

Results from systematic reviews in preschool physical activity and sedentary behaviour interventions, and future directions

Dr Liane Azevedo, Teesside University
Dr Laura Basterfield, Newcastle University



Introduction

- Only 9% of boys and 10% of girls aged 2-4 years old meet the current guidelines of 3 hours of physical activity (PA) per day in England¹.
- Higher levels of PA in preschool children are :
 - Inversely associated with body fat %²
 - Positively associated with:
 - improved cardiovascular risk factors³
 - bone health⁴
 - motor skills and psychosocial health⁵



1. Health Survey for England. Chapter Physical Activity in Children 2013
2. Sijtsma A et al. Int J Pediatr Obes. 2011;6:389-400.
3. Kleber M et al. Klin Padiatr. 2009;221:290-294.
4. Timmons BW et al. Can J Public Health. 2007;98 Suppl 2:S122-S134.
5. Timmons BW et al. Appl Physiol Nutr Metab. 2012; 37:773-792.

Diet, physical activity, and behavioural interventions for the treatment of overweight or obesity in preschool children up to the age of 6 years (Review)

Colquitt JL, Loveman E, O'Malley C, Azevedo LB, Mead E, Al-Khudairy L, Ellis LJ, Metzendorf MI, Rees K

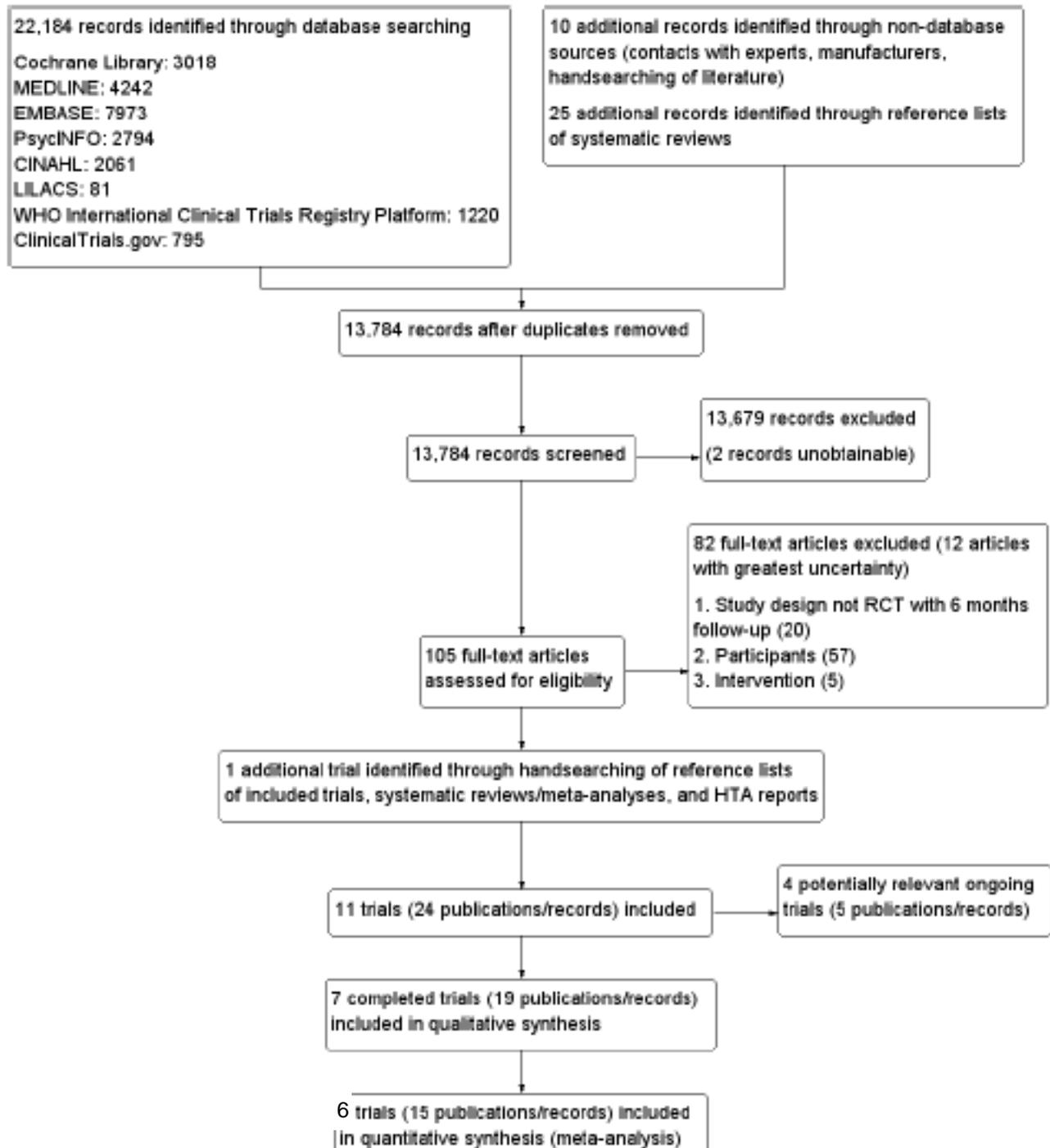
- In 2010, 43 million preschool children (35 million in developing countries) were overweight or obese.¹
- Family- based interventions combining dietary, physical activity and sedentary behaviour have been considered the current best practice in treatment of childhood obesity.²

Aim: to assess the effects of diet, physical activity and behavioral interventions for treatment of overweight or obesity in preschool children up to age of 6 years.

Inclusion criteria

- Mean age: 0 to 6 years at baseline.
- Only RCTs with six months follow-up.
- Any form of lifestyle intervention (diet, physical activity or behavioural) with a primary aim to treat overweight or obesity in children.
- Comparator: no intervention or usual care.
- Outcomes: change in BMI.

Flow Chart

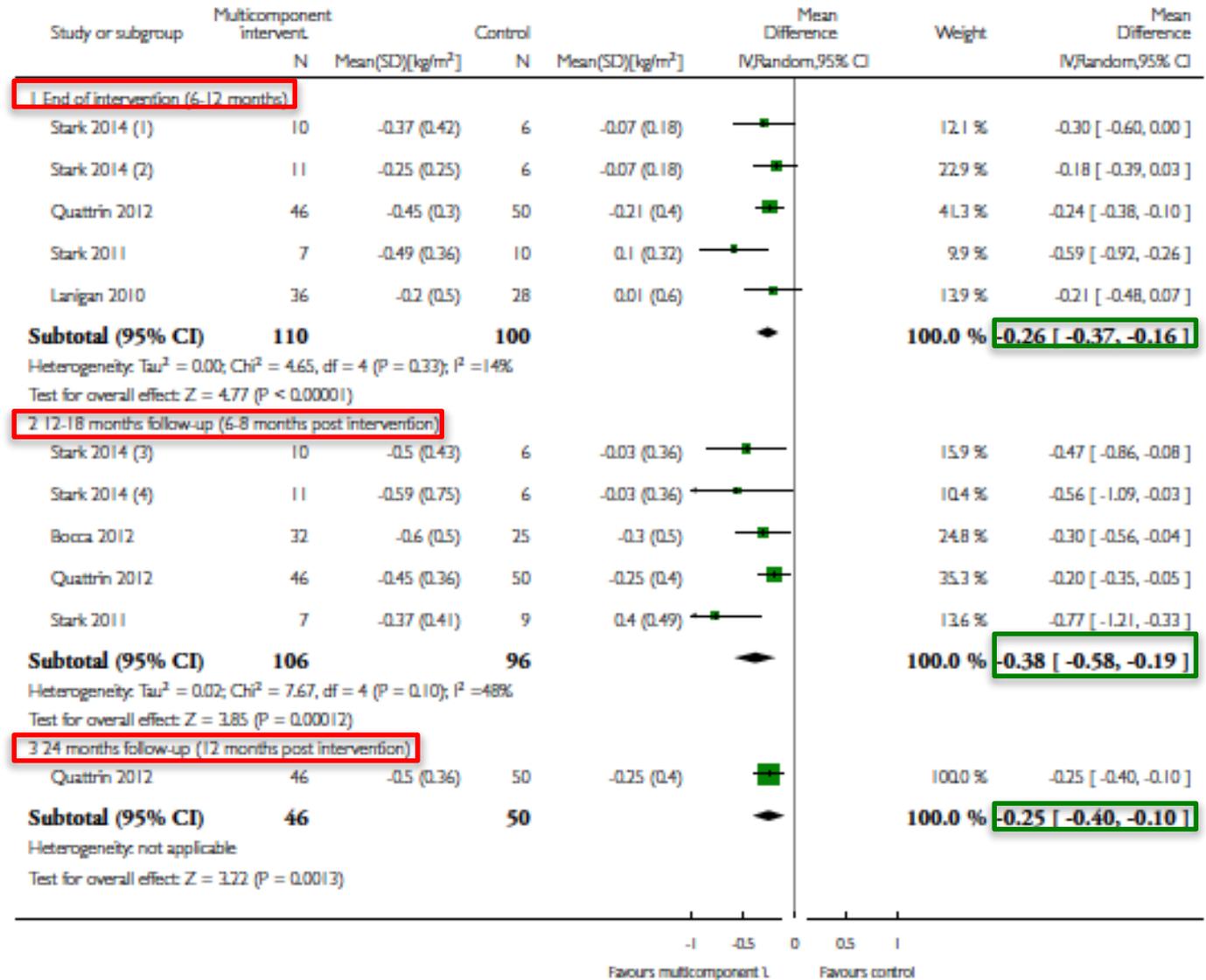


Analysis 1.1. Comparison 1 Multicomponent intervention versus control, Outcome 1 Changes in BMI z score.

Review: Diet, physical activity, and behavioural interventions for the treatment of overweight or obesity in preschool children up to the age of 6 years

Comparison: 1 Multicomponent intervention versus control

Outcome: 1 Changes in BMI z score



Results

Meta-analysis

Results

- Mean difference BMI: -0.40 kg/m^2 (95% CI: -0.85 to 0.05)¹ and -1.00 kg/m^2 (95% CI: -1.79 to -0.21)²
- No effect on physical activity between groups.³
 - Different methods of measuring PA (hours outdoor playtime, steps per day, MVPA).
- Significant difference in hours of TV viewing: mean difference: -0.46 hrs (95% CI: -0.64 to -0.09).⁴
- The role of dietary interventions is limited, with one trial⁵ (high-risk of bias) suggesting that dairy interventions may be effective in the longer term.
- Quality of evidence low to very low.

1: Lanigan et al. 2010

2: Bocca et al. 2012

3: Bocca 2012; Stark 2011; Stark 2014; Taveras 2011

4: Taveras et al. 2011

5: Kelishadi et al 2009

Conclusion

- Overall multicomponent interventions were more successful than comparators in reducing BMIz. The effects appeared to be maintained after 2 years. However, evidence is limited and trials had high risk of bias.
- The trials measured behaviour inconsistently, the effect of intervention in these outcomes are equivocal.

Pediatric Obesity/Treatment

The effectiveness of sedentary behaviour interventions for reducing body mass index in children and adolescents: systematic review and meta-analysis

Liane B. Azevedo¹, Jonathan Ling², Istvan Soos³, Shannon Robalino⁴ and Louisa Els¹

- Sedentary behaviour (i.e. television viewing) has been associated with obesity in children.¹
- However, some argue that there is still mixed evidence and the association might be small and not clinically relevant.²
- Parental self-efficacy and parents' own screen time was associated with children's screen time in young children (<6 years old).³

1: Ray-Lopez et al., 2008; te Velde et al., 2012; Tremblay et al., 2011

2: Marshall et al., 2004; Pate et al., 2013

3: Xu et al., 2015

Aim

Primary aim:

- The aim of this meta-analysis is to summarize and compare the effect of interventions that target sedentary behavior (e.g. TV viewing, video game) on BMI in children.

Secondary aim:

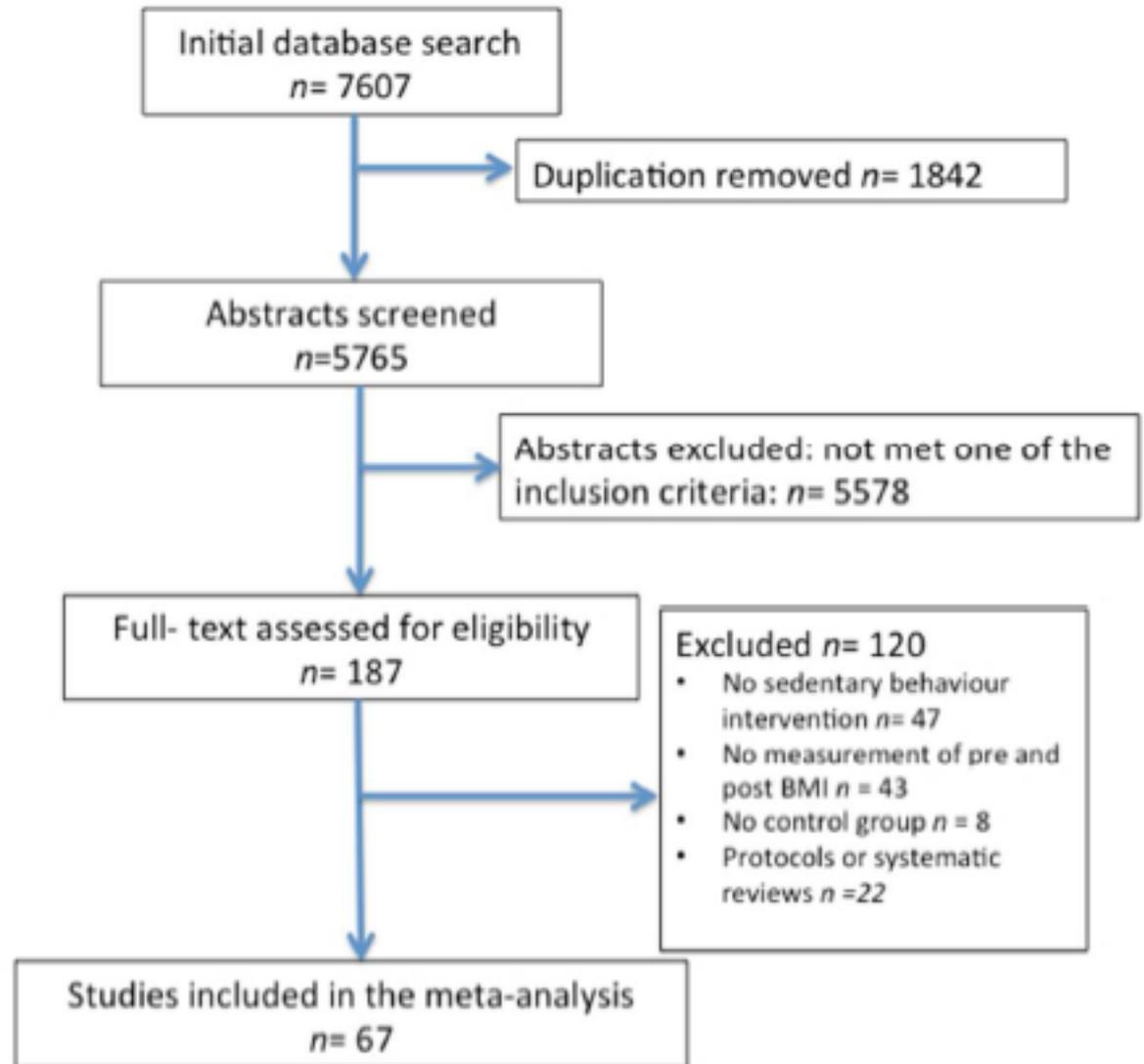
- Explore the impact of several moderator variables (duration, setting, type,...) on intervention
 - **Child age range:** pre-school (0 to 4 years old); children (4 to 10 years old) and adolescents (11 to 17 years old).

Inclusion criteria

- Intervention studies (randomised and non-randomised) with a control group.
- Children aged 0 to 17 years old
- Intervention targeted sedentary activities but also included other behaviours (e.g. diet and physical activity)
- Objectively measured weight and height



Flow chart



Flow chart of the study selection process

Results

Study design

- 61 studies conducted an RCT or cluster RCT
- 6 were non-randomised trials.

Age

- 17 studies with preschool children (0 to 5 years old)
- 35 studies with children (5 to 12 years old)
- 15 studies with adolescents (12 to 17 years old)

Population

- 18 studies exclusively overweight
- 49 studies mixed-weight population

Meta-analysis

Group or Subgroup	Meta-analysis (95%CI)	Heterogeneity	Between group differences p value	Number of studies (entries)
Overall change SMD	-0.060 (-0.098 to -0.022)	50%	<0.001	71
Overall change BMI (kg/m ²)	-0.158 (-0.238 to -0.077)	88%	<0.001	51

Studies overweight

Group or Subgroup	Meta-analysis (95%CI)	Heterogeneity	Between group differences p value	Number of studies (entries)
Overweight or obese	-0.255 (-0.400 to -0.109)	52%	0.001	18
Mixed weight	-0.037 (-0.073 to -0.001)	45%	0.044	53

BMI (kg/m ²)	Meta-analysis (95%CI)
Overweight or obese	-0.493 (-0.681 to -0.304)
Mixed weight	-0.029 (-0.093 to -0.035)

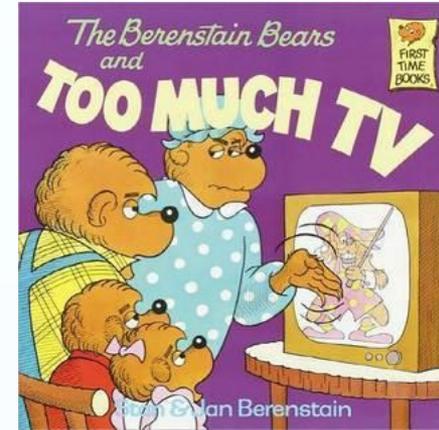
Group or Subgroup	Meta-analysis (95%CI)	Heterogeneity	Between group differences p value	Number of studies (entries)
Intervention				
0-5 years	-0.057 (-0.149 to 0.036)	68%	NS	17
5-12 years	-0.077 (-0.133 to -0.022)	42%	<0.006	38
12-17 years	-0.037 (-0.094 to -0.020)	37%	NS	16

Results

- The intensity of sedentary behaviour intervention was varied. Some low intensity (e.g. participants encouraged to reduce SB)

Dennison et al., 2004 (Sedentary behaviour only intervention)

- Parents kept a diary record TV time and videotaped child
- Parents, preschool staff received 7 sessions (20 min) educational material: alternative activities to TV viewing.
- Children listed activities that they enjoyed other than TV.
- Read *The Berenstain Bears and Too Much TV*
- Provided list of alternative activities guided by *Television and the Family* from the American Academy of Pediatrics.
- “No television” signs at home
“No television” stickers to reward children
- Materials from the National TV- Turnoff Week website (now screen free: <http://www.screenfree.org>)



Summary

- Sedentary behaviour interventions are associated significant but very small (SMD: -0.06, -0.098 to -0.022) improvement in BMI and BMI z. The clinical importance is questionable.
- However, the pooled estimate was substantially greater for an overweight or obese population (SMD: -0.255, -0.400 to -0.109).
- Sedentary behaviour interventions are not effective to reduce BMI in preschool children. However, there is a high heterogeneity and clinical diversity between studies.

Future studies



Early years physical activity and motor skills intervention – feasibility study to evaluate an existing training programme for early years practitioners



- Around 88% of young children spend time in daycare (nursery or pre-school)¹, and are reliant on the nursery practitioners to provide suitable opportunities for PA.
- Practitioners might be unaware of the need for young children to be physically active, or lack confidence in their abilities to provide safe and suitable activities.

Early years physical activity and movement skills intervention

Aim: provide a training programme for early years practitioners to plan and organise physically active (PA) play environments for children under five years old.

Intervention: Based on a whole system approach

- Create enabling environments for PA
- Plan PA for all stages of development
- Balance child-initiated and adult-led physical activities
- Encourage parent and carer support and promote PA beyond the nursery setting

Outline of the Research

- 10 nurseries: 5 intervention, 5 control
(2 practitioners from each nursery)
- Outcome measures (baseline and 6 months later):
 - Physical Activity and Sedentary Behaviour (ActivPAL)
 - Movement skills (Movement ABC-2)
 - BMI
 - Practitioner knowledge and intentions (interviews and questionnaires)

PROTOCOL

Open Access

Protocol for systematic reviews of determinants/ correlates of obesity-related dietary and physical activity behaviors in young children (preschool 0 to 6 years): evidence mapping and syntheses

Rajalakshmi Lakshman^{1,2*}, Veena Mazarello Paes³, Kathryn Hesketh², Claire O'Malley⁴, Helen Moore⁴, Ken Ong^{1,2}, Simon Griffin^{1,2}, Esther van Sluijs^{1,2} and Carolyn Summerbell⁴

Paes, V.M., Ong, K.K. and Lakshman, R., 2015.

Factors influencing obesogenic dietary intake in young children (0–6 years): systematic review of qualitative evidence. *BMJ open*, 5(9), p.e007396.

Paes, V.M., Hesketh, K., O'Malley, C., Moore, H., Summerbell, C., Griffin, S., Sluijs, E.M.F., Ong, K.K. and Lakshman, R., 2015. Determinants of sugar-sweetened beverage consumption in young children: a systematic review. *Obesity Reviews*, 16(11), pp.903-913

Hesketh K, O'Malley C, Paes V.M, Moore H, Summerbell C, Ong K, Lakshman R., van Sluijs E.M. Determinants of Change in Physical Activity in Children 0-6 years: A Systematic Review of Quantitative Literature. *Sports Medicine* (in press)

Azevedo L.B, Hesketh K, Jones D., Moore H, van Sluijs E.M. Determinants of Change in Physical Activity in Children 0-6 years: A Systematic Review of Quantitative Literature. In preparation



**KEEP
CALM
AND
WATCH
THIS SPACE**

Thank you