

Where to from here for Australian childhood obesity?

Jasmine Antoine

MBBS, MPH, BSc

University of Queensland

Jasmine recently completed her MBBS at the University of Queensland. She is a Junior House Officer at Nambour General Hospital. She is interested in paediatrics and public health.

Aim: At least one in twenty Australian school children are obese. [1] The causes and consequences of childhood obesity are well documented. This article examines the current literature on obesity management in school-aged, Australian children. **Methods:** A systematic review was undertaken to examine the efficacy of weight management strategies of obese Australian school-aged children. Search strategies were implemented in Medline and Pubmed databases. The inclusion criteria required original data of Australian origin, school-aged children (4 to 18 years), BMI defined populations and publication within the period of January 2005 to July 2011. Reviews, editorials and publications with inappropriate focus were excluded. Thirteen publications were analysed. **Results:** Nine of the thirteen papers reviewed focused on general practice (GP) mediated interventions, with the remainder utilising community, school or tertiary hospital management. Limitations identified by GP-led interventions included difficulties recognising obese children, discussing obesity with families, poor financial reward, time constraints, and a lack of proven management strategies. A school-based program was investigated, but was found to be ineffective in reducing obesity. Successful community-based strategies focused on parent-centred dietary modifications or exercise alterations in children. **Conclusion:** Obesity-specific management programs of children are scarce in Australia. As obesity remains a significant problem in Australia, this topic warrants further focus and investigation.



Introduction

In many countries the level of childhood obesity is rising. [2] Whilst the popular press have painted Australia as being in a similar situation, research has failed to identify significant increases in the level of childhood obesity since 1997, and in fact, recent data suggests a small decrease. [2,3] Nonetheless, an estimated four to nine percent of school-aged children are obese. [1,4] Consequently, the Australian government have pledged to reduce the prevalence of childhood obesity. [5]

In this review, articles defined Body Mass Index (BMI) by dividing weight (in kilograms) by the square of the height (in metres). [1] BMI was then compared to age- and gender-specific international set points. [6] Obesity was defined as children who had a BMI \geq 95% of children with the same age and gender. [6] The subjects of this review, Australian school-aged children, were defined as those aged 4 to 18 years in order to include most children from preschool to the completion of secondary school throughout Australia. As evidence suggests that obese individuals have significantly worse outcomes than overweight children, this review focused on obesity rather than overweight and obese individuals. [1]

The aim of this article was to examine the recent Australian literature on childhood obesity management strategies.

Background

Causes of obesity

A myriad of causes of childhood obesity are well established in the literature. Family and culture influence a child's eating habits, their level of physical activity and ultimately their weight status. [4,7,8] Parental attributes such as maternal obesity and dismissive or

disengaged fathers also play a role. [9] Notably, maternal depression or inappropriate parenting styles have little effect on obesity. [10] Children from lower socio-economic status (SES) are at a greater risk of being obese. [9,11-13]

Culture and genetic inheritance also influence a child's chance of being obese. [8] Evidence suggests that culture influences an individual's beliefs regarding body size, food and exercise. [7,14] O'Dea (2008) found that Australian children of European and Asian descent had higher rates of obesity when compared with those of Pacific Islander or Middle Eastern heritage. [8] Interestingly, there is conflicting evidence as to whether being an Indigenous Australian is an independent risk factor for childhood obesity. [7,9]

A child's nutritional knowledge has little impact on their weight. Several authors have shown that while obese and non-obese children have different eating styles, they possess a similar level of knowledge about food. [4,13] Children with a higher BMI had lower quality breakfast and were more likely to omit meals in comparison to normal weight children. [4,7,13]

The environment in which a child lives may impact their weight status; existing literature suggests that the built environment has little influence over dietary intake, physical activity and ultimately weight status. [15,16] However, there is limited research presently available.

Consequences of obesity

Obesity significantly impacts a child's health, resulting in poorer physical and social outcomes. [4,17] Obese children are at greater risk of becoming obese in adulthood. [4,18] Venn *et al.* (2008) estimates that obese children are at a four- to nine-fold risk of becoming obese adults. [18] Furthermore, obese children have an increased risk of acquiring type 2 diabetes, sleep apnoea, fatty liver disease, arthritis and cardiovascular disease. [4,19]

An individual's social health is detrimentally affected by childhood obesity. Obese children have significantly lower self worth, body image and perceived level of social acceptance amongst their peers. [7,20,21] Indeed, overall social functioning is reduced in obese children. [17] Interestingly, some studies identify no differing rates of mental illness or emotional functioning between obese and non-obese children. [12,17,22,23]

Method

Using Medline and Pubmed, searches were undertaken with the following MeSH terms: child, obesity and Australia. Review and editorial publication types were excluded, as only original data was sought for analysis. Further limits to the search included literature available in English, focused on school-aged children from 4 to 18 years, articles which defined obesity in their population using BMI, publications which addressed the research question (management of childhood obesity), and recent literature. Recent literature was defined as articles published from 1 January 2005 until 31 July 2011. This restriction was placed in part due to resource constraints, but January 2005 was specifically chosen, as this marked the introduction of several Australian government strategies to reduce childhood obesity. [5]

In total, 280 publications were identified in the Pubmed and Medline searches. The abstracts of these articles were manually assessed by the investigator for relevance to the research question and described inclusion and exclusion criteria. As a result of inappropriate topic focus, population, publication type, publication date and repetition, 265 articles were excluded. Ten articles were identified as pertinent via Pubmed. Medline searches revealed five articles of relevance, all of which were duplicated in the Pubmed search. Hence, ten publications were examined. Additionally, a search of relevant publications' reference lists identified three further articles for analysis. Subsequently, this paper reviews thirteen articles.

Publications included in this study were either randomised controlled trials or cross-sectional analyses. The papers collected data from a variety of sources, including children, parents, clinicians and simulated patients. Consequently, population sizes varied greatly throughout the literature.

Results

Much of the Australian literature on childhood weight management does not specifically focus on the obese; instead, it combines the outcomes of obese and overweight children, sometimes including normal weight children.

Thirteen intervention articles were identified in the literature, nine of which employed GP mediated interventions, with the remainder using a community-based approach, school-based or tertiary hospital mediated obesity management.

General practitioner intervention

The National Health and Medical Research Council (NHMRC) guidelines recommend biannual anthropometric screening for children; however, many studies illustrate that few GPs regularly weigh and measure children. [24,25] Whilst Dettori *et al.* (2009) reported 79% of GPs interviewed measure children's weight and height, only half of their respondents regularly converted these figures to determine if a child was obese. [26] A possible reason for the low rates of BMI calculation may be that many GPs find it difficult to initiate discussions about weight status in children. [24-27] A number of authors have identified that some GPs fear losing business, alienating or offending their clients. [24,25,27]

There was wide variability in the tools GPs used to screen children, which may ultimately have led to incorrect weight classifications. [24] Spurrier *et al.* (2006) investigated this further, identifying that GPs may use visual cues to identify normal weight children; however, using visual cues alone GPs are not always able to recognise an obese from an overweight child or an overweight from a normal weight child. [28] Hence, GPs may fail to identify obese children if appropriate anthropometric testing is not performed.

There is mixed evidence regarding the willingness of GPs to manage obese children. Firstly, McMeniman *et al.* (2007) identified that GPs felt there was a lack of clear management guidelines, with the majority of participants feeling they would not be able to successfully treat

an obese child. [27] Some studies identified that GPs see their role as gatekeeper for allied health intervention. [24,25] Another study showed that GPs preferred shared care, providing the primary support for obese children, which involved offering advice on nutrition, weight and exercise, whilst also referring onto other health professionals such as nutritionists, dieticians and physicians. [11]

Other factors impeding GP-managed programs are time and financial constraints. The treatment of childhood obesity in general practice is time consuming. [11,26,27] Similarly, McMeniman *et al.* [27] highlighted that the majority of responders (75%) felt that there was not adequate financial incentive to identify and manage obese children.

Evidence suggests that providing education to GPs on identifying and managing obesity could be useful in building their confidence. [26] One publication found that over half of GPs receiving education were able to better identify obese children. [26] Similarly, Gerner *et al.* (2010) illustrated, by using simulated patients, that GPs felt they had improved their competence in the management of obese children. [29] In the Live, Eat and Play (LEAP) trial, patient outcomes at nine months were compared to GP's self-rated competence, simulated patient ratings and parent ratings on consultations. [29] Interestingly, simulated patient ratings were shown to be a good predictor of real patient outcomes, with higher simulated patient marks correlating to larger drop in a child's BMI. [29]

Unfortunately, no trials illustrated an effective GP-led child obese management strategy. The LEAP trial, a twelve week GP-mediated intervention focused on nutrition, physical exercise and the reduction of sedentary behaviour, failed to show any significant decrease in BMI of the intervention group compared with the control. [30] Notably, the LEAP trial failed to separate the data of obese and non-obese children. [30]

Further analysis of the LEAP trial illustrated that the program was expensive, with the cost to an intervention family being \$4094 greater than of that to a control family. [31] This is a significant burden on families, with an additional fiscal burden of \$873 per family to the health sector. [31] Whilst these amounts are likely to be elevated due to the small number of children, program delivery is costly for both families and the health care sector. [31]

Community-based programs

Literature describing community-based obesity reduction was sparse. Two publications were identified, both of which pertained to the HICKUP trial. These articles illustrated that parent-centred dietary program and child-focused exercise approaches can be efficacious in weight reduction in a population of children including the obese. [32,33] In this randomised controlled trial, children were divided into three groups: i) parent-focused dietary program, ii) child-centred exercise, and iii) combination of the aforementioned. [32,33] Dietary programs focused on improving parenting skills to provide behavioural change in children, whilst physical activity program involved improving children's fundamental skills and competence. [32,33] A significant limitation of the study was that children were identified through responding to advertising in school newsletters and GP practices, lending this investigation to volunteer bias. Additionally, the outcome data in these studies failed to delineate obese children from overweight or normal weight children.

School-based programs

Evidence suggests that an education and exercise-based program can be implemented into a school system. [34] The Peralta *et al.* (2009) intervention involved a small sample of twelve to thirteen year old boys who were either normal weight, overweight or obese, and were randomised to a control or intervention group. [34] The program's curriculum focused on education as well as increasing physical activity. Education sessions were based on dietary awareness, goal setting and

behavioural modification. [34] This randomised control trial failed to identify any change in the BMI of individuals who participated in the intervention versus those in the control group. [34]

Tertiary hospital interventions

The literature search highlighted a single article describing weight management programs in tertiary hospitals throughout Australia. In 2008, Spilchak *et al.* [35] identified nine dedicated services. Approaches included BMI, exercise and sedentary behaviour assessment, as well as modification of dietary intake and patient review. [35] The study highlights several limitations to these services. Firstly, services are only available in three states. [35] In addition, children were waiting an average of five months for an appointment, and the services were only available to the severely obese. [35] A further issue is that only three services perform in-house appraisals to determine the effectiveness of their treatment regime. [35]

Discussion

This review highlights the poorer physical and social outcomes of obese Australian children. The findings emphasise the need for effective management strategies to reduce the current rates of obesity amongst younger Australians. However, data on the management of obese Australian children is lacking.

Out of the publications discussed, all six articles initiating intervention failed to delineate the outcomes of obese children from non-obese overweight children. This was an unexpected finding for several reasons: childhood obesity is more detrimental than being overweight, obesity is prevalent amongst Australian children and notably, the Australian government's recent commitment to reducing obesity. Additionally, if populations were stratified into obese or non-obese, the efficacy of studies may have been more favourable.

GPs have access to a large proportion of Australian school children each year. Ideally, general practices could be used as a gateway to identify, treat and refer children whom are obese. Studies have illustrated that there are many limitations in the ability of GPs to manage obese children, including identification, practitioner willingness, time and financial constraints. [24-27]

There remains scarce evidence for GP mediated programs, with the only intervention identified failing to be efficacious. More interventions assessing the effectiveness of GPs managing childhood obesity should be undertaken. Additionally, further funding and education should be provided to GPs to encourage them to identify and manage obese children.

Wake *et al.* (2008) illustrated that implementing GP-based programs is expensive for both families and the health care sector. [31] Given that children from lower socioeconomic backgrounds are more likely to be obese than affluent children, this could prove to be an overwhelming barrier to receiving GP-managed obesity therapy.

Programs run in the community focusing on parent-centred dietary changes and children increasing physical exercise can be successful in reducing the weight of obese children. [32,33] Despite being labour intensive and requiring specialised staff, community-based initiatives can have long-term reduction in the level of obese children. Further

References

- [1] Batch JA, Baur LA. Management and prevention of obesity and its complications in children and adolescents. *Med J Aust.* 2005;182:130-5.
- [2] Popkin BM. Recent dynamics suggest selected countries catching up to US obesity. *Am J Clin Nutr.* 2010;91(1):284S-8S.
- [3] Booth ML, Dobbins T, Okely AD, Denney-Wilson E, Hardy LL. Trends in the prevalence of overweight and obesity among young Australians, 1985, 1997, and 2004[ast]. *Obes.* 2007;15(5):1089-95.
- [4] Booth ML, Okely AD, Denney-Wilson E, Hardy L, Yang B, Dobbins T. NSW schools physical activity and nutrition survey (SPANS) 2004: Summary report. Sydney: NSW Department of Health. 2006.
- [5] National Obesity Taskforce. National obesity taskforce overview 2005. Canberra: Australian Government. December 2005.
- [6] Overweight and obesity prevalence for children (International classification and National

investigation utilising the HICKUP trial method should be undertaken to determine the specific outcome of obese children.

While it is encouraging that some publications are available on school-based initiatives, data remains rare. Peralta *et al.* (2009) have shown that weight management programs can be operated in schools; however, this intervention did not reduce BMI. [34] Schools have regular access to children and could encourage exercise through a variety of avenues including physical education lessons, lunchtime games, extracurricular activities, as well as provide educational sessions. As a result, school-based programs could be efficacious in reducing the number of obese school children.

Obesity management services at tertiary hospitals are scarce within Australia. These services should evaluate the efficacy of their approaches and make these findings available to the community, so that lessons learnt from these programs can be applied to other intervention strategies.

Limitations

In total, thirteen publications were reviewed for this summary. The literature considered could have been expanded by inclusion of data from other developed countries. This was not undertaken as the Australian community operates under a unique healthcare system. Using a broader range of search engines, such as EMBASE, may have identified further data. This study reviewed several publications that used convenience sampling, leading to the possibility of volunteer bias and the ultimate skewing of data. In addition, many of the publications investigated a subset of the childhood population. None of the 13 publications utilised the 4 to 18 year age range. As a result, some of the evidence may not be able to be applicable to this wider population.

Conclusion

This review has considered the existing Australian literature on childhood obesity interventions. Obese children are at an increased risk of detrimental health outcomes when compared with their peers. It is vitally important that effective interventions are developed to reduce childhood obesity in Australia.

Current evidence on the effectiveness of interventions is lacking. Present intervention trials using GP, community, and school-based management should delineate between overweight and obese children. Further research in each of these areas should be undertaken, to better determine their effectiveness. Similarly, tertiary hospital-based programs should be expanded to cater for a wider population of obese children. Each of these strategies requires further funding as well as commitment from the Australian government, practitioners, and community.

Conflict of interest

None declared.

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Correspondence

D R McMullen: danielle.mcmullen@student.unsw.edu.au

BMI percentiles), by age and sex. [Internet] 2002 [cited 2010 20th September]. Available from: <http://www.iotf.org/popout.asp?linkto=http://www.archive2.official-documents.co.uk/document/deps/doh/survey02/hcyp/tables/hcyp159.htm>.

[7] Cinelli RL, O'Dea JA. Body image and obesity among Australian adolescents from indigenous and anglo-european backgrounds: Implications for health promotion and obesity prevention among Aboriginal youth. *Health Edu Res.* 2009;24(6):1059-68.

[8] O'Dea JA. Gender, ethnicity, culture and social class influences on childhood obesity among Australian schoolchildren: Implications for treatment, prevention and community education. *Health Soc Care Community.* 2008;16(3):282-90.

[9] Wake M, Hardy P, Canterford L, Sawyer M, Carlin JB. Overweight, obesity and girth of Australian preschoolers: Prevalence and socio-economic correlates. *Int J Obes.* 2006;31(7):1044-51.

[10] Gibson LY, Byrne SM, Davis EA, Blair E, Jacoby P, Zubrick SR. The role of family and

maternal factors in childhood obesity. *Med J Aust.* 2007;186:591-5.

- [11] Cretikos MA, Valenti L, Britt HC, Baur LA. General practice management of overweight and obesity in children and adolescents in Australia. *Med Care.* 2008;46(11):1163-9.
- [12] O'Dea J, Dibley M. Obesity increase among low SES Australian school children between 2000 and 2006: Time for preventive interventions to target children from low income schools? *Int J Public Health.* 2010;55(3):185-92.
- [13] O'Dea JA, Wilson R. Socio-cognitive and nutritional factors associated with body mass index in children and adolescents: Possibilities for childhood obesity prevention. *Health Educ Res.* 2006;21(6):796-805.
- [14] Renzaho AMN, Swinburn B, Burns C. Maintenance of traditional cultural orientation is associated with lower rates of obesity and sedentary behaviours among African migrant children to Australia. *Int J Obes.* 2008;32(4):594-600.
- [15] Timperio A, Salmon J, Telford A, Crawford D. Perceptions of local neighbourhood environments and their relationship to childhood overweight and obesity. *Int J Obes.* 2005;29(2):170-5.
- [16] Crawford DA, Timperio AF, Salmon JA, Baur L, Giles-Corti B, Roberts RJ *et al.* Neighbourhood fast food outlets and obesity in children and adults: The CLAN study. *Int J Pediatr Obes.* 2008;3(4):249-56.
- [17] Williams J, Wake M, Hesketh K, Maher E, Waters E. Health-related quality of life of overweight and obese children. *JAMA.* 2005;293(1):70-6.
- [18] Venn AJ, Thomson RJ, Schmidt MD, Cleland VJ, Curry BA, Gennat HC *et al.* Overweight and obesity from childhood to adulthood: A follow-up of participants in the 1985 Australian schools health and fitness survey. *Med J Aust.* 2007;186(9):458-60.
- [19] Denney-Wilson E, Hardy LL, Dobbins T, Okely AD, Baur LA. Body mass index, waist circumference, and chronic disease risk factors in Australian adolescents. *Arch Pediatr Adolesc Med.* 2008;162(6):566-73.
- [20] Allen KL, Byrne SM, La Puma M, McLean N, Davis EA. The onset and course of binge eating in 8- to 13-year-old healthy weight, overweight and obese children. *Eat Behav.* 2008;9(4):438-46.
- [21] Franklin J, Denyer G, Steinbeck KS, Caterson ID, Hill AJ. Obesity and risk of low self-esteem: a statewide survey of Australian children. *Pediatrics.* 2006;118(6):2481-7.
- [22] Sawyer MG, Miller-Lewis L, Guy S, Wake M, Canterford L, Carlin JB. Is there a relationship between overweight and obesity and mental health problems in 4- to 5-year-old Australian children? *Ambul Pediatr.* 2006;6(6):306-11.
- [23] Morgan PJ, Okely AD, Cliff DP, Jones RA, Baur LA. Correlates of objectively measured

physical activity in obese children. *Obes.* 2008;16(12):2634-41.

- [24] Gerner B, McCallum Z, Sheehan J, Harris C, Wake M. Are general practitioners equipped to detect child overweight/obesity? Survey and audit. *J Paediatr Child Health.* 2006;42(4):206-11.
- [25] King LA, Loss JHM, Wilkenfeld RL, Pagnini DL, Booth ML, Booth SL. Australian GPs' perceptions about child and adolescent overweight and obesity; the weight of opinion study. *Br J Gen Pract.* 2007;124-9.
- [26] Dettori H, Elliott H, Horn J, Leong G. Barriers to the management of obesity in children: a cross sectional survey of GPs. *Aust Fam Physician.* 2009;38(6):460-4.
- [27] McMeniman E, Moore R, Yelland M, McClure R. Childhood obesity: how do Australian general practitioners feel about managing this growing health problem? *Aust J Prim Health.* 2011;17(1):60-5.
- [28] Spurrier NJ, Magarey A, Wong C. Recognition and management of childhood overweight and obesity by clinicians. *J Paediatr Child Health.* 2006;42:7-8.
- [29] Gerner B, Sancil L, Cahill H, Ukoumunne OC, Gold L, Rogers L *et al.* Using simulated patients to develop doctors' skills in facilitating behaviour change: Addressing childhood obesity. *Med Educ.* 2010;44(7):706-15.
- [30] McCallum Z, Wake M, Gerner B, Baur L, Gibbons K, Gold L *et al.* Outcome data from the LEAP (live, eat and play) trial: A randomised controlled trial of a primary care intervention for childhood overweight/mild obesity. *Int J Obesity.* 2007;31:630-6.
- [31] Wake M, Gold L, McCallum Z, Gerner B, Waters E. Economic evaluation of a primary care trial to reduce weight gain in overweight/obese children: The LEAP trial. *Ambul Pediatr.* 2008;8(5):336-41.
- [32] Collins CE, Okely AD, Morgan PJ, Jones RA, Burrows TL, Cliff DP *et al.* Parent diet modification, child activity, or both in obese children: An RCT. *Pediatr.* 2011;127(4):619-27.
- [33] Okely AD, Collins CE, Morgan PJ, Jones RA, Warren JM, Cliff DP *et al.* Multi-site randomised controlled trial of a child-centered physical activity program, a parent-centered dietary-modification program, or both in overweight children: The HIKCUPS study. *J Pediatr.* 2010;157(3):388-94.
- [34] Peralta LR, Jones RA, Okely AD. Promoting healthy lifestyles among adolescent boys: the fitness improvement and lifestyle awareness program RCT. *Prev Med.* 2009;48(6):537-42.
- [35] Spilchak PJ, Denney-Wilson E, King L, Baur LA. Tertiary paediatric obesity services in Australia. *J Paediatr Child Health.* 2008;44(5):243-7.

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