sugar knowledge and attitudes and free sugar intake or dietary practices.

Methods: 15 electronic databases were searched from inception for relevant articles. Peer-reviewed and grey literature published in English language and involving adults (≥18 years) were eligible for inclusion. The process of study selection followed by their quality assessments was conducted using the PRISMA guidelines and Effective Public Health Practice Project tool respectively. Findings were summarised using meta-narrative synthesis.

Results: A total of 3287 papers were identified of which 21 studies (11 for each objective) were included. Receiving nutrition education from health professionals (such as nurse, diabetes educator, or dietician) and advertising were associated with higher sugar knowledge and positive attitudes towards lower sugar consumption. In addition, lower current and past use of sugar-sweetened beverages and exposure to sugar-specific food labelling were associated with positive attitudes towards lower sugar consumption. Individuals' attitudes towards high dietary sugar consumption were influenced by their peers. Inconsistent associations were found concerning the role of dietary sugar knowledge and attitudes in determining free sugar intake or dietary practices. The overall quality of evidence was weak.

Conclusion: Sugar consumption is complex. The findings of the available literature on determinants of dietary sugar knowledge and attitudes, and role of knowledge and attitudes in determining sugar consumption are inconclusive. More research with robust study designs investigating the role of broader determinants are warranted. This will enable the development of effective interventions and policies to promote healthy behaviours.

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Voluntary exercise improves metabolic and hepatic phenotypes in dietary but not metabolic obesity in male mice

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Background: Increasing physical activity reduces obesity complications. In female mice with dietary or metabolic obesity, exercise maintains insulin sensitivity, reduces adipose inflammation, and improves liver histology [1]. Male gender is associated with a worse metabolic phenotype in mice. We therefore tested whether exercise can delay onset of obesity, and ameliorate metabolic phenotype in male mice by improving adipose morphology and function.

Methods: Male *Alms1*$^{-/-}$ (*foz/foz*) NOD.B10 mice and *Wt* littermates (8/group), fed atherogenic (high fat/sugar/cholesterol) diet, were caged in pairs until 24 week-old. Half the cages were fitted with an exercise wheel and cycle computer. Blood, liver, and lumbar/epididymal/mesenteric white adipose tissue were removed.

Results: *Wt* mice ran ~8 km/day, whereas *foz/foz* mice ran ~1.5 km/day; *foz/foz* mice were notably less active and showed a decrease in wheel use towards the end of study. Exercise delayed but failed to prevent development of severe obesity in *foz/foz* mice; all *foz/foz* mice weighed ~57 g at Week 24. Exercising *Wt* mice weighed less than non-exercising counterparts (~34 g vs. ~44 g; $P < 0.05$). There were also reductions in liver and adipose depot weights in exercising *Wt* mice ($P < 0.05$), but not in *foz/foz* mice. Exercise improved hyperglycemia and insulin sensitivity in *Wt* but not *foz/foz* mice. Exercise improved morphometry and reduced inflammatory recruitment in all adipose compartments in *Wt* mice, but failed to improve adipose dysfunction in *foz/foz* mice. Hepatic lipid partitioning was less in exercising *Wt* but not *foz/foz* mice vs. non-exercising; exercise normalized liver histology and abolished fibrosis in *Wt* mice.

Conclusions: Exercise confers metabo-protective effects in mice with dietary obesity

(atherogenic diet-fed *Wt*) by reducing adipose inflammation and improving adipose morphometry, and this corrects fatty livers. Diabetic mice with metabolic obesity (atherogenic diet-fed *foz/foz*) were reluctant to use the wheel, perhaps secondary to excessive weight gain, and resultant mild exercise failed to confer benefits on the metabolic phenotype.

Reference

[1] Haczeyni F, Barn V, Mridha AR, Yeh MM, Estevez E, Febbraio MA, et al. Exercise improves adipose function and inflammation and ameliorates fatty liver disease in obese diabetic mice. Obesity 2015;23:1845—55.

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Parent-focused childhood overweight and obesity eHealth interventions: A systematic review and meta-analysis

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Introduction: eHealth interventions have shown promise in assisting with lifestyle behaviour change and offer the advantage of broad-reach access. Many previous eHealth studies in children and adolescents have demonstrated positive results in relation to weight, physical activity or diet. However, there have been no previous reviews which have specifically investigated the effectiveness of parent-focused eHealth obesity interventions.

Methods: Seven databases were searched from 1995—2015. Randomised controlled trials which reported BMI/BMI z-score were included. Secondary outcomes included diet, physical activity and screen time.

Results: Eight articles on seven eHealth interventions, using the mediums of internet, interactive voice response and telemedicine were included. Participant age ranged from 5—15 years and study size ranged from 35—1013 dyads. One study reported a significant improvement in weight/adiposity (waist-to-hip ratio). Three studies demonstrated significant improvements in at least one dietary measurement and three studies showed significant improvements in at least one physical activity measurement. A meta-analysis demonstrated no significant difference in the effects of parent-focussed eHealth obesity interventions compared to a control on BMI/BMI z-score (SMD −0.15, 95% CI −0.45 to 0.16, $Z = 0.94$, $P = 0.35$).

Conclusion: While over half of the studies demonstrated significant improvements in diet or physical activity, only one found a significant change in weight/adiposity. As many studies were small, they may have been inadequately powered. There were no studies on children under the age of five. It is recommended that larger studies be conducted, particularly those which target younger age groups.

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Treatment seeking people with obesity still in need of nutrition education

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Objective: A better understanding of the general nutrition knowledge among obese patients (OP) will inform the design of effective weight management education programs. This study assessed general nutrition knowledge in OP seeking treatment and compared this to a community sample (CM) with participants from the healthy weight (HW), overweight (OW) and obese (OB) range.

Methods: Participants were a convenience sample of OP attending a tertiary weight loss clinic and the general community (CM) (aged > 34 years). BMI was measured in OP and self-reported in CM. Nutrition knowledge was measured using a validated, General Nutrition Knowledge Questionnaire (GNKQ) assessing four domains: dietary recommendations, sources of nutrients, choosing everyday foods and the diet—disease relationships. The influence of demographic characteristics (age, gender, education) on general nutrition knowledge was also assessed.

Results: A total of 472 participants (OP: 211; CM: 261) were recruited. OP were older (OP: 53.0 ± 9.8; CM 49.1 ± 10.0 y; $p < 0.0005$) and had a higher BMI (OP: 45.0 ± 9.2; CM: 26.8 ± 6.1 kg m^{-2}; $p < 0.0005$)