

Obesity in Children, Causes and Possible Solutions¹

Luma M. Al-Obaidy*, Heba M. Attash, Shahad M. Khaleel

College of Pharmacy, University of Mosul, Mosul, Iraq

*email: l.m.saadallah@uomosul.edu.iq

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ABSTRACT

Background: One of the most significant public health issues of the twenty-one century was obesity. It may start in childhood and persist during adult life. Several causes including endogenous and exogenous factors are contributing to an increase in weight and obesity. The paper presents a review of previously published articles that studied obesity in children and summarizes several registered clinical trials that applied specific physical activity and diet programs to decrease weight among obese children. **Method:** Papers were gathered using the keywords "Obese", "Overweight" and "Children". Google Scholar and PUBMED were used as a searching engines to gather scientific articles associated with the subject. **Results:** There are many causes of obesity in children. However, adapting to healthy life-style and programmed physical activities may decrease weight among obese children. **Conclusion:** There is an urgent need for interventions that can effectively manage and prevent pediatric obesity.

Keywords: Obesity, Children, Overweight, Obesity causes, Intervention

INTRODUCTION

Obesity represents a modern life problem that developed at a young life. More than one in five kids in the United Kingdom (UK) were overweight when they started school [1]. Politicians and health practitioners are worried about the exponential increase in the number of obese and overweight children [2]. In the past, an obese child was categorized as a healthy child. However, nowadays health care professionals, parents and kids all have serious concerns about it. The dangers of childhood obesity frequently continued in-to adolescence and adult life [3]. Obesity is a significant health issue since it increased the risk of problems during childhood and also it increased the death rate and morbidity in adulthood life [4]. Given the enormous effects of obesity on acute and chronic illnesses, and physical and growth wellbeing, so preventing obesity in

children is a primary objective in the field of public health internationally [5]. Children's well-being as well as their psychology were strongly linked to obesity [6]. The psychological and social factors are often adversely affected by the onset and persistence of obesity. When a Child's Psychological performance is affected, children are seemed to be more likely to experience psychological defects including low self-esteem, feelings of shame from body image, anxiety and depressed mood, which can adversely affect the life quality and increase their risk of having dental caries and attention-deficit syndrome [3,1]. Obesity may remain in adult life and correlate with a higher likelihood of several physical problems such as heart disease, asthma, chronic liver failure and some types of cancer [1, 6]. It has been predicted that more than half of all overweight children aged five to ten years

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exhibit at least one physiological heart disease risk factor [7].

In comparison to adulthood obesity, the prevalence of obesity in children is believed to be less common. However, the rate of increasing childhood obesity is significantly higher than that's for adult obesity in many regions all over the world [6]. According to studies from different countries, children's overweight and obesity rates began to increase at the end of 1980. In 2010, there were 43 million overweight or obese children under the age of five, including 35 million of them lived in low and moderate-income states. Although, there is a fact of decreasing or slowing down obesity in some age groups, the prevalence of childhood obesity is still rising globally [5]. According to a study done by The National Health and Nutrition Examination Survey (NHANES), in the years between 1999 to 2002, around a third of children over two years old years and less than a quarter of children aged between six and nineteen years old were obese and overweight. Many variables may increase the risk of children developing obesity like race, gender, maternal education level and socioeconomic status [4]. Approximately 110 million young adults and children were considered to be obese according to reports registered in 2015 [6]. After smoking, obesity is the second factor that caused death and affected the economic status of the United States (US), and caused a loss of more than one hundred billion dollars per year [7].

Fast food is widely available in the US and correlates with the poorer nutritional quality and impaired health in both children and adults. To achieve and sustain good health, kids require parents to teach them healthy eating behaviours by introducing them to healthy meals and serving as positive role models [8]. Multinational approaches were applied by authorities as a defensive response against Coronavirus disease 2019 (COVID-19), including suggestions of social isolation, lockdowns, travel restriction and school closing to limit the spread of the virus and reducing pressure on the healthcare system. However, these approaches may associate with weight gain [9]. Three important groups of temporal techniques for the management of obesity include lifestyle modifications, medicinal therapy as well as surgical

intervention [10]. However, these strategies were expensive, cannot be used widely and may have serious effects. For such cases, early detection and management of obesity are preferable to delayed approaches of treatment [6]. This narrative review aims to gather and summarize the previously published studies about obesity in children, to identify their specific causes and suggest solutions for this important public health problem.

METHODS

In this narrative review, several published papers about childhood obesity were gathered using the keywords "obesity", "children", and "overweight". Both PUBMED and Google scholar were applied as the search engines. The authors included only the scientific articles that were published in English language, arranged and summarized these papers to give a comprehensive review about the etiology of obesity and its prevention among children. Ethical approval was not obtained since it was a review article.

CAUSES OF OBESITY

Unbalanced energy is the main cause of obesity. However, obesity may result from the combination of both genetics as well as environmental factors [1]. Whereas body mass index (BMI) is the easiest method for identifying overweight and obese children, it does not always recognize whether individuals have abdominal fat deposits which put them at higher risk of health concerns [2]. Since lifestyle is the major cause of adult obesity, developmental characteristics have newly been found to be significant early-life contributors. Infants nutrition, fast early growing (upward centile-crossing), less healthy food diet habits and eating behaviours are the factors most significantly related to weight gain [1]. Obesity risk is lower when an infant is breastfeeding. This could be probably because breastfed babies grow more slowly than formula-fed babies. Infant formula contained more protein and energy than breastfeeding and bottle-fed infants take more amount of milk than breastfeed, which contributes to higher growth in formula feed babies. The prevention of the development of obesity is influenced by responsive breastfeeding and formula-feeding, in which the mother reacts correctly

to her baby's hungry and satisfaction senses [1,10]. A sedentary lifestyle and reduced physical activity such as the use of electronic devices including social media, video games on (computers, tablets and phones) and televisions, are significantly connected with a higher risk of chronic diseases such as overweight. In many states like the UK, it is advised that all preschool kids be physically active for at least three hours a day, and also those school-aged kids should participate in activities of moderate to strong levels for a minimum of one hour daily. However, many kids do not achieve these objectives [1]. The results of sixteen randomized clinical trials done in different countries around the world among children aged from zero to five years old showed that interventions including specific physical activities and reduced diet have a moderate effect in reducing BMI when compared to control [5]. Childhood obesity rates may rise correspondingly to the number of months that schools are locked down, as has been previously reported. Children and adolescents gain weight during the summer. A study conducted during the COVID-19 pandemic by Stavridou et al, 2021, concluded that if schools do not return, more one million cases of children obesity will be reported[9]. During holidays, individuals changed their eating habits and lifestyle, buying and consuming a lot of processed and preserved food. On the other hand, arise in sedentary behavior, electronic device usage and a reduction in physical activity could also be related with childhood obesity during those conditions[11]. To minimize childhood obesity both dietary reduction as well as programmed physical activities were recommended. In pre-school children between the age of zero and five, there is weak evidence that those children can experience lower obesity risk when food and exercise-related interventions are employed. The effect was the same when dietary control was applied to the children aged from six to twelve years old as well as to adolescents aged from 13 to 18 years old. However programmed physical activities and the combination of dietary control and increased physical activities were associated with a reduction in BMI in these age groups[5].

PREVENTION OF OBESITY

Pediatricians usually employed three strategies to control childhood obesity: pharmacological, lifestyle, as well as surgical interventions[10].

The best method for avoiding childhood obesity according to the UK National Institute for Health and Care Excellence (NICE), involves community-based multi-component programs that focus on nutrition, behavioural change and physical activities. These interventions work best with younger kids (below 6 years old)[4]. Programs can be obtained by self-referral or through primary care providers, and at least one additional member of the family should be included. Nevertheless, there are few evidence-based programs provided, and even fewer of them specifically target preschoolers. One program that promotes a healthy lifestyle, Planet Munch helps in lowering preschoolers' risk of obesity[1].

A most commonly recommended interventions in the plan relates to parents and childhood education, food product labelling, the establishment of dietary guidelines and recommendations, advice on meal sizes, support, guidance, and nutrition and health knowledge. The information attempts to modify the behaviours of both parents and kids appropriately. Moreover, the concept is that a parent or caregiver who is well educated will accept the responsibility and can modify their child's behaviour. This needs must be done for monitoring purposes so that population's developmental level will be followed. Numerous programs further recommended using early measurements as a way to detect and intervene concerning manage children who are currently obese or have a risk of obesity. Specific management programs to prevent and treat obese and overweight kids were recommended. In New Zealand, all kids diagnosed as obese at pre-school checks will be referred to a health professional for clinical diagnosis and make the possible interventions for activities and lifestyle as well as to start a family-based diet. Thus, all obese kids will be reached even if they knew nothing about their condition [2].

CLINICAL TRIALS ON CHILDHOOD OBESITY

Several clinical trials from different countries were summarized in this paper (Table 1). The inclusion criteria were: randomized, from the period between 2014 to 2018, involving both male and female children aged between 0 and 18 years. Some studies involved obese children while others involved children predispose to obesity. Studies other than clinical trials

as well as non-randomized clinical trials and trials that included only one gender children were excluded. The intervention involved the administration of a healthy diet and programmed activities and some studies involved behavioral changes versus normal diet and physical activities. The outcomes measured included body weight, BMI and fat deposition. Some of these clinical trials showed promising results while others fail to show the benefit of adaptive plans in reducing weight among obese children.

Table 1. Clinical trials associated with obesity in children

Reference, Country	Number	Ages	Duration	Interventions	Outcome	Comments
(Kharofa et al., 2015)[12] USA	181	2.5-14 y	6months	The standard diet and activity counselling were administered to both control and intervention groups. Intervention group was then asked to complete a specific Wellness Action Plan, where the specific diet and activities were recorded before and after programmed visits and during follow-up period(1 to 3 months)	The Wellness Action Plan was effective when used as a counselling tool to decrease body weight among the intervention group	This study is associated with a short follow-up period, also the studied sample population was obtained from the same ethnic group
(Farias et al., 2015)[13] Brazil	386 students	15-17 y	1year	The control group were subjected to normal physical activity, while the intervention group were subjected to programmed physical activities	The programmed physical activity encouraged adolescents to significantly reduce their weight	This study was associated with intervention for a long-term period and several variables other than BMI were measured
(Berry et al., 2014)[14] USA	358	7-10 y	18 months	Parents and children in the intervention group received two phases of exercise, nutrition, education and coping skill interventions, while those in the control group received usual care	Weight and BMI were not significantly decreased among the children in the experimental group, but their eating behaviour was significantly improved	Subjective measures were used in this trial, these measures were usually associated with bias
(Händel et al., 2017)[15] Denmark	307	2-6 y	15 months	Participants involved parents and children with normal weight who are prone to develop obesity. In the intervention group, participants met a healthcare consultant (10 visits), while participants in the control group had only 2 visits with a healthcare consultant (at the beginning and end of the study) The consultation involved methods to optimize diet, activity, sleep and stress pattern.	The findings imply that the Healthy Start intervention improved the length of time that normal weight and obesity-prone kids spent participating in sports and outdoor activities	This research was associated with selection bias, but it may provide promising results to prevent obesity among children in future
(Martínez-Vizcaíno et al., 2020)[16] Spain	4-7 y	2407	1y	The intervention group received physical activity program and specific teaching skills for parents, while the control group received no intervention	There was no significant improvement in BMI between the two groups, but muscular strength was increased among the intervention group	This study has the advantage of a large sample size
(Li et al., 2019)[17] China	6-7 y	1622	1y	The studied groups were allocated to the usual practice (control group) or intervention arm where specific diet and programmed physical activity and behavioural change techniques were applied to them.	The intervention was highly effective in reducing BMI among the intervention group.	The study involved a large number of children in non-western countries

CONCLUSION

Obesity in children was one of the most significant health issues around the world. Many factors were associated with obesity among children such as reduced physical activities, unhealthy diet, in addition to some genetic diseases. To decrease obesity among children, an adaptation to a healthy life-style (including diet and physical activities) was recommended. Several trials were done to evaluate the effect of specific action plans involving programmed activities and diet to decrease weight among obese children. Some of these plans were effective while others were not. However, this may provide a suggestion for further research in this aspect.

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REFERENCES

- Lanigan J, Tee L, Brandreth R. Childhood obesity. *Medicine (United Kingdom)*. 2019;47(3):190-194. doi:10.1016/j.mpmed.2018.12.007.
- Vallgård S. Childhood obesity policies – mighty concerns, meek reactions. *Obesity Reviews*. 2018;19(3):295-301. doi:10.1111/obr.12639.
- Sagar R, Gupta T. Psychological Aspects of Obesity in Children and Adolescents. *Indian Journal of Pediatrics*. 2018;85(7):554-559. doi:10.1007/s12098-017-2539-2.
- Abraham RJ, Pillai PC. Survey of obesity among school children in rural Kerala, India. 2019;6(6):2413-2418.
- Brown T, Moore TH, Hooper L, et al. Interventions for preventing obesity in children. *Cochrane Database of Systematic Reviews*. 2019;2019(7). doi:10.1002/14651858.CD001871.pub4.
- Bussiek PBV, De Poli C, Bevan G. A scoping review protocol to map the evidence on interventions to prevent overweight and obesity in children. *BMJ Open*. 2018;8(2):1-6. doi:10.1136/bmjopen-2017-019311.
- Robinson TN, Sirard JR. Preventing childhood obesity: A solution-oriented research paradigm. *American Journal of Preventive Medicine*. 2005;28(2 SUPPL. 2):194-201. doi:10.1016/j.amepre.2004.10.030.
- Fulkerson JA. Fast food in the diet: Implications and solutions for families. *Physiology and Behavior*. 2018;193(2017):252-256. doi:10.1016/j.physbeh.2018.04.005
- Pandemic C, Stavridou A, Kapsali E, et al. Obesity in Children and Adolescents during COVID-19 Pandemic. Published online 2021:1-16.
- Vasileva L V., Marchev AS, Georgiev MI. Causes and solutions to “globesity”: The new fa(s)t alarming global epidemic. *Food and Chemical Toxicology*. 2018;121(May):173-193. doi:10.1016/j.fct.2018.08.071
- Or Caspi, Michael J. Smart RBN. Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-. *Ann Oncol*. 2020;(January):19-21.
- Kharofa RY, Copeland KA, Sucharew H, Meurer JR. Randomized controlled trial of a Wellness Action Plan to promote healthy diet and activity in pediatric primary care. *Preventive Medicine Reports*. 2015;2(October):899-905. doi:10.1016/j.pmedr.2015.10.008
- Farias EDS, Gonçalves EM, Morcillo AM, Guerra-Júnior G, Amancio OMS. Effects of programmed physical activity on body composition in post-pubertal schoolchildren. *Jornal de Pediatria*. 2015;91(2):122-129. doi:10.1016/j.jped.2014.06.004.
- Berry DC, Schwartz TA, McMurray RG, et al. The family partners for health study: A cluster randomized controlled trial for child and parent weight management. *Nutrition and Diabetes*. 2014;4(JANUARY):e101-9. doi:10.1038/nutd.2013.42.
- Händel MN, Larsen SC, Rohde JF, Stougaard M, Olsen NJ, Heitmann BL. Effects of the Healthy Start randomized intervention trial on physical activity among normal weight preschool children predisposed to overweight and obesity. *PLoS ONE*. 2017;12(10):1-14. doi:10.1371/journal.pone.0185266.
- Martínez-Vizcaíno V, Pozuelo-Carrascosa DP, García-Prieto JC, et al. Effectiveness of a school-based physical activity intervention on adiposity, fitness and blood pressure: MOVI-KIDS study.

British Journal of Sports Medicine.
2020;54(5):279-285. doi:10.1136/bjsports-2018-099655.

17. Li B, Pallan M, Liu WJ, et al. The CHIRPY DRAGON intervention in preventing obesity in Chinese primary school-aged children: A cluster-randomised controlled trial. *PLoS Medicine.* 2019;16(11). doi:10.1371/journal.pmed.1002971.