and oil
- …precursors of retinol (Vitamin A)
- …of particular interest in adipogenesis, lipolysis, insulin resistance and the pathology of metabolic syndrome

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METHODS

- Pubmed and Cochrane database were used for literature research
- Research that was published between 01/01/1997 and 03/31/2017 was considered
- The main outcome was metabolic syndrome
- Inclusion criteria and prognostic factors were:
  - General population, adults and adolescents aged >12years
  - Carotenoid levels in diet or serum; serum retinol and retinyl esters
  - Observational studies for systematic review; cross-sectional studies for the meta-analysis

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RESULTS

Key findings of the systematic review:

- Both absolute and serum beta-carotene levels were found to be decreased in obese children with metabolic syndrome
- Adults with metabolic syndrome have suboptimal concentrations of several antioxidants, including serum total carotenoids and beta-carotene
- Studies suggest that total or single carotenoids like ß-carotene, α-carotene or lutein, as well a retinyl esters are positively associated with metabolic syndrome

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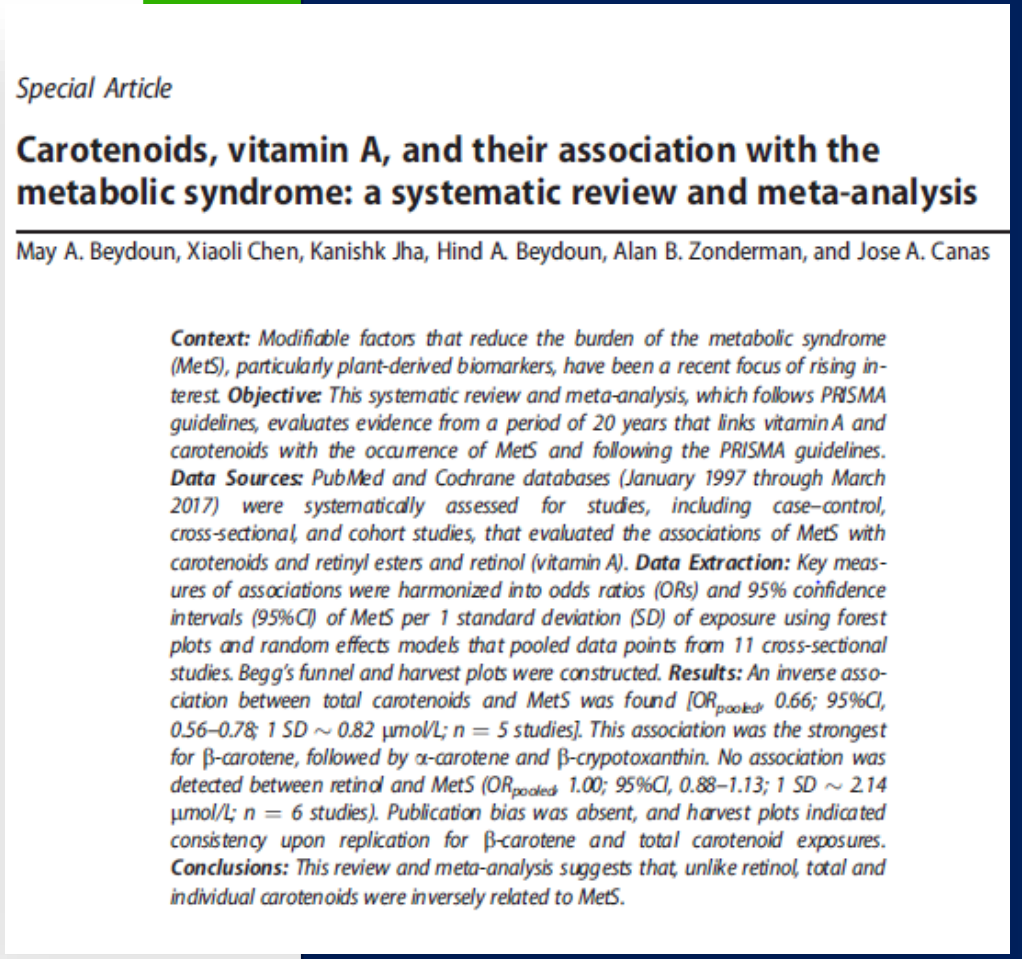
CONCLUSION

"Serum levels of total and individual carotenoids like alpha-carotene, beta-carotene or lutein, as well as retinyl esters were found to be inversely associated with metabolic syndrome".



Special Article

Carotenoids, vitamin A, and their association with the metabolic syndrome: a systematic review and meta-analysis

May A. Beydoun, Xiaoli Chen, Kanishk Jha, Hind A. Beydoun, Alan B. Zonderman, and Jose A. Canas

Context: *Modifiable factors that reduce the burden of the metabolic syndrome (MetS), particularly plant-derived biomarkers, have been a recent focus of rising interest.* ***Objective:*** *This systematic review and meta-analysis, which follows PRISMA guidelines, evaluates evidence from a period of 20 years that links vitamin A and carotenoids with the occurrence of MetS and following the PRISMA guidelines.* ***Data Sources:*** *PubMed and Cochrane databases (January 1997 through March 2017) were systematically assessed for studies, including case–control, cross-sectional, and cohort studies, that evaluated the associations of MetS with carotenoids and retinyl esters and retinol (vitamin A).* ***Data Extraction:*** *Key measures of associations were harmonized into odds ratios (ORs) and 95% confidence intervals (95%CI) of MetS per 1 standard deviation (SD) of exposure using forest plots and random effects models that pooled data points from 11 cross-sectional studies. Begg's funnel and harvest plots were constructed.* ***Results:*** *An inverse association between total carotenoids and MetS was found [OR_{pooled}, 0.66; 95%CI, 0.56–0.78; 1 SD ~ 0.82 μmol/L; n = 5 studies]. This association was the strongest for β-carotene, followed by α-carotene and β-crypotoxanthin. No association was detected between retinol and MetS (OR_{pooled}, 1.00; 95%CI, 0.88–1.13; 1 SD ~ 2.14 μmol/L; n = 6 studies). Publication bias was absent, and harvest plots indicated consistency upon replication for β-carotene and total carotenoid exposures.* ***Conclusions:*** *This review and meta-analysis suggests that, unlike retinol, total and individual carotenoids were inversely related to MetS.*

Article available at: https://pubmed.ncbi.nlm.nih.gov/30202882/