Title: Impact of diet on cardiometabolic health in children and adolescents

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Author's response to reviews:

Title: Impact of diet on cardiometabolic health in children and adolescents

We thank the referee for the time invested in this review and for providing us with invaluable comments; we considered all the comments and answered them carefully one by one.

Referee #1

Comment 1: Page 4, Na and salt intake: Include a range of normal salt intake in children and the average increase in intake from snacks.

Reply: We added the requested information about the salt intake range: “In children, the daily recommended Na intake increases with age. For children younger than one year, the daily recommended salt intake is < 1 g/d (range 0.4 – 1.3 g/d); newborns and infants need more salt per kg of body weight than older children, in whom the adverse effects from excessive salt consumption are similar to adults. In children aged 1 to 5 and 5 to 10 years, the recommended daily intake is 2 g/d and 4 g/d, respectively; however, the actual salt intake reaches 4.9 g/d and 8.1, respectively. For those aged 10 to 20 years the recommendation is 5 g/d, although actual daily intake ranges from 6.7 to 11.0 g/d [18].” Page 4, lines 18 - 25, page 5 line 1

Comment 2: Page 5, Na and salt intake, Line 12: Why only results of children aged 3-4 years are mention. Is it because other age groups had different outcomes or it is because study subjects were only in this age group. The authors need to clarify.

Reply: We understand the reviewer’s point and have addressed this question in the revised version of the manuscript:

“Finally, a study carried out in low-income children aged 3-4 years found a higher risk of elevated systolic blood pressure in those who consumed >1200 mg of sodium/day (3.32, 95% CI 0.98, 11.2) or had >0.5 waist-to-height ratio (8.81, 95%CI 2.1, 36.3) [23].” Page 5, lines 7-10.

Comment 3: Page 6, Line 4: "1 mmHg difference” is not a significant change in
blood pressure values.
Reply: We agree with the reviewer, and we removed the cited study from the manuscript and references.

Comment 4: Page 6, Line 23-24: Authors need to elaborate on the diet pattern of "Seventh-day Adventist school". Reference to this diet pattern is again given in Page 20, Line 8.
Reply: We have included the requested information:
“A 40% lower risk of overweight (95% CI 0.43, 0.85) was observed in the top tertile of nuts consumption among healthy children and adolescents attending Seventh Day Adventist schools, where a high proportion of students are vegetarians or vegans in accordance with religious beliefs [35].” Page 6, lines 11-14.

Page 17, lines 18-21: “Sabate and Wien (2010) showed that most of the available studies were carried out in the Seventh Day Adventist population, in which a large percentage of people follow plant-based dietary patterns, ranging from vegetarians, who consume dairy foods and eggs, to vegans, who avoid all animal products.”

Comment 5: Page 7, Line 1: Authors need to elaborate on the type of "added fat". Also they need to clarify to what food the "fat" was added.
Reply: We agree with the reviewer and have added the requested information:
“Among food groups with lipid-rich content, vegetable oils were associated with low fasting glucose (#=-3.34, 95% CI -4.1, -0.27) and added fats (cream, butter, lard, creamy dressing, and sauces) were positively associated with higher levels of triglycerides (# =2.70, 95% CI 0.29, 23.3) [36].” Page 6, lines 14-16.

Comment 6: Page 7, Line 10: Flavored milk comes in many forms. The authors need to describe the type of milk in the flavored milk- fat free or whole milk used in the study and the effect of added sugar present in flavored milk on obesity.
Reply: We agree with the reviewer that study participants could have been consuming a wide range of flavored milks. The data collection did not differentiate between fat-free or full-fat flavored milk, which could affect the study results in participants with obesity who consumed large quantities of these beverages. In response, we added information about flavored milk in the manuscript: “Flavored milks usually have higher energy per unit than non-flavored milk; however, the sugar and fat content of flavored milks differs according to the brand.” Page 7, lines 2-4.

Comment 7: Page 8, Lines 1-4: The statement made by authors is contradictory. The lower abdominal obesity can be interpreted as a result of active life style rather than low milk consumption as reasoned by the authors.
Reply: We agree with the reviewer that the statement was unclear, and we clarified it in the revised manuscript: “In a study by Abreu et al. (2012), high milk
consumption was associated with lower abdominal obesity, independently of physical activity level: even the participants with low levels of physical activity and high milk consumption had lower odds of abdominal obesity (OR 0.412, 95%CI 0.20, 0.85), compared to highly active adolescents with low milk consumption (OR 0.928, 95%CI 0.56, 1.53) [45]." Page 7, lines 16-21.

Comment 8: Page 8, Line 21: Authors need to define "servings per day".
Reply: We added the requested information: “Yuan et al. (2013) showed that #2 servings per day of dairy products were associated with 1.74 mmHg (p<0.005) and 0.87 mmHg (p=0.010) lower systolic and diastolic blood pressure, respectively, in a fully-adjusted model. In their study, daily servings were defined according to the dairy product: milk, 250 ml; yogurt, 175 g; and cheese, 50 g. They excluded other dairy products, such as ice cream, cream, milkshakes, and combination dishes [50].” Page 8, lines 13-18.

Comment 9: Page 8, Line 24: Authors need to describe "high fat dairy"
Reply: We added the requested information: “However, in school-aged children in Mexico, high intake of high-fat dairy (i.e., produced from whole milk) was associated with higher diastolic blood pressure (#=8.76, 95%CI 0.75, 2.5) and also with a higher level of HDL-cholesterol (#=10.37, 95%CI 0.21, 2.0) [36].” Page 8, lines 18-21.

Comment 10: Page 9, Line 13: it should be "and" instead of "but".
Reply: Thank you. We have revised the sentence to improve clarity: “In school children, fruits and vegetables consumption during school breaks was associated with lower BMI levels [54]. Another study, carried out in school children in the US, found that higher vegetable consumption was associated with 37% lower odds of being overweight (95%CI 0.48, 0.94) [35].” Page 9, lines 6-9.

Comment 11: Page 10, Line 17: Authors need to give reasoning for including "polyphenols"as they are not vitamins.
Reply :We agree and removed the reference to polyphenols from this page.

Comment 12: Page 11, Lines 2-5: The writeup is confusing. Explain "in a fully adjusted model, but only in these obese pubertal study group"
Reply: We rewrote the sentence in the revised manuscript to make it more clear: “Higher levels of serum vitamin D was associated with better glucose levels and lipid metabolism and lower general and abdominal adiposity levels, blood pressure, risk of metabolic syndrome, and pubertal development stage in children from different countries [65-74].” Page 10, lines 18-21.

Comment 13: Page 11, Lines 9 and 12: Authors need to detail whether "high" or "low" levels of serum levels of 25(OH) Vitamin D
Reply : We have revised the sentence as follows: “Higher levels of serum vitamin D was associated with better glucose levels and lipid metabolism and lower general and abdominal adiposity levels, blood pressure, risk of metabolic syndrome, and pubertal development stage in children from different countries [65-74].” Page 10, lines 18-21.
Comment 14: Page 11, Lines 22: It will be more appropriate to use the term "decreased arterial stiffness" instead of "better arterial stiffness" as arterial stiffness generally describes the reduced capability of an artery to expand and contract in response to blood pressure changes.

Reply: We agree and changed the terms: “In a randomized trial with adolescents, high intake of vitamin D (4000 UI/day) was associated with decreased arterial stiffness, and low intake (200 UI/day) with increased stiffness, but this result was observed in only one of three measurements [75].” Page 10, lines 21-24.

Comment 15: Page 11, Lines 19-24: References for the different studies need to be included.

Reply: Done: “In a randomized trial with adolescents, high intake of vitamin D (4000 UI/day) was associated with decreased arterial stiffness, and low intake (200 UI/day) with increased stiffness, but this result was observed in only one of three measurements [75].” Page 10, lines 21-24.

Comment 16: Page 15, Line 3: It will be more appropriate to use the term "lower cardiovascular risk factors" instead of "better cardiovascular risk factors"

Reply: Done, thank you. Page 12, line 23.

Comment 17: Page 15, Line 6: No need to include "however"

Reply: We removed the word. Page 13, line 2.

Comment 18: Page 16, Line 3: Authors need to explain "due to energy under reporting"

Reply: We explained the statement in the revised manuscript: “Surprisingly, in Mexican school-age children the consumption of red and processed meat was associated with lower glucose levels (#=-7.75, p = 0.02) [36], which could be due to selective food energy misreporting (i.e., self-reporting of energy consumption different from actual levels for particular food groups consumed). Elevated BMI and weight satisfaction [99] are predictors of energy misreporting, which increases with age [100] and has been found to be a common issue among obese participants in a dietary survey [101]. In children, selective energy underreporting (a type of energy misreporting in which reported energy consumption is below the actual level for particular food groups) was associated with higher intake from fruits and vegetables, compared to plausible energy reporters [100].” Page 13-14, lines 20-25 and 1-4.

Comment 19: Under introduction the authors mention that most studies related to diet are done on adults. Therefore, there is no need for the authors to repeat this information in the beginning of each sub heading.

Reply: We eliminated this statement to avoid repetition
Page 4, line 18
Page 6, lines 19-20
Page 8, lines 23-25
Referee #2

Comment 1: Furthermore, the tracking rate of obesity from childhood to adulthood is especially high (Comment: not clear)

Reply: We rewrote the sentence to make it more clear: “Furthermore, the risk is especially high when overweight or obesity is maintained from childhood to adulthood [14].” Page 4, lines 1-2.

Comment 2: Many studies have shown the positive association between fat consumption and obesity, and the results are consistent (Comment: please clarify the statement “the results are consistent” and also provide pertinent references).

Reply: We eliminated the statement and we provided the reference according to the text: “Fatty acids and fats are an important source of energy, and fat makes food more attractive and tasty, especially for children; however, many studies have shown the positive association between fat consumption and obesity [26, 27].” Page 5, lines 14-16.

Comment 3: Foods have also received little attention; foods such as dairy, fast food, and soft drinks have been more studied than others (Comment: not clear).

Reply: We modified the sentence to make it more understandable: “Food groups such as dairy, fast food, and soft drinks have been studied more extensively than others, but even in these groups, the results are inconsistent.” Page 19, lines 15-17.

Minor Essential Revisions: article is too elaborative; would benefit from being shortened

Reply: We shortened the text of the article by combining similar statements and eliminating repetitive or unnecessary ones, especially see chapters “Na and salt intake”, “Vitamins” and “Post-hoc dietary patterns”.

Quality of written English: The review underwent additional revision by an English native speaker and professional manuscript editor.